Volume I

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Final Environmental Impact Statement
for
the Proposed

York County Energy Partners Cogeneration Facility

York County, Pennsylvania

DEPARTMENT OF ENERGY • UNITED STATES OF AMERICA •

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Volume I

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CHANGES TO THE DEIS ARE SHOWN
IN A ***BOLDFACE ITALICS FONT***
IN THIS FEIS.

COVER SHEET

LEAD AGENCY

United States Department of Energy (DOE)

TITLE

Final Environmental Impact Statement for the Proposed York County Energy Partners Cogeneration Facility; North Codorus Township, Pennsylvania

CONTACT

Additional copies or information concerning this ***Final*** Environmental Impact Statement (***FEIS***) can be obtained from Dr. ***Jan K. Wachter***, Environment, Safety and Health Program Support Division, United States Department of Energy, Morgantown Energy Technology Center, P.O. Box 880, 3610 Collins Ferry Road, Morgantown, WV 25607-0880. Telephone: (304) 285-***4607***.

ABSTRACT

This ***FEIS*** has been prepared by the DOE in compliance with the National Environmental Policy Act (NEPA) to assess the environmental and human health impacts associated with the York County Energy Partners (YCEP) Cogeneration Facility at the North Codorus Township site. ***This is*** a proposed demonstration project that would be cost-shared by DOE [under DOE's Clean Coal Technology (CCT) Program] and YCEP, a project company wholly-owned by Air Products and Chemicals, Inc. The goal of the CCT Program is to demonstrate advanced coal utilization technologies that are energy efficient and reliable and that are able to achieve substantial reductions in emissions ***when*** compared ***to*** conventional coal technologies.

The proposed Federal action is for DOE to provide cost-shared funding of $75 million (approximately 20 percent of the project cost) to YCEP for the construction of a utility-scale circulating fluidized bed (CFB) technology cogeneration facility to be located in North Codorus Township, York County, Pennsylvania. The overall purpose of the proposed project would be to demonstrate the commercial viability of using utility-scale CFB technology in a cogeneration facility to generate electric power and steam. YCEP would design, construct, and operate a 250-megawatt (MW) gross (227-MW net) coal-fired cogeneration facility on a 38-acre (15.4 hectare) parcel in North Codorus Township adjacent to the P. H. Glatfelter Company Roundwood Facility and across Codorus Creek from the P. H. Glatfelter Company paper mill. The P. H. Glatfelter Company would purchase up to 400,000 lbs/hr of the steam generated by the project, and the electricity produced (227 MW net) would be purchased and delivered to Metropolitan Edison ***Company*** (Met-Ed), a local utility company. The purchase of steam supplied by the proposed facility would enable the P. H. Glatfelter Company to place the use of its Power Boiler No. 4 on "hot standby" and would allow no more than 720 hours/year of simultaneous operation with the proposed facility ***under a federally enforceable permit***. The proposed facility would be designed to operate continuously (24 hours a day, 365 days per year), with the exception of outages for maintenance. The proposed facility operation would include a 24-month demonstration period, followed by approximately 23 years of commercial operation, for a total expected operational life of 25 years. In addition, the proposed project would require the construction of a new 115 kilovolt (kV) interconnection power line and electrical ***switchyard***. The ***switchyard*** would be ***placed near*** an existing Met-Ed owned substation located approximately 6.5 km (3.8 miles) northeast of the proposed facility.

This document provides a detailed description of existing conditions at the proposed site, an alternative site, and the surrounding area. Inclusion of issues was based on both the public comments received through the public scoping ***and public hearing processes*** and the requirements under ***the National Environmental Policy Act*** (NEPA) for full public disclosure. The most detailed analyses focus on the level of impacts that could be expected to air quality, water resources, human health and safety, socioeconomic resources, traffic, and noise. This ***FEIS*** also examines solid waste, land use, biological resources and biodiversity, hazardous/toxic materials and waste, geology and soils, historical and cultural resources, pollution prevention, environmental justice, aesthetics, wetlands, cumulative impacts, and proposed mitigation. ***In response to public and agency comments, various additions or clarifications have been incorporated into the FEIS. These include the following: the presentation and comparison of actual (expected) emissions from the proposed plant and P. H. Glatfelter Company's Power Boiler No. 4, including carbon monoxide and volatile organic compounds; the recalculation of radionuclide emissions from the proposed project, an estimation of radionuclide emissions from P. H. Glatfelter Company's Power Boiler No. 4, and a reassessment of health effects due to radionuclides; the revision of the health risk assessment section to incorporate and analyze the reports received by DOE from York County medical societies and the EPA (Region 3) that investigated the association between health*** *effects and air pollution (especially for particulates); a more expansive discussion on the effects of electromagnetic fields associated with the utility corridor and, in particular, the electric switchyard addition to Bair substation; a discussion of odor associated with the use of P. H. Glatfelter Company's wastewater as cooling tower make-up water; a discussion explaining the modeling conducted and the meteorological data used to predict icing and fogging events from the cooling tower for the proposed project; an enhanced discussion about the specific atmospheric circulating fluidized bed technology that would be demonstrated by the proposed project and the commercialization status of that technology in general; a more extensive discussion on the environmental analyses conducted for the various utility corridor routes examined; a discussion on the results of a historical resources survey conducted for the proposed project and its utility corridor; the analysis of a new no-action sub-alternative (if the proposed project would not be funded, Met-Ed would purchase excess electricity on the open market in the short term as an energy management strategy); a more expanded analysis of the need for power; and a discussion of exceedances of environmental regulations and guidelines, especially as related to water quality criteria.*

AVAILABILITY

The *FEIS* and technical support documents will be available for public inspection in the following public *reading rooms (Appendix A)*:

- United States Department of Energy, Freedom of Information Public Reading Room, Room 1E-190, 1000 Independence Ave., SW, Washington, DC 20585 (202) 586-6020

- Glatfelter Memorial Library, 101 Glenview Rd., Spring Grove, PA 17362 (717) 225-3220.

- York County Library, 118 Pleasant Acres Rd., York, PA 17401 (717) 757-9685.

- York County Courthouse ***Law Library***, 28 E. Market St., York, PA 17401 (717) 771-9675.

- United States Department of Energy Library, Morgantown Energy Technology Center, 3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507-0880 (304) 285-4184 Attention: Mr. Matt Marsteller.

PUBLIC COMMENTS

DOE encourages public participation in the NEPA process. Accordingly, public scoping meetings were held on August 19, 1993, at the North Codorus Township Fire Company Auditorium in North Codorus Township, PA. The public was invited to provide oral comments at the scoping meeting and to submit additional comments in writing to DOE by the close of the scoping period on September 15, 1993. In response to the degree of public interest in this proposed Federal action, and to ensure that all individuals who wished to present oral comments were accommodated, the public scoping meeting was continued on October 5, 1993. Additionally, the public comment period was extended to November 5, 1993, to allow the public adequate time after the continuation scoping meeting to submit written comments. In preparing the DEIS, DOE considered both oral and written comments. ***Public hearings on the DEIS were held at the York Fairgrounds, Old Main Building, in York, PA, on December 14, 15, and 16, 1994. A continuation public hearing was held on January 18, 1995. The public was invited to provide oral comments at the hearings and to submit written comments to DOE by the close of the public comment period which had been extended to January 31, 1995 (the original closing date, January 10, 1995, was extended due, in part, to the high degree of public interest in this proposed project). In preparing the FEIS, DOE considered approximately 900 oral and written comments. Copies of the comments and their responses are provided in Volumes II and III of this document. All communication should be sent to the contact person identified above.***

All changes in this FEIS, including the correction of typographic errors, addition of grammatical improvements, and clarification of information from the DEIS, are indicated with bold italic type. To enhance document readability, if an entire table or appendix consists of new material, only the title is placed in boldface italics font. Two new appendices have been added to the end of the document. Appendix K contains DOE's independent analysis of the need for power. Appendix L provides information related to DOE's estimation of radionuclide emissions from the proposed project. A summary of the major changes made to each chapter since the issuance of the DEIS is included at the beginning of each chapter.

EXECUTIVE SUMMARY

This ***Final*** Environmental Impact Statement (***FEIS***) has been prepared by the United States Department of Energy (DOE) in compliance with the National Environmental Policy Act (NEPA) to assess the environmental and human health impacts associated with the York County Energy Partners (YCEP) Cogeneration Facility at the North Codorus Township site. ***This is*** a proposed demonstration project that would be cost-shared by DOE [under DOE's Clean Coal Technology (CCT) Program] and YCEP, a project company wholly-owned by Air Products and Chemicals, Inc. The goal of the CCT Program is to demonstrate advanced coal utilization technologies that are energy efficient and reliable and that are able to achieve substantial reductions in emissions ***when*** compared ***to*** existing coal technologies.

DOE determined that providing cost-shared Federal funding support for this proposed project constitutes a major Federal action that may significantly affect the human environment. Consequently, DOE has prepared this ***FEIS*** to assess potential impacts on the affected human and natural environments. This document has been prepared in accordance with Section 102(2)(c) of NEPA as implemented under regulations promulgated by the President's Council on Environmental Quality (CEQ) (40 CFR Parts 1500-1508), and as provided in DOE regulations for implementing NEPA (10 CFR Part 1021).

This ***FEIS*** represents the third and final element of DOE's overall NEPA strategy developed for the CCT Program. The first element involved the preparation of a comprehensive Programmatic Environmental Impact Statement, published in November 1989 *(DOE/EIS-0146)*. The second element involved conducting a pre-selection, project-specific, environmental review of proposed projects for consideration during the DOE selection process. This ***FEIS*** evaluates three alternatives in detail: the proposed action, which is to fund the project as proposed; the alternative site, which is to fund a similar project at another similar location; and the no-action alternative, which is not to provide funding for the proposed YCEP Cogeneration Facility. Any other alternative that would not achieve the objectives of the CCT Program would not be within the scope of this document.

Section 102 of NEPA requires that Federal agencies discuss the reasonable alternatives to the proposed action in an Environmental Impact Statement (EIS). The term "reasonable alternatives" is not self-defining, but rather must be determined in the context of the statutory purpose expressed by the underlying legislation. The goals of the "Federal action" requiring the EIS establish the limits of its reasonable alternatives. Congress established a very specific goal for this first phase of the CCT Program: to demonstrate innovative, energy-efficient coal technologies. DOE's purpose in selecting the

YCEP Project is to demonstrate large-scale, single boiler CFB cogeneration technology, while incorporating a pollution control train consisting of selective non-catalytic reduction for reducing emissions of oxides of nitrogen (NO_x) and a baghouse for reducing emissions of particulates (PM_{10}). Reasonable alternatives to this proposed action must be capable of meeting this purpose.

DOE recognizes that a wide range of options are available that could be considered as alternative actions to replace or augment the CCT Program. These options include nuclear energy, natural gas, renewable energy sources, and conservation. DOE has provided extensive support toward developing and demonstrating the benefits of alternative fuels, renewable forms of energy, and conservation. However, these alternatives would not achieve the goals of the CCT Program and consequently are beyond the scope of this document. Alternative coal-fired technologies were evaluated as part of the CCT Program's overall strategy for compliance with NEPA. Alternative coal-based technologies proposed by other participants that were selected for demonstration are subject to separate site-specific environmental analyses. These projects are not alternatives to one another.

The proposed YCEP project was selected to demonstrate a particular type of technology -- atmospheric CFB technology at utility scale (200 MW or larger) -- that other CCT projects would not achieve. DOE's role is limited to providing cost-shared Federal funding support for YCEP's proposed project. As such, the range of alternatives that meet the goals of such demonstration is narrower because of the proposal selection process DOE must follow by law.

Congress has also directed DOE to pursue CCT goals established by legislation by means of partial funding of projects owned and controlled by non-federal government sponsors. This statutory requirement places DOE in a much more limited role than if the Federal government were the owner and operator of the project. In the latter situation, DOE would be responsible for a comprehensive review of reasonable alternatives for siting the project. However, in dealing with an industrial partner, the scope of alternatives is necessarily more restricted because DOE must focus on alternative ways to accomplish its purpose that reflect both the application before it and the functions it plays in the decisional process. It is appropriate in such cases for DOE to give substantial weight to the industrial partner's needs in establishing a project's reasonable alternatives.

This document provides a detailed description of existing conditions at the proposed site, the alternative site, and the surrounding area. Inclusion of issues was based on the public comments received through the public scoping ***and public hearing*** process*es* and the requirements under NEPA for full public disclosure. The scoping process yielded 614 separate written and oral comments, received through November 5, 1993. ***The public hearing process generated approximately 900 separate written and oral comments, received through January 31, 1995.*** In this ***FEIS***, the most detailed analyses focus on the level of expected impacts to air quality, water resources, human health and safety, socioeconomic resources, traffic, and noise. Solid waste, land use, biological resources and biodiversity, hazardous/toxic materials and waste, geology and soils, historical and cultural resources, pollution prevention, environmental justice, aesthetics, wetlands, and cumulative impacts are also examined in this ***FEIS***.

Proposed Action. The proposed Federal action is for DOE to provide cost-shared funding of $75 million (approximately 20 percent of the project cost) to YCEP for the design, construction, and operation of a nominal 250-megawatt (MW), coal-fired, cogeneration facility to demonstrate circulating fluidized bed (CFB) technology. The proposed facility would be designed to operate continuously (24 hours a day, 365 days per year), with the exception of outages for maintenance purposes. Operation of the proposed facility would include a 24-month demonstration period, followed by approximately 23 years of commercial operation, for a total expected operational life of 25 years. The ***proposed*** YCEP Cogeneration Facility would include an atmospheric CFB boiler and a pollution control system consisting of a baghouse to control emissions of particulates (PM_{10}), selective non-catalytic reduction for reducing emissions of oxides of nitrogen (NO_x), and limestone injection for reducing emissions of sulfur dioxide (SO_2).

The major subsystems and key components of the proposed facility are listed below:

- an enclosed coal unloading building and storage area;
- limestone and ash storage silos;
- raw water and condensate tanks;
- a boiler room building housing the CFB boiler;
- a turbine bay;
- a switchyard;
- a baghouse to collect particulate matter generated by the process;
- a stack equipped with a continuous emissions monitoring system; and
- a cooling tower.

In addition, the proposed project would require the construction of a new 115 kilovolt (Kv) interconnection power line and ***electric switchyard*** adjacent to a substation owned by Metropolitan Edison ***Company*** (Met-Ed) and located approximately 6.5 kilometers (km), or 3.8 miles, northeast of the site.

The proposed facility would be constructed on a 38-acre (15.4-hectare) parcel of land in North Codorus Township, York County, Pennsylvania, bounded by State Route 116 to the south, the P. H. Glatfelter Company Roundwood Facility (a processing area for incoming logwood) to the west, and by Kessler Pond, the mill pond (an impoundment of the Codorus Creek), and Codorus Creek to the east and north. Several small commercial establishments and a cluster of eight residences are located along Route 116 south of the site; however, the proposed site is undeveloped and currently used for recreational and agricultural purposes. The parcel of land delineated as the proposed site is currently owned by the P. H. Glatfelter Company, and would be purchased by YCEP.

As a benefit of the ***cogeneration aspect of the*** proposed project, the P. H. Glatfelter Company would curtail operation of one of their existing coal-fired boilers, Power Boiler No. 4, which would be placed on hot stand-by. "Hot stand-by" refers to the use of low-pressure steam to keep the boiler unit hot and readily available for use. No coal would be burned in Power Boiler No. 4 during hot stand-by periods since the required low-pressure steam would be generated by the proposed facility. During periods when the proposed YCEP ***Cogeneration Facility*** is down for maintenance, or other rare circumstances such as the loss of steam production from another ***of*** P. H. Glatfelter Company***'s*** power boiler***s***, Power Boiler No. 4 would operate to provide the steam supply necessary for mill operation. Power Boiler No. 4 would be limited through a federally enforceable permit to operate no more than 720 hours per year [or the operating equivalent of 720 hours of oxides of nitrogen (NO_x) emissions at full output] in parallel with the proposed YCEP facility. However, in the event that the proposed facility is not operating, Power Boiler No. 4 would be allowed to run without time constraints on operation.

The ***footprint of the*** proposed project would be located on an unzoned site, adjacent to an existing industrial use. Site geology and soils would not be expected to be adversely affected during construction. Air quality impacts during construction would be associated with dust from earth moving activities. Impacts are expected to be short-term and would be minimized by dust suppression techniques. Water demands during the construction phase would be adequately met by the local water supply company, the Spring Grove Water Company, and the P. H. Glatfelter Company. Stormwater runoff would be diverted to a stormwater retention pond to minimize potential impacts to Codorus Creek. Noise impacts associated with vehicles, machinery, and purging of the steam systems, would be short-term in duration. Steam system purging noise would be mitigated through use of steam vent silencers, citizen notification, scheduling, and by limiting testing episodes. No ***archeological*** resources are known to exist on the site, therefore, no impacts to these resources are expected. ***The area affected by the proposed project, including the Cogeneration Facility, utility corridors, and electric switchyard, was surveyed for historic resources. A total of 187 resources within the affected area were identified as being over 50 years old. Of this number, 11 individual resources and 4 historic districts were found to be eligible for listing in the National Register of Historic Places. The proposed project [including the 6.5 km (3.8 mile) interconnect] was determined to have an adverse visual effect on one eligible individual resource and one eligible district. DOE has entered into consultation with the Bureau for Historic Preservation to mitigate these adverse visual effects.***

The proposed facility would be required to comply with the provisions of the Clean Air Act (CAA) Amendments of 1990 (42 U.S.C. §§ 7401-7626). Under Title IV, Section 403 of the CAA Amendments ***of 1990***, all new electric utility sources which operate after January 1, 2000, are required to obtain sulfur dioxide ***(SO_2)*** allowances, which represent a limited authorization to emit sulfur dioxide (SO_2) in accordance with the provisions of the Title IV program. These allowances must be obtained from an existing baseline facility or facilities, and are designed to assure no net increase in sulfur dioxide (SO_2) emissions above a pre-established baseline. It is unlawful for a new electric-utility source to emit an annual tonnage of sulfur dioxide (SO_2) in excess of the allowances it holds; therefore, YCEP would be required to obtain the necessary sulfur dioxide ***(SO_2)*** allowances once final rules are promulgated by EPA.

Under Title I, Section 182, the Commonwealth of Pennsylvania has been included in an air quality area designated as the Northeast Ozone Transport Region (NOTR). Any major stationary source located in the NOTR with the potential to emit more than 100 tons/yr of oxides of nitrogen (NO_x) or 50 tons/yr of volatile organic compounds (VOCs) must offset these emissions by obtaining emissions reduction credits (ERCs) from existing baseline facilities in the surrounding area. The new source emissions must be offset by a ratio of 1.15 to 1 (which is equivalent to 115 percent) of the potential to emit. The proposed facility is subject to the oxides of nitrogen (NO_x) emission requirements because it has the potential to emit greater than 100 tons of oxides of nitrogen (NO_x) per year. The proposed new facility would not be subject to the volatile organic compound requirements since its potential to emit is less than 50 tons/yr of VOCs. These ERCs must be obtained by the proposed facility as part of the air quality permitting process. It is anticipated that offsets of oxides of nitrogen (NO_x) required by the CAA Amendments ***of 1990*** would be obtained from two sources in York County: the P. H. Glatfelter Company and the

Transcontinental Gas Pipe Line Corporation. As a result of actions taken at each of these two sources, ERCs would be created and transferred to YCEP. A total of 1,652 tons/yr of ERCs would be required by YCEP to provide a 1.15 to 1 offset of oxides of nitrogen (NO_x).

The proposed facility would be required to comply with Prevention of Significant Deterioration (PSD) provisions of the CAA. The PSD review requires a Best Available Control Technology (BACT) analysis. The BACT determination made in YCEP's PSD Permit Application includes a detailed technical analysis of the pollution control equipment being proposed.

The proposed YCEP facility would have a sulfur dioxide (SO_2) emissions level of 0.25 pounds per million Btu (lbs/MMBtu), a 92 percent reduction from the potential uncontrolled sulfur dioxide (SO_2) emissions level. This emissions level was confirmed based on a pilot plant test conducted by the boiler manufacturer using the coal and limestone materials expected to be used with the proposed project. Aqueous ammonia (NH_3) would be injected into the boiler exhaust stream to limit oxides of nitrogen (NO_x) emissions to 0.125 lbs/MMBtu and achieve a 40 percent or greater reduction from the potential uncontrolled oxides of nitrogen (NO_x) emissions. The proposed facility would include a fabric filter collection system (baghouse) used to control particulate matter (PM_{10}) emissions to 0.011 lbs/MMBtu and achieve a 99.9 percent or greater reduction from the potential uncontrolled particulate matter (PM_{10}) emissions. Both this and the aqueous ammonia control technology have been used on other CFB boilers and have been demonstrated to be technically feasible.

The CFB boiler is an efficient combustion process which limits carbon monoxide (CO) and VOC emissions through good combustion control practices. The proposed CFB boiler would have a carbon monoxide (CO) emissions level of 0.15 lbs/MMBtu and volatile organic compounds (VOCs) emissions level of 0.004 lbs/MMBtu. The proposed YCEP facility would provide sufficient high pressure steam to the P. H. Glatfelter Company mill to allow the curtailment in operations of the P. H. Glatfelter Company***'s*** Power Boiler No. 4, thereby creating ERCs ***for oxides of nitrogen (NO_x)*** which would be transferred to YCEP. It is anticipated that up to 900 tons/yr of ERCs would be created and available for transfer to YCEP. The Power Boiler No. 4 ***has the potential to emit*** approximately ***990*** tons/yr of oxides of nitrogen (NO_x)***, based on recent control technology installed [i.e., low oxides of nitrogen (NO_x) burners] to implement Reasonably Achievable Control Technology (RACT) requirements.***

The existing P. H. Glatfelter ***Company's*** Power Boiler No. 4 consumes approximately 105,580 tons of coal per year ***and has the potential to emit*** 5,785 tons of sulfur dioxide (SO_2), while the proposed YCEP facility would consume approximately 912,500 tons of coal per year and ***has the potential to*** emit 2,891 tons of ***sulfur dioxide*** (SO_2) per year. Thus, the proposed project would consume 760 percent more coal than Power Boiler No. 4, but would emit 50 percent less sulfur dioxide (SO_2), thereby supporting the Clean Coal Technology Program's objectives. Emissions from the proposed project would not cause or greatly contribute to pollutant concentrations that would exceed the primary or secondary ***National Ambient Air Quality Standards*** (NAAQS) or the Commonwealth of Pennsylvania ambient air quality standards in the local area. The increase in ambient (local) concentrations attributable to the proposed project would not exceed the allowable *P*revention of *S*ignificant *D*eterioration (PSD) increment consumption in the local Class II area. In particular, the percentages of increment consumed by the proposed project and all of the PSD facilities on a cumulative basis in the vicinity of the proposed project are 24 percent of both the annual ***sulfur dioxide*** (SO_2) and ***oxides of nitrogen*** (NO_x) allowable increments. ***These findings were based on the use of conservative models to estimate maximum ambient concentrations of key air pollutants. Expected ambient concentrations should be less than the modeled results due to the conservation of models and the assumptions used.***

Actual (expected) air emissions were also analyzed for the entire proposed project, including the curtailment of P. H. Glatfelter Company's Power Boiler No. 4 to 720 hours of simultaneous operation each year with the proposed project. The analyses indicated that there would be an overall reduction of 650 tons/yr in sulfur dioxide (SO_2), 415 tons/year in oxides of nitrogen (NO_x), and 7 tons/yr in particles (PM_{10}). There would be increases of 1,349 tons/yr of carbon monoxide (CO), 35 tons/yr of volatile organic compounds (VOCs) and 225 microcuries per year (mCi/yr) of radionuclides.

As part of the air quality modeling for the proposed project, additional analyses were completed to address potential air quality impacts to Class I and Class II areas and other areas under the control of the National Park Service. The impact of the proposed facility on visibility in Shenandoah National Park, Brigantine National Wilderness Area, Dolly Sods National Wilderness Area, Otter Creek National Wilderness Area, and James River Face National Wilderness Area (Class I areas) and the Gettysburg National Military Park (Class II area), were evaluated utilizing the VIZSCREEN model. The facility would not be expected to have an adverse impact on visibility at the Class I areas. At the Gettysburg National Military Park, the maximum modeled sulfur dioxide (SO_2) concentration of 0.105 $\mu g/m^3$ is well below the Class II annual average significance level of 1 $\mu g/m^3$ which EPA has determined to be the trigger for further air quality analysis. No adverse impacts on air quality at Gettysburg would be expected to result from the proposed action.

Five risk assessments were conducted ***for the proposed project. These assessments looked at substances of potential concern (including*** toxic metals, radionuclides, VOCs, polycyclic aromatic hydrocarbons [PAHs], chloroform, and cyanide emissions***)*** and their potential effects to human health. Exposure assumptions used in these assessments were conservative, and included exposure factors for both children and adults as suggested by the EPA in its guidance documents. Health effects from both boiler stack and cooling tower emissions were investigated.

The results of these assessments indicate that the lifetime excess cancer rate from potential exposure to emissions from the proposed project would be ***no more than three*** in one million, which is ***in the range of*** generally accepted lifetime cancer risk. ***Radionuclide emissions account for much of this cancer risk.*** Hazard Quotients for noncarcinogenic substances are all less than 1, and Hazard Indices for all pathway-specific exposures (air, soil, and food) to noncarcinogenic substances are less than 1, indicating that adverse, noncancer health effects due to emissions from the proposed project would not be expected. The proposed project should, therefore, have no measurable adverse effects to human health. ***In addition, the effects of air emissions on vegetation and agriculture were analyzed. Emissions from the proposed project are not expected to affect either crop yield or the consumability of products from a health perspective.***

Compliance with appropriate water quality limitations is regulated through the Pennsylvania Department of Environmental Resources (PADER) approvals and ***S***tate Water Quality Certification. The proposed project would require a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharge. In addition, P. H. Glatfelter Company's existing industrial wastewater discharge permit would require modification to allow for accepting and treating the proposed project's industrial wastewater discharge. The review and evaluation for approval of modifications would be conducted by the PADER Bureau of Water Quality. The project area would also be in the jurisdiction of the Susquehanna River Basin Commission (SRBC), a regional agency that has review and approval authority over projects involving major surface water or groundwater withdrawals, consumptive use, and/or projects requiring a commitment of water to a specific use for greater than 10 years. Because of the projected consumptive use of the proposed project, SRBC approval would be required, ***and has been obtained.*** The proposed facility would mitigate consumption of water during low-flow periods by compl***ying*** with SRBC requirements for consumptive water use replacement during low-flow (drought) through release of water either from an existing SRBC storage reservoir or a private reservoir within the Susquehanna River basin region. No additional water releases would occur or be required from Lake Marburg.

Water usage during construction would vary daily depending on the nature of the construction activities performed. Water usage during construction would be required primarily for dust control and potable water consumption. The projected demand would range from 5,000 to 15,000 gallons per day (gpd). Water needed for construction activities would be supplied by P. H. Glatfelter Company's water supply system. Spring Grove Water Company and P. H. Glatfelter Company currently have adequate capacity to satisfy this demand.

YCEP proposes to withdraw treated wastewater (an average of 4.2 *mgd*) from the P. H. Glatfelter Company's wastewater stream prior to discharge and use this treated wastewater as cooling water. Although concentrations of constituents in the P. H. Glatfelter Company's wastewater would increase due to evaporative losses in the proposed project's cooling tower, mass loadings (pounds per day) would not increase. However, the proposed project would decrease effluent biochemical oxygen demand (BOD) and suspended solids loadings by maintaining a higher level of treatment.

In 1994, the P. H. Glatfelter Company completed a ***Pulp Mill Modernization Project***. One component of the ***Pulp Mill Modernization Project*** included the installation of an oxygen delignification system which should result in a large decrease in the mass and concentration of dissolved solids that are discharged first to the wastewater treatment plant and finally to Codorus Creek. These anticipated changes in the composition of the P. H. Glatfelter Company's secondary effluent were considered in planning for the utilization of the secondary effluent stream in the proposed YCEP cooling tower system and would not be expected to have an impact on the use of wastewater in the proposed cooling tower system. The effluent baseline characteristics are expected to change (and be improved) as a result of the ***Pulp Mill Modernization Project,*** and then be degraded somewhat by concentration of inorganic solids due to evaporative water losses from the proposed YCEP project.

Concentration in parts per million (ppm) and mass (lbs/day) of total dissolved solids (consisting ***primarily*** of chloride, sulfate, calcium, and sodium constituents) in the secondary treatment plant effluent should decrease due to the ***Pulp Mill Modernization Project***. The effluent color also would decrease by the ***Pulp Mill Modernization Project***. Once the proposed YCEP facility begins operation, the mass of total dissolved solids (i.e., chloride, sulfate, calcium, and sodium) in the effluent would be the same. However, the concentration of total dissolved solids would increase because the evaporation of 2.8 million gpd (mgd) of water from the P. H. Glatfelter Company's wastewater treatment facility during YCEP cooling tower operation would reduce the effluent flow from 12.5 mgd to 9.7 mgd. The mass of total suspended solids and ***biochemical*** oxygen demanding substances would decrease with the start-up of the proposed facility. Additionally, the decrease in the temperature of the secondary effluent due to the cooler temperature of the cooling tower blowdown stream along with the 25 percent wastewater reduction discharged to the creek would reduce the overall heat load within Codorus Creek. The reduced heat load and reduced ***biochemical oxygen demand*** (BOD) would result in an increased dissolved oxygen concentration in the water of Codorus Creek, especially during summer and fall low-flow periods. ***Due to the proposed project, average flows at Spring Grove during normal flow and low-flow years would be reduced by approximately 5 and 10 percent, respectively. During rare minimum flow events, the flow would be reduced by approximately 20 percent. These reductions would translate into increases in dissolved solids and other water quality parameters in Codorus Creek. These increases were assessed in light of potential baseline exceedances of water quality criteria for parameters such as copper, chloride, total dissolved solids, phenols, chloroform, dissolved oxygen, temperature, and color. Upon further analysis, it was determined that the proposed project would not contribute significantly to either current or potential exceedances and that exceedances were less likely to occur or have an impact when other factors such as in-stream hardness or frequency and duration of occurrence were considered.***

Acute and chronic ambient water quality criteria would not be exceeded with the projected concentration of chloride (207 mg/L) in Codorus Creek under mean flow conditions. The projected chloride concentration in Codorus Creek during low-flow conditions would not exceed the EPA acute ambient water quality criteria but would marginally exceed the EPA *(1988a)* chronic ambient water quality criteria by a factor of approximately 1.1. However, the projected low-flow concentration of chloride (246 mg/L) is less than the chronic maximum acceptable toxicant concentration (372.1 mg/L) for the most sensitive species tested (a *cladoceran*) and below the chronic maximum acceptable toxicant concentration (4,343.1 mg/L) for warm water fish species (fathead minnow). Consequently, no adverse impacts to the biodiversity of organisms in Codorus Creek would be anticipated to result from the projected chloride levels, primarily because the ambient water quality criteria values are conservative, the exceedance would be marginal, and the exceedance would only occur under the low-flow condition.

Groundwater would not be used by the proposed project, and no impacts to groundwater resources would be expected to occur from operation of the proposed project. Groundwater underlying the project site has been sampled and found to be largely free of contamination. Five monitoring wells have been established on-site, and would be sampled periodically to assess groundwater conditions and quality.

In terms of terrestrial ecosystems, some wildlife and vegetation would be permanently displaced because of grading and compaction, while others could be temporarily affected because of construction noise and activity. The United States Fish and Wildlife Service (USFWS) has concurred with the opinion that threatened and endangered species would not be impacted by the project (Appendix E). In addition, appropriate permanent vegetative and landscaping measures would be employed following final construction activities to prevent erosion of surface areas.

The solid wastes that would be produced as a result of combustion consist of dry and benign solid calcium sulfate ($CaSO_4$) and coal ash. The ash byproduct would be collected from the following areas: bottom ash material would be collected from the CFB boiler, and fly ash material from the air heater hoppers and baghouse hoppers. The ash byproduct would be suitable for beneficial uses such as construction aggregate, agricultural fertilizer, and for use in reclaiming surface mining areas, or failing beneficial use, for permitted landfill disposal.

No adverse socioeconomic impacts are expected to occur as a result of the proposed project. ***There is currently too much uncertainty in energy markets and industry to accurately estimate the effects of the proposed project on electric utility rates in the long term; therefore, no long term economic impacts to rate payers are quantified in this FEIS. The Pennsylvania Public Utility Commission has approved a Met-Ed and YCEP contract which calls for 6.8 cents per kilowatt-hour. Met-Ed has reported that it could currently purchase electricity on the open market at 3.5-4.0 cents per kilowatt-hour or construct a gas-fired combined cycle facility that would generate electricity at approximately 4.4 cents per kilowatt-hour.*** Adequate labor force, housing, schools, police protection, fire protection, and medical services are available. A beneficial impact of increased tax revenue would be expected. It is expected that the ash-byproduct would be used to reclaim mine sites owned by Harriman Coal Corporation.

The associated traffic of employees and truck shipments required to support facility operation would have an effect upon operation conditions at key intersections providing access to the site. The projected increase in traffic resulting from the operation of the proposed facility would be approximately 125 vehicles per day, for a total projected access driveway volume of 325 vehicles per day. At the intersection of York Road (PA Route 116) and Colonial Valley Road (SR 3053), the intersection traffic would increase by 5 percent during both A.M. and P.M. peak hours and would continue to operate at an acceptable level of service. The intersection of York Road (PA Route 116) and the Roundwood Facility Access Drive would operate under an acceptable level of service for northbound left turns but unacceptably for the outbound approach from the Roundwood Facility. The intersection is currently unsignaled, and the possibility of installing a traffic signal was investigated. Traffic volumes, however, did not warrant a traffic signal under ***Pennsylvania Department of Transportation*** (PennDOT) guidelines. The intersection of York Road (PA Route 116), Jefferson Road (PA Route 516) and Lehman Road (SR 3078) currently operates below acceptable levels. The proposed project would increase total intersection traffic by 5 percent during both A.M. and P.M. peak hours. *I*mprovements (installing a traffic signal and lane improvements, such as constructing additional lanes on the north-, south-, and westbound approaches) could attain an acceptable level of service. ***PennDOT has recently approved the addition of a traffic signal at the intersection of Routes 516 and 116.***

Environmental justice is examined in accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 FR 7629). The order requires Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. No disproportionate and adverse impacts would be anticipated to occur to minority or low-income communities.

Four alternative routes for the electrical interconnection were originally considered. These routes were considered based on guidance received from Met-Ed requiring that the line from the proposed cogeneration facility interconnect with either the existing substation located in Bair, PA or the existing substation located on East Berlin Road in Jackson Township, PA. The following four routings from the proposed *C*ogeneration *F*acility were evaluated by YCEP ***and DOE***:

(1) FCP - to the Bair Substation via Flood Control Property (FCP);

(2) MPR - to the Bair Substation via the Maryland & Pennsylvania Railroad (MPR) Corridor;

(3) MECO - to the Bair Substation via the Metropolitan Edison Company Trolley Line (MECO) Corridor; and

(4) WMR - to the Jackson Substation via the Western Maryland Railroad (WMR) Corridor.

Evaluation criteria of these routes included land use considerations and environmental issues. Based on a comparative analysis, the Flood Control Property route was selected ***by DOE*** as the preferred alignment for the proposed project corridor.

A visual assessment was conducted to obtain a comprehensive analysis of the visual resources within the proposed electrical interconnection corridor. The assessment process included identifying and characterizing the visual resources, defining the visual corridor boundaries, and identifying critical viewpoints within these boundaries. Five viewpoints were further analyzed to determine potential visual effects of the proposed electrical interconnection alignment. For two of these viewpoints, expansion facilities or utility poles associated with the interconnection corridor would be visibly prominent.

The electrical interconnection corridor would have three major stream crossings of Codorus Creek that would occupy approximately 0.9 acres (0.4 hectares). These crossings would have the potential to impact the dominant tree species and wildlife located along the Codorus Creek riparian zone. Selective clearing of vegetation at stream crossings would be limited to the width of the electric interconnection. Any necessary removal of vegetation within wetland areas would be done manually to further minimize impacts associated with mechanical clearing techniques. The location of the interconnection was chosen, in part, to minimize impacts to wildlife and their associated habitat. The majority of the line has been sited along previously disturbed areas. Short-term impacts to wildlife habitat may result from periodic maintenance of the interconnection corridor. Vegetation control measures, necessary to maintain right-of-way access and minimize safety hazards, would result in temporary disturbances to vegetation and increases in noise levels, and may be disruptive to wildlife. Appropriate mitigation measures would be implemented to restore disturbed areas to their natural habitat. ***Mitigation measures for wildlife habitat have been coordinated with the Pennsylvania Game Commission and would include the planting of low-growing shrubs to replace lost wildlife habitat in riparian areas along Codorus Creek, the placement of waterfowl nesting structures along Codorus Creek to replace large trees, possible placement of other wildlife nesting/resting structures on transmission line poles, the planting of warm season grass species to provide food and cover for wildlife, and the construction of brush piles from vegetation cleared during transmission line pole placement to provide wildlife cover.***

DOE regulations (10 CFR ***Part*** 1022) implementing Executive Order 11988 -- Floodplain Management, and Executive Order 11990 -- Protection of Wetlands, requires DOE to avoid direct and indirect support of development in floodplains and wetlands wherever there is a practicable alternative. Where there is not a practicable alternative, DOE is required to prepare a Floodplain/Wetlands Assessment discussing the effects on the floodplain/wetlands, and consideration of alternatives. DOE is also required to provide opportunity for public review of any plans or proposals for actions in floodplains and new construction in wetlands. ***DOE's Floodplain Notification was published in the Federal Register on November 25, 1994 (59 FR 60614).*** DOE requirements regarding floodplain and wetlands management and protection, are incorporated and addressed in this ***FEIS***.

The majority of the proposed project would be constructed and operated outside the 100-year floodplain and identified wetlands. However, portions of rail ladder tracks, a rail spur, and between 14 to 22 power line utility poles would be located on land within the 100-year floodplain of Codorus Creek, and segments of some service roads would fall within the 500-year floodplain of Codorus Creek. In total, approximately 1.1 acres (0.44 hectares) of the 100-year floodplain would be affected by the proposed project (1.1 acres) and its utility electrical interconnection corridor (0.013 acres). Given the small and dispersed nature of the affected acreage and the nature of the structures to be constructed, it is expected that the proposed project would not measurably impact flow direction or debris collection during flood events.

United States Army Corps of Engineers (ACOE) controls portions of floodplain lands (Indian Rock Dam project) within the proposed electrical interconnection corridor, and has leased approximately 1,540 acres (623 hectares) to the Pennsylvania Game Commission for wildlife conservation. Approximately 17.3 acres (7.0 hectares) of 1,759 acres (711.4 hectares) of land controlled by ACOE (less than 1 percent) would be spanned by the proposed electrical interconnection corridor. Approximately 37 percent of the proposed electrical interconnection corridor would be located on land controlled by ACOE. In addition, approximately 60 percent (0.008 acres) of the floodplains impacted by the electrical interconnection corridor (0.013 acres) would be contained within land controlled by the ACOE. Approximately 14 to 22 utility poles would be permanently located within the 100-year floodplain. It is not anticipated that these poles could trap enough debris to impede flood flow, or alter flood dynamics and cause additional damage.

Additionally, portions of the proposed steam and condensate return pipelines to P. H. Glatfelter Company, cooling tower supply pipeline, and cooling tower return pipelines would unavoidably traverse identified wetlands. Approximately 0.5 acres (0.20 hectares) of wetlands would be impacted by the proposed project (0.3 acres) and corridors (0.2 acres). It is expected that wetlands affected by the proposed pipeline corridor [approximately 0.2 acres (0.08 hectares)] would be restored to original condition after construction of the pipeline facilities, and that a Section 404 Dredge and Fill Permit from the ACOE may not be necessary, although a permit application may be required. It is also anticipated, barring unforeseen circumstances, that the regulated activities that would impact 0.2 acres (0.08 hectares) of jurisdictional wetlands could be authorized by ACOE under Nationwide Permit Number 12, Backfilling and Bedding For Utility Lines, and/or Nationwide Permit Number 26, Headwaters and Isolated Water Discharges. However, coordination with ACOE would be conducted prior to any wetland disturbing activities, and their recommendations would be followed for required mitigation.

Floodplain and wetland areas potentially affected by these proposed facilities are described in Section 3.1.4.3, Floodplains, and 3.1.5.5, Wetlands, for the proposed Cogeneration Facility; and Sections 3.1.14.4 (Floodplains), and 3.1.14.5 (Wetlands), for the proposed utility corridor. The specific impacts of proposed development are addressed in Section 4.1.4.5, Floodplains, and 4.1.5.5, Wetlands, for the ***proposed*** cogeneration unit; and Sections 4.1.14.4 (Floodplains), and 4.1.14.5 (Wetlands) for the proposed utility corridors.

If the proposed YCEP project is constructed and operated, various mitigation measures would be necessary to minimize both direct and indirect impacts to the environment. Monitoring activities would be determined based on permit requirements and are currently undefined. Air emissions generated during construction activities would be minimized through the application of appropriate construction practices, including periodic wetting and mulching of the construction area to minimize fugitive emissions associated with vehicles traversing the site, particularly large particulate matter emissions associated with wind erosion of disturbed soils. Potential air pollution emissions associated with wind erosion would be minimized by limiting disturbance to the portion of land required for construction of the facility.

Measures would be taken to minimize the amount of soil disturbance and migration. Terrain exposed at any one time would be limited to the area necessary for a particular phase of construction. Exposed soils would be seeded for short-term stabilization upon completion of each construction phase. Grading activities would be restricted to keep the disturbed area to a minimum. In order to minimize erosion on slopes, diversion ditches would be installed at appropriate intervals. Any disturbed land would be stabilized as soon as the construction of the facility has progressed to the point where this measure is practical. ***As stated previously, a variety of mitigation options would be followed to restore any wildlife habitat lost due to the placement of the electric interconnection through Pennsylvania Game Commission-leased land.***

The project would use the lowest quality available water, as appropriate, rather than relying on community potable water supplies.

As stated previously, ***PennDOT has approved a request for a traffic signal for the*** intersection of York Road (Route 116) ***and*** Jefferson Road (Route 516). ***This mitigation measure should improve traffic conditions.***

Access to the construction site would be from the existing access drive to the Roundwood Facility. This driveway would be able to accommodate all categories of facility construction vehicles, and is at a location with adequate sight distance available to ensure safe entry and exit. To address the existing problems of occasional disruption to traffic flow on York Road (Route 116) from overflow of log truck queues on the site driveway, an additional storage area to accommodate the queue would be provided. This action would mitigate the existing problem in addition to providing construction vehicles unimpeded access to the site.

All material laydown and employee parking areas would be provided on-site. Facility security would enforce a ban of on-street parking. Traffic conditions throughout the construction period would be monitored. If congestion should be noted, additional mitigation measures, such as scheduling of shifts to further avoid peak periods or the stationing of traffic control personnel at critical locations, would be instituted.

Insulation and other noise mitigation techniques would be employed on major pieces of construction equipment. With these noise mitigation measures, the predicted increase in noise levels at the nearest outdoor receptor locations during normal construction operations are expected to be minimal (3 dBA or less). ***In addition, a***dvance notice would be given to the potentially affected public prior to major noise events, such as steam system purging.

To mitigate noise from operational activities, the proposed facility would be designed to include specific noise reduction and control features. Where feasible, low noise design equipment would be used, and all ***stationary*** equipment noise sources would be enclosed in insulated buildings designed to absorb noise. The spatial orientation of the major noise production structures has been planned to block direct propagation of noise to off-site receptors. The cumulative result of these noise reduction measures would be to minimize the increase in background noise at the off-site receptors (to between 0 and 3 dBA) due to operation of the proposed facility.

Alternatives to the Proposed Action. The proposed alternative site would be located on a 47-acre (19 hectare) parcel of land in West Manchester Township, York County, PA. From the perspective of potential environmental impacts, the West Manchester Township site is typical of alternative locations at which the proposed project could be constructed. For that reason, it was selected as the reasonable alternative site to be analyzed for comparative purposes in this EIS. Earlier in the planning process, the West Manchester Township site was proposed for use by YCEP and was evaluated by the company during its search for a suitable location at which to demonstrate coal-fired CFB cogeneration technology with cogeneration at the 250-MW scale. It should be noted, however, that YCEP does not now propose to construct its facility at the West Manchester Township site.

The alternative site is zoned for General Industrial uses, signifying the most intensive level of industrial zoning in West Manchester Township. Mixed land uses surround the alternative site. The J.E. Baker Company's dolomite quarrying and brick manufacturing facility located on Emigs Mill Road, opposite the alternative site, is the nearest industrial land use. Commercial, residential, and recreational (***e.g.***, a golf course) land uses are in the vicinity of the alternative site. Five buildings of local historical significance are located within 1.6 km (1 mile) of the alternative site, however, none of these buildings are listed on the Pennsylvania Commonwealth or the Federal Register of Historic Places.

The 227-MW (net) Cogeneration Facility at the alternative site would be similar to that of the proposed action (i.e., one CFB boiler and supporting equipment designed to operate continuously (24 hours per day, 365 days per year), with the exception of planned outages for maintenance purposes). The steam generated in the CFB boiler would be used to drive a steam turbine to produce electricity for purchase by Met-Ed, and a portion of the high pressure steam exiting the steam turbine would be sold to the J.E. Baker Company for use in their dolomite brick manufacturing operations. The CFB boiler at the proposed site would be slightly larger than at the alternative site due to greater steam requirements of the P. H. Glatfelter Company.

The proposed alternative site is located in the Northeast Ozone Transport Region established by the CAA. Additionally, projected oxides of nitrogen (NO_x) emissions from project operation would exceed 100 tons/year. Consequently, the facility at the alternative site would be required to offset any oxides of nitrogen (NO_x) emissions at a ratio of 1.15 to 1. The proposed facility would be also subject to PSD permit regulations, and the type of air pollution control equipment needed would have to be determined. Air pollution control technologies associated with the proposed project at the alternative site would be equivalent to those described for the proposed action at the North Codorus Township site.

Implementation of the no-action alternative would result if DOE does not provide cost-shared financial assistance for the proposed project and approximately $75 million of Federal funds would not be expended for this specific CCT project. Under the no-action alternative, YCEP would not construct the proposed project because (if built) the resulting cash flows, largely driven by the power agreement with Met-Ed, would not provide an adequate return on a stand-alone capital investment in excess of $379 million. Failure to construct the ***facility*** would mean that demonstration of the commercial viability of a utility-scale CFB facility (a CCT program goal) would not be achieved. YCEP would not construct the proposed project at another site because of timing considerations under the existing power sales agreement with Met-Ed. As a result of failure to demonstrate utility-scale (250-MW) CFB technology, commercialization of the proposed technology domestically would be ***more uncertain*** because utilities and private sector companies would be inclined to choose known and proven technologies.

An additional reasonably foreseeable result of implementing the no-action alternative would be the loss of an opportunity to reduce emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulates (PM_{10}) in York County by curtailing operations of the P. H. Glatfelter Company***'s*** Power Boiler No. 4. This opportunity cost is discussed further in Section 2.1.3. This power boiler is a 1950s vintage pulverized coal boiler that would continue to operate into the foreseeable future (20 years), according to the P. H. Glatfelter Company. In the event that the proposed YCEP project is not constructed at the North Codorus Township location, it is reasonable to assume that the P. H. Glatfelter Company would continue to operate Power Boiler No. 4.

Under the no-action alternative, it is reasonable to assume that to meet the ***long-term*** need for electrical power in the region, new power generation facilities ***could*** be required. Future electricity demands ***could*** be met by purchasing power from new non-utility generators, ***purchasing power in the short term from the power pool, conducting purchase transactions outside the pool with private entities, or constructing new gas- or coal-fired facilities.***

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LIST OF ABBREVIATIONS/ACRONYMS/SYMBOLS

AAQS	Ambient Air Quality Standards
AC	*Alternating current*
ACFB	*Atmospheric circulating fluidized bed*
ACOE	United States Army Corps of Engineers
ADT	Average daily traffic
AFCB	*Atmospheric fluidized bed combustor*
AGL	Above ground level
Al	Chemical symbol for aluminum
APCA	Pennsylvania Air Pollution Control Act
AQCR	Air Quality Control Region
AST	Aboveground storage tank
ATG	Air Toxics Policy and Procedure Guidelines
ATR	Automatic traffic recorder
AWQC	Ambient Water Quality Criteria
BACT	Best Available Control Technology
BEHP	Bis (2-Ethylhexyl) phthalate
Be	Chemical symbol for beryllium
BMY	Bowen-McGlaughlin-York
BOD	Biochemical oxygen demand
BTEX	Collective reference to benzene, toluene, ethylbenzene, and xylene
Btu	British Thermal Unit
C	Chemical symbol for carbon
Ca	Chemical symbol for calcium
CAA	Clean Air Act, as amended 1990
CAP-88	Clean Air Act Assessment Package-1988
$CaCO_3$	Chemical symbol for calcium carbonate
CaO	Chemical symbol for calcium oxide
$CaSO_4$	Chemical symbol for calcium sulfate
CCT	Clean Coal Technology
CEMS	Continuous emissions monitoring system
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFB	Circulating fluidized bed

cfm	Cubic feet per minute
CFR	Code of Federal Regulations
cfs	Cubic feet per second
Ci	*Curie*
Cl	Chemical symbol for chlorine
ClO_2	Chemical symbol for chlorine dioxide
cm	Centimeter
CMA	Chemical Manufacturers Association
CO	Chemical symbol for carbon monoxide
CO_2	Chemical symbol for carbon dioxide
COD	***Chemical oxygen demand***
CPP	Competitive Procurement Program
CPR	Cardio-pulmonary Resuscitation
CU	Color Units
CWA	Clean Water Act
CWF	Cold water fishery
DEIS	Draft Environmental Impact Statement
dB	Decibels
dBA	Decibels as recorded on the A-weighted scale of a standard sound level meter
DC	***Direct current***
DO	Dissolved oxygen
DOE	United States Department of Energy
DOT	Department of Transportation
EES	Environmental and Energy Systems
EF	***Enrichment factor***
EHS	Extremely hazardous substance
EIS	Environmental Impact Statement
EIV	Environmental Information Volume
EMF	Electromagnetic fields
EPA	United States Environmental Protection Agency
EQB	Pennsylvania Environmental Quality Board
ERCs	Emission reduction credits
ERM	Environmental Resources Management, Inc.
ERTNOI	Point source propagation model

EWG	Exempt Wholesale Generator
FAA	Federal Aviation Administration
FAV	Final acute toxicity value
FDA	***Food and Drug Administration***
FEIS	***Final Environmental Impact Statement***
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	Federal Register
ft	Foot
ft^3	Cubic feet
FWCA	Fish and Wildlife Coordination Act
G	***Gauss***
gal	Gallon
$(gal/min)/mi^2$	Gallons per minute per square mile
GEP	Good Engineering Practice
gpd	Gallons per day
gpm	Gallons per minute
GPU	General Public ***Utilities***
HAP	Hazardous Air Pollutants
HBI	Hilsenhoff's Biotic Index
HCl	Chemical symbol for hydrochloric acid
HCS	Highway Capacity Software
HEC	***Hydrologic Engineering Center of ACOE***
HF	Chemical symbol for hydrogen fluoride
Hg	Chemical symbol for mercury
HI	Hazard Index
HQ	Hazard Quotient
H_2S	Chemical symbol for hydrogen sulfide
H_2SO_4	Chemical symbol for sulfuric acid
Hz	***Hertz***
IBI	Index of biological integrity
ISC	Industrial source complex
kg	Kilogram

km	Kilometer
km^2	Square kilometer
kV	Kilovolt
kV/m	***Kilovolt per meter***
L	Liter
L_d	Average noise-level of daytime period (07:00-22:00)
L_{dn}	Day-night average noise level
L_{eq}	Equivalent sound level
L_n	Average noise-level of nighttime period (22:00-07:00)
L_{90}	Residual noise level
LAER	Lowest Achievable Emission Rate
lb	Pound
lbs/day	***Pounds per day***
lbs/hr	Pounds per hour
lbs/MMBtu	Pounds per million British thermal units
LMDCT	Linear mechanical draft cooling tower
LOP	***Letter of permission***
LOS	Level of Service
m	Meter
MACT	***Maximum achievable control technology***
mCi	***Millicurie***
MCLs	Maximum Contaminant Levels
METC	Morgantown Energy Technology Center
Met-Ed	Metropolitan Edison Company
mG	***Milligauss***
mgd	Million gallons per day
mg/L	Milligram per liter
mg/m^3	Milligram per cubic meter
mi	Mile
MIBK	The herbicide 4-methyl-2-pentanone
mL	Milliliter
Mlb/hr	***Thousand pounds per hour***
MMlb/hr	***Million pounds per hour***
MMBtu	Million British thermal units

mrem/yr	***Millirem per year***
MSAs	Metropolitan Statistical Areas
MSDSs	Material Safety Data Sheets
msl	Mean sea level
MW	Megawatt
MWe	***Megawatt electricity***
NAAQS	National Ambient Air Quality Standards
NAPAP	National Acid Precipitation Assessment Program
NEPA	National Environmental Policy Act
NESHAP	***National Emissions Standards for Hazardous Air Pollutants***
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act of 1966
NMP	National Military Park
NOAA	National Oceanic and Atmospheric Administration (United States Dept. of Commerce)
NOI	Notice of Intent (to prepare an EIS)
NOTR	Northeast Ozone Transport Region
NO_x	Chemical symbol for oxides of nitrogen
NO_2	Chemical symbol for nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory map
NWS	National Weather Service
OSHA	Occupational Safety and Health Administration
O_2	Chemical symbol for oxygen
O_3	Chemical symbol for ozone
PaCode	***Pennsylvania Code of State Regulations***
PADER	Pennsylvania Department of Environmental Resources
Pb	Chemical symbol for lead
PAH	Polycyclic aromatic hydrocarbons
pCi	***Picocurie***
PennDOT	Pennsylvania Department of Transportation
PEIS	Programmatic Environmental Impact Statement
PGC	Pennsylvania Game Commission

pH	***The negative log of hydrogen ion concentration***
PHG	***The P. H. Glatfelter Company***
PJM	Pennsylvania-New Jersey-Maryland Power Pool
PM	Preventive Maintenance Program
PM_{10}	Particulate matter less than 10 microns in diameter
PMSAs	Primary Metropolitan Statistical Areas
PON	Program Opportunity Notice
PPC	Preparedness, Prevention, and Contingency Plan
ppb	***Parts per billion***
ppm	Parts per million
ppt	***Parts per trillion***
PSD	Prevention of Significant Deterioration
PSDC	Pennsylvania State Data Center
psi	***Pound per square inch***
PUC	Pennsylvania Public Utility Commission
PURPA	Public Utility Regulatory Policy Act of 1978
PWB	Priority water body
$Q_{7\text{-}10}$	***Estimated lowest 7 consecutive day average stream flow that occurs once in 10 years***
Ra	***Chemical symbol for radium***
RACT	Reasonably available control technology
RCRA	Resource Conservation and Recovery Act
RM	River mile
Rn	***Chemical symbol for radon***
ROD	Record of Decision
S	***Chemical symbol for sulfur***
SARA	Superfund Amendments and Reauthorization Act of 1986
SACTI	Seasonal Annual Cooling Tower Impacts
SCR	***Selective catalytic reduction***
SCS	Soil Conservation Service (United States Department of Agriculture)
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SiO_2	Chemical symbol for silica
SIP	State Implementation Plan
SNCR	Selective non-catalytic reduction

SO_2	Chemical symbol for sulfur dioxide
$SO_4^=$	Chemical symbol for sulfates
SO_x	Chemical symbol for sulfur oxides
SpA	***Specific activity***
SPCC	Spill Prevention Control and Countermeasures Plan
SRBC	Susquehanna River Basin Commission
s.u.	pH standard units
T	***Tesla***
$T_{1/2}$	***Half-life***
TCLP	Toxicity Characteristics Leachate Procedure test
TDR	Transfer of development rights
TDS	Total dissolved solids
TGPL	Transcontinental Gas Pipe Line Corporation
Th	***Chemical symbol for thorium***
TMDL	Total maximum daily load
tons/yr	Tons per year
TOC	***Total organic carbon***
TPQ	Threshold Planning Quantity
TRI	Toxics Release Inventory
TRS	***Total reduced sulfur***
TSP	Total suspended particulates
TSS	Total suspended solids
U	***Chemical symbol for uranium***
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile organic compounds
Vol	Volume
WLA	Wasteload allocation
WWF	Warm water fishery
YATA	York Area Transit Authority
YCEP	York County Energy Partners, L.P.
yd^3	Cubic yards

yr	Year
°C	Degrees Celsius
°F	Degrees Fahrenheit
§	***Section***
μ	Micro
μg	Microgram
$\mu g/m^3$	Micrograms per cubic meter
μmhos/cm	***A standard measure of electrical conductivity of water***
>	Greater than
<	Less than

1. PURPOSE AND NEED FOR PROPOSED ACTION

1.0 Summary of Major Changes Since the DEIS

Section 1.3.1 (DOE Purpose) was updated to reflect more information on the commercialization status of atmospheric CFB technology. A table was added describing the 10 largest CFB boilers in the world. Section 1.3.4 (Met-Ed's Long-Term Electrical Generating Capacity Requirements) was renamed and rewritten to more accurately reflect recent information received from Metropolitan Edison Company. Section 1.4 (National Environmental Policy Act Strategy) was updated to include discussion of the public comment process for the DEIS.

1.1 Introduction

The abundance of coal in the United States makes it one of our Nation's most important strategic resources in building a secure energy future. Coal has the potential to be one of this country's most beneficial and efficient energy sources well into the 21st century and beyond; with today's prices and technology, recoverable reserves located in the United States could supply the Nation's coal consumption at current rates for nearly 300 years. However, if coal is to reach its full potential as an environmentally acceptable and economically competitive source of energy, an expanded menu of advanced clean coal technologies must be developed to provide substantially improved options both for the consumer and private industry.

Since the early 1970s, the ***United States*** Department of Energy (DOE) and its predecessor organizations have pursued a broadly based coal research and development program directed toward increasing the Nation's opportunities to use its most abundant fossil energy resource while improving environmental quality. This research and development program includes long-term projects that support the development of innovative concepts for a wide variety of coal technologies.

Any technology, before it can be seriously considered for commercialization, must be demonstrated at sufficiently large scale to develop industry confidence in its technical and economic feasibility. Demonstrating a new technology, however, is costly and can entail considerable capital risk for a private industry. Public utilities are regulated and must account to the regulating agency and the public for capital funds disbursed, and the economic risk associated with technology demonstration is, in general, too high for the private sector to assume in the absence of strong economic incentives or legal requirements. The implementation of a Federal technology demonstration program is an important means of accelerating the development of technology to meet near-term energy and environmental goals, to minimize risk to human health and the environment, and to provide the incentives required for continued activity in innovative research and development directed at providing solutions to long-range energy supply problems.

The DOE Clean Coal Technology (CCT) Program sponsors a broad spectrum of demonstration projects that are jointly funded by the Federal government and industry. Clean coal technology refers to a new generation of advanced coal utilization technologies that are environmentally cleaner and, in many cases, more efficient and less costly than conventional coal-using processes. The goal of the CCT Program is to make available a number of advanced, more efficient, reliable, and environmentally responsive coal utilization and environmental control technologies to the ***United States*** energy marketplace. These technologies are intended to reduce or eliminate many of the economic and environmental impediments that limit the full consideration of coal as a future energy resource.

The CCT Program demonstrations are designed on a scale large enough to generate all of the design, construction, and operational data necessary for the private sector to judge the commercial potential of the technology and to make informed and confident decisions on commercial readiness. In addition, the CCT Program can lead to improved marketability of ***United States*** coal technologies and open new international markets in the utility, industrial, and commercial sectors. The availability of developed and demonstrated coal technologies that meet the energy objectives of the international community can give the United States a substantial marketing advantage overseas. Further, there is the potential to link ***United States*** coal exports with coal technologies, and thus strengthen ***United States*** competitiveness in both areas.

The strategy being implemented to achieve the goal of the CCT Program has been to conduct a multiphase effort consisting of five separate solicitations for projects. Each solicitation has individual objectives (Figure 1.1-1) that, when integrated, make technology options available on a schedule that is both consistent with the demands of the energy market and responsive to relevant environmental considerations.

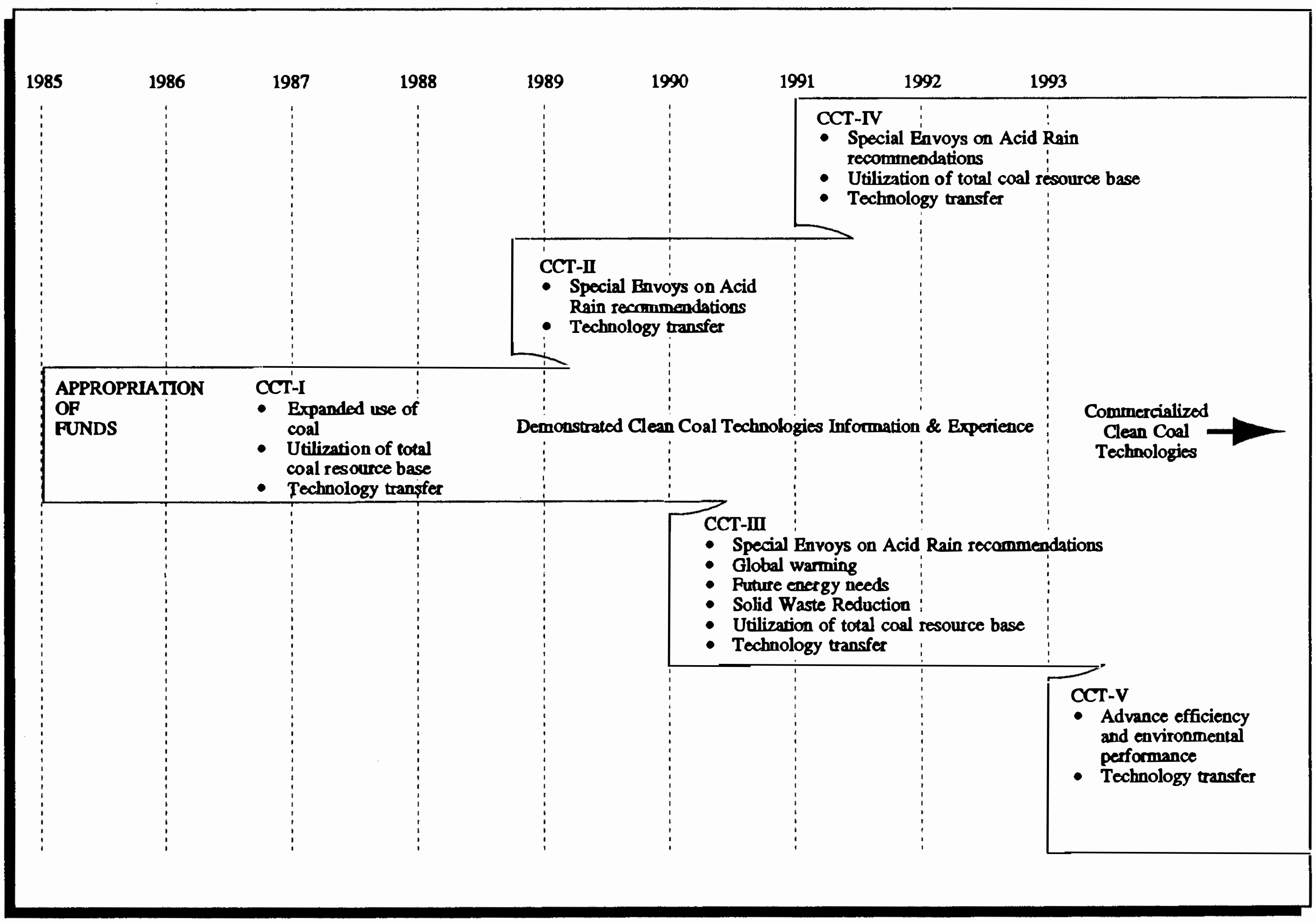

Figure 1.1-1. CCT Demonstration Program strategy.

Under the terms of the "Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1986, and for Other Purposes" (Pub. L. 99-190), Congress provided funding to support the construction and operation of demonstration facilities selected for cost-shared financial assistance as a part of DOE's CCT Program. In December 1985, Congress made funds available to DOE for conducting the first round of the cost-shared CCT Program. Congress directed that the first solicitation for *F*ederal cost-sharing (1) be open to all market applications of clean coal technologies, (2) apply to any segment of the ***United States*** coal resource base, and (3) encompass both "new" and "retrofit" applications. On February 17, 1986, DOE issued a Program Opportunity Notice (PON) soliciting proposals to conduct cost-shared projects to demonstrate innovative, energy efficient, and economically competitive technologies. In response to the solicitation, 51 proposals were received. From these proposals, nine projects were selected by DOE for negotiation in July 1986, and a list of alternate candidates was established from which replacement selection could be made should any of the original nine not proceed. In November 1990, the Arvah B. Hopkins Circulating Fluidized Bed (CFB) Repowering Project, proposed by the City of Tallahassee, Florida, was selected from the alternate list. As originally envisioned, this project would have repowered one of the City of Tallahassee's municipally owned 250-megawatt (MW) natural gas boilers with atmospheric CFB combustion "clean coal technology." The steam produced would have been utilized solely for power generation, as there was no associated steam host for cogeneration. However, in early September 1991, the City of Tallahassee indicated that it no longer wished to proceed with the proposed CFB project. ***Several issues influenced the decision to move the proposed project from the Tallahassee site. An updated economic fuel analysis conducted by the City of Tallahassee in late 1991 indicated that the projected cost of gas and oil would be lower than forecasted in its economic evaluation, thus casting doubt on the justification for the Hopkins Generating Station Unit 2 repowering project. It became clear from the new study that coal would not provide the lowest cost option for repowering at the Tallahassee site. It is also believed that public opposition to the plant, as reflected in the city's referendum on the issue, also contributed to the decision to move.*** Therefore, other potential sponsors for the project were considered. Subsequently, DOE agreed to reassign the project to York County Energy Partners, L.P. (YCEP), a project company wholly-owned by Air Products and Chemicals, Inc., of Allentown, Pennsylvania. The new sponsor proposed to relocate the project from Tallahassee, FL, to an industrial site adjacent to The J. E. Baker Company quarry and brick manufacturing operations in West Manchester Township, York County, PA, where it was proposed to operate as a 250-MW gross (227-MW net) Cogeneration Facility. Approximately 40,000 pounds per hour (lbs/hr) of steam produced by the project would have been purchased by J. E. Baker Company. Electricity would have been purchased by Metropolitan Edison

Company (Met-Ed), the local electric utility. All other major aspects of the project would have remained unchanged from the original project at the City of Tallahassee.

During the summer of 1992, YCEP sought opportunities for air emissions reductions from existing companies in the vicinity of the proposed project as a means of acquiring an enhanced level of air emissions offsets. Discussions with the P. H. Glatfelter Company, ***Spring Grove***, Pennsylvania, indicated that air emissions reductions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) would result if the proposed YCEP project could provide sufficient steam to displace in large part the use of an existing P. H. Glatfelter Company coal-fired boiler. (The old boiler would be relegated to standby operation for periods when sufficient steam from the proposed YCEP project might not be available.) Additionally, it was determined that the co-location of the proposed YCEP project with the Spring Grove paper mill facility would enable YCEP to recycle the mill's wastewater for cooling purposes, thereby greatly reducing fresh water requirements. ***Another factor relevant to the move from the West Manchester site was zoning ordinance (stack height) considerations.*** Accordingly, on February 1, 1993, YCEP and the P. H. Glatfelter Company issued a joint statement that they were evaluating the feasibility of relocating the proposed YCEP project to the North Codorus Township site in York County. DOE also considered the feasibility of changing the project site, and, in June 1993, agreed to the relocation.

DOE entered into a Cooperative Agreement with YCEP, under which DOE would be sharing the cost of design, construction, and operation. The Cooperative Agreement was first signed on June 5, 1992, and June 15, 1992, by YCEP and the Morgantown Energy Technology Center (METC), respectively. The Agreement was modified as a result of the site change to the North Codorus Township. This modification to the Cooperative Agreement was signed on June 23, 1993, by METC, and on June 29, 1993, by YCEP. The Cooperative Agreement stipulates that DOE funds may not be expended by YCEP on project construction or operation unless and until the environmental review procedures required by the National Environmental Policy Act (NEPA) have been completed and the subsequent Record of Decision indicates a favorable outcome. The project cost, per the Cooperative Agreement, is $379,645,450. The DOE cooperative funding for the project is $74,790,000, or 19.7 percent, of the total project cost.

1.2 The Proposed Action

The proposed Federal action is to provide cost-shared funding of approximately $75 million (approximately 20 percent of the project cost) to YCEP for the design, construction, and operation of a nominal 250-MW, coal-fired, Cogeneration Facility to demonstrate CFB technology. The proposed facility would be designed to operate continuously (24 hours a day, 365 days per year), with the exception of outages for maintenance purposes. The proposed facility operation would include a 24-month demonstration period, followed by approximately 23 years of commercial operation, for a total operational life of 25 years. The ***proposed*** YCEP Cogeneration Facility would include an atmospheric CFB ***(ACFB)*** boiler and a pollution control system consisting of a baghouse to control emissions of particulates, selective non-catalytic reduction for reducing emissions of oxides of nitrogen (NO_x), and limestone injection for reducing emissions of sulfur dioxide (SO_2).

The major subsystems and key components of the proposed facility are listed below:

- an enclosed coal unloading building and storage area;
- limestone and ash storage silos;
- raw water and condensate tanks;
- a boiler room building housing the CFB boiler;
- a turbine bay;
- a switchyard;
- a baghouse to collect particulate matter created by the process;
- a stack equipped with a continuous emissions monitoring system; and
- a cooling tower.

In addition, the proposed project would require the construction of a new 115 kilovolt (kV) interconnection power line and electric switchyard adjacent to a Met-Ed owned substation located approximately 6.1 kilometers (km) [3.8 miles (mi)] northeast of the site. Several alternative interconnection and power line routes have been evaluated and are described in Section 2.1.3.

As a benefit of the proposed project, the P. H. Glatfelter Company would curtail operation of one of their existing coal-fired boilers, Power Boiler No. 4, which would be placed on "hot" stand-by. "Hot stand-by" refers to the use of low-pressure steam to keep the boiler hot and readily available for use. Because steam to keep Power Boiler No. 4 in a "hot" standby condition would be generated in an existing P. H.

Glatfelter Company on-site unit, no coal would be burned in Power Boiler No.4 during stand-by periods. During periods when the YCEP CFB unit is down for maintenance, or other rare circumstances such as the loss of steam production from another P. H. Glatfelter Company power boiler, Power Boiler No. 4 would operate to provide the steam supply necessary for mill operation. Power Boiler No. 4 would be limited through a federally enforceable air quality permit (issued to the P. H. Glatfelter Company) to operate no more than 720 hours per year in parallel with the proposed YCEP facility. These 720 hours per year would provide the P. H. Glatfelter Company the flexibility to operate Power Boiler No. 4 for steam generation when its other operating boilers are temporarily out of service or when the proposed YCEP boiler is shut down for maintenance. However, in the event that the proposed YCEP facility is not operating, Power Boiler No. 4 would be allowed to run without time constraints on operation. The air quality permit for Power Boiler No. 4 would then be modified accordingly to ensure that emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) are consistent with the level of operation. The P. H. Glatfelter Company would purchase up to 400,000 lb/hr of the steam [at a pressure of 4,136,854 newtons per square meter, pascal (600 pounds per square inch absolute) and a temperature of ***360*** degrees Celsius (680 degrees Fahrenheit)] generated by the proposed project and the electricity produced would be sold to Met-Ed. The coal supply for the project would be approximately 2,500 tons per day of eastern ***United States*** bituminous coal (mined in Pennsylvania) with propane used during facility start-up. The proposed demonstration of atmospheric CFB technology at the 250-MW (2.1 million lb/hr steam) scale is expected to generate valuable technical and environmental information that can be disseminated to the utility industry which can then use the new information to evaluate CFB technology as an alternative to other less advanced technologies for both repowering existing facilities and new greenfield projects.

The proposed facility would be constructed on a 38-acre (15.4 hectare) parcel of land in North Codorus Township, York County, PA, adjacent to the P. H. Glatfelter Company mill. The proposed site is bounded by York Road (State Route 116) to the south, the P. H. Glatfelter Company Roundwood Facility (a processing area for incoming logwood) to the west, and by the Kessler Pond, the mill pond (an impoundment of Codorus Creek), and Codorus Creek to the east and north. Several small commercial establishments and a cluster of eight residences are located along York Road (Route 116) south of the site; however, the proposed site is vacant and currently used for recreational and agricultural purposes. The parcel of land is currently owned by the P. H. Glatfelter Company, and would be purchased by YCEP.

1.3 Purpose and Need

The Clean Air Act (CAA), including the 1990 amendments, has placed stringent requirements on new and existing coal-fired power plants to achieve significant reductions in emissions. One of the goals of the CCT Program is to demonstrate coal utilization technologies that assist in achieving the mandated emission levels and also result in cleaner plants than are presently required under the CAA. The need for the proposed YCEP Cogeneration Facility is twofold. The proposed facility would fulfill the congressional policy of demonstrating environmentally sound technologies for the utilization of coal while providing electricity for the Met-Ed service area.

The overall purpose of the proposed project would be to demonstrate the commercial viability of using utility scale atmospheric CFB technology in a Cogeneration Facility to generate electric power and steam. The resulting environmental, cost, and performance data would be representative of the commercial application of this technology. Although CFB technology has been demonstrated to be commercially viable at a smaller scale (less than 150 MW), it has not been demonstrated in the United States at an intermediate utility scale (200 to 500 MW) (*Rezaiyan, 1994*).

1.3.1 DOE Purpose

The purpose of the proposed Federal action is to demonstrate atmospheric CFB technology at a large enough scale to evaluate environmental, cost, and plant performance data necessary for commercialization of the technology. Fluidized-bed combustors offer several advantages over conventional combustors. Although the proposed action would only be permitted to use a clean bituminous coal fuel supply, a CFB boiler would allow a wider variety of fossil fuels to be combusted, especially low-quality fuels that contain high volumes of moisture and/or ash. Limestone within the bed can remove sulfur dioxide (SO_2) during combustion, eliminating the need for expensive scrubbers. In addition, atmospheric CFB technology operates at lower temperatures than conventional boilers, thus reducing the thermal production of oxides of nitrogen (NO_x). DOE expects to demonstrate that atmospheric CFB technology has high potential for application in both the industrial and utility sectors, whether for use in repowering existing plants or in new facilities.

While there are many small, mostly industrial atmospheric CFBs in existence in the United States, the large [200-megawatt electricity (MWe) and greater], utility-scale atmospheric CFB combustion boiler is not yet accepted as commercial technology in the utility market. The conventional pulverized-coal

boilers used today by electric utilities are predominantly 250-400 MWe units. The largest atmospheric CFB currently operating in the United States is 150 MWe. The Warrior Run project in Cumberland, MD, a planned 180-MWe CFB, is scheduled to begin producing power in 1999. The next step up in size in this country would be the proposed 250-MWe YCEP Cogeneration Facility.

The net electrical power output (i.e., MWe-net) is often used to describe and differentiate among atmospheric CFB combustors as a measure of "scale" with respect to the size of the unit (for commercial utility operations). This parameter is mainly used because it tends to be more easily understood by the general public. However, this parameter does not include the energy inherent in the industrial steam that is exported by cogeneration operations, such as the proposed YCEP boiler. Steam from cogeneration plants could be used to produce electricity or in a process application. Because different plants may utilize the steam product in different ways, electricity production is not always an accurate parameter for making comparisons. A more consistent comparison between systems is the amount of steam produced if the steam characteristics (i.e., pressure and temperature) are the same. A unique feature of the proposed YCEP Cogeneration Facility is the scale of the CFB unit in terms of steam production. This unit would produce 2.1 million pounds per hour (MMlb/hr) of steam. This steam flow is considerably larger (i.e., 25 percent larger) than any unit that has been built, planned, or is under construction anywhere in the world. In other words, if steam flow is used to assess boiler "size," the proposed YCEP atmospheric CFB combustor, if constructed, would be the largest CFB combustor in the world.

Table 1.3-1 lists the world's largest CFB boilers being planned, operated, or constructed, based on the parameter unit steam flow [thousand pounds per hour (Mlb/hr)]. The boiler database used for this table was provided by SFA Pacific and contains descriptive information on commercial and commercial-scale demonstration projects for all major FBC installations worldwide. Other reported projects still in the early planning phases and not yet confirmed include a 300-MWe CFB combustor in Australia and a 220 MWe ABB CFB combustor in Korea. No other information was available on these projects by the deadline for printing of this document.

In addition to the size parameter, the proposed YCEP project is unique (because of a combination of features) when compared to other atmospheric CFB combustors being planned, designed, or constructed. The proposed project would demonstrate United States technology owned and marketed by domestic manufacturers. The proposed project would utilize United States bituminous coals (which are in abundance in the United States) in a cogeneration mode of operation that would be demonstrated

Table 1.3-1. Fluidized bed combustion boiler database (SFA Pacific, Inc.): 10 Largest CFBC boilers in the world.

Project Owner; Location; Vendor; Combustor Type; Number of Boilers	Main Unit Steam Flow (Mlb/hr)	Power Output MW (net)	Fuel; Application	Start-up Date; Operating Status
York County Energy Partners; Spring Grove, PA USA; Foster Wheeler Energy Corp.; CFBC; 1 boiler	2,100	225	Bituminous coal; cogeneration	1998; planning
Electricite de France/Soprolif; Gardanne, France; Lurgi; CFBC; 1 boiler	1,540	225	Lignite; utility	1995; construction
Turow Power Station; Bogatynia, Poland; Ahlstrom Pyropower; CFBC (Pyroflow); 2 boilers	1,472	410 (2 boilers)	Lignite; utility	1996; planning
AES - Warrior Run; Cumberland, MD USA; ABB Combustion Engineering Systems; CFBC; 1 boiler	1,397	180	Bituminous coal; cogeneration	1999; planning
Nova Scotia Power Corporation; Point Aconi, Nova Scotia, Canada; Ahlstrom Pyropower; CFBC (Pyroflow); 1 boiler	1,163	165	Bituminous coal; utility	1993; operating
Wisconsin Public Service; Rhinelander, WI USA; ABB Combustion Engineering Systems; CFBC; 1 boiler	1,100	90	Subbituminous coal; cogeneration	1996; engineering
Texas-New Mexico Power Co.; Bremond, Robertson County, TX USA; ABB Combustion Engineering Systems; CFBC; 2 boilers	1,025	300 (2 boilers)	Lignite; utility	1990; operating
Tri-State Generation and Transmission; Nucla, CO USA; Ahlstrom Pyropower; CFBC (Pyroflow); 1 boiler	925	110	Bituminous coal; utility	1987; operating
ACE Cogeneration; Trona CA USA; Ahlstrom Pyropower; CFBC (Pyroflow); 1 boiler	910	96	Bituminous coal; cogeneration	1990; operating
CMIEC; Neijang, China; Ahlstrom Pyropower; CFBC (Pyroflow); 1 boiler	905	100	Bituminous coal; utility	1996; construction

Source: Correspondence from D. Simbeck to S. Van Ooteghem, dated January 24, 1995.

in the Nation. Other unique technological aspects of CFB combustor technology in general, and the proposed project specifically, are described in Section 2.1.2. The project proposed by YCEP is likely to be a successful demonstration project, based on engineering and scale-up design, while still maintaining a reasonable scale-up risk.

1.3.2 DOE Need

The goal of the CCT Program, as funded by Congress in 1985, is to make available to the ***United States*** energy marketplace advanced and environmentally responsive technologies for expanded coal utilization. Solutions to a number of key energy issues depend directly on the degree to which coal can be considered an available energy option. These issues include: (1) long-range requirements for increased power demand; (2) need for energy security; and (3) increased competitiveness in the international marketplace.

Almost 50 percent of the current inventory of electrical generating capacity in the United States will be more than 30 years old by 1997. The need to replace or refurbish this capacity, adding new capacity in addition to keeping pace with the rising demand for electricity, means that a major investment in electrical generation capacity should begin by the mid-1990s. Improved technologies using available energy resources must be developed and tested for use on a commercial basis prior to the year 2000 to keep pace with these economic and environmental challenges.

In DOE's examination of domestic energy-related security interests, contained in the Energy Security Report *(DOE, 1987)*, coal was recognized as having substantial potential to reduce dependence on imported oil and to enhance the energy security of the United States. The report notes that coal supplies are abundant in many countries and subject to widespread competition, and that coal availability is relatively insulated from foreign political manipulation. However, the report recognizes that coal's ability to compete with oil and gas needs to be improved. The report identifies five principal areas where action is needed:

- continuing contributions to the technological base for "clean coal" use;
- broadening opportunities to choose coal as a fuel;
- ensuring balanced environmental programs;
- expanding ***United States*** coal exports; and
- removing barriers to an efficient coal supply chain.

The CCT Program largely contributes to these recommended areas of activities.

DOE's need for the proposed project is to demonstrate the commercial viability of using utility-scale atmospheric CFB technology in a Cogeneration Facility to generate electric power and steam. The ability to show domestic and prospective overseas customers an actual operating facility running on ***United States*** coal, rather than a drawing-board concept or an engineering model, is expected to be a very persuasive inducement; and could provide the advantage that would sway overseas consumers to buy an American package of coal along with the proven clean coal technology that would allow companies to burn coal cleanly and effectively.

Utilities are generally risk-averse to new technologies due to strict environmental regulations and the need to prove long-term reliability and flexibility in different applications (different locations, feedstocks, and system configurations). Until ACFB technology has been successfully demonstrated at utility scale, electric utilities, financiers, and regulators are not as likely to consider the ACFB as an option to provide environmentally acceptable, coal-derived power.

There are a suite of coal-based processes and clean-up technologies that have been included in the Clean Coal Technology (CCT) Demonstration Program. There are various levels of maturity for these technologies, with those technologies being "high" on the maturity scale typically having a lower technological risk. The cost-shared financial assistance to be contributed by DOE for the proposed project reduces the risk associated with the project so that the demonstration process can be accelerated. There is a trade off between technology maturation and risk. This technological risk, which involves reliability, maintainability, operability, and performance characteristics, can also affect environmental performance. The proposed technology (ACFB with in-bed desulfurization) is a more mature technology than some of the others being demonstrated under the CCT Program; and because of its relative maturity, it tends to have a lower level of risk. The percentage of DOE funding is often associated with the level of technological risk. DOE proposes to fund this cogeneration project at approximately 20 percent of total cost.

The commercialization of environmentally progressive technologies for using coal is an important mechanism for the electric utility industry to balance the costs and benefits of generating electricity cost-effectively. The proposed YCEP Cogeneration Facility should significantly contribute to the environmentally acceptable technology options that are available to electric utilities, independent power producers, and cogenerators in their efforts to produce power economically from abundantly available coal. The proposed project, as compared with conventional technology (pulverized coal power plant) without additional controls, is expected to demonstrate at least a 92 percent reduction in emissions of sulfur dioxide (SO_2) and at least a 40 percent reduction in emissions of oxides of nitrogen (NO_x). It also is anticipated that the proposed project would operate at a greater efficiency than conventional technology so that less coal would be required during combustion to produce the same amount of power. Successful demonstration would indicate that this technology is a valid option available for power generators in complying with the existing provisions of the CAA (such as New Source Performance Standards, and Prevention of Significant Deterioration requirements), and for future compliance with provisions of Phase II of Title IV ("Acidic Deposition") of the CAA Amendments of 1990.

Successful demonstration of a technology in itself does not ensure that the technology will enjoy widespread deployment. As a part of the CCT Program, DOE works closely with industrial partners to develop plans for technology transfer and commercialization to help further the technology and expand its information base. DOE believes that development of this specific technology [the Foster Wheeler atmospheric circulating fluidized bed (ACFB) technology] will accelerate the demonstration process for ACFB technology and further the deployment of this clean coal technology.

1.3.3 YCEP Need

York County Energy Partners ***(YCEP)*** is a wholly-owned project company of Air Products and Chemicals, Inc., a Fortune 500 company headquartered in Allentown, PA. Air Products conducts business in three princip***al*** areas; industrial gases, specialty chemicals, and environmental and energy systems. Under the environmental and energy systems areas, Air Products is involved in the development, construction, ownership, and operation of cogeneration and independent power facilities. Air Products currently owns and operates three large (greater than 50 MW) cogeneration facilities and several smaller (less than 50 MW) cogeneration facilities.

During the course of its business development activities, Air Products became aware, through publicly available Pennsylvania Public Utility Commission (PUC) information, ***that Met-Ed could use power that a cogeneration plant could supply***. Each year, investor-owned electric utilities operating within the Commonwealth of Pennsylvania are required to file 20-year projections of future demands and the plans for meeting those demands *(Pennsylvania Code, Title 52, Sections 57.49 and 57.50, as cited in ENSR, 1994).* ***The bulk of the data filed pursuant to these regulations contains 20-year projections of electric demand and capacity, focusing attention on long-term, rather than short-term needs. Although*** these filings ***may not present a complete picture of Met-Ed's short-, intermediate-, and long-term needs, they provide an indication that*** Met-Ed ***could effectively use*** 500 to 550 MW of additional power for its system ***during the next 20 years.*** These filings also showed that Met-Ed is the fastest growing electric utility in the Pennsylvania/New Jersey/Maryland interconnected area, and the territory served by the utility is expected to experience inadequate reserve margins of electric generation capacity during most of the next 20 years.

In light of Met-Ed's ***capacity needs***, and in anticipation of submitting a proposal to Met-Ed to supply power from an Air Products' Cogeneration Facility, Air Products began evaluating potential sites for the proposed facility. This site evaluation culminated in early 1991 with the selection of the West Manchester Township site, and development activities began for a ***conventional, pulverized*** coal-fired Cogeneration Facility ***with flue-gas desulfurization*** at that proposed site. Air Products began these development activities under the project company YCEP.

In September 1991, YCEP became aware that the CCT Program funds for the City of Tallahassee project might be transferred to another project for subsequent demonstration. Because of YCEP's ongoing project development activities in West Manchester Township, YCEP expressed interest in the funding and was selected by DOE as the Industrial Participant in June 1992.

In October 1991, YCEP notified PUC of the potential for the CCT Program funding to be used to supply Met-Ed with power from the YCEP project being developed, and requested the PUC to order Met-Ed to enter into a power supply agreement. PUC concurred in an order issued November 1991 (Docket No. P-910549), and YCEP and Met-Ed executed a 227-MW, 25-year power supply agreement in April 1992. The 227 MW from the YCEP project, therefore, ***would provide additional capacity that the PUC believes Met-Ed will need*** during the 1990s.

1.3.4 Met-Ed's *Long-Term* Electrical Generating Capacity *Requirements*

Each year PUC reviews the adequacy and reliability of existing generation and transmission facilities and the Pennsylvania jurisdictional electric utilities' plans and projections for meeting the future energy needs of their customers. ***One of the sources of*** data ***for*** the current and future electric power supply and demand situation is ***the*** annual report prepared by the PUC's Bureau of Conservation, Economics & Energy Planning, entitled the *Electric Power Outlook for Pennsylvania, 1993-2013 (1994)*, with the 20 year review period updated each year.

The eleven investor-owned utilities operating within the Commonwealth of Pennsylvania generate the data contained in the *Electric Power Outlook for Pennsylvania* pursuant to the Commission's regulations in Title 52 of the Pennsylvania Code, Section 57.49 and 57.50. These regulations set forth comprehensive reporting requirements which include the following: (1) a 20 year projection of energy consumption and system peak demand by the customer sector; (2) individual forecasts for three load growth scenarios; (3) a breakdown of scheduled and projected imports and exports of capacity and energy, including transactions with subsidiaries, other public utilities, municipal systems, electric cooperatives, and cogeneration and small power production facilities; (4) a description of future capacity additions and the potential for additional system capacity achieved through improvements in efficiencies of the existing system operation; (5) a forecast of the potential for ensuring the full utilization of all practical and economical energy conservation and load management.

Met-Ed ***has reported to the PUC that it*** develops its least cost plan using a sequential process in which demand planning follows load forecasting and supply planning. The supply plan determines a cost-minimizing mix of supply options to serve the forecasted demand. Applying this approach and philosophy to its electrical system planning has resulted in ***an*** expectation that non-utility generation ***could*** provide an important share of ***Met-Ed's*** future resource additions, amounting to as much as 845 MW of Pennsylvania-New Jersey-Maryland Power Pool (PJM) capacity credits, or 32.5 percent of total resources, by the summer of 1998. Included in this projected Met-Ed resource base is the 227 MW capacity from the proposed YCEP project.

Met-Ed ***has reported that its*** electrical system capacity target is derived from its obligation to General Public Utilities (GPU), its parent company, as the official member of the PJM Power Pool. Both PJM and GPU are summer peaking systems and planning is done on a coordinated basis. Due to PJM's responsibility to plan for plant outages, extreme weather conditions, unforeseen load growth and other contingencies, PJM requires each utility member to plan for generating capacity over and above its projected peak demand. This buffer capacity that is planned to insure the availability of a reliable source of power is known as reserve margin. At the present time, the PJM reserve margin requirement is 22 percent of its summer peak load. This requirement is allocated among the PJM member companies, such as GPU, considering each company's load and generating capacities. GPU's reserve capacity requirement is then allocated among the three GPU sister companies (Met-Ed, Pennsylvania Electric, and Jersey Central Power & Light). Met-Ed's share of GPU's reserve margin has been projected to be between 23.1 percent and 24.4 percent over the 1994-2013 GPU planning horizon.

Notwithstanding the Power Purchase Agreement that Met-Ed ***has*** signed with YCEP, Met-Ed could fall short of its reserve margin requirements during ***many*** of the next 20 years. Quoting from the *Electric*

Power Outlook for Pennsylvania 1993-2013, Met-Ed projects its summer reserve margin to fall below its capacity target for most of the planning period.

On the basis of an independent review of Met-Ed's ***long-term power generation requirements,*** DOE has determined that additional electric generating capacity ***could help to meet those requirements. For a more thorough presentation of DOE's analysis of long-term electrical generating capacity requirements, especially information on energy requirements to meet reserve margins, see Appendix K, Volume III.***

1.4 National Environmental Policy Act (NEPA) Strategy

This environmental impact statement (EIS) has been prepared by DOE, in compliance with the NEPA of 1969, to evaluate the potential environmental impacts that would be expected to occur as a result of the construction and operation of a proposed clean coal technology demonstration project at North Codorus Township, Pennsylvania.

An overall strategy for compliance with NEPA was developed for the CCT Program, consistent with the Council on Environmental Quality (CEQ) NEPA regulations and DOE regulations for compliance with NEPA, which includes consideration of both programmatic and project-specific environmental impacts during and after the process of selecting a project. This strategy is called "tiering" (40 CFR 1508.28), and refers to the coverage of general matters in a broader EIS (e.g., for the CCT Program) with subsequent narrower statements of environmental analyses incorporating by reference the general discussions and concentrating solely on the issues specific to each subsequently prepared statement. Tiering eliminates repetitive discussions of the same issues and focuses on those specific issues appropriate for decision-making.

The DOE strategy has three principal elements. The first element involved preparation of a comprehensive Programmatic Environmental Impact Statement (PEIS) for the CCT Program, published in November 1989 (*DOE, 1989a*), to address the potential environmental consequences of widespread commercialization by the year 2010 for each of 22 successfully demonstrated clean coal technologies. The PEIS evaluated (1) a no-action alternative, which assumed that the CCT Program was not continued and that conventional coal-fired technologies with flue gas desulfurization controls would continue to be used for new plants or as replacements for existing plants that are retired or refurbished, and (2) a proposed action, which assumed that CCT Program projects were selected for funding and that successfully demonstrated technologies would undergo widespread commercialization by 2010.

The second element of the general strategy, a preselection environmental review based on project-specific environmental data and analyses, uses information supplied to DOE as part of the applicant proposal. Due to the YCEP site change, DOE reviewed environmental data submitted with the change-in-site application to ensure the proposed project would continue to meet the requirements of the PON. The preliminary review included site-specific environmental, health, safety, and socioeconomic issues associated with the project. The proposed re-sited project was found to meet the requirements of the PON.

The third strategic element requires preparation of site-specific NEPA documents for each selected project (such as this EIS for the proposed YCEP CFB Cogeneration Project). Consistent with the overall NEPA strategy for the CCT Program, DOE requires the Industrial Participant (i.e., YCEP) to produce an Environmental Information Volume *(ENSR, 1994)*. The YCEP Environmental Information Volume (EIV) included a discussion of alternative sites, and presented information on those sites that were dismissed from further consideration in the preparation of YCEP's proposal to DOE. The YCEP EIV is one of the major source documents used to prepare this EIS. In addition to the EIV, other source documents include supplemental reports (e.g., Wastewater Reuse Feasibility Study, Biodiversity Study, Prevention of Significant Deterioration Permit Application, and Human Health Risk Assessment) provided by YCEP and their contractors. Data provided to DOE in these documents have been independently reviewed and analyzed by DOE, the Army Corps of Engineers (ACOE), and their contractors. DOE used information in the EIV, source documents, and other supplemental information (such as that received from the public) for development of this EIS. Copies of the EIV and other supporting source documents used in the preparation of this EIS are available in the public reading rooms (Appendix A).

In defining the scope of alternatives under the CCT program cost-shared agreements, DOE's role is limited because the Federal government is neither the owner nor the operator of the proposed project. DOE has given substantial weight to the applicant's needs in defining reasonable alternatives. In a cooperative agreement with the applicant, the scope of alternatives is necessarily more restricted, so that DOE can focus on alternative ways to accomplish the programmatic goals based on the specific application being considered for funding.

Between the time of selection and development of specific NEPA documentation (the third element in the NEPA process), project-specific engineering and environmental issues were evaluated by DOE. The objective of these independent DOE analyses is to ensure that for each project, the technology selection was optimal both environmentally and in terms of cost-effectiveness and that the proposed facility was located at an environmentally sound and cost-effective site within the pertinent service area.

The proposed project was initially submitted in response to the first CCT PON based on the FY86 Appropriations Act, Pub. L. 99-190. The Arvah B. Hopkins CFB Repowering Project, sponsored by the City of Tallahassee, FL, was selected for negotiation from an alternative candidate list on June 23, 1989, after one of the previously selected participants and DOE mutually agreed to terminate their cooperative agreement. DOE determined that an EIS would be the required level of documentation under the NEPA process. A Federal Register Notice of Intent (NOI) to Prepare an EIS was published on October 15, 1990 (55 FR 41747). A public scoping meeting was held in the City of Tallahassee on October 30, 1990, to receive public comments.

Subsequently, the City of Tallahassee chose not to move forward with the proposed project. Other potential hosts for the project were considered, with the City of Tallahassee indicating its willingness to cooperate with the effort to relocate the proposed project. DOE then agreed to reassign the project, and it was relocated from Tallahassee, FL, to York County, PA, with YCEP replacing the City of Tallahassee as the Industrial Participant. YCEP planned to build the 250-MW gross (227-MW net) plant in West Manchester Township, PA, adjacent to the J.E. Baker Company quarry and brick manufacturing operations, where it was proposed to operate as a Cogeneration Facility supplying up to 40,000 lb/hr of steam to the J.E. Baker Company. All major aspects of the project would remain essentially unchanged from the proposed project sponsored by the City of Tallahassee, FL, except for the use of the facility for cogeneration of steam to be used by the J.E. Baker Company. DOE determined that an EIS would be the required level of documentation under the NEPA process. A Federal Register NOI to Prepare an EIS was published on August 11, 1992 (57 FR 35790). A public scoping meeting was held in West Manchester Township, PA, on August 26, 1992; approximately 400 people attended and 212 comments from 121 individuals were received. An Implementation Plan (for the preparation of an EIS) for the proposed project in West Manchester Township was drafted.

In the summer of 1992, YCEP sought opportunities to obtain air emission offsets from existing companies in the vicinity of the proposed project. Discussions with the P. H. Glatfelter Company indicated that air emission reductions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) could be achieved by the relocation of the project to a site adjacent to the P. H. Glatfelter Company paper mill facility in North Codorus Township [approximately 9.6 km (6 mi) from The J.E. Baker Company site]. On February 1, 1993, YCEP and the P. H. Glatfelter Company issued a joint statement that they were evaluating the feasibility of relocating the proposed YCEP project to the North Codorus Township site. DOE was requested to consider this proposed site change, and its approval was issued in a Cooperative Agreement Modification, dated June 23, 1993. DOE determined that an EIS would be the required level of documentation to obtain NEPA compliance.

DOE began preparation of the Draft EIS (DEIS) with the publication of an NOI to prepare an EIS and to conduct a public scoping meeting. The NOI was published in the Federal Register on Thursday, July 29, 1993 (58 FR 40631). Similar public notices were published in The Gettysburg Times, York Daily Record, and York Dispatch on August 3, 1993. A copy of either the NOI or the public notice also was sent to Federal, state, and local agencies, environmental groups, and other organizations to solicit information and their comments on the proposed project. A public scoping meeting was held on August 19, 1993, at the North Codorus Township Fire Company Auditorium in North Codorus Township, PA. The public was invited to provide oral comments at the scoping meeting and to submit additional comments in writing to DOE by the close of the scoping period on September 15, 1993. The meeting was attended by 375 individuals, 57 of whom presented oral comments regarding the proposed project. Additionally, 21 written comments were submitted at the scoping meeting for inclusion in the public record.

In response to the degree of public interest in this proposed project, and to ensure that all individuals who wished to present oral comments were accommodated, the public scoping meeting was continued on October 5, 1993. The NOI for the continuation of the scoping meeting was published in the Federal Register on Friday, September 17, 1993 (58 FR 48639), and similar public notices were published in the previously mentioned newspapers on September 17, 1993. Additionally, a copy of either the NOI for the continuation or the public notice was sent to Federal, state, and local agencies, environmental groups, and other organizations, as well as to the individuals who registered to speak at the August 19, 1993, meeting but did not have the opportunity. The public scoping meeting continuation resulted in a public comment period extension to November 5, 1993, to allow the public adequate time after the scoping meeting to submit written comments.

The public scoping meeting continuation was held on October 5, 1993, at the York County Fairgrounds in York, PA. The public was again invited to provide oral comments at the scoping meetings and to submit additional comments in writing to DOE by the close of the EIS scoping period on November 5, 1993. The scoping meeting continuation was attended by 95 individuals, 31 of whom presented oral comments. Fourteen written comments were submitted at the scoping meeting for inclusion in the public record.

More than 277 written comments were mailed directly to DOE postmarked on or before the November 5, 1993 close of the scoping period. Based on these comments, the comments presented at the scoping meetings, and other information gathered by DOE, an Implementation Plan (*DOE, 1994*) for preparation of this EIS was produced. This Implementation Plan summarizes the comments submitted, contains the procedures for completing this ***Final EIS (FEIS)***, and includes an outline of the topics to be included in this statement. The Implementation Plan (*DOE, 1994*) is available in public reading rooms (Appendix A).

The DEIS was produced in November 1994 and mailed to the individuals and agencies identified on the distribution list (see Chapter 13). A Notice of Availability (NOA) was published in the Federal Register by EPA on November 25, 1994 (59 FR 60614). The text of the NOA and public meeting notices for the first 3 days of public hearings (held December 14, 15, and 16, 1994) was also published in The Gettysburg Times, York Daily Record, and York Dispatch/York Sunday News on December 5, December 10, and December 11, 1994. The NOA and a public meeting notice were published in the York Sun (a Sunday paper) on December 11, 1994. In addition, a public service announcement on the York Cable TV community calendar was run beginning the first week in December 1994. All of the public hearings were held at the York Fairgrounds, Old Main Building.

Due, in part, to the degree of public interest in this proposed project, the close of the written comment period was then extended from January 10, 1995, to January 31, 1995. The extension of the written comment period was announced at each of the public hearings, and published in the Federal Register (59 FR 64653) on December 15, 1994.

At the beginning of the public hearing on December 16, 1994, it was also announced that DOE would hold a fourth day of public hearings at the York Fairgrounds in the Old Main Building in January 1995. The fourth day of public hearings was subsequently scheduled for January 18, 1995. Notice of the fourth day of public hearings was published in the Federal Register on December 28, 1994 (59 FR 66943). A legal notice regarding this additional day of public hearings was also published in the York Dispatch/York Sunday News, and the York Daily Record on January 3, 1995. Similar public meeting notices were published in the York Dispatch/York Sunday News and the York Daily Record on January 4, and January 17, 1995, and in the Gettysburg Times on January 3 and January 16, 1995.

The public was invited to provide oral comments at each of these hearings and to submit written comments to DOE by the close of the public comment period, January 31, 1995. In preparing the FEIS, DOE considered approximately 900 written and oral comments. Copies of these comments and their resolution are provided in Volumes II and III of the FEIS.

As part of the overall NEPA strategy for the CCT Program, this ***FEIS*** draws upon comments received from the public and other reviewing agencies, reports and studies prepared by YCEP and their contractors, the PEIS, and the pre-NEPA reviews including specific information submitted in support of site modification requests.

1.5 Scope of the EIS

This ***FEIS*** complies with DOE requirements for preparation of NEPA documents (10 CFR Part 1021) and is organized in accordance with CEQ recommendations (40 CFR 1502.10). Three alternatives are evaluated in detail in Chapter 2: the proposed action, which is to fund the project as proposed (Section 2.1.1); the alternative site, which is to fund a similar project, but at another location (Section 2.1.2); and the no-action alternative; not to provide funding for the proposed YCEP Cogeneration Facility (Section 2.1.3). Any other alternative that would not achieve the CCT Program goals is not within the scope of this document.

The NOI (58 FR 40631) listed several issues to be considered in detail in this document. These issues are listed in Table 1.5-1. The total response to the scoping process resulted in 614 separate comments from both the written and oral comments received through November 5, 1993. A summary of the issues raised during the scoping process is provided in Table 1.5-2.

A composite of the environmental impact issues covered in this ***FEIS*** is listed in Table 1.5-3 by the degree of detail provided. Inclusion of issues was based on both the public comments received through the public scoping ***and public hearing*** process***es*** and requirements for full public disclosure by DOE. The most detailed analyses focus on the level of impact that could be expected to air quality, water resources and quality, human health and safety, socioeconomic resources, traffic, and noise. This ***FEIS*** also examines solid waste, land use, biological resources and biodiversity, hazardous/toxic materials and waste, geology and soils, historical and cultural resources, pollution prevention, environmental justice, aesthetics, wetlands, electromagnetic fields, and cumulative impacts. The issues are evaluated in Chapter

Table 1.5-1. Issues identified in NOI.

Issue	Comment
Air Quality	The effects of air emissions within the region surrounding the site.
Water Resources and Water Quality	The qualitative and quantitative effects on water resources and other water users in the region.
Wetlands	Wetlands potentially impacted by facility construction and operation.
Socioeconomics	Potential bearing on communities that might be affected by the project, as well as consumer costs associated with the project.
Land Use	The potential consequences to land, utilities, transportation routes, and traffic patterns resulting from the project as well as issues related to prime farmlands.
Solid Waste	The environmental effects of generation, treatment, transport, storage, and disposal of solid wastes.
Biological Resources	Potential disturbance or destruction of species, including the potential effects on biodiversity and threatened or endangered species of flora and fauna.
Cultural Resources	Potential effects on historical, archaeological, scientific, or culturally important sites.
Cumulative Impacts	Impacts on the environment that result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions.
Pollution Prevention and Waste Minimization	Pollution prevention and waste minimization measures used during construction and operation of the proposed facility, and their potential impact on existing conditions.

4 for both the construction and operation phases of the proposed project, the alternative site, and the no-action alternative, where applicable. Mitigation measures are summarized in Section 4.4. In addition, the probable outcomes that would result from a successful demonstration, and from failure of the demonstration are discussed. The environmental impacts assessment methodology used for these analyses is provided in Appendix B.

DOE provides Federal agencies with the opportunity to become cooperating agencies according to jurisdiction by law or special expertise on environmental issues (40 CFR 1501.6). For this ***FEIS***, no agency has requested cooperating agency status. However, DOE has consulted with agencies having jurisdiction within the geographical area over natural resources and for regulations pertaining to the

Table 1.5-2. Issues identified during the scoping process.

Issue	Comment
Air Quality (148 comments)	Amount and composition of emissions; short-term and long-term effects of these emissions on the environment and community health.
Water Resources (92 comments)	Consumptive use of surface water and the composition and impact of the proposed facility's discharges on the surface water quality of Codorus Creek and the surrounding area waterways; impacts on thermal loads, suspended solids, dioxin, dissolved oxygen levels, and the aquatic community (warm water fishery) in Codorus Creek; impact on recreational aspects of Lake Marburg.
Human Health and Safety (83 comments)	Impacts to the long-term health of the community in general, and health impacts to those persons already experiencing respiratory problems.
Technology and Fuel Alternatives (64 comments)	Substitution of alternative technologies or alternative fuels for the proposed coal-based CFB technology.
Project Characteristics (54 comments)	Facility inputs, facility outputs, emissions monitoring, control devices.
Regulatory Compliance (55 comments)	Emissions standards, emission offsets, monitoring and enforcement of environmental standards.
Socioeconomic Resources (34 comments)	Number of jobs created by the project, the economic benefits to the county, impacts to electric rates.
Traffic (23 comments)	Impacts to the community because of increased vehicular and railroad traffic volume in the area; present traffic levels on Route 116 and Route 30 and the potential further degradation of traffic patterns/congestion near and around the proposed facility.
Noise (12 comments)	Potential for increased noise and cumulative noise levels because of the project, including noise resulting from increased traffic levels.
Biological Resources (5 comments)	Impacts to wetlands and floodplains on project site; impacts to aquatic species in Codorus Creek.
Geology and Soils (3 comments)	Impacts to local soils from all emissions.
Historical and Cultural Resources (3 comments)	Potential for site to contain pre-historic and historic resources; potential impacts to surrounding historical resources.
Land Use (1 comment)	Concern over amount of acreage required for proposed facility.
Other (37 comments)	Funding, NEPA process, role of the CCT Program, national agenda, economic and environmental benefits of CFB technology.

Table 1.5-3. Issues analyzed in the EIS and issues beyond the scope of the EIS.

Issues Analyzed in Detail

- Air quality
- Water resources and water quality
- Human health and safety
- Proposed project (including site and description)
- Regulatory compliance
- Socioeconomics
- Traffic
- Noise
- Alternatives
- Need for project

Other Issues Analyzed

- Solid waste
- Land use
- Biological resources and biodiversity
- Hazardous and toxic materials and wastes
- Historical and cultural resources
- Wetlands
- Electromagnetic Fields (EMF)
- Floodplains
- Pollution prevention
- Environmental justice
- Cumulative impacts
- Geology and soils
- Aesthetics
- Global Climate Change

Issues Beyond the Scope of this EIS

- Funding unrelated community projects (e.g., York bypass, local industry upgrades)
- Certain alternative technologies (e.g., oil, solar, wind power, and other clean coal technologies)
- YCEP contractual obligations
- Air Products' Cambria and Stockton plants

environmental protection of the region covered by this ***FEIS***, and information from these agencies has been used in the preparation of the ***FEIS***. These agencies have an interest in the outcome and can provide valuable input to the technical content and evaluation of the ***FEIS***; DOE will continue consultations throughout the process. A list of agencies that have been or may be consulted and the subject areas they may discuss is provided in Table 1.5-4.

Table 1.5-4. Agency consultations*.

Agency	Subject Area
U.S. Environmental Protection Agency	Air Pollution, Water Pollution, Water Use and Availability, Wetlands, Floodplains, Waste Management and Transportation, Noise, Pollution Prevention, Environmental Justice, Risk Assessments, Conformity Rule
U.S. Department of the Interior, U.S. Fish and Wildlife Service	Endangered Species, Migratory Birds, Wetlands, Floodplains, River Status
U.S. Department of the Interior, U.S. Park Service	Air Quality Related Values
U.S. Army Corps of Engineers	Navigable Waters of the United States, Wetlands, Floodplains
Federal Emergency Management Agency	Floodplains
U.S. Department of Transportation	Waste Management and Transportation
U.S. Department of Agriculture, Soil Conservation Service	Soils, Prime and Unique Farmlands
U.S. Department of Agriculture, U.S. Forest Service	Air Pollution
U.S. Department of Labor, Occupational Safety and Health Administration	Operational Hazards
President's Advisory Council on Historic Preservation	Archaeological, Historical, and Cultural Preservation
State Historic Preservation Officer	Archaeological, Historical, and Cultural Preservation
State Agencies	Endangered Species, Wildlife Habitat, Air Pollution, Water Pollution, Water Use and Availability, Wetlands, River Status, Noise, Waste Management and Transportation, Operational Hazards, Siting and Planning, Conformity Rule
Local Agencies	Archaeological, Historical, and Cultural Preservation, Air Pollution, River Status, Land Use, Socioeconomics, Transportation, Siting and Planning

* These consultations were undertaken to obtain full public disclosure of all aspects of the proposed project.

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2. THE PROPOSED ACTION AND ALTERNATIVES

2.0 Summary of Major Changes Since the DEIS

Section 2.1.2 (Summary Description of the Technology) was updated to reflect the unique aspects of the Foster Wheeler atmospheric CFB unit proposed to be demonstrated. Section 2.1.3 (Project Description) was revised to include a technology description of, and operational information on, P. H. Glatfelter Company's Power Boiler No. 4. Table 2.1-1 was updated to show expected radionuclide emissions for the proposed project. Statistics on the impacts of the proposed project to area (mine specific) coal reserves and national coal reserves are presented. Clarifying information related to the change in location of the proposed project from two other sites is included in Section 2.2.1.1 (YCEP's Site Selection Process). Revised emission rates for the proposed project at the West Manchester site are included in Section 2.2.3. A new ramification of the no-action alternative was included in Section 2.2.4 (No-Action Alternative). This ramification (discussed in more detail in Section 2.2.4.3) involves Metropolitan Edison Company's short-term purchasing of excess electricity from a power pool to accomodate reserve margin requirements. The rationale for not including associated air emission reductions (i.e., curtailment of P. H. Glatfelter Company's Power Boiler No. 4) in the no-action alternative is also presented in Section 2.2.4. An expanded discussion of the analysis and selection of the utility corridor alternatives by DOE is included in Section 2.2.5.1 (Alternatives Related to the Utility Corridors). In particular, the application and use of environmental criteria have been discussed in greater detail. Table 2.3-1 in Section 2.3 (Comparison of Alternatives) has been reformatted and updated to include more recent, clarifying, or additional information, as well as provide a comparison with the new no-action alternative ramification (electricity purchase from a power pool).

This chapter discusses the proposed action [to provide cost-shared funding support for the York County Energy Partners, L.P. (YCEP) Cogeneration Facility at the North Codorus Township site], construction and operation of the proposed facility at the alternative site (at the West Manchester Township site), and the no-action alternative [the Department of Energy (DOE) does not provide funding support for the proposed project]. In addition, a brief summary is included regarding additional site alternatives considered but rejected by the Industrial Participant. Finally, a comparative synopsis of potential impacts (discussed in detail in Chapter 4) is presented for the three alternatives. It should be noted that the philosophy of approach to defining the boundaries to be analyzed for the alternatives, including the proposed action, tiers on the information contained in DOE's Programmatic Environmental Impact Statement (PEIS) *(DOE, 1989a)*.

Under the National Environmental Policy Act of 1969 (NEPA), DOE is required to identify and assess reasonable alternatives to a proposed project that could potentially avoid or minimize adverse effects on the quality of the human environment. "Reasonable alternatives" are limited by the underlying legislation of the Clean Coal Technology (CCT) Program. The limits of reasonable alternatives are established in the goals of the Federal action. Congress directed the first solicitation for the cost-shared CCT Program to be open to all market applications of clean coal technologies, to apply to any segment of the ***United States*** coal resource base, to encompass both "new" and "retrofit" applications, and to make available to the ***United States*** energy marketplace a number of advanced, more efficient, economically feasible, and environmentally acceptable coal technologies. Congress also directed DOE to pursue the goals of the legislation by means of partial funding (cost-sharing) of projects owned and controlled by non-Federal government sponsors. This statutory requirement places DOE in a much more limited role than if the Federal government were the owner and operator of the project. In the latter situation, DOE would be responsible for a comprehensive review of all reasonable alternatives for siting the project. However, under the CCT Program, the scope of reasonable alternatives is necessarily more restricted. The DOE must focus on alternatives that accomplish its purpose and reflect both the application before it and the functions it plays in the decisional process. Therefore, it is appropriate that DOE has given substantial weight to the applicant's needs in establishing the reasonable alternatives for this project.

The following sections include discussions of the proposed location, the proposed technology, and project descriptions at the proposed site and at an alternative site; the no-action alternative and ramifications of this selection; and the alternatives considered but dismissed from further consideration.

2.1 Proposed Action at North Codorus Township Site

The proposed Federal action is for DOE to provide cost-shared financial assistance for the construction, design, and demonstration, of a utility-scale circulating fluidized bed (CFB) technology Cogeneration Facility to be located in North Codorus Township, York County, PA (Figure 2.1-1). YCEP, a project company wholly-owned by Air Products and Chemicals, Inc. (Air Products) would design, construct, and operate a 250-megawatt (MW) gross (227 MW net) coal-fired Cogeneration Facility on a 38-acre (15.4 hectares) parcel in North Codorus Township, adjacent to the P. H. Glatfelter Company Roundwood Facility and across Codorus Creek from the P. H. Glatfelter Company paper mill. The P. H. Glatfelter Company would purchase up to 400,000 pounds per hour (lbs/hr) of the steam [at a pressure of 4,136,854 newtons per square meter, pascal (600 pounds per square inch (psi) absolute) and temperature of ***360*** degrees Celsius (680 degrees Fahrenheit)] generated by the project, and the electricity produced

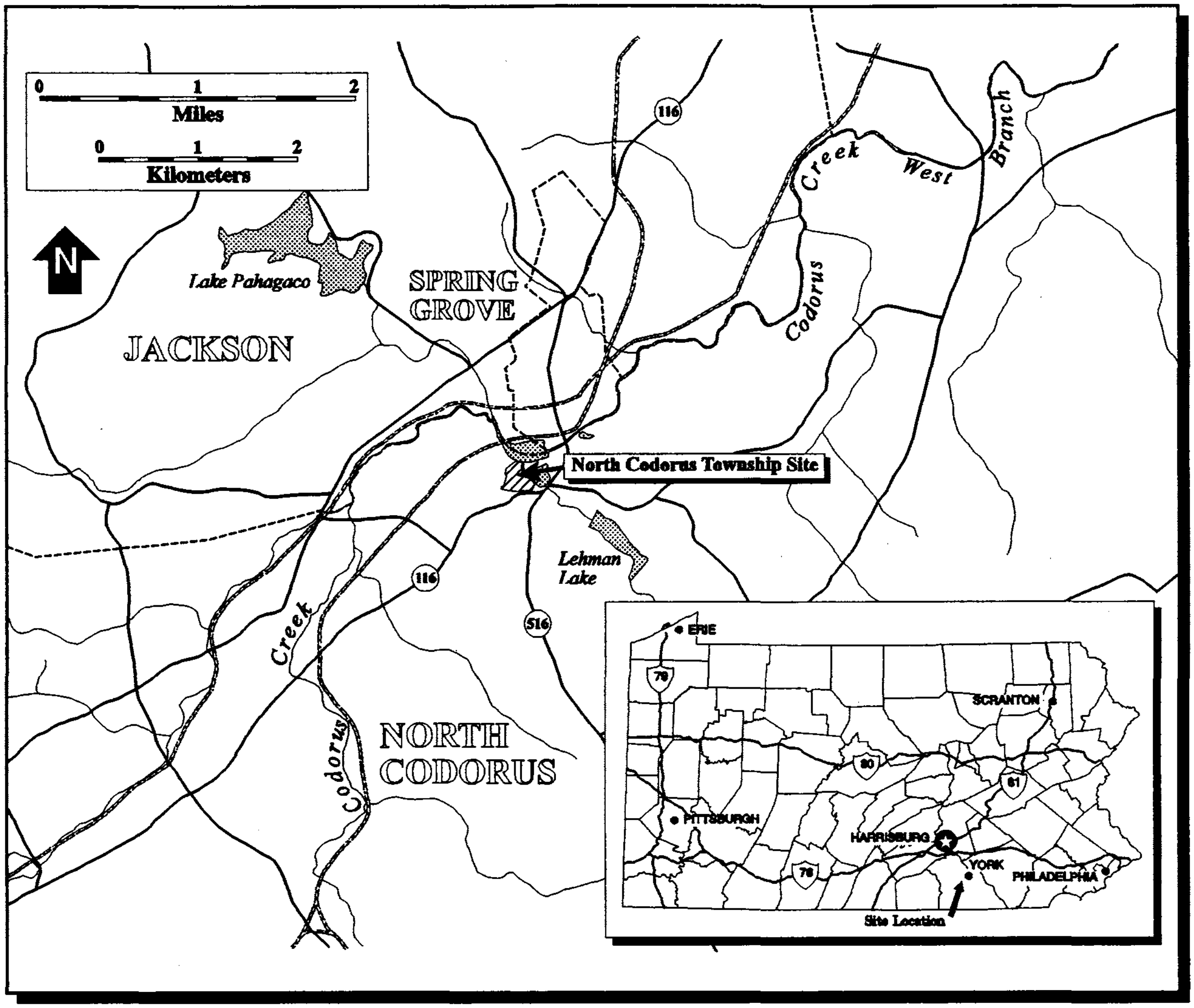

Figure 2.1-1. Regional map showing the North Codorus Township location of the proposed YCEP Cogeneration Facility.

(227 MW net) would be purchased and delivered to Metropolitan Edison ***Company*** (Met-Ed), a local utility company.

With the limited operation of the P. H. Glatfelter Company Power Boiler No. 4 and reduction of oxides of nitrogen (NO_x) emissions at another combustion source in York County, it is anticipated that the proposed project would result in an overall reduction of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) emissions within the York air basin. The potential emissions reduction numbers are based on a comparison of the projected permitted emissions of the YCEP facility and permitted emissions of the P. H. Glatfelter Company Power Boiler No. 4.

- A net reduction in potential sulfur dioxide (SO_2) emissions of 2,419 tons per year ***(tons/yr)*** would result from the curtailment in operation of the P. H. Glatfelter Company Power Boiler No. 4.

- Offsets of oxides of nitrogen (NO_x) required by the Clean Air Act, as amended 1990 (CAA) would be obtained from two sources in York County: the P. H. Glatfelter Company and the Transcontinental Gas Pipe Line Corporation. As a result of actions taken at each of these two sources, Emission Reduction Credits (ERCs) would be created and transferred to YCEP. A total of 1,652 tons/*yr* of ERCs would be required by YCEP to provide a 1.15-to-1 offset of oxides of nitrogen (NO_x).

- A net reduction in potential particulate matter (PM_{10}) emissions of 65 tons/*yr* would result from the curtailment in operation of the P. H. Glatfelter Company Power Boiler No. 4.

2.1.1 Project Location

The proposed YCEP Cogeneration Facility would be located on a 38-acre (15.4 hectares) site in North Codorus Township, York County, PA (Figure 2.1-2), across Codorus Creek from the P. H. Glatfelter Company paper mill. The site is bounded on the west by the P. H. Glatfelter Company Roundwood Facility, on the south by York Road (PA Route 116), and on the east and north by Kessler Pond, the mill pond (an impoundment of Codorus Creek), and Codorus Creek. The proposed facility site is approximately 9.6 km (6 mi) southwest of York, PA.

Mixed land uses surround the proposed site. The P. H. Glatfelter Company paper mill and Roundwood Facility represent the nearest industrial use of land. Small commercial uses (e.g., gas station, autobody shop) and a cluster of eight residences characterize development along York Road (PA Route 116) south of the site. Land west and northwest of the site is utilized for agricultural purposes.

The proposed project location has been intermittently vacant or used for agricultural and recreational purposes for the past 40 years. Currently, the site is unimproved, with the southern section leased for

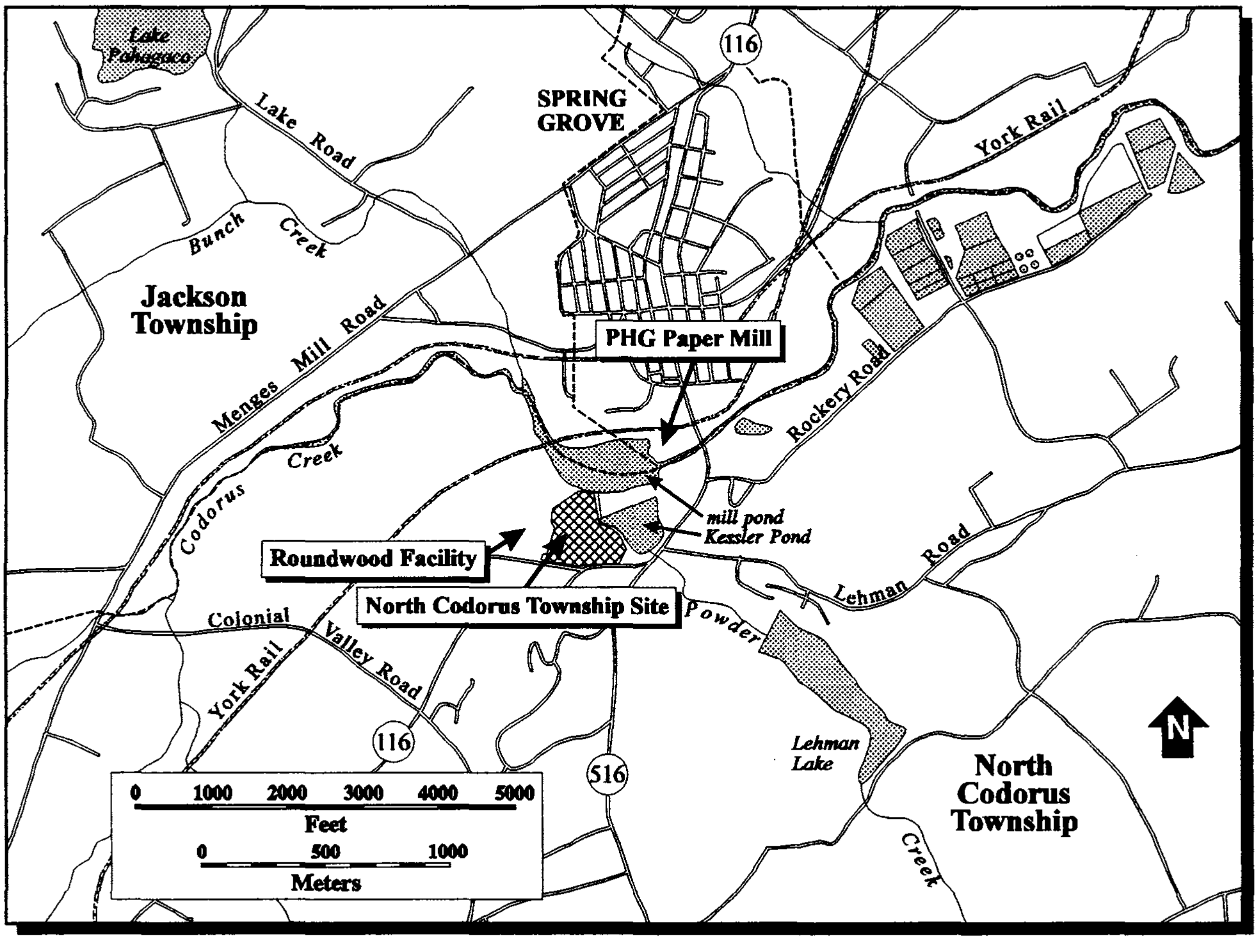

Figure 2.1-2. North Codorus Township location of the proposed YCEP Cogeneration Facility.

corn production, and the central section occupied by a baseball field used by the P. H. Glatfelter Company employees. A dirt and gravel road, entering from the west, provides access to the baseball field from the Roundwood Facility driveway located along the proposed site's southern boundary.

The proposed site is in proximity to major transportation facilities. A rail line owned by Yorkrail Company, with a right-of-way through the P. H. Glatfelter Company property, is located to the north of the proposed facility site. A new rail spur would be constructed from the existing rail line to provide rail access to the proposed YCEP Cogeneration Facility ***(for additional information, please see Section 2.1.3 and Figure 2.1-4)***. York Road (PA Route 116), accessed by an existing driveway to the P. H. Glatfelter Company Roundwood Facility, connects with Lincoln Highway (U.S. Route 30), a major east-west arterial roadway, approximately 9.6 km (6 mi) northeast of the site. Interstate 83, approximately 16 km

(10 mi) east of the site, provides regional access from the north and south through its interchange in York with U.S. Route 30.

2.1.2 Summary Description of the Technology

A boiler is basically a combustion vessel whose walls are lined with tubes containing steam and/or water that absorbs the heat generated from burning fuel. In CFB boilers, the burning of the coal actually takes place in a high temperature bed made up of coal, sorbent ***(to control sulfur dioxide [SO_2] emissions)***, and inert materials such as ash. The bed is fluidized by air nozzles in the bottom of the boiler, and supplied with air by primary air fans. The primary air expands the bed, creates turbulence for good mixing, and provides most of the air necessary for combustion of the fuel in the bed. During operation, the top part of the bed is carried over into a cyclone which uses centrifugal force to push the larger particles to the outside walls of the cyclone. The heavier particles fall out of the hot gas stream and are returned to the bed while the hot gases and smaller fly ash particles which remain entrained in the flow move into a backpass section where the heat may be transferred to tubes filled with steam or feedwater, or to combustion air in an air heater. Drains in the bottom of the boiler remove a fraction of the bed while new bed material, coal and sorbent, is added. In this way, ash is removed from the bed and the bed material is continuously recycled.

A CFB boiler has several unique operating characteristics which differentiate it from more conventional boiler technologies. Because the coal and sorbent being added represent only a fraction of the total coal and sorbent available in the bed, the boiler reacts more slowly to variations in coal or sorbent quality. Steam characteristics and boiler temperatures are more uniform, which usually results in easier operation, fewer upset conditions and emission spikes, and more consistent waste products. As a consequence of bed fluidization and the recycling back from the cyclone, good mixing is achieved at more uniform temperatures, and allows more complete combustion and sorbent reaction.

The mechanisms for heat transfer to the water phase in CFB boilers are mainly radiant transfer and convection. Particulate convection describes the unique type of heat transmission which occurs as the pulsing fluidized bed particulate comes in contact with the boiler walls. Because the continual action of the fluidized bed particles is very abrasive, refractory is used to protect the steel tubes in the bottom of the boiler and in other areas prone to erosion.

The proposed YCEP Cogeneration Facility would demonstrate the performance of a 250-MW (gross), ***(2.1 million lb/hr steam)*** coal-fired, single-boiler CFB system. The proposed facility would consist of one CFB boiler and supporting equipment. The boiler would release combustion gases through a 120.4-meter (m) [395-foot (ft)] high stack. The steam generated in the single CFB boiler would be used to drive a steam turbine to produce electricity for sale to Met-Ed. A portion (approximately 20 percent) of the high pressure steam exiting the steam turbine would be sold to P. H. Glatfelter Company for use in its paper mill operations.

The primary components of the proposed CFB combustion process are shown in Figure 2.1-3. This flow diagram includes the major components of the process such as the CFB boiler, cyclone, baghouse, selective non-catalytic reduction (SNCR) system, and flue gas stack. ***SNCR typically refers to the addition of chemicals, such as ammonia, to a gas stream which would react without the use of catalysts with nitrogen-containing gases (such as nitrogen dioxide [NO_2]) to form nitrogen gas (N_2) and water (H_2O).***

A number of water-filled tubes, collectively known as waterwalls, would line the CFB boiler walls. Heat would be removed from the CFB boiler combustion chamber by these waterwalls. The water in the waterwalls would be converted to high pressure steam and superheated in tube bundles positioned in the solids circulating stream and the flue gas stream. The high pressure steam would be used to drive a steam turbine-generator to produce electricity, with approximately 20 percent of the steam exiting the turbine directed to the paper mill, resulting in cogeneration.

The relatively low combustion temperature inherent to CFB technology limits formation of oxides of nitrogen (NO_x), and optimizes sulfur capture. The SNCR system would be employed to further reduce emissions of oxides of nitrogen (NO_x). In this process, aqueous ammonia would be injected into the CFB boiler exhaust gas to convert the oxides of nitrogen (NO_x) to nitrogen and water through a reduction reaction. To control the sulfur dioxide (SO_2) formed during combustion of coal, limestone would be added to the CFB boiler. When heated in the CFB boiler combustion chamber, the limestone, consisting principally of calcium carbonate ($CaCO_3$), would convert to calcium oxide (CaO) and carbon dioxide (CO_2). The calcium oxide (CaO) would react with the sulfur dioxide (SO_2) emitted in the coal burning process, forming calcium sulfate ($CaSO_4$), an inert gypsum material that would be removed with the coal ash.

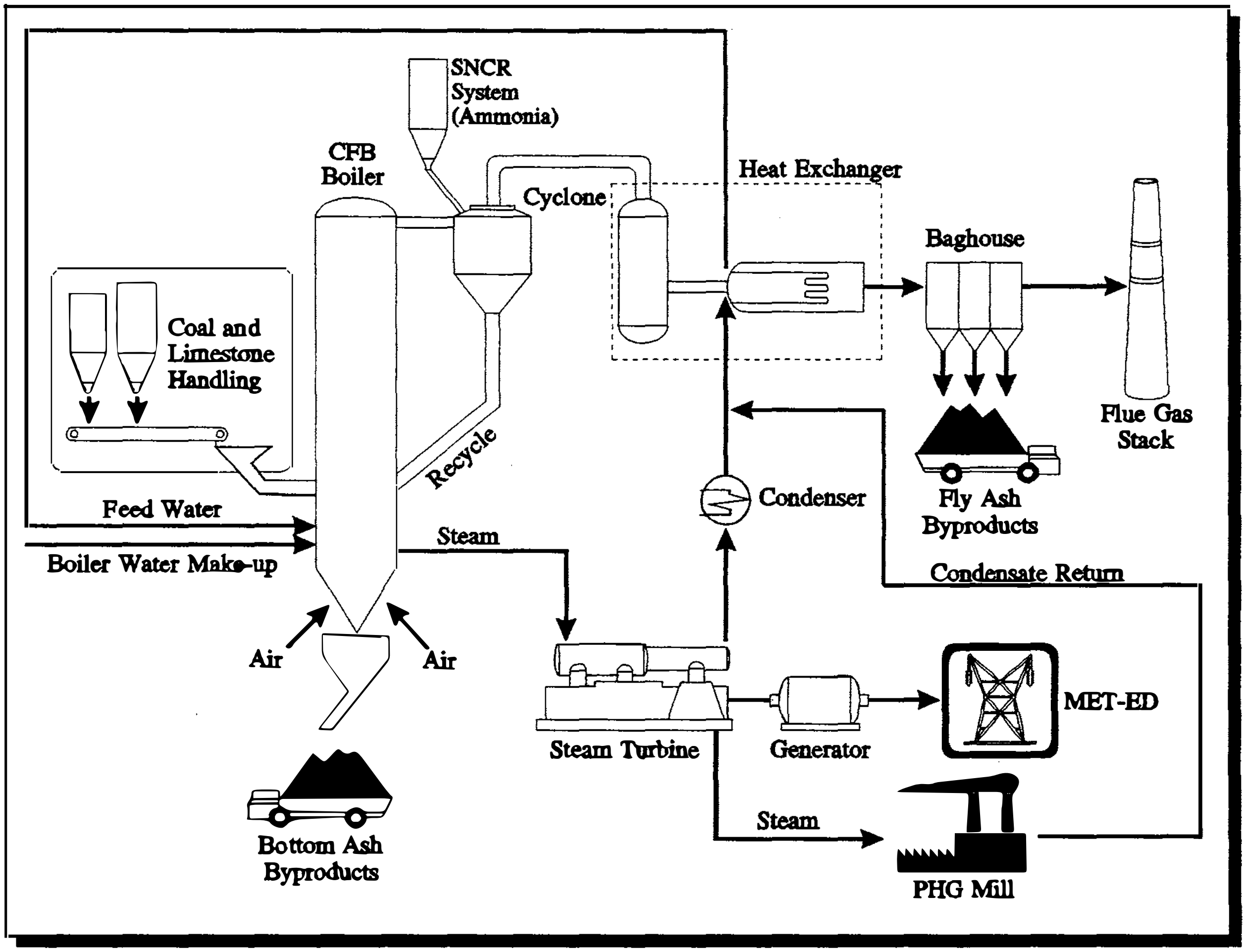

Figure 2.1-3. Diagram of the CFB combustion technology process.

The solid wastes that would be produced as a result of combustion consist of dry and benign solid calcium sulfate ($CaSO_4$) and coal ash. The ash byproduct would be collected from the following areas: bottom ash material would be collected from the CFB boiler, and fly ash material from the air heater hoppers and baghouse hoppers. The ash byproduct would be suitable for beneficial uses such as construction aggregate, agricultural fertilizer, and for use in reclaiming surface mining areas, or failing beneficial use, for permitted landfill disposal.

The Foster Wheeler atmospheric CFB boiler technology proposed by YCEP represents several unique advances in technology. One unique feature of the proposed YCEP plant is the scale of the fluidized-bed unit in terms of steam production. This unit would produce 2.1 million pounds per hour

(MMlb/hr) of steam. This steam flow is considerably larger (25 percent larger) than any unit that has been built, planned, or is under construction anywhere in the world.

In addition to the size parameter, the proposed YCEP project is unique because of a combination of features when compared to other ACFB combustors being planned, designed, or constructed. First, the proposed facility would reuse wastewater from pulp mill operations as cooling water for the boiler steam cycle cooling exhaust. This means clean water resources are preserved.

Second, the proposed boiler would have a water-cooled full division wall that would improve water circulation, and thereby improve temperature uniformity and reduce unit height. Pressure equalization openings would be provided in the division wall to equalize pressures across the boiler, and fins between tubes also would be removed in lower and upper sections of the boiler for this purpose. (Balanced heat release and absorption are important for maintaining combustor temperatures to allow for optimal sulfur dioxide (SO_2) capture and reduced oxides of nitrogen (NO_x) emissions while remaining below ash-fusion temperature and achieving a high combustion efficiency.)

Third, the proposed boiler would include an INTREX™ heat exchanger to increase heat transfer surface area, thereby decreasing the required height of the boiler. Fourth, the YCEP boiler has also been designed for high sorbent utilization efficiency by advantageous placement of front and rear wall feeders to allow for lower feed rates and longer residence times for feedstock (coal and limestone). Fifth, this boiler has been designed to have a relatively short mixing zone and air-swept coal distribution to allow for optimal solids mixing. The YCEP boiler would use four cyclones in parallel to absorb heat while recycling fine particles back to the boiler furnace. Conventionally sized cyclones would be used, since particle collection efficiency tends to decrease for the same gas inlet velocity as cyclone size increases.

2.1.3 Project Description

The proposed net 227-MW Cogeneration Facility, consisting of one CFB boiler and supporting equipment, would be designed to operate continuously (24 hours per day, 365 days per year), with the exception of outages for maintenance purposes, for an expected period of 25 years. Output of the facility would range from 114- to 227-MW (net) depending on Met-Ed's hourly power requirements. When operating at less than 100 percent capacity, coal and limestone use would be decreased. Steam generated in the CFB boiler would be used to drive a steam turbine to produce electricity for sale to Met-Ed. Up to 400,000 lbs/hr of the high pressure steam [at a pressure of 4,136,854 newtons per square meter, pascal (600 psi absolute) and a temperature of ***360*** degrees Celsius (680 degrees Fahrenheit)] exiting the steam turbine would be sold to the P. H. Glatfelter Company for use in their paper mill operations. Although Met-Ed reserves the right to dispatch the facility down to a minimum of 50 percent electrical load, the YCEP facility is being designed as a baseload facility which would operate at full load. The power sales contract does not have specific language on the number of hours per year the facility could be dispatched. A conservative operation estimate expected by YCEP would be for the facility to operate in dispatch mode 1,000 hours per year of which 500 hours per year would be at 50 percent electrical load and 500 hours per year at 75 percent electrical load. It should be noted, however, that high pressure steam ***would*** be supplied to the P. H. Glatfelter Company regardless of the electrical dispatch condition of the YCEP facility.

As a benefit of the proposed project, the P. H. Glatfelter Company would curtail operation of one of their existing coal fired boilers. Power Boiler No. 4 would be placed on hot stand-by. (Hot stand-by refers to the use of low pressure steam from other P. H. Glatfelter Company facilities to keep Power Boiler No. 4 hot and readily available for use.) During periods when the YCEP CFB unit is down for maintenance, or other rare circumstances such as the loss of steam production from another P. H. Glatfelter Company boiler, Power Boiler No. 4 would operate to provide the steam supply necessary for mill operation. It is anticipated that Power Boiler No. 4 would be limited through a federally enforceable permit to operate no more than 720 hours per year [or the operating equivalent of 720 hours of ***oxides of nitrogen*** (NO_x) emissions at full output] in parallel with the proposed YCEP facility. However, in the event that the proposed facility is not operating, Power Boiler No. 4 would be allowed to run without time constraints on operation. The operation of Power Boiler No. 4 under the modified permit is discussed in more detail in Section 4.1.2.3.

Power Boiler No. 4 began operation in 1956 and presently produces a maximum steam flow of 300,000 lbs/hr of 600 psig superheated steam by burning up to 290 tons of coal per day. It has an average annual steam production rate of 260,000 lbs per hour, and serves as the peaking unit for the P. H. Glatfelter Company's boiler/steam system. Power Boiler No. 4 was manufactured by Combustion Engineering as a front wall-fired, dry-bottom, pulverized coal unit which burns coal from western Pennsylvania and northern West Virginia.

In 1993, a total of 94,446 tons of coal were burned in Power Boiler No. 4. The coals used in this boiler have had various characteristics over the past few years; however, the coal used is roughly 8 percent ash and has a higher heating value (hhv) of about 13,200 Btu/lb.

Power Boiler No. 4 undergoes yearly routine maintenance during the annual plant-wide outage each summer. Over the past 10 years, the boiler has not experienced any unscheduled or emergency outages. Over the last 6 years, it has averaged a yearly operating time of 8,555 hours, which equates to an equivalent yearly operating rate of 97.6 percent.

Power Boiler No. 4 employs a multi-cyclone dust collector and an electrostatic precipitator which is shared with other P. H. Glatfelter Company units for particulate removal before the gas exits the 200-foot (above grade) stack.

In July of 1994, a major modification was performed on Power Boiler No. 4 to decrease oxides of nitrogen (NO_x) production. The low-NO_x retrofit was required to bring this boiler up to Reasonably Available Control Technology (RACT) standards as required by Pennsylvania's State Implementation Plan pursuant to the Federal Clean Air Act. This modification, which altered the burner and combustion air flow configuration, decreased oxides of nitrogen (NO_x) production in the stack gas and also decreased boiler efficiency somewhat, resulting in slightly higher coal feed rates to maintain the same steam production. No other major parts, replacements, or repairs have been made to this boiler over the last 10 years (the P. H. Glatfelter Company has attested to the fact that the boiler is in good operating condition and, if the proposed YCEP boiler is not built, would continue operation.)

The site plan for the proposed YCEP Cogeneration Facility, indicating the location of major system components, is presented in Figure 2.1-4. Landscaping and the creation of berms would be incorporated into the facility design to screen ground level activities from York Road (PA Route 116). A new rail spur, from the existing rail line onto the proposed site, would be designed to ensure that railcars delivering coal are accommodated completely off the main line to eliminate potential impacts to rail traffic on the Yorkrail line.

General operational characteristics of the proposed YCEP Cogeneration Facility, at 100 percent capacity, are presented in Table 2.1-1. Components of the proposed project are described below. A detailed description of the system specifications for the proposed YCEP Cogeneration Facility is provided in the Response Document for the Department of Environmental Resources' request for additional information

Table 2.1-1. Expected operating characteristics of the proposed YCEP cogeneration facility at full load, 100% capacity.

Characteristics	Inputs	Outputs
Capacity, MW		250 gross (227 net)
Capacity to Met-Ed, MW		227
Steam to P.H. Glatfelter Company		400,000 lbs/hr
Fuel Consumption per year (2,500 tons/day of coal expected at 100% capacity)	912,500 tons/yr	
Limestone Consumption per year (552 tons/day of limestone expected at 100% capacity)	201,480 tons/yr	
Aqueous Ammonia Consumption per year (19.2 tons/day for SNCR system)	7,008 tons/yr	
Propane Consumption per year (CFB Boiler start-up, liquid propane vaporizer burner, thaw shed space heaters)	300,000 gallons/yr	
Air Emissions		
Sulfur Dioxide (SO_2)		2,891 tons/yr
Oxides of Nitrogen (NO_x)		1,437 tons/yr
Particulate Matter (PM_{10})		127 tons/yr
Carbon Monoxide (CO)		1,726 tons/yr
Carbon Dioxide (CO_2)		2,328,968 tons/yr
Volatile Organic Compounds (VOC)[a]		48 tons/yr
Evaporation and Drift		2.5 mgd
Radionuclides[b]		*279 mCi/yr*
Water Requirements		
Cooling Tower Make-up Water (Source: P.H. Glatfelter Company wastewater treatment plant effluent and YCEP process streams)	4.2 mgd	
Boiler Water Make-up (Source: P.H. Glatfelter Company condensate return, hot lime softened water, process water)	1.2 mgd	
Potable Water (Source: Spring Grove Water Co.)	2,800 gpd	
Water Effluents		
Cooling Tower Blowdown		1.7 mgd
Sidestream Filter Backwash		0.06 mgd
Sanitary Wastewater		6,000 gpd
Solid Waste		
Ash Byproduct		270,000 tons/yr

[a] ***VOC speciation data are shown in Table 4.1-11.***
[b] ***Individual radionuclide emissions are listed in Tables 4.1-12 and 4.1-12a.***

Source: ENSR, 1994.

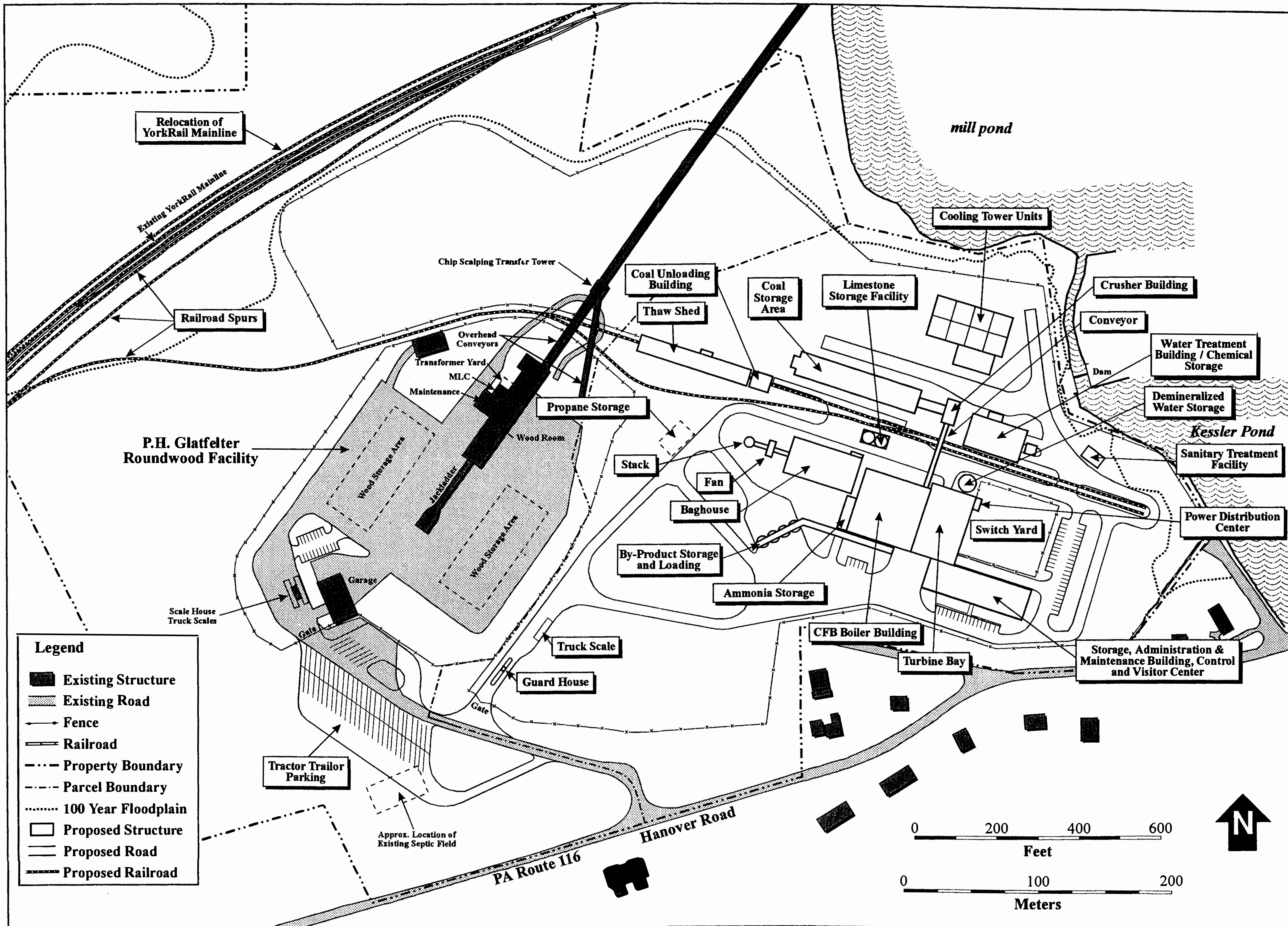

Figure 2.1-4. Proposed YCEP cogeneration facility site plan for the North Codorus Township site.

on the Prevention of Significant Deterioration (PSD) Air Quality Permit Application issued February 8, 1994 (*YCEP, 1994b*). The major commitments of this PSD permit are discussed in Section 4.1.2.1 and Appendix I of this ***Final Environmental Impact Statement (FEIS). In addition, a detailed listing of volatile organic compound speciation and estimated radionuclide emissions can be found in Sections 4.1.2.7 (Air Toxics and Trace Elements) and 4.1.2.8 (Radionuclide Emissions) in Tables 4.1-11 (volatile organics) and 4.1-12 through 4.1-12c (radionuclides).***

Facility Inputs

During operation of the proposed facility, the primary fuel supply would be eastern bituminous coal with an expected sulfur content of 2 percent or less. Consol's Bailey/Enlow mine [approximately 320 km (200 mi) west of the proposed site] would supply washed coal by 100-ton capacity railcars to the proposed YCEP Cogeneration Facility. The air permit for the proposed facility would be based on the use of 2 percent sulfur coal. The properties of bituminous coal expected to be consumed in this facility are listed in Table 2.1-2. It is anticipated that the proposed facility would utilize approximately 2,500 tons per day of coal at maximum capacity. The P. H. Glatfelter Company facility currently uses up to 1,000 tons per day of coal in the generation of steam and power. Of this total, up to 290 tons per day of coal is currently consumed in the operation of Power Boiler No. 4.

For the proposed project, the actual coal consumption (roughly 800,000 tons/yr) represents approximately 6 percent of the 13 million tons/yr of coal currently mined from Consol's Bailey/Enlow mines (which comprise the largest mining operation in Pennsylvania) and 0.08 percent of the 1 billion tons/yr of coal mined domestically. On an industry basis, roughly 474 billion tons are currently recognized as the "United States Demonstrated Coal Reserve Base." Of this, 265 billion tons are considered "recoverable" (Energy Ventures Analysis, Inc., May 1994; Keystone Coal Industry Manual, 1989). Because all of the coal consumed by the YCEP facility in its 25-year life would represent 0.0075 percent of current recoverable United States reserves, the proposed project would not have an appreciable effect to the coal mining industry as a whole. Thus, a discussion of the effects of the proposed project related to coal industry in general is not included in this Environmental Impact Statement. With respect to the Bailey/Enlow mines, there are a number of existing coal customers which purchase far more coal from the mine than the 6 percent that would be attributable to YCEP. Additionally, it is probable that some portion of the YCEP coal requirement would be procured from a secondary source, reducing YCEP's demand from the Bailey/Enlow operation to less than 800,000 tons/yr. Given the small percentage of total coal that would be mined at the Bailey/Enlow mines for

the proposed project, the Bailey/Enlow mines would not depend on the proposed project to justify its existence, and the proposed project would not have an appreciable effect on the existence, operation, or environmental impacts associated with the Bailey/Enlow mines. Therefore, a discussion on the effects of the proposed project related to specific mining impacts at the Bailey/Enlow mines is not included in this Environmental Impact Statement.

Table 2.1-2. Expected properties of the design coal for the proposed project.

Proximate Analysis	
Heat Value (Btu/lb)	13,000
Sulfur (%)	≤ 2.0
Ash (%)	< 10.0
Moisture (%)	7.0
Fixed Carbon (%)	51.0
Volatile Matter (%)	37.0
Ultimate Analysis (Dry)	
Carbon (%)	78.0
Hydrogen (%)	5.5
Nitrogen (%)	1.2
Chlorine (%)	0.10
Mineral Ash Analysis	
Sodium Oxide (%)	0.7
Potassium Oxide (%)	1.3

Source: ENSR, 1994

Coal, washed at the coal mine's on-site preparation plant, would be delivered to the YCEP site by rail via a new rail spur that would be constructed from the existing rail line into the proposed facility. In order to provide rail service to the proposed facility, a rail spur and an accompanying ladder track arrangement would be constructed on the site. In addition, an accompanying ladder-track arrangement would be constructed on P. H. Glatfelter Company property to allow for staging of railcars. The rail spur would connect ***to*** the existing Yorkrail track and would extend across the project site through the thaw shed, rotary dumper, and past the coal storage silos. The rail spur would be approximately ***914 m (****3,000****)*** ft in length. ***T***o temporarily store the unit train off the main Yorkrail line during unloading, five ladder tracks, each holding 18-20 cars, would be constructed adjacent to the Yorkrail line on property to be owned by YCEP. Coal would be delivered every 4 to 5 days by unit train shipments, consisting of 80 to 100-ton open top railcars with rotary couplers. The rail transportation company would separate the unit train into 18 to 20 car segments, and position them on the ladder track for unloading. A diagram indicating the proposed coal handling and storage facilities at the North Codorus Township site is presented in Figure 2.1-5.

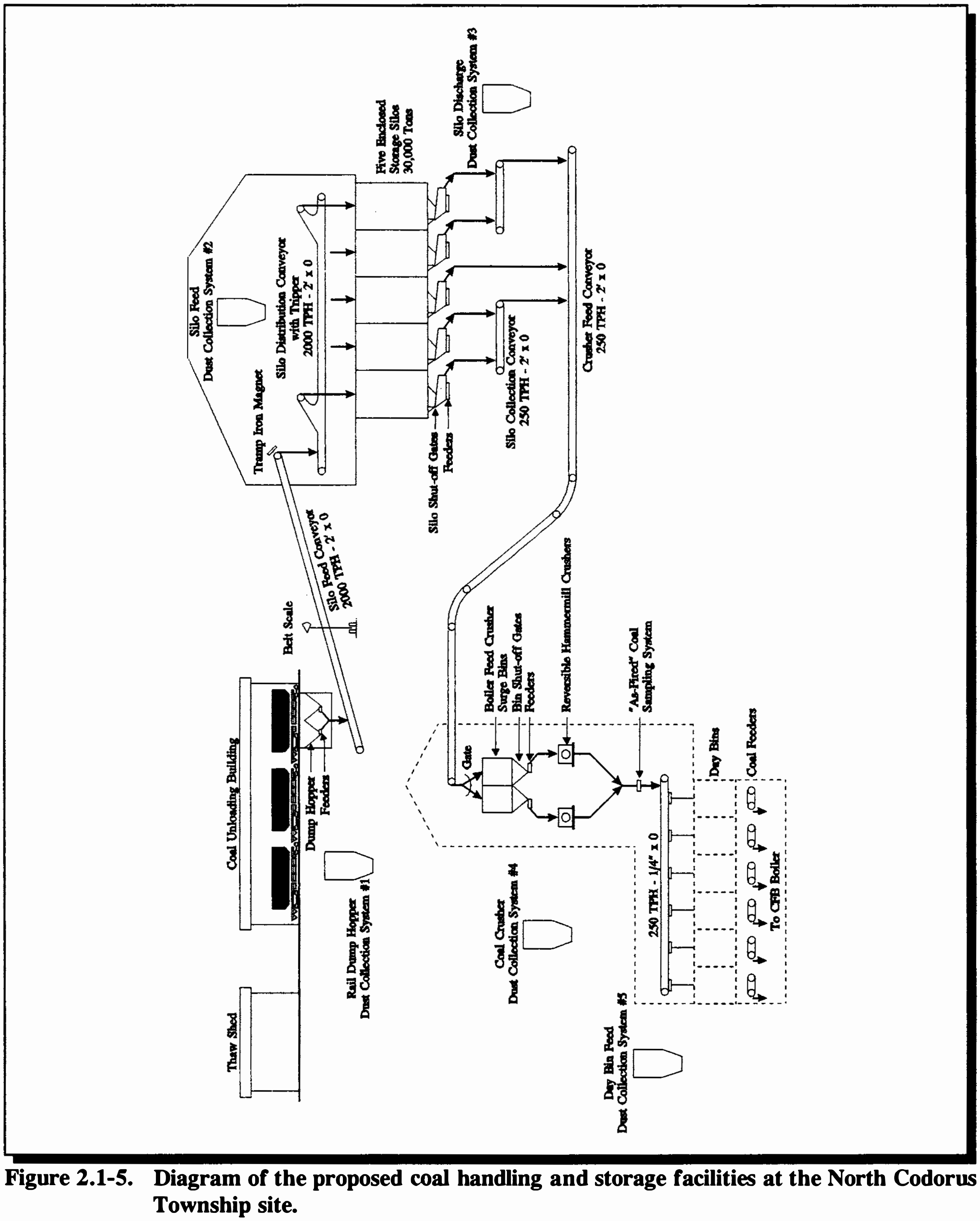

Figure 2.1-5. Diagram of the proposed coal handling and storage facilities at the North Codorus Township site.

In the event of a pending interruption to coal delivery (e.g., a rail strike or coal mining strike), coal would be staged in advance at Yorkrail's staging area in West York to provide an additional five day fuel supply that would be delivered by Yorkrail personnel. In a worst case extended strike scenario, electrical output of the proposed facility would be curtailed to extend the available fuel supply, including the back-up supply, to 25 days of operation. Following this period, coal would be delivered to the proposed facility by truck at a rate of three trucks per hour. The proposed facility would include an emergency truck dump system for coal delivery in the event of disruption of rail delivery. It should be noted that the facility would only accept coal by truck during an emergency, and then only for short periods of time.

Key features of the proposed coal handling and storage facilities include a dust control system for coal unloading and a propane-heated thaw shed for heating railcars prior to unloading during winter months. Coal would be unloaded inside the coal unloading building (a completely enclosed structure) by the rotary railcar dumper, dumped into a two-section 300-ton capacity rail dump hopper, and would be discharged to the rail dump conveyor. The rail dump conveyor would transfer the coal onto the silo feed conveyor. The silo feed conveyor would discharge the coal to the silo distribution conveyor, allowing the coal to fill each of the five 6,000-ton capacity storage silos. A 30,000 ton (approximately 12-day) supply of coal would be maintained in the five enclosed silos. Material handling systems would be totally enclosed to minimize noise, supplied with a fire suppression system, and equipped with dust collection systems to minimize the potential for fugitive dust emissions and suspended solids discharge in stormwater runoff. From the storage silos, the coal would be transferred by enclosed conveyance to the boiler house.

Each of the five coal storage silos would discharge coal to belt feeders that would transfer the coal to one of the 50-ton capacity crusher surge bins. From the surge bin, the crushed coal would be transferred to a reversible hammermill crusher via a vibrating feeder. The hammermill crusher would reduce the coal to a smaller size (less than or equal to ¼ inch) which would be transferred ultimately to one of the six day bins. An "as-fired" coal sampling system would be installed downstream of the coal crushers to obtain representative coal samples to monitor incoming coal characteristics. From the day bins, coal would be conveyed on a gravimetric feeder belt into the CFB boiler.

Due to the unavailability of natural gas (no gas mains with adequate capacity are in the vicinity of the proposed site), propane would be used as start-up fuel for the cold start-up of the CFB boiler, and as fuel for the thaw shed space heaters and the propane vaporizer burner. For each cold boiler start-up, the CFB boiler would be warmed using the propane-fired auxiliary burners to minimize the potential for thermal shock to boiler components. Cold start-up would take approximately 5 hours and the auxiliary burners would consume propane fuel. Liquid propane consumption for CFB boiler start-up is estimated at 183,300 gallons per year based on six boiler cold start-ups, and 117,000 gallons per year for other consumptive uses (e.g., thaw shed heaters). Propane would be delivered by truck and stored on site in three 30,000-gallon horizontal tanks located west of the boiler baghouse.

Pulverized limestone, the solid sorbent used in the proposed CFB system for sulfur dioxide (SO_2) emissions control, would be delivered in 25-ton capacity enclosed trucks to the limestone unloading area of the proposed facility. In addition, some portion of the limestone may be provided by 100-ton capacity railcars. Limestone is readily available from sources within a 64 km (40 mi) radius of the proposed site. A specific quarry has not been contracted to supply limestone to the proposed project, but availability of limestone would not be a problem. The proposed limestone handling and storage system for the North Codorus Township site is depicted in Figure 2.1-6. Delivery would occur during daytime hours on weekdays. It is anticipated that on a typical weekday, approximately 31 trucks would deliver limestone to the proposed facility. The limestone would be pneumatically (air blown) transferred from the delivery trucks to the 80-ton limestone receiving hopper, and from the receiving hopper to one of two 1,100-ton storage silos. At a usage rate of approximately 550 tons per day, the limestone storage silos would provide approximately a 4-day supply of limestone (i.e., 2,200 tons). The amount of limestone stored on site is less than the amount of coal because the risk of service interruption for limestone is lower than that for coal. Additionally, commercial suppliers of limestone are more abundant locally than coal suppliers. The potential for fugitive dust emissions would be minimized by the enclosed material transfer systems, as well as by dust collection equipment that would be included at air exhaust points. Limestone silos would be provided with one outlet each from which to discharge to a day bin. Limestone material would be pneumatically transferred from the storage silo to the bins in the boiler house. The limestone material would then be fed directly from the day bins into the CFB boiler.

A chlorine dioxide (ClO_2) solution would be used in the cooling water recirculating system as the biocide for controlling microbiological growth (algae) ***(ENSR, 1994)***. Chlorine dioxide is an effective biocide with constant activity over a broad pH range. The chlorine dioxide solution would be made on site in a water stream by mixing sodium chlorite ***($NaClO_2$)*** with sodium hypochlorite ***(NaOCl)*** and hydrochloric acid (HCl) or by mixing sodium chlorate ($NaClO_3$) and ***hydrochloric acid*** (HCl).

Although the chlorine dioxide (ClO_2) solution is a more expensive option for biocide control over chlorine gas, the use of chlorine dioxide was determined to be the best alternative for this cooling water treatment application for the following reasons.

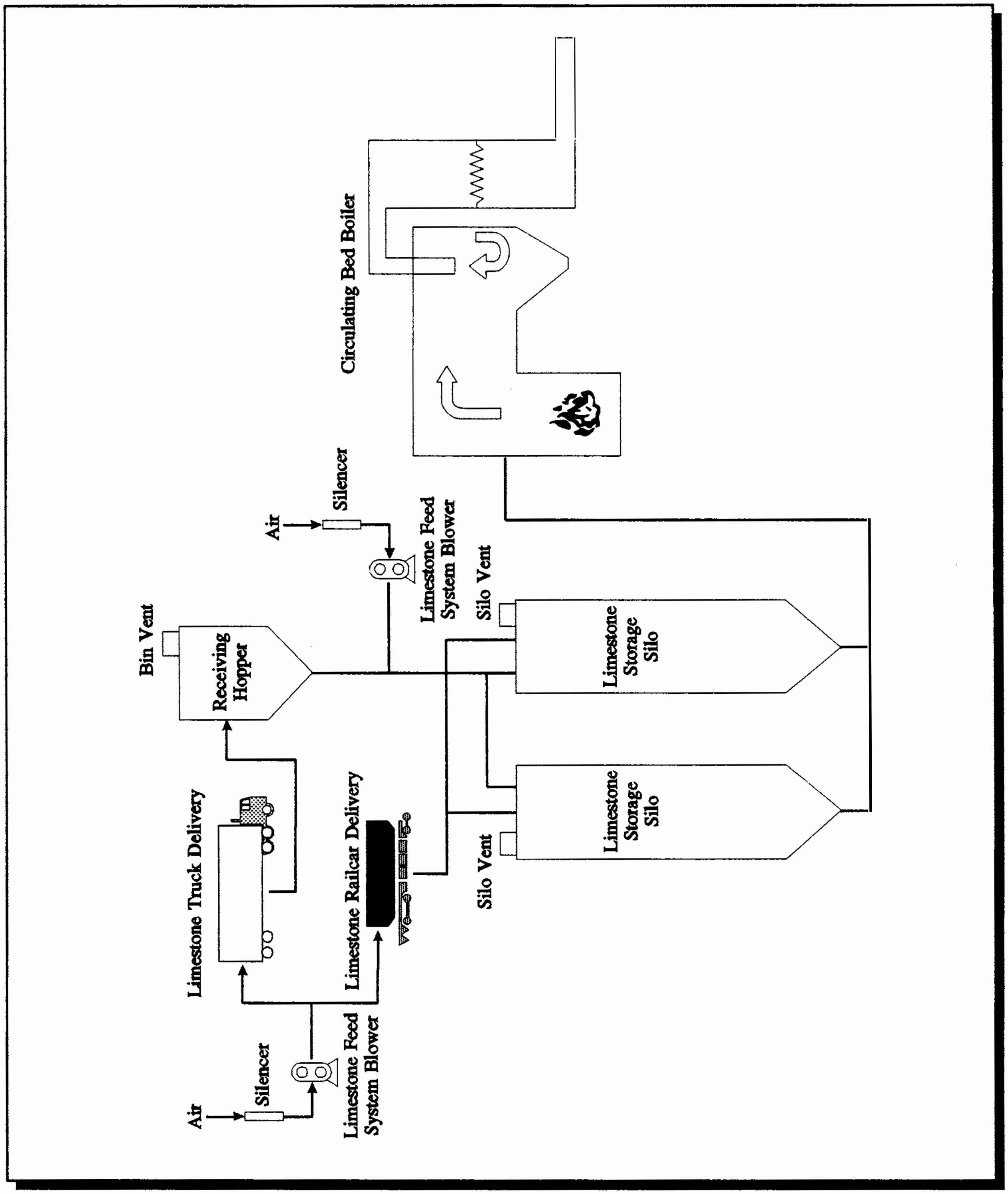

Figure 2.1-6. Diagram of the proposed limestone handling and storage facilities at the North Codorus Township site.

- A chlorine dioxide (ClO_2) solution would avoid the need for storage and use of gaseous chlorine material. On-site storage of up to 4 to 5 one-ton cylinders of gaseous chlorine would therefore not be needed to treat cooling water.

- The cooling water source would be the P. H. Glatfelter Company wastewater effluent which is elevated in organic material. Chlorine dioxide tends to react with organic compounds by oxidation and does not produce the chlorinated organics (chloramines and chlorinated phenolics) which could be produced if gaseous chlorine were to be used.

- In the event that phenolic compounds were present in the water supply, chlorine dioxide would react with ***the*** phenolic compounds, ***resulting*** in a breakdown of the phenolic compounds to carbon dioxide and water.

- When using gaseous chlorine, the potential exists for formation of chloroform and other trihalomethanes during the water treatment process. Due to the chemical properties of chlorine dioxide, it does not tend to contribute to the formation of chloroform or trihalomethanes.

Chlorine dioxide (ClO_2) is currently being used in potable water treatment for removal of tastes and odors, and cooling water systems for controlling microbiological growth (algae). It has wide application in the food processing and paper making industries.

Standard operation of the proposed Cogeneration Facility would require on-site use and storage of chemicals for water treatment. Water treatment chemicals for use in the facility would be selected so as to not cause or ***to*** minimize impacts to the environment (e.g., the cooling tower circulating water system would use a phosphate-based rather than a heavy-metal based treatment program). Most of the chemicals to be used at the proposed facility would be delivered in closed bulk containers and stored in the cooling water treatment building, demineralizer building, or outside silo/tanks, depending on the quantity and location for use of each chemical. The primary use of these chemicals would be for cooling water and boiler water treatment.

The estimated quantities of on-site storage of chemicals for water treatment and pollution control equipment are as follows *(ENSR, 1994)*:

•	Cooling water treatment chemicals	
	Dispersant (phosphate polymer)	7,500 gallons
	Biocide (NaOCl, $NaClO_2$, HCl)	3 x 7,500 gallons
•	Sulfuric Acid (H_2SO_4)	12,000 gallons
•	Caustic (NaOH)	12,000 gallons
•	Aqueous Ammonia	30,000 gallons

Small quantities of miscellaneous chemicals would be stored within the maintenance and storage buildings. Chemical storage areas would contain curbs and drains to route any spills to enclosed sumps for collection and/or treatment. Outdoor storage tanks would be surrounded with diked concrete areas that would provide sufficient secondary containment of contents of the storage tank to prevent a release to the environment. In addition, large storage tanks would be equipped with level analyzers which would continuously monitor fluid levels and report leaks to the plant control room. Transport piping would be constructed of compatible material to prevent corrosion or deterioration by the liquid being carried.

Approximately 1,600 lbs/hr, or 19.2 tons per day, of aqueous ammonia (27 percent by weight) would be required for the SNCR system, a proposed air pollution control system designed to minimize emissions of oxides of nitrogen (NO_x). A summary of the ammonia-based SNCR system specifications is presented in Table 2.1-3. During this process, aqueous ammonia would be injected into the boiler exhaust gas to convert the oxides of nitrogen (NO_x) into nitrogen and water. This control method would achieve a 40 percent or greater reduction in oxides of nitrogen (NO_x) emissions as guaranteed by the equipment manufacturer. Approximately 5 times per week, aqueous ammonia would be delivered to the proposed facility via truck (i.e., 1 truck delivers 5 times per week). The ammonia storage tank (30,000 gallon capacity) would be located within a fully contained and diked concrete area providing sufficient secondary containment to prevent a release to the surrounding environment should a leak occur.

In the event of a significant release of any chemical solution, the spilled material would be retained within a concrete containment area. Interconnecting piping would be located overhead or within trenches to enable any potential spills to be collected and routed directly to a sump for proper treatment. A low point gravity drain routed to the demineralizer sump would be provided in the truck containment area to collect accidental spillage. Prior to plant start-up and the first delivery of chemicals, the facility would develop a Preparedness, Prevention, and Contingency (PPC) plan that would identify procedures for prompt handling and reporting (within 24 hours) of a spill in accordance with regulatory requirements. This PPC plan is required by the Pennsylvania Department of Environmental Resources (PADER) as part of the

Commonwealth's regulatory program. The proposed facility would also develop a Spill Prevention Control and Countermeasures (SPCC) plan. This SPCC plan is required by the ***United States*** Environmental Protection Agency (EPA) (40 CFR, ***Part*** 112) and would outline engineering design measures incorporated into the proposed facility to ensure that the potential for oil and chemical spills is minimized. Pennsylvania's hazardous waste management regulations (Title 25, PA Code Chapter 260 through 270) do not specify additional spill prevention, control, and countermeasures plan requirements. ***Because the proposed facility would be a small quantity generator, a spill contingency plan is also not required under the Resource Conservation and Recovery Act (RCRA) [40 CFR 261.5(b)].***

Table 2.1-3. Summary of SNCR system specifications.

Specification	Ammonia
Carrier gas	air or steam
Reagent	27% by weight aqueous ammonia
Storage tank capacity	30,000 gal
Injection rate	1,600 lbs/hr
Ammonia to NO_x molar ratio	1.5 : 1
NO_x removal efficiency	40%
Ammonia "slip" guarantee	20 ppmv

Source: ENSR, 1994

Due to the quantities and types of chemicals required for water treatment and pollution equipment control, the proposed facility would be required to make specific notifications to the Federal, state, and local government in accordance with the Emergency Planning and Community Right-To-Know Act (EPCRA). EPCRA was passed as Title III of the Superfund Amendments and Reauthorization Act of 1986 to provide a legislative vehicle for the transfer of facility-specific information to Federal, state, and local agencies. EPCRA has two main goals: 1) to encourage and support emergency planning for responding to chemical accidents; and 2) to provide local governments and the public with information about possible chemical hazards in their communities. To accomplish these goals, ***Section 311 of*** EPCRA establishes specific reporting requirements designed to: aid in the development of emergency plans to protect the public from chemical accidents; set up procedures to warn, and if necessary, evacuate the public in the case of a chemical emergency; provide citizens and local governments with information about hazardous chemicals and accidental releases of chemicals in their communities; and prepare public reports on annual releases of toxic chemicals into the air, water, and soil. ***Under these reporting requirements (40 CFR 370.21), the proposed facility would be required to submit to the local emergency planning committee, the state emergency response commission, and the fire department with jurisdiction over the facility either a material safety data sheet (MSDS) for each hazardous chemical stored at the facility in excess of a***

threshold quantity 4,540 kg (10,000 lbs) for hazardous chemicals; 227 kg (500 lbs) for extremely hazardous chemicals] [40 CFR 370.20(b)(1)] or a list of hazardous chemicals (exceeding threshold quantities) for which a MSDS is required under the Occupational Safety and Health Act (OSHA). Additionally, the proposed facility would be required to submit chemical inventory (Tier One) information required under 40 CFR 370.25. This information includes the amount and general locations of hazardous chemicals stored on-site as well as a classification of the physical and health hazards posed by the chemicals. The required reports would have to be re-filed every year on or before the March 1st statutory deadline (42 U.S.C. 11022).

Facility Water Usage

Projected facility water use would range from 5,000 to 15,000 gallons per day (gpd) for various construction-related activities during the 3-year construction period. During normal operations, the proposed facility water needs would average approximately 4.2 million gallons per day (mgd). Approximately 2,800 gpd of this average daily water need would be supplied by the Spring Grove Water Company for sanitary and some process needs within the facility. The remaining water needed would be supplied by the P. H. Glatfelter Company wastewater treatment plant secondary effluent and process water. The proposed facility's water balance for normal YCEP facility operation is presented in Figure 2.1-7. A detailed water balance diagram for normal facility operation can be found in Appendix H.

The source of water for the P. H. Glatfelter Company is Lake Marburg, a major impoundment of Codorus Creek. Lake Marburg was constructed by the P. H. Glatfelter Company to satisfy its water demands. Since the proposed project would be utilizing the P. H. Glatfelter Company's wastewater from its secondary treatment plant, the proposed project's indirect source of most of its water would be Lake Marburg. The water needs of the proposed project are well within the allowable amounts the P. H. Glatfelter Company can withdraw for its own needs.

Steam Condensate Recycling The proposed YCEP Cogeneration Facility would supply up to 400,000 lbs/hr of high pressure steam to the P. H. Glatfelter Company. In return, the process water make-up for the steam system (i.e., boiler water make-up) would be provided from the P. H. Glatfelter Company's boiler feed water or condensate systems, which would be returned to the proposed Cogeneration Facility. For each pound of steam supplied to the P. H. Glatfelter Company, one pound of condensate and/or boiler feed water would be returned to the proposed Cogeneration Facility, resulting in an average return flow of 0.98 mgd and a maximum return flow of 1.15 mgd. The quality of the returned condensate and boiler feed water would be lower (i.e., higher concentrations of dissolved minerals and impurities) than required for make-up for the Cogeneration Facility steam system. Consequently, the returned stream would have to be treated through a demineralization treatment process to remove the impurities prior to reuse in the CFB boiler system. Water supplied from the P. H. Glatfelter Company process water supply would compensate for process water losses from the steam system, water treatment, and boiler blowdown. Periodic blowdown of the boiler would be required to minimize the potential for scale formation in the system. The average flow of additional water transferred from the P. H. Glatfelter Company process water system to make up for operating losses would be approximately 200,000 gpd; maximum flow would be 397,000 gpd. The existing P. H. Glatfelter Company water allocation approval for water use from the Lake Marburg reservoir between the PADER (Bureau of Parks) and the P. H. Glatfelter Company dated 2 May 1966 (which authorizes a maximum consumptive use of 30 mgd) would not need to be modified ***(ERM, 1994a), since the P. H. Glatfelter Company is not increasing water withdrawals over their approved allocation level.***

Cooling Water System The cooling water system would consist of an evaporative cooling tower serving as the heat sink for the main plant power cycle and major equipment items. The total cooling water system make-up requirements for the proposed Cogeneration Facility would average 4.2 mgd, with a maximum of 5.7 mgd. This cooling water requirement would be entirely met using the P. H. Glatfelter Company wastewater treatment plant secondary effluent and by recycling internal water streams. The P. H. Glatfelter Company wastewater treatment system currently discharges an average ***weekly maximum*** of 12.5 mgd of secondary effluent to Codorus Creek. To satisfy the YCEP cooling water requirements, an average of 4.1 mgd and a maximum of 5.4 mgd of this treated P. H. Glatfelter Company discharge would be pumped through an underground pipeline from the P. H. Glatfelter Company treatment facility clarifiers to the proposed Cogeneration Facility. Secondary effluent wastewater would then be treated in the cooling water recirculation system with a biocide for biological control, a dispersant to prevent fouling of the heat exchanger equipment, and sulfuric acid to control pH in the recirculating water. The technical feasibility of reusing this treated wastewater in the cooling water system was verified through laboratory studies and a pilot plant study, the results of which are documented in the Wastewater Reuse Feasibility Study *(YCEP, 1994a)* available in the public reading rooms (Appendix A). The remaining cooling water make-up requirements (0.25 mgd at maximum operation) would be met by reusing internal wastewater streams, such as the boiler water make-up waste stream, the boiler blowdown, and the boiler island drains.

Potable Water Use The proposed Cogeneration Facility would require potable water for sanitary use and some process uses. Potable water demand from the proposed facility would average 2,800 gpd with a maximum of 4,500 gpd. The Spring Grove Water Company would supply the potable water needs of the proposed facility from their water supply source, Kessler Pond.

Water Reuse Plan Internal recycle/reuse of water would be employed, as appropriate, to reduce total water demands, as well as to limit wastewater discharge from the facility. Condensate from the steam to be supplied to the P. H. Glatfelter Company would be returned to the condenser for reuse in the steam generator (Figure 2.1-7). Boiler blowdown would be reused to offset a portion of the proposed facility's cooling unit make-up requirements. In addition, waste streams from membrane softening and the boiler island drains would be returned to the cooling water make-up system. The proposed facility's water reuse plan would save approximately 83,400 gpd of water during average facility operation.

Back-up Water Supplies Back-up water supplies may be necessary for cooling water make-up and boiler water make-up. The mill pond would serve as a back-up supply for the cooling system. Back-up boiler water make-up would consist of either raw mill pond water or potable water. It is anticipated that the use of these back-up supplies would be rare and temporary, occurring for short periods of time if an emergency loss of the primary water supplies occurred.

Air Pollution Control

The proposed project site is located in the Northeast Ozone Transport Region (NOTR) established by the CAA. Additionally, projected oxides of nitrogen (NO_x) emissions from proposed project operation exceed 100 tons/yr. Consequently, the facility would be required to offset oxides of nitrogen (NO_x) emissions at a ratio of 1.15 to 1, and would be required to complete a Lowest Achievable Emission Rate (LAER) performance analysis to demonstrate if lower oxides of nitrogen (NO_x) emissions level could be achieved. The LAER performance analysis would be conducted when the proposed facility undergoes a performance test for the PSD Air Quality "Authority to Operate" permit approval; PADER then would determine if a lower emission level would be incorporated into the operating permit.

The proposed facility would also be subject to PSD regulations; therefore, the type of air pollution control equipment associated with the proposed project would be determined through a Best Available Control Technology (BACT) analysis. Both the BACT analysis and oxides of nitrogen (NO_x) offset plan approvals would be conducted as part of the PSD air quality permit application process. Specific

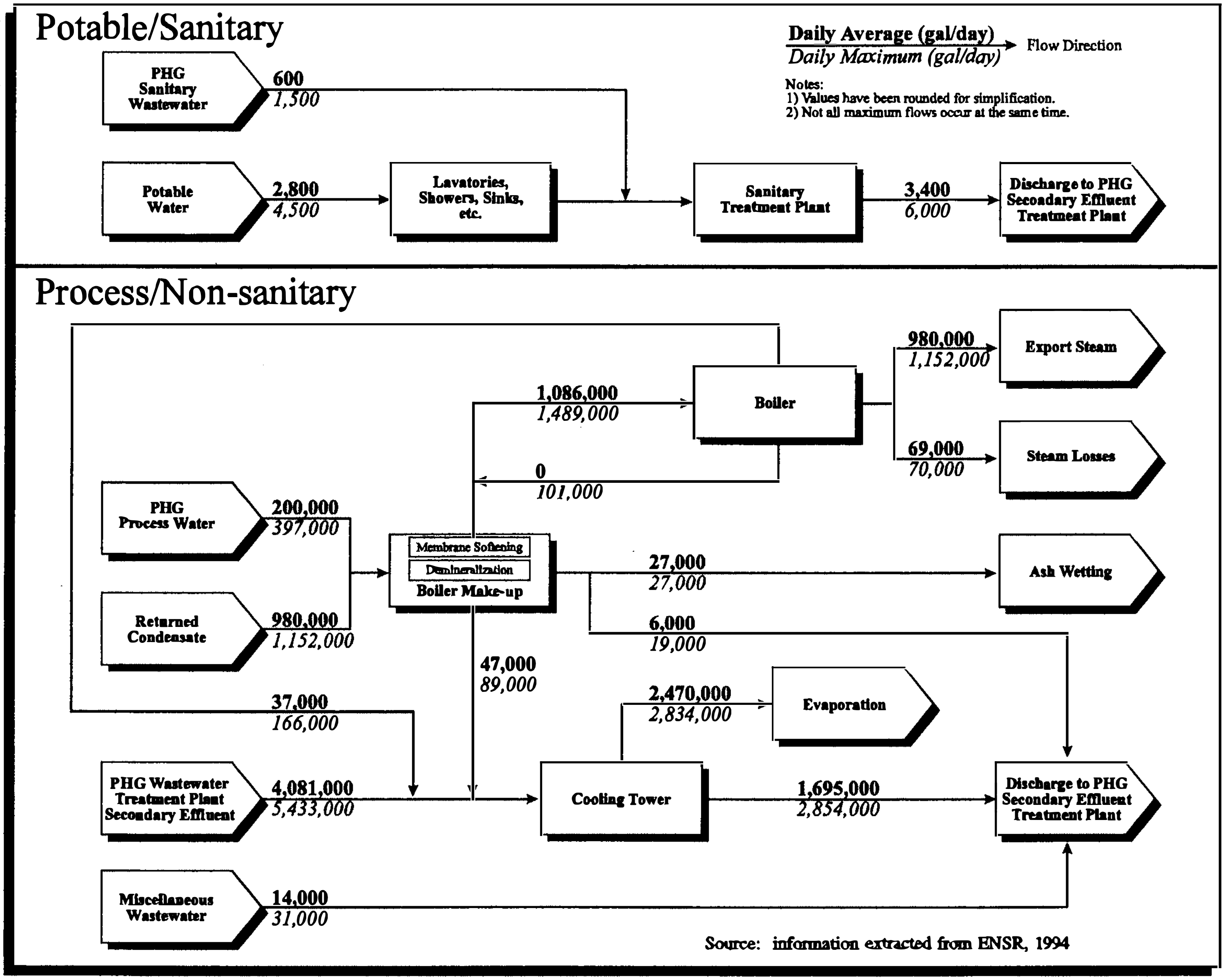

Figure 2.1-7. Water balance diagram for the proposed YCEP Cogeneration Facility.

information pertaining to the BACT analysis and the sources of oxides of nitrogen (NO_x) offsets is found in the PSD Permit Application (*Weston, 1994d*) and the Response Document for the Department of Environmental Resources, February 8, 1994, Request for Additional Information on the PSD Air Quality Permit Application (*YCEP, 1994b*). These documents are discussed in further detail in Section 4.1.2 of this ***FEIS***. Both documents are publicly available in the reading rooms (Appendix A).

Sulfur dioxide emissions control for the proposed facility would include limestone injection into the CFB boiler combustion chamber. Limestone injection is capable of controlling sulfur dioxide (SO_2) emissions to 0.25 pounds per million Btu (lbs/MMBtu), achieving at least a 92 percent reduction in sulfur dioxide emissions when compared to uncontrolled emissions. Limestone sorbent in the boiler combustion chamber would interact with the sulfur dioxide (SO_2) emitted in the coal burning process to control the sulfur dioxide (SO_2) emissions level. Limestone sorbent would be fed at a maximum rate of 23 tons/hr at the boiler maximum heat input rate to achieve a calcium-to-sulfur ratio of approximately 2.5 to 1. The sulfur dioxide (SO_2) emissions level of 0.25 lbs/MMBtu and 92 percent sulfur dioxide (SO_2) reduction level were confirmed based on a pilot plant test conducted by the boiler manufacturer using the coal and limestone materials expected to be used by the proposed project.

Proposed air pollution control equipment includes the employment of an aqueous ammonia injection technology known as SNCR to minimize emissions of oxides of nitrogen (NO_x) (see Table 2.1-3). During this process, aqueous ammonia would be injected into the boiler exhaust gas to convert the oxides of nitrogen (NO_x) into nitrogen and water. This injection technology would control oxides of nitrogen (NO_x) emissions to 0.125 lbs/MMBtu and achieve a 40 percent or greater reduction in oxides of nitrogen (NO_x) emissions compared to conventional technology. This control technology has been used on ***small, mostly industrial*** CFB boilers and has been demonstrated to be technically feasible ***in this role***, as discussed in the PSD Permit Application (*Weston, 1994d*) and Response Document (*YCEP, 1994b*). ***The use of SNCR with a utility-scale CFB boiler is a scale-up of this control technology. The chemical reactions (i.e., ammonia [NH_3] reacting with nitrogen dioxide [NO_2]) associated with SNCR technology in smaller scale vessels would take place under the expected operating conditions of the proposed combustor (i.e., appropriate temperature and reaction times).***

Particulate emissions would be controlled to 0.011 lbs/MMBtu using a fabric filter collection system (i.e., baghouse) in accordance with PSD permit requirements. The baghouse would be designed to have a minimum of eight compartments, and would remove fine particles from the boiler exhaust stream prior to release of the exhaust gas into the atmosphere. The baghouse would be designed to remove greater than 99.9 percent of particulate matter compared to uncontrolled emissions. This control technology has been used on other CFB boilers and it has been demonstrated to be technically feasible.

From the baghouse, flue gas would be directed to the flue gas stack via an induced draft fan. The proposed stack would be 120.4 m (395 ft) in height and would be provided with Federal Aviation Administration (FAA) aircraft obstruction lighting and markings in accordance with FAA Advisory Circular 70/7460—1H, Chapters 3, 4, 5, and 13.

Each project in the CCT Program is required to develop and implement an Environmental Monitoring Plan (EMP) which addresses both compliance monitoring required under permit conditions and supplemental monitoring. One objective of this monitoring activity is to quantify the mass flow rate of hazardous air pollutants (HAPs) in stack gases emitted to the ambient air at clean coal demonstration project sites, under both baseline and demonstration operating conditions. In order to obtain data relevant to monitoring air toxics applicable to the electric utility industry (included in the list of 189 air toxics as outlined in Title III of the Clean Air Act Amendments), YCEP would monitor the following HAPs: elements/compounds including antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium; inorganic compounds including chlorine/hydrochloric acid, cyanide compounds, fluorine/hydrogen fluoride, phosphorus/phosphates, and radionuclides; and organic compounds including formaldehyde and semi-volatile and volatile organics.

The proposed facility would also be equipped with a continuous emissions monitoring (CEM) system located in the flue gas stack, downstream of the pollution control equipment. The purpose of the CEM system would be to monitor the regulated emission components of the flue gas and provide verification of compliance with these regulations to the PADER as stipulated in the PSD air permit. The CEM system would be installed approximately 61 m (200 ft) up in the stack, and would continuously measure and record flue gas volumetric flowrate and temperature; opacity; and sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and either carbon dioxide (CO_2) or oxygen (O_2) concentrations. Monitoring and recording equipment would be installed and operated in accordance with technical specifications, and installation and maintenance requirements under the PADER Continuous Source Monitoring Manual, Revision 5, March, 1993.

Facility Wastes

Pollution Prevention Programs Because Air Products would be the facility operator, the proposed YCEP Cogeneration Facility would be required to implement the pollution prevention programs that have been adopted by Air Products. Air Products has adopted the requirements of the Chemical Manufacturers Association (CMA) Responsible Care Pollution Prevention Code of Management Practices. This voluntary code commits member companies to improve performance in response to public concerns about the impact of chemicals on health, safety, and the environment. However, the CMA code imposes no statutory or regulatory requirements and is not enforceable by Federal or state agencies. The Pollution Prevention Code consists of 14 voluntary management practices that provide the framework for companies to achieve ongoing reductions in the amount of contaminants and pollutants generated and released to the environment. Key concepts of this code include: (1) All waste, all media — it applies to all wastes and releases to all media (e.g., air, water, land); (2) Preferred reduction hierarchy — it maintains a pollution prevention hierarchy in which source reduction is preferred over recycle/reuse/reclaim which is preferred over treatment; and (3) Continuous improvement — it requires ongoing reductions of wastes and releases with a goal of establishing a long-term downward trend in the amount of wastes generated and releases to the environment (i.e., it requires continuous improvement as long as wastes or releases are generated). An annual audit is conducted at each Air Products facility to ascertain its progress in implementing the "practice in place" definitions of each management practice. Air Products facilities are required to establish goals to meet the requirements of each Responsible Care Code, and new facilities must prepare a staged implementation of the 14 management practices. The proposed Cogeneration Facility would be anticipated to be in full compliance 4 years after start-up. Further details regarding the 14 management practices are presented in Section 5.11.2 of the Environmental Information Volume (EIV) which is available in the public reading rooms (Appendix A).

The facility operation manual would include the Commonwealth-required PPC plan that would describe procedures for prompt handling and reporting of accidental releases. The plan would be submitted as part of the facility's National Pollutant Discharge Elimination System (NPDES) stormwater permit application process. The facility operations manual also would provide the SPCC Plan, required by EPA, that would outline measures for minimizing the potential for oil discharges into the Nation's waterways. The SPCC plan is required by the Federal Water Pollution Control Act, and described in 40 CFR Parts 110, 112, 114, and 153.

A Preventive Maintenance Program would be developed that identified procedures for reducing the potential for equipment failures that could result in releases. The procedures would include identification of applicable equipment systems, periodic inspections, adjustments, and parts replacement.

General good housekeeping practices would be followed at the proposed facility. These practices would include neat and orderly storage of chemicals, prompt cleanup of small spills, regular refuse removal, maintenance of dry and clean floors, and proper storage of containers away from walkways and roads. In addition, a recycling program would be implemented.

Solid Waste Generation and Disposal Facility construction would generate waste from steel and other metals, as well as typical construction debris (e.g., wood, concrete, paper, and other garbage). It is estimated that a total of 7,646 cubic meters (m^3) [10,000 cubic yards (yd^3)] of waste would be generated at varying rates throughout the 36-month construction period. The volume of construction debris would vary daily depending on the nature of the current construction activities. Debris would be stored in on-site dumpsters. The location for disposal of this waste stream has not been set. However, it has been determined that the Modern Landfill, a commercial facility in York County, has adequate capacity to accept this volume of solid waste, throughout the construction period.

Operation of the proposed plant would be anticipated to generate approximately 3 tons per month of domestic solid waste (based on conditions at a similar cogeneration facility operated by Air Products). Solid waste would be stored in an enclosed on-site dumpster and would be disposed of by a private local contractor in an approved municipal landfill. Collection and transportation of municipal waste by the private hauler will be in accordance with PADER Municipal Waste Regulations Chapter 285, Subchapter B. The Modern Landfill has adequate capacity for the anticipated volume of solid waste. Should the Modern Landfill capacity not be available, a number of alternate landfills with adequate capacity are located within a 120-km (75-mi) radius of the proposed project site. The proposed facility would also implement a recycling program, with disposal of recycleables at America's Recycling Center located in the city of York.

Combustion of coal, with limestone, in a CFB boiler during facility operation would result in the generation of ash byproducts. Fly ash and bottom ash byproduct material is expected to have similar physical and chemical characteristics to CFB ash byproducts generated by other similar, smaller CFB boilers using an eastern bituminous coal supply. The CFB ash byproduct is a mixture of coal ash, calcium sulfate ($CaSO_4$), and calcium oxide (CaO). Specific characteristics of the ash are discussed in

Section 4.1.6.2. The ash byproducts from these other CFB boilers has been tested and found to be in compliance with the EPA Toxicity Characteristics Leachate Procedure (TCLP) test for solid waste material. The YCEP ash byproducts would undergo sampling and laboratory testing in accordance with this TCLP test on a quarterly basis, with the results reported to PADER.

The volume of ash byproduct would be approximately 31 tons per hour. Up to 270,000 tons/*yr* of ash byproducts would be generated based on results from the pilot plant test conducted by the boiler manufacturer. Bottom ash material would accumulate in the CFB boiler, and fly ash material in the boiler baghouse. Ash material would then be transferred by separate conveying systems to separate ash silos. A diagram of the proposed ash handling system is depicted in Figure 2.1-8.

Bottom ash discharging from each of the four outlets on the CFB boiler would transfer via an enclosed pneumatic conveying system to either of two 950-ton capacity bottom ash silos. The bottom ash silos would be sized to provide approximately 4 days of storage. Each silo would be provided with one hopper outlet to the ash conditioner system. Bottom ash would discharge from the silo through a slide gate and fed into an ash conditioner where the ash would be dampened with water. ***The amount of water (from boiler blowdown) that would be required depends upon the proportion of the calcium oxide in the bottom ash material. In other similar CFB facilities, typically 10 to 12 percent water by weight is added to the bottom ash (which amounts to approximately 27,000 gpd).*** Conditioned bottom ash would later be directly loaded into covered or completely enclosed 25-ton ash disposal transport trucks.

Fly ash would be collected in air heater hoppers and baghouse hoppers and transferred via an enclosed pneumatic conveying system to either of the two 600-ton capacity fly ash silos. Fly ash silos would be sized to provide approximately 5 days of storage. Fly ash would discharge from the silo through a slide gate to a weigh bin for conditioning. When the required batch of ash is measured, the required amount of water ***for dampening*** would be weighed and measured in a separate vessel. ***The amount of water that would be required depends upon the proportion of the calcium oxide in the fly ash material. In other similar CFB facilities, typically 18 to 20 percent water by weight is added to the fly ash.*** The two streams would then be introduced and fed to the ash mixing/conditioning unit on a batch basis. Conditioned fly ash would then be discharged ***directly*** into covered or completely enclosed 25-ton ash disposal transport trucks. ***The conditioned ash would be a dry to damp solid material, not a liquid, so it would not leach water during transport to the surface mine reclamation site.***

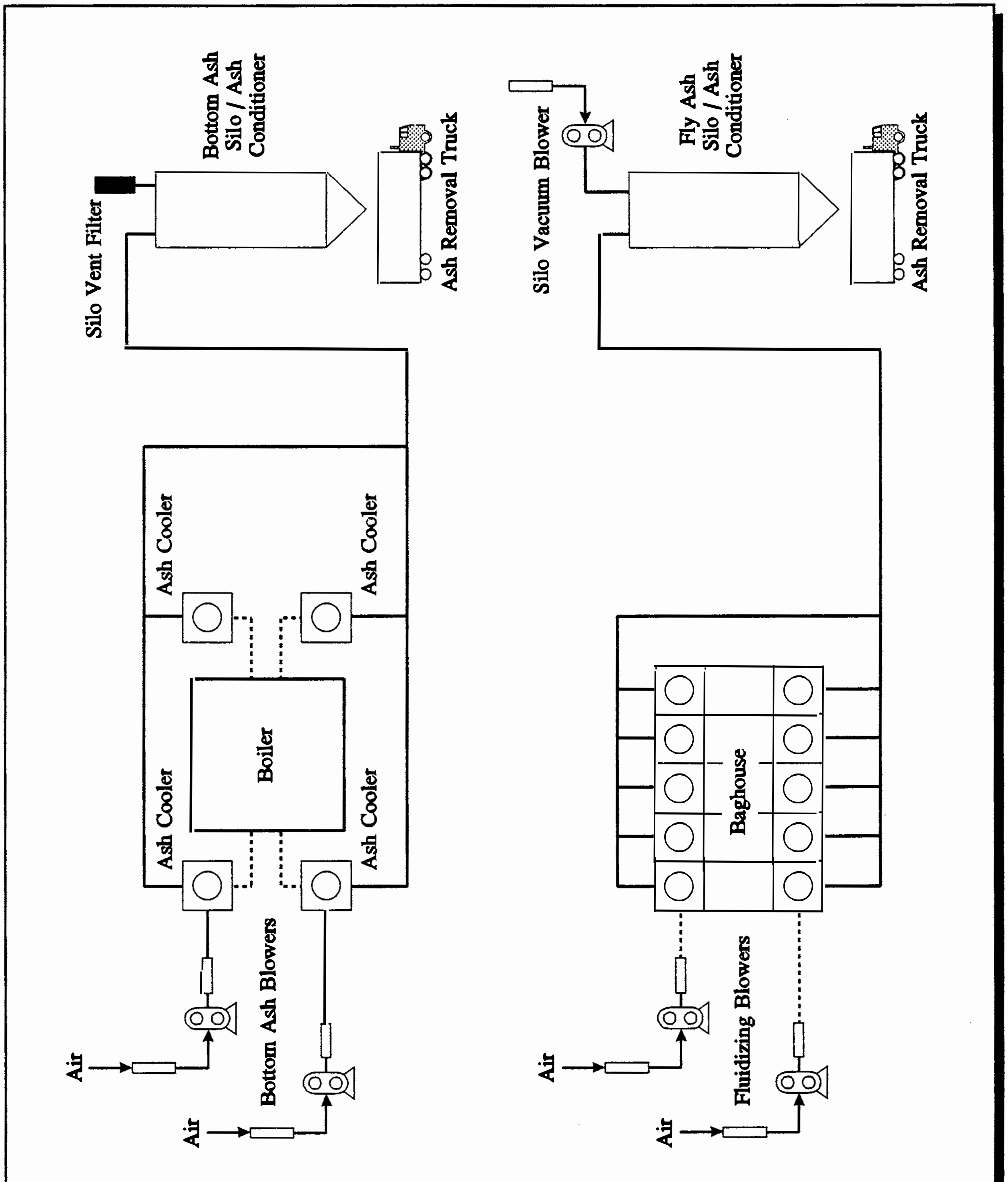

Figure 2.1-8. Diagram of the proposed ash handling and storage facilities for the North Codorus Township site.

Because the dry bottom and fly ash materials would be transported pneumatically from the point of generation to their respective ash byproduct silos, transport air must be exhausted to the atmosphere at the silos. Each silo would be equipped with a silo vent system to filter out fugitive dust prior to discharging the air to the atmosphere.

Both the bottom ash and fly ash silos would be provided with an additional outlet to allow dry bottom or fly ash discharge to trucks. The system would be designed to have sufficient capacity to load a 25-ton transport truck in 15 minutes.

Ash byproduct would be generated as a result of coal combustion in the CFB boiler during facility operation. At full operation, up to 270,000 tons/yr of ash byproduct is estimated to be generated (based upon trial burns conducted by the boiler manufacturer). Ash byproduct materials are dry and inert, consisting of calcium sulfate ($CaSO_4$) and coal ash, and have the potential for beneficial uses because of the high lime content, concentrations of silicon, aluminum, and iron, and cement-like properties. Potential beneficial uses include sludge stabilization agents, agricultural soil additives, coal mine reclamation, and road bed aggregate. For the proposed project, the ash byproduct would be used as backfill in a coal mine reclamation project. Ash byproduct would serve to neutralize the pH of the acid mine water that results from coal mining operations, as well as to restore the topography of the mined area. Ash byproducts could be used as a beneficial use material for mine land reclamation in accordance with the PADER Residual Waste Regulations, Chapter 287, Subchapter H. Proposed beneficial uses of CFB ash must be approved by PADER on a project specific basis.

The Harriman Coal Corporation (Harriman) operates an existing anthracite surface mining facility, located in a sparsely populated mining area, that is currently permitted by PADER (Permit No. 54803004C, approved July 27, 1993) to accept coal ash as backfill material. The PADER Bureau of Mining and Reclamation has encouraged the coal company to use ash byproduct for reclamation. A commercial agreement between Harriman and YCEP was signed in 1993 that gave the proposed facility exclusive rights to dispose of ash byproduct in this single mine reclamation pit located in Schuylkill County, PA. The proposed mine reclamation pit has the capacity to accommodate 270,000 tons of ash byproduct per year for 15 to 20 years. Harriman also operates adjacent permitted pits at its Schuylkill County site that could accommodate proposed facility ash byproduct for an additional 10 to 15 years. Additional mine reclamation sites are available in Schuylkill County and adjacent counties. In the event that reclamation opportunities would no longer be available, there would be adequate landfill capacity in eastern Pennsylvania.

The conditioned ash byproduct generated during facility operations would be transported from the proposed Cogeneration Facility to the Harriman site by covered or completely enclosed 25-ton trucks. During operation of the proposed facility at 100 percent capacity, 41 trucks would haul the ash material from the site on a daily basis (assuming 5 days/week operation) for use at a surface mine reclamation facility in Schuylkill County, Pennsylvania, approximately 112 km (70 mi) northeast of the proposed site. Ash haulers, as yet not identified, would be responsible for the material from the point of pickup at the proposed facility to the point of unloading at the Harriman reclamation site and would be required to comply with all applicable municipal ordinances, Pennsylvania motor vehicle codes, and all safety rules and operating procedures at the proposed facility.

Liquid Waste Generation and Disposal During construction, liquid waste streams would consist of sanitary sewage, construction dewatering, and stormwater runoff. No community services would be required for the disposal of these three wastewaters. Portable sanitary facilities would be provided on site during facility construction through an agreement with a local contractor who would be responsible for providing all services including disposal. Water resulting from construction dewatering activities and stormwater runoff would be collected on site and directed to the existing P. H. Glatfelter Company stormwater retention pond for settling.

During operation, the proposed facility would minimize wastewater discharge through recirculation and reuse of water. Facility wastewater not reused would be discharged to the P. H. Glatfelter Company's wastewater treatment system equalization basin. The average discharge to the equalization basin, from all sources, would be approximately 1.72 mgd. The proposed facility would include two separate plant drain systems for liquid waste disposal: a sanitary waste, cooling tower blowdown waste, and high suspended solid washdown waste system; and an industrial or process waste system. The sanitary, cooling tower blowdown, and high suspended solids washdown wastes would be pumped in a pipeline to the P. H. Glatfelter Company's equalization basin. Proposed facility sanitary wastewater would be treated at the YCEP on-site package treatment facility prior to discharge. Process waste streams would be pumped and discharged to the cooling tower for use as a make-up stream. A portion of the effluent from the process waste stream would also be directed to the ash conditioning system for reuse.

The recirculating cooling system would be designed to transfer heat from the main plant cycle to the cooling tower where the heat would be released to the atmosphere largely by evaporative cooling. Heat would be removed by circulating water through a condenser, closed cooling water heat exchanger, turbine lube oil system, generator cooling system, and condenser vacuum pumps. The cooling tower would conserve water by maximizing the amount of water recirculated through the cooling system, the heated circulating water would be distributed along the top of the tower where it would cascade down over the cooling tower fill, releasing heat to the atmosphere, and then be collected in the cooling tower cold water basin. Circulating water would be cooled in the cooling tower by evaporation of a portion of the circulating water into the air that passes through the cooling tower. The air leaving the cooling tower would be saturated with water. The water droplets in this air stream comprise the cooling tower drift. The water in the cooling tower cold water basin would flow through a trash screen to the circulating water pump sump, and complete the cycle. A portion of the circulating water would be blown down to maintain acceptable chemical concentrations in the circulating water. Blowdown flow in this cooling tower system would vary depending on the number of allowable cycles of concentration in the recirculated water. The number of cycles of concentration is a factor by which the recirculation water mineral concentrations are increased due to the evaporation of water. Blowdown water would be routed to the P. H. Glatfelter Company equalization basin. In addition to blowdown, cooling water would be lost through cooling tower evaporation and drift, and sidestream filter system backwash, which would need to be made up continuously.

Expected constituents of the cooling water blowdown are presented in Table 2.1-4. These cooling water characteristics are based on pilot plant testing program results conducted during the fourth quarter of 1993 and using the expected wastewater quality following completion of the P. H. Glatfelter Company ***Pulp Mill Modernization Project, which has now been completed***. The purpose of the pilot plant testing program was to determine how the P. H. Glatfelter Company wastewater treatment plant effluent stream could most effectively be used as the source of water for the YCEP cooling tower water requirements. The objectives of the study were to determine the current wastewater characteristics, the cooling water treatment program needed for this water reuse, the characteristics of the cooling tower blowdown and drift streams, the operational reliability of the proposed reuse, and the technical and environmental results for the reuse operation.

The results of the pilot plant program are documented in the Wastewater Reuse Feasibility Study (*YCEP, 1994a*). This document is available to the public in the reading rooms (Appendix A).

Cooling water consumption would vary with ambient conditions, plant production levels, and cooling water quality. Average consumption attributed to evaporation and drift would be approximately 2.5 mgd and maximum consumption would be approximately 2.8 mgd. The combined cooling tower discharge to the blowdown sump, for transfer to the P. H. Glatfelter Company equalization basin, would be approximately 1.7 mgd on average and 2.9 mgd at maximum flow, as noted in Figure 2.1-7. Cooling tower blowdown would be discharged at a rate consistent with the number of operating cycles of the recirculating water system. The pilot study indicated that optimum operation of the full-scale cooling tower would be at 2.5 cycles, utilizing the unsoftened wastewater effluent from the P. H. Glatfelter Company treatment facility. The cycles of operation would be limited due to calcium sulfate solubility in the recirculation water, which causes fouling of the equipment. Water quality constituents of the cooling system blowdown would consist primarily of naturally occurring minerals (e.g., calcium, magnesium, and sulfate) initially contained in the make-up water that have been concentrated due to evaporation of water in the steam and cooling water systems. Other characteristics are discussed in Section 4.1.4.1.

Table 2.1-4. Expected constituents of the cooling system blowdown.

Constituent	Concentration (mg/l)
Calcium	403
Magnesium	35
Sodium	1,067
Chloride	1,190
Sulfate	593
Total Dissolved Solids	3,600
Silica	13
Total Suspended Solids	33
Biochemical Oxygen Demand	6
Chemical Oxygen Demand	259

Source: YCEP, 1994a.

The P. H. Glatfelter Company is currently operating its wastewater treatment system under a NPDES Industrial Wastewater Discharge Permit. Modification of this permit and approval by the PADER Bureau of Water Quality to accommodate YCEP's discharge are expected during 1995. It is anticipated that these permit modifications would consist of approval to reuse the wastewater within the proposed facility for cooling purposes and approval to return the proposed facility's wastewater to the P. H. Glatfelter Company facility for treatment and discharge to Codorus Creek. The anticipated waste stream flow to the treatment facility would average 1.7 mgd, with a maximum flow of 2.9 mgd. The existing treatment facility has a design capacity of 20 mgd. Current flow through the facility averages 12.5 mgd, indicating the facility has adequate capacity to treat the waste streams from the proposed Cogeneration Facility. ***The P. H. Glatfelter Company's secondary treatment facility would continue to have adequate biochemical oxygen demand (BOD) loading even though the influent stream would be diluted by the proposed project's cooling tower blowdown (1.7-2.9 mgd) having a lower BOD concentration. This is due to P. H. Glatfelter Company's higher BOD loadings and the volume of its influent (12.5 mgd) when compared to the proposed project's influent characteristics.***

Stormwater runoff, from areas of the site that may contribute to suspended solids concentrations, would be collected on site in an existing P. H. Glatfelter Company stormwater retention basin designed to remove suspended solids. Stormwater runoff from the facility would be discharged to the existing on-site stormwater retention basin. An NPDES Construction Stormwater Permit has been filed for the YCEP facility stormwater management. An NPDES operational stormwater permit would be filed prior to start-up and operation of the proposed project.

Safety Features

Guidelines and procedures have been established by Air Products and Chemicals designed to guarantee a safe and efficient work environment throughout the construction phase of the project. These guidelines and procedures would be communicated to contractors both in writing and through training classes prior to site work. Construction permits and safety inspections would be employed in an effort to minimize the frequency of accidents and further ensure worker safety.

For operation, the proposed Cogeneration Facility would be equipped with a comprehensive on-site fire protection system to control and extinguish fires within buildings and yard areas. The fire protection system would be designed in accordance with the Uniform Fire Code and all applicable National Fire Protection Association (NFPA) standards, as well as all Commonwealth and local requirements. This system would employ a fire protection water system, a dry chemical extinguishing system, a carbon dioxide (CO_2) extinguishing system, and portable fire extinguishers to control and extinguish fires. This equipment would allow appropriate response to the various potential types of fire situations that could occur at the facility. Additionally, all plant operators would be trained in the operation of the facility's fire protection system.

The fire protection water system would be supplied from the mill pond, an impoundment of Codorus Creek upstream of the P. H. Glatfelter Company Treatment Plant discharge, and would consist of a water supply loop, fire hydrants, sprinkler systems, and hoses placed at key locations. ***The water pressure in the fire protection system would be maintained under normal and emergency conditions by use of electrical and diesel powered fire water pump systems. The diesel powered system would be used in the event of loss of electrical power to the fire water pump system.*** An underground fire main pipeline would be installed with hydrants and associated hose stations at periodic intervals throughout the site. Portable fire extinguishers would also be provided at key locations within the facility. The quantity and types of extinguishers would reflect the type of fire likely to occur at that location, and would satisfy applicable code requirements.

First aid facilities would include first aid kits, eyewash stations, and drench showers placed at locations throughout the facility. The availability of this equipment would facilitate rapid medical response in an emergency situation. Basic emergency care training for new employees and ongoing training for existing employees would be provided consistent with Occupational Safety and Health Administration (OSHA) requirements. Basic emergency care training would include 8 hours of first aid training every 3 years and 8 hours of cardio-pulmonary resuscitation (CPR) training once per year. In addition, ***facility*** personnel ***responsible for first aid and emergency medical procedures*** would be trained annually in accordance with OSHA's "Bloodborne Pathogens" standard.

To maximize safe operation of the proposed facility, plant operations would be centrally directed from a control room. Plant instruments and controls would be designed to ensure safe start-up, operation, and shutdown of the facility. This control system would be responsible for the majority of plant monitoring of operation parameters, annunciation, and reporting functions. Local control panels or stations would also be placed at those facility locations in which operator attention would be required.

Potential safety hazards to personnel, equipment, and the surrounding community would be taken into consideration when planning equipment layouts and facility locations. Federal, Commonwealth, and local standards and ordinances, including those established by OSHA and NFPA, would be reviewed to minimize exposure to potential hazards. Prior to start-up of the proposed facility, local emergency services (e.g., fire departments, hospitals, and ambulance services) would be identified and contacted. YCEP would work with local safety agencies to develop the safety and emergency procedures and plans required, and would advise local safety and emergency response agencies in advance of anticipated need to provide those agencies time to upgrade their capabilities, if needed, to assist the proposed facility.

Transportation Features

Traffic accessing the proposed site on a regular basis during construction would consist of construction worker vehicles, and trucks delivering equipment and supplies. When possible, rail would be used to transport equipment. Construction shifts would be scheduled to avoid commuter travel periods. The Pennsylvania Department of Transportation (PennDOT) ***plans to upgrade the*** intersection of York Road (PA Route 116), Jefferson Road (Route 516) and Lehman Road, to improve traffic flow through this poorly designed intersection. Additional queuing space would also be constructed at the P. H. Glatfelter Company Roundwood Facility to handle present access driveway overflow conditions.

The projected traffic to be generated by daily operation of the proposed facility is based on an estimate of ***70*** limestone delivery and ash removal trucks entering and exiting the plant per ***day (9 per hour)*** and 55 employees per day distributed as follows: 25 people (8 A.M. to 4 P.M.), 15 people (4 P.M. to 12 P.M.), and 15 people (12 A.M. to 8 A.M.). Thus, operation of the Cogeneration Facility would generate approximately 125 vehicles per day, for a total projected access driveway volume of 325 vehicles per day (200 ***vehicles***/day from the current Roundwood Facility operations and 125 ***vehicles***/day from the proposed facility). ***Each vehicle accessing the proposed facility would generate 2 trips (one entering and one exiting), which would impact the affected transportation infrastructure.*** Of these new trips, 68 would occur in the A.M. peak ***hour*** (39 entering and 29 exiting) and 68 would occur in the P.M. peak period (29 entering and 39 exiting).

Associated Utility Infrastructure Expansion

Rights-of-way/easements would be required for land utilized during construction and operation of the utility corridor, including the primary electrical corridor, and access to the P. H. Glatfelter Company wastewater supply and other auxiliary lines. All necessary rights-of-way/easements would be secured prior to land utilization. The proposed utility corridors include five main utility corridors and an electrical substation consisting of:

- a 6.1-km (3.8-mi) single circuit 115 kilovolt (kV) electrical interconnection extending from the proposed Cogeneration Facility to a substation in Bair, Pennsylvania;

- the switching function of the substation at Bair would be upgraded to accommodate the additional electricity supplied by the proposed facility. ***The proposed switchyard would cover an area of approximately 1 acre (0.4 hectare)***;

- a 228.6-m (750-ft) double circuit 115 kV electrical intraconnection linking the proposed Cogeneration Facility with an existing Met-Ed line at the P. H. Glatfelter Company paper mill;

- a 685.8-m (2,250-ft) steam supply line/condensate return line and electrical raceway (to provide a control conduit for electrical service lines to the P. H. Glatfelter Company Waste Treatment facilities) extending from the proposed Cogeneration Facility to the P. H. Glatfelter Company facility;

- a 762.0-m (2,500-ft) potable water supply line extending from an existing Spring Grove Water company water line to the proposed Cogeneration Facility; and

- cooling water supply lines and ***wastewater*** return lines that would be located east of the proposed Cogeneration Facility and would cover a combined distance of approximately 2.4 km (1.5 mi) from the proposed Cogeneration Facility to the P. H. Glatfelter Company wastewater treatment facility.

The locations of these corridors were selected to follow existing utility or transportation corridors when possible. The electrical interconnection, steam/condensate return lines, potable water supply line, and the cooling water supply/wastewater return lines would be located, in part, on P. H. Glatfelter Company property, a heavy industrial area. The electrical interconnection would extend beyond the P. H. Glatfelter Company property and would traverse industrial, agricultural, residential, wooded, flood control/game management, and transportation land uses. The locations of these corridors for water and steam are presented in Figure 2.1-9. In depth discussions on the exact locations of utility and transportation corridors beyond P. H. Glatfelter ***Company*** property are provided later in this section. Based upon Met-Ed specified requirements, the electrical connection for the proposed project would consist of a double circuit 115 kV *intra*connection line and a single circuit 115 kV *inter*connection line.

Electrical *Intra*connection A 115 kV double circuit line would extend north from the proposed site, across Codorus Creek, to tie into an existing Met-Ed 115 kV line on the P. H. Glatfelter Company paper mill site. The connection would occur at the point at which the existing transmission line corridor runs along the Yorkrail right-of-way on the north side of the mill pond. A 30.5-m-wide (100-ft-wide) right-of-way would span the mill pond for approximately 228.6 m (750 ft). The location of this electrical line is presented in Figure 2.1-10.

Electrical *Inter*connection The proposed electrical interconnection on the P. H. Glatfelter Company property would be a single circuit 115 kV line interconnecting with the existing Met-Ed 115 kV line that would extend from the proposed Cogeneration Facility in North Codorus Township, pass through Jackson

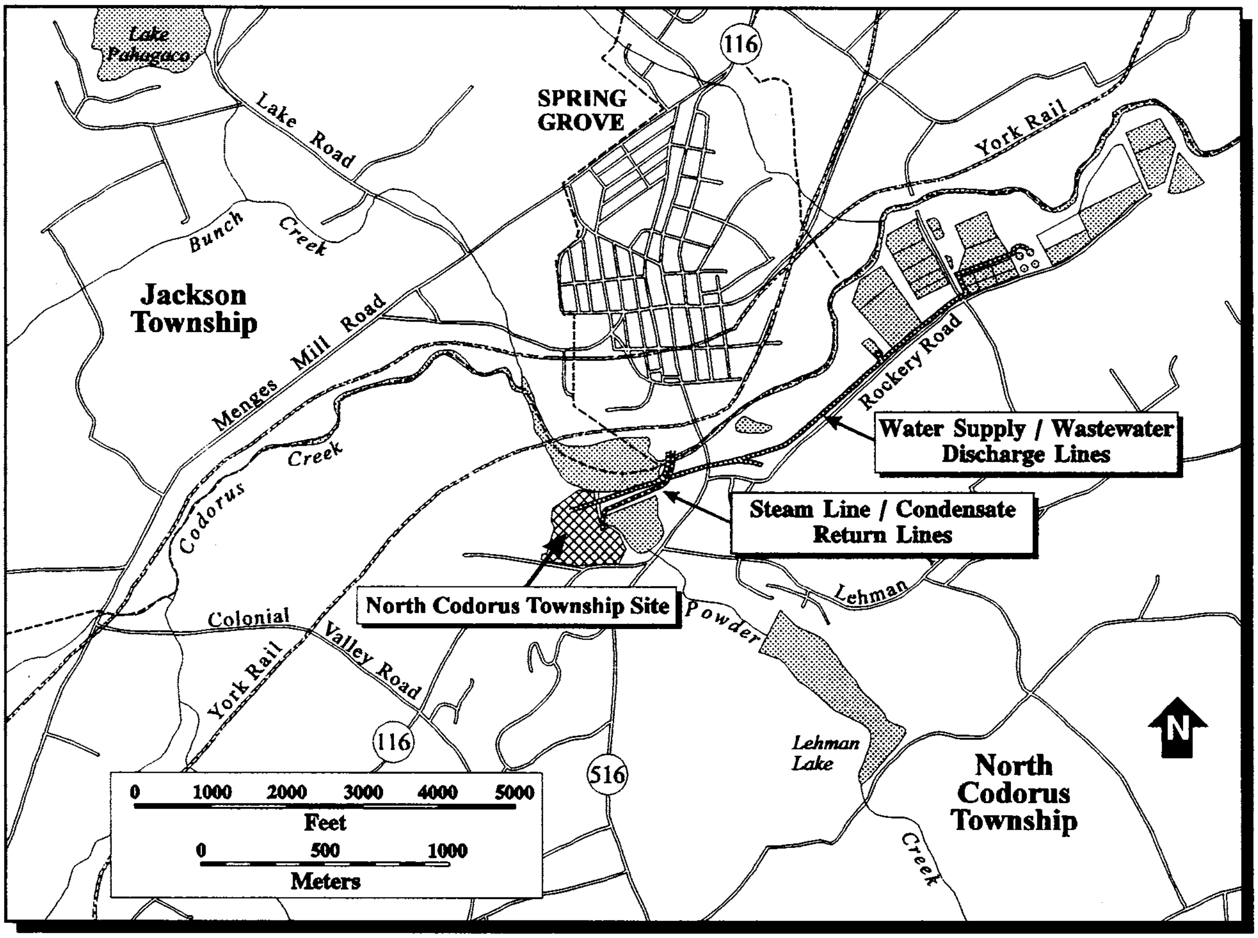

Figure 2.1-9. Proposed route of utility infrastructure at the North Codorus Township site.

Township, and terminate at the Bair substation in West Manchester Township (Figure 2.1-11). The interconnection would be supported on single-shaft steel or wooden poles located at approximately 137.2 m (450 ft) intervals along the proposed 6.1-km (3.8-mi) alignment. The poles would number approximately 48 and would range in height from 17.4 to 25.9 m (57 to 85 ft). The proposed electrical interconnection alignment would exit the proposed Cogeneration Facility's switchyard and run in a northeasterly direction across a breakwater area between Kessler Pond and the P. H. Glatfelter Company mill pond, and then cross a truck trailer parking area for a distance of approximately 0.5 km (0.3 mi), at which point it would cross York Road (PA Route 116). The alignment would continue along a P. H. Glatfelter Company private road and Rockery Road until it intersects Hershey Road, and would then run in an easterly direction along a P. H. Glatfelter Company private road to the point where the road ends as it approaches Codorus Creek. The land traversed up to this point is industrial and has been used by

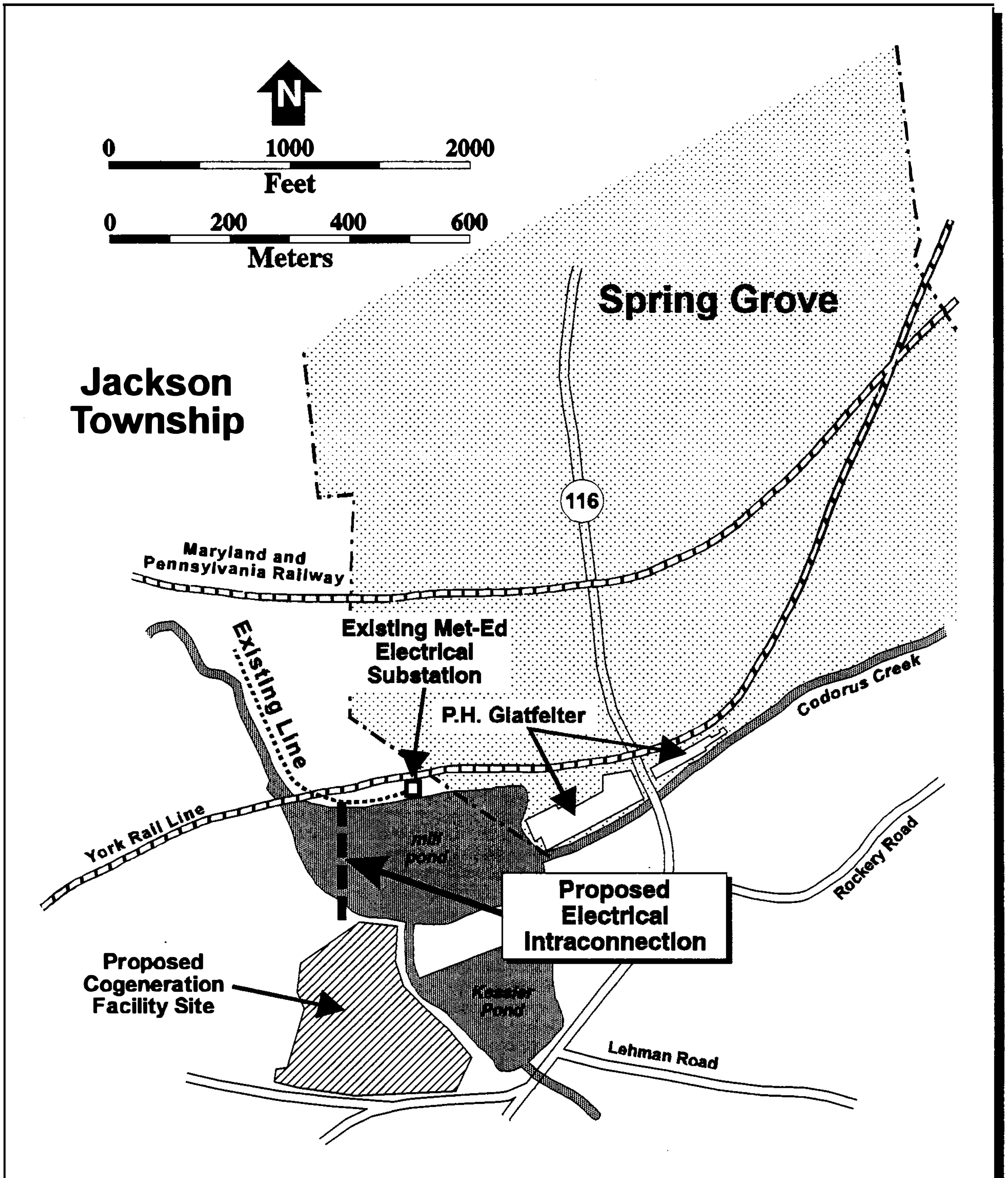

Figure 2.1-10. Location of the proposed electrical intraconnection corridor on P. H. Glatfelter Company property.

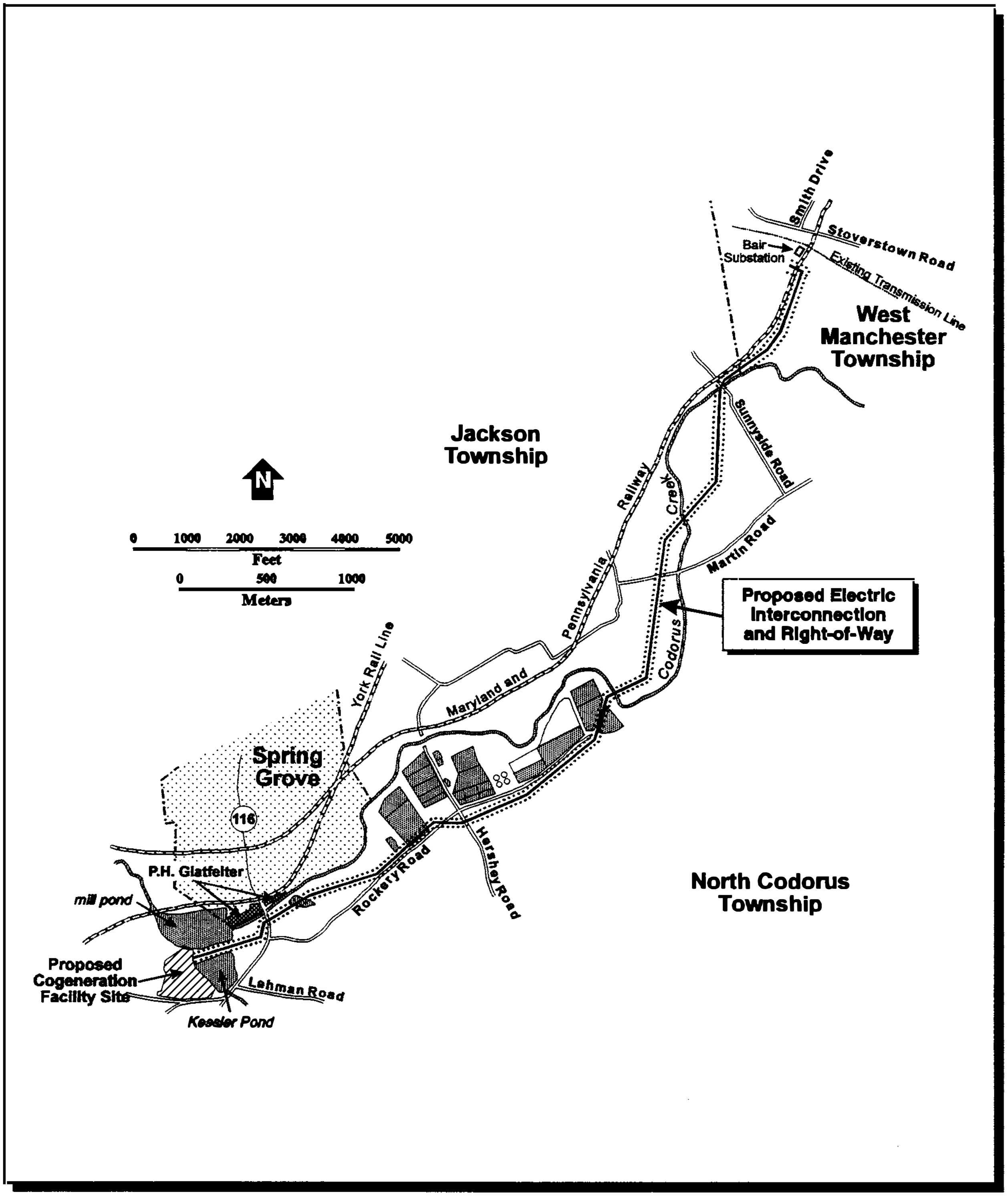

Figure 2.1-11. Location of proposed electric interconnection to the existing Met-Ed 115V double circuit line.

the P. H. Glatfelter Company for wastewater treatment operations and landfilling and composting operations. At mile 1.8, the alignment would begin to traverse ***United States*** Army Corps of Engineers (ACOE) flood control property and would cross Codorus Creek. The alignment would generally follow the western edge of the flood control property on the west side of Codorus Creek for approximately 0.8 km (0.5 mi) where it would cross over Martin Road.

The ACOE flood control property consists of a portion of the Indian Rock Dam reservoir project which was constructed by ACOE in 1939 for the protection of residents and properties in York from flood waters. This land, consisting of cultivated and fallow fields and narrow riparian forests along Codorus Creek, is anticipated by the ACOE to continue to be used in its current capacity. A portion of the land has been leased to the Pennsylvania Game Commission for wildlife conservation. In the 1950s Met-Ed was granted five easements for electrical lines on the ACOE property.

At approximately 0.2 km (0.15 mi) northeast of Sunnyside Road, the Met-Ed trolley line property parallels the Maryland & Pennsylvania Railroad right-of-way. The electrical interconnection alignment would follow this combined right-of-way for approximately 0.8 km (0.5 mi) until its termination at the Bair Substation. The trolley service is no longer in operation and the tracks have been removed. Met-Ed owns the 18.3-m-wide (60-ft-wide) right-of-way which is currently used for a 13.2 kV electrical line. In areas where the trolley line is adjacent to the Maryland & Pennsylvania Railroad, the combined right-of-way is 30.5 m (100 ft) wide.

The switching function at the Bair Substation would be upgraded to accommodate the additional electricity supplied by the proposed Cogeneration ***Facility***. ***YCEP would construct a new switchyard facility near t***he existing substation, and the area owned by Met-Ed would ***increase*** from approximately 0.***25*** acres to 1.***25*** acres (0.1 to 0.5 hectares). This expansion to enhance switching capabilities would not require additional transformers. The area would be enclosed by a 1.8-m-high (6-ft-high) chain linked fence.

Met-Ed would assume responsibility for operation and maintenance of the electrical interconnection facilities, as well as the right-of-way prior to the line being energized, in accordance with the formal agreement between YCEP and Met-Ed. A minimum transmission corridor width of 30.5-m (100-ft) is required by Met-Ed guidelines. Although current evidence is far from conclusive, available scientific knowledge points toward the possibility of some risk related to exposure to electromagnetic fields (EMF). ***EMF are the electric and magnetic fields generated by electric sources (please see Sections 3.1.14.6 and 4.1.14.6 of the FEIS for more information on EMF).*** Further complicating the issue is that researchers do not know what levels of EMF exposure can be considered "safe". Some research has shown that the effects of EMF exposure that appear at field strengths of certain levels will disappear at higher levels, only to reappear at still higher levels *(The Environmental Forum, Nov/Dec 1991)*. Considering this, YCEP has adopted a strategy that allows, to the extent possible, the "prudent avoidance" of human exposure to power frequency fields in the determination of the Electrical Interconnection Utility Corridor. This means that the distance between the electrical interconnection line and units such as existing and future residences, churches, schools, and recreational areas would be established to meet EMF concerns.

Steam Line/Condensate Return Line A 0.5-m (1.5-ft) diameter, 685.8-m (2,250-ft) long steam line would be constructed to transport steam from the proposed Cogeneration Facility to the P. H. Glatfelter Company. The steam line would extend from the proposed facility in an easterly direction, crossing the breakwater between Kessler Pond and the mill pond before crossing Codorus Creek on an existing P. H. Glatfelter Company pipe bridge. The insulated line would be supported approximately 0.9 m (3 ft) aboveground on a pipe rack/piling arrangement, with the exception of locations where the line would traverse transportation features. The 0.2 m (0.75-ft) condensate return line from the P. H. Glatfelter Company would parallel the steam line route. An electrical raceway also would be associated with this line. The corridor for these lines would be approximately 1.8 m (6 ft) wide. The proposed route for these utilities is shown in Figure 2.1-12.

Water Supply Lines Potable water for the proposed facility would be supplied from the Spring Grove Water Company. The corridor for this line would be 762.0 m (2,500 ft) in length and 0.5 m (1.5 ft) in width. The 0.15-m (0.5-ft) supply line would interconnect with the water company line along a private road, owned by the P. H. Glatfelter Company. The potable water line would follow the private road, cross under York Road (PA Route 116), cross the P. H. Glatfelter Company truck parking lot, then extend over the breakwater between Kessler Pond and the mill pond to the proposed facility. These lines would be primarily below ground. The location of the potable water line is shown in Figure 2.1-13.

The P. H. Glatfelter Company would supply process and raw water back-up via 0.15-m (0.5-ft) supply lines extending from the P. H. Glatfelter Company's boiler feed water or condensate systems, across the breakwater between the mill pond and Kessler Pond, then running north across the existing pipe bridge. A temporary interconnection along this route would be used for water supply needs during the construction period of the proposed Cogeneration Facility. The proposed route for the secondary water utility line is shown in Figure 2.1-14.

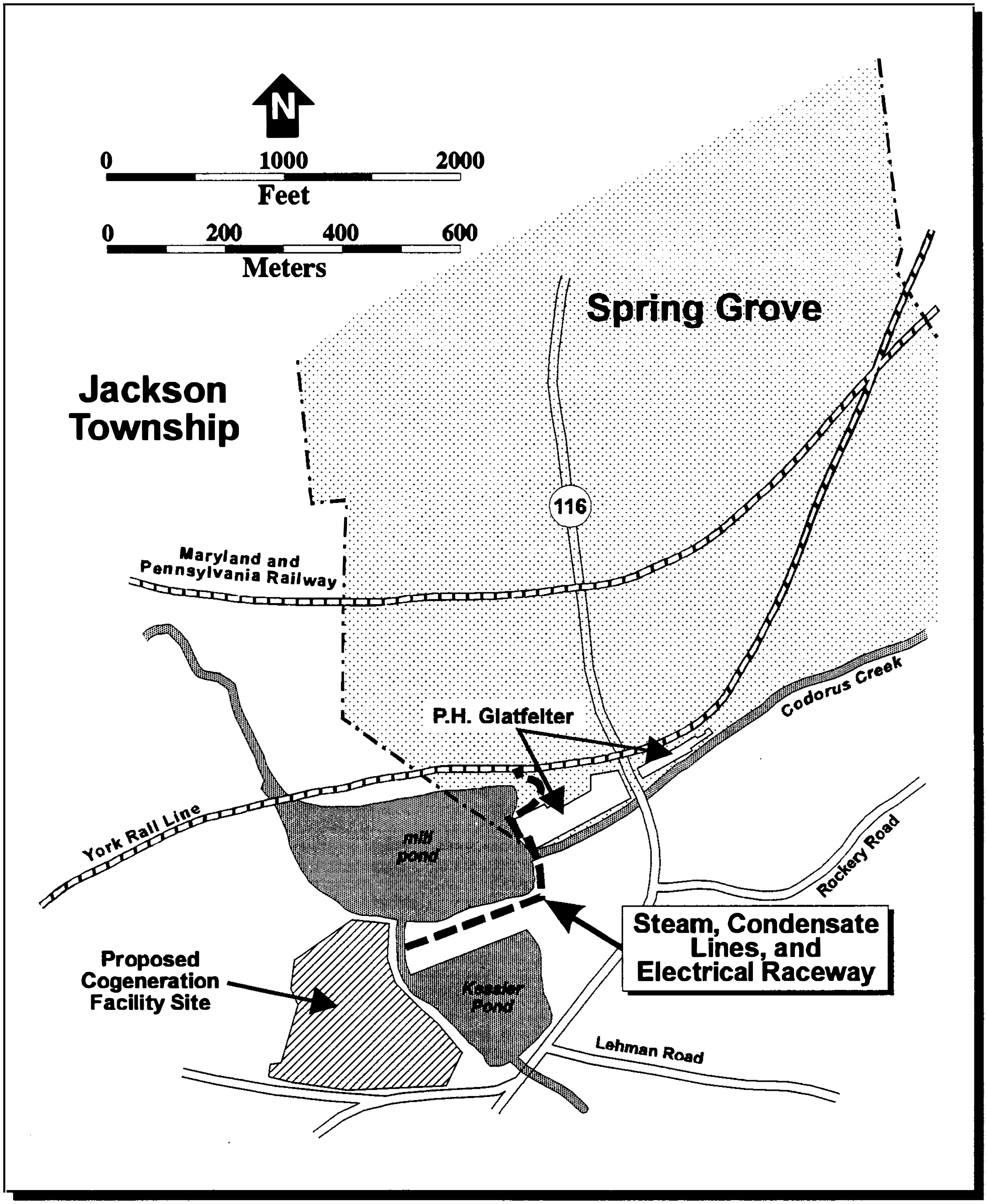

Figure 2.1-12. Location of the proposed steam line/condensate return line corridor.

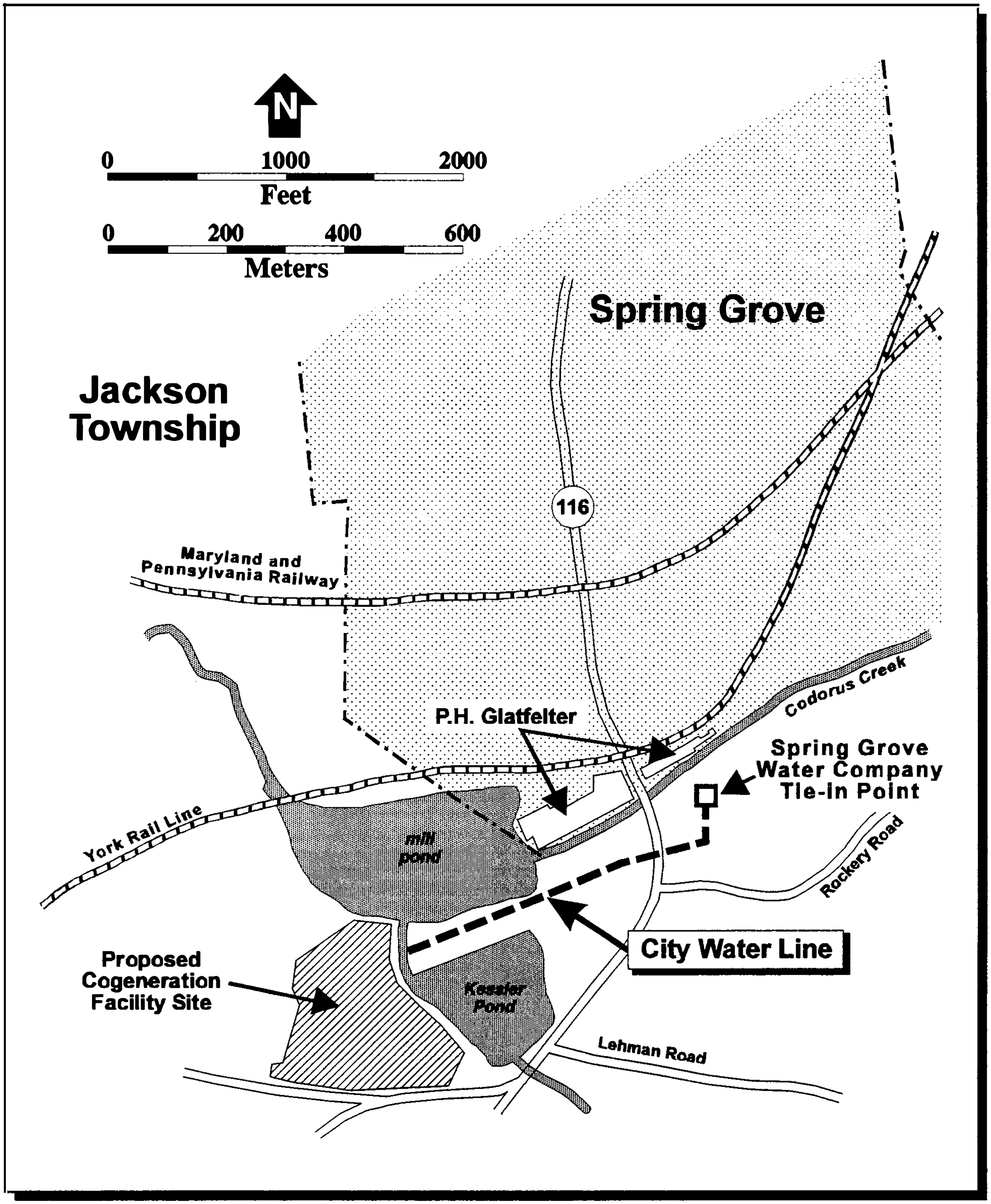

Figure 2.1-13. Location of the proposed Spring Grove Water Company potable water line corridor.

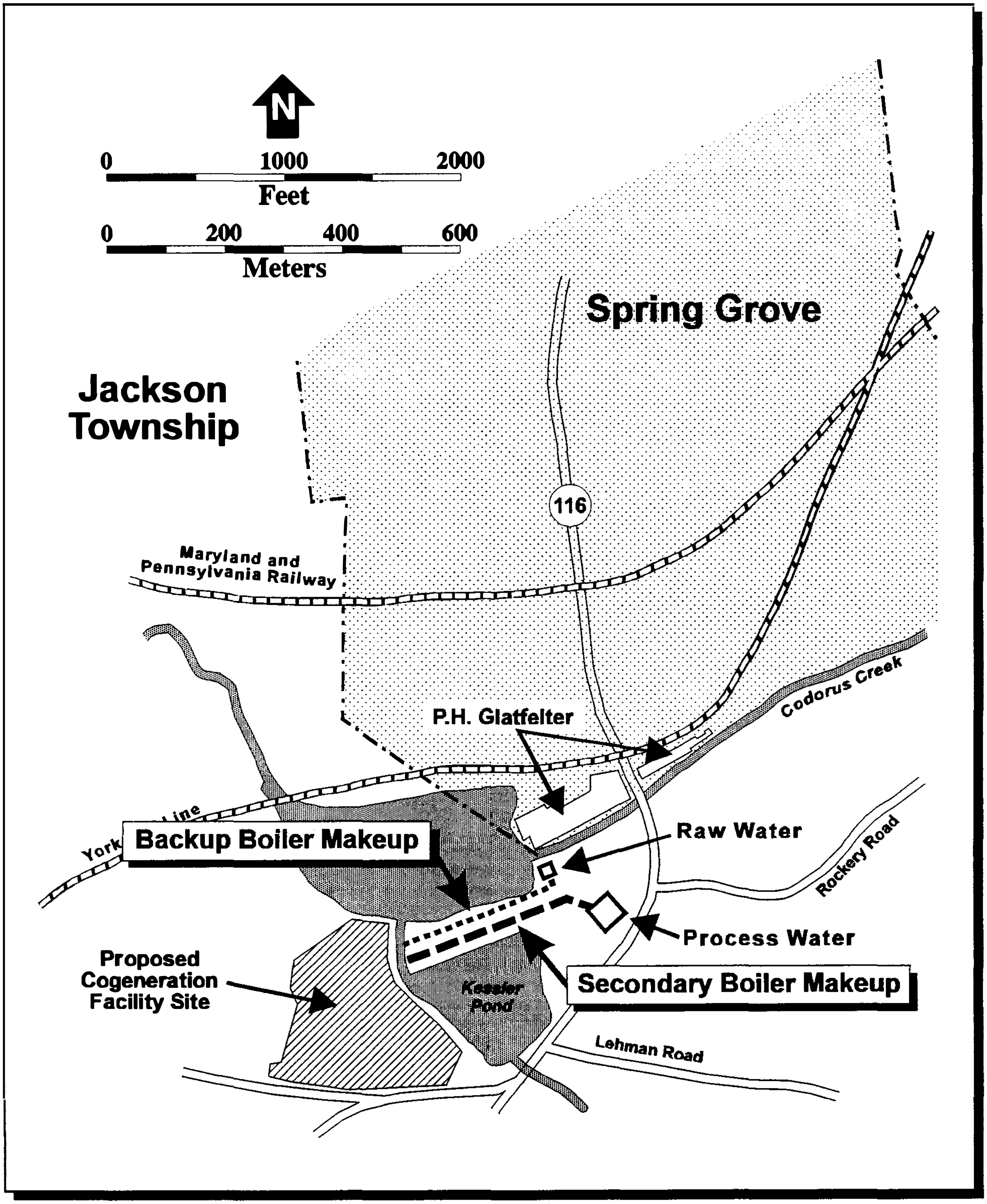

Figure 2.1-14. Location of the proposed process and raw water back-up line corridor.

Fire Protection Water A 0.25-m (0.9-ft) fire protection water line consisting of ductile iron would extend from the P. H. Glatfelter Company intake structure located on the southeast corner of mill pond, across the breakwater between the mill pond and Kessler Pond, to its connection with the proposed Cogeneration Facility. The location of the fire protection water line is shown in Figure 2.1-15.

Wastewater Return/Primary Cooling Lines The supply of treated wastewater, from the P. H. Glatfelter Company wastewater treatment facility, to the proposed Cogeneration Facility for use in the cooling water make-up, would be handled via a 0.5-m (1.5-ft) pipe constructed from the treatment plant effluent area to the east side of the proposed Cogeneration Facility. This 2.4-km (1.5-mi) primary cooling water make-up pipeline corridor would follow an existing utility corridor from the treatment effluent area to the proposed Cogeneration Facility. The secondary cooling tower make-up pipeline would extend from the P. H. Glatfelter Company intake structure located on the southeast corner of the mill pond, cross the breakwater between Kessler Pond and the mill pond, to its connection with the proposed Cogeneration Facility. The proposed route for this utility is shown in Figure 2.1-16.

The proposed facility wastewater (i.e., cooling tower blowdown, treated sanitary wastewater) would be discharged to the P. H. Glatfelter Company wastewater treatment system equalization basin. The 0.36-m (1.1-ft) wastewater return line would follow the pipeline corridor of the water supply lines from the proposed Cogeneration Facility for approximately 1,463 m (4,800 ft) and then turn to the north for an additional 213.4 m (700 ft) to the equalization basin. The combined wastewater return/primary cooling line corridor would have a width of approximately 1.5 m (5 ft). The proposed route for this utility line is shown in Figure 2.1-17.

The combination of utility lines crossing the breakwater between Kessler Pond and the mill pond would form a utility corridor of approximately 3.7 m (12 ft) in width for a distance of 213.4 m (700 ft).

Oils and Solvents

Standard operation of the proposed Cogeneration Facility would require on-site use and storage of lubricants for maintenance of mechanical equipment. These materials would include oil and grease, diesel fuel, and degreasing solvents. A supply of oils and greases is required to keep the mechanical equipment in working order. Therefore, a supply of approximately twelve 55-gallon drums of oils and greases would be stored on site for replenishing equipment needs. The drums would be stored inside buildings to prevent exposure to rainfall.

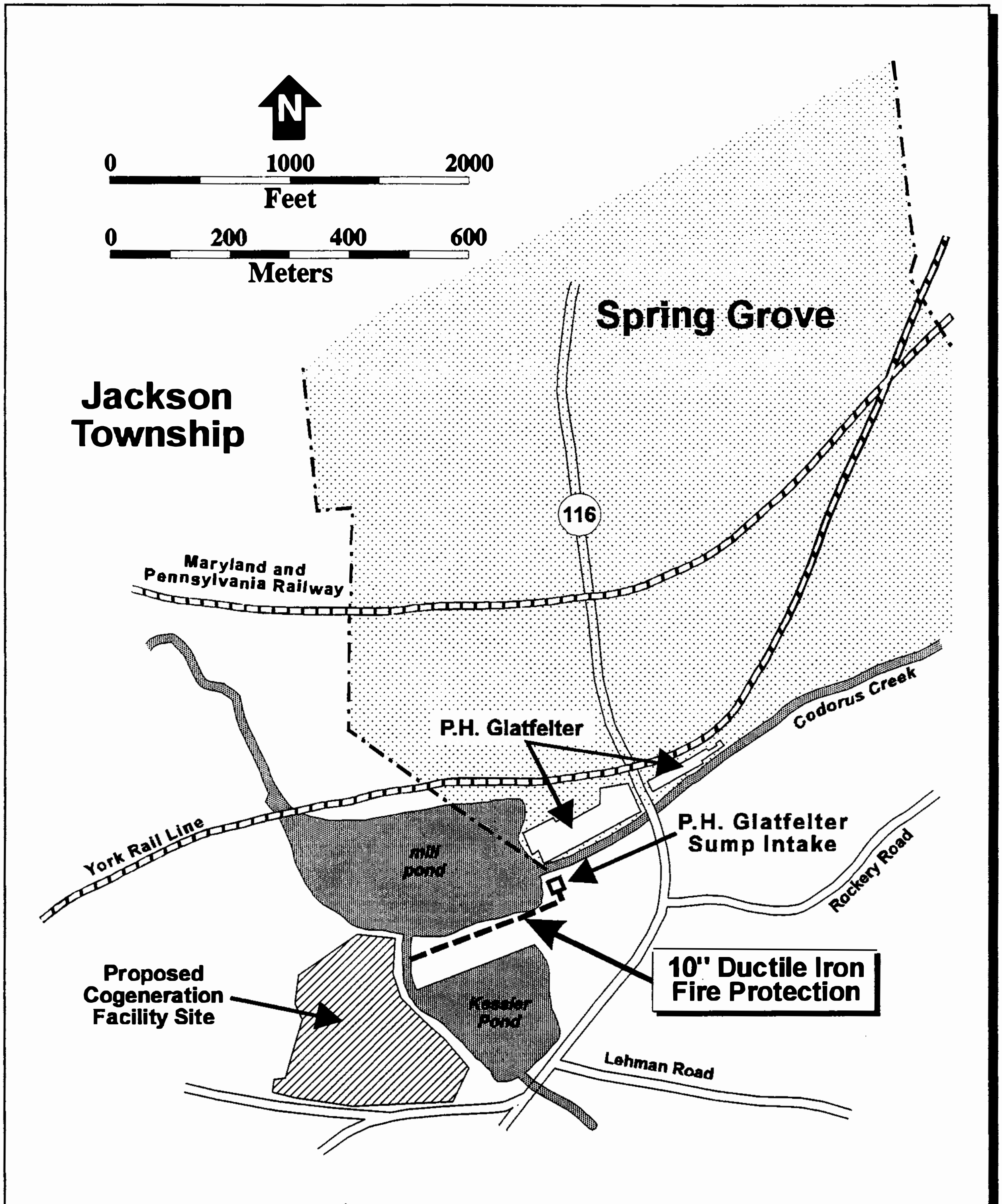

Figure 2.1-15. Location of the proposed fire protection water line corridor.

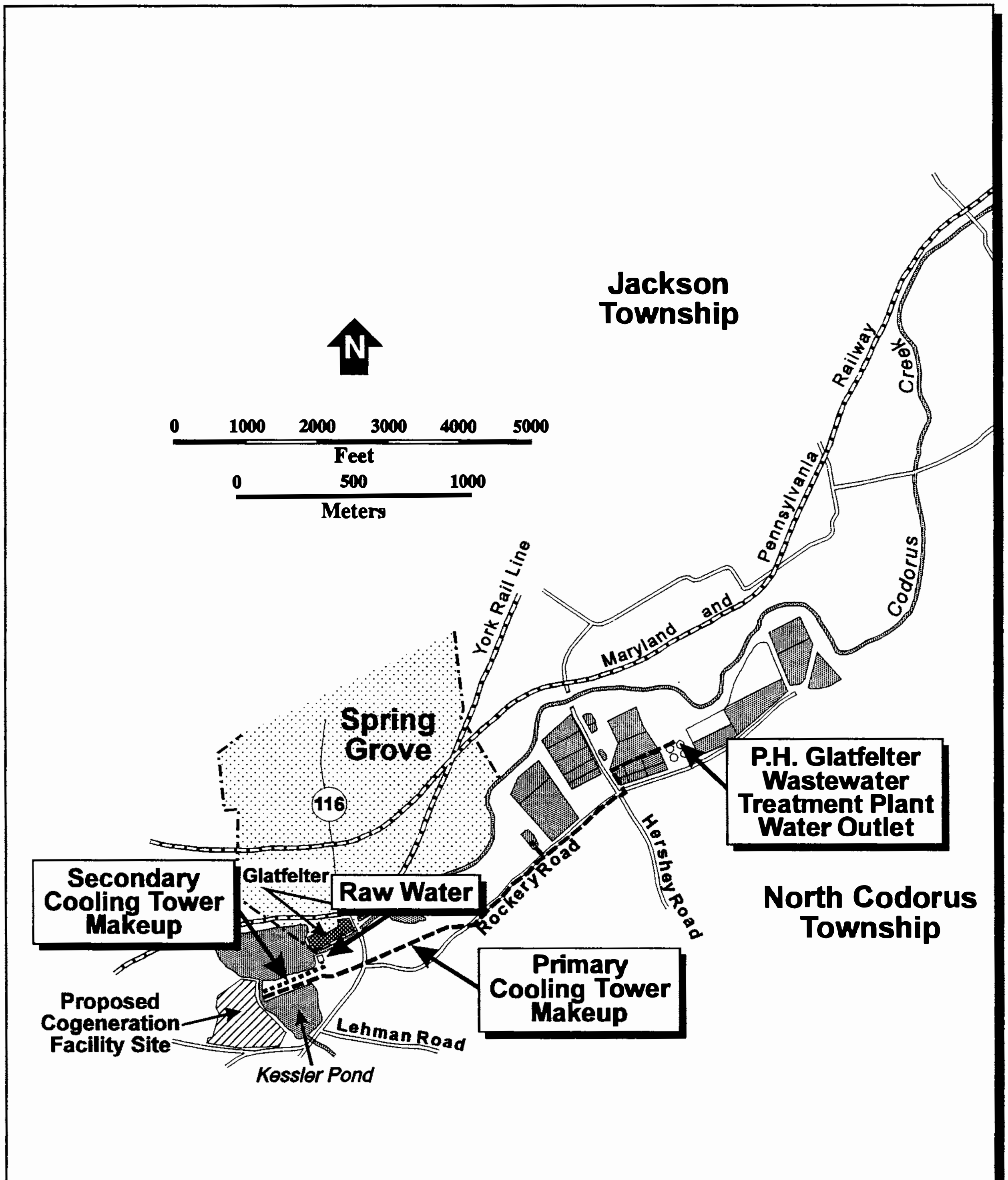

Figure 2.1-16. Location of the proposed primary and secondary cooling water make-up line corridor.

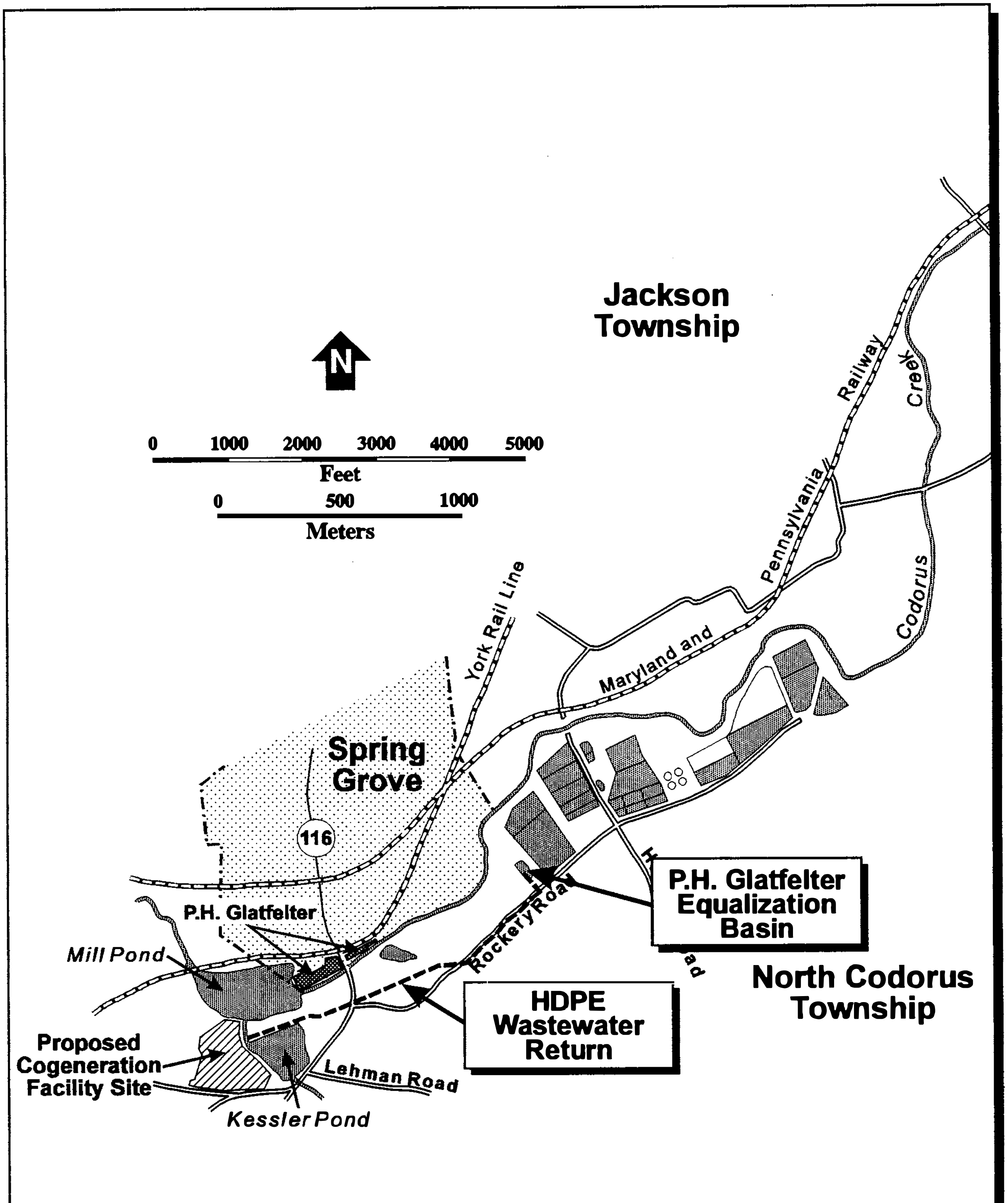

Figure 2.1-17. Location of the proposed wastewater return line corridor.

Two aboveground storage tanks (AST) would be located on site to provide diesel fuel for emergency equipment. The ASTs will comply with the applicable standard, the Underwriter's Laboratory (UL) No. 142 design code. A 250-gallon diesel AST would be used as a fuel supply for the facility's fire protection water pumps. This tank would be stored inside a building with the fire protection water pumps near the P. H. Glatfelter Company water intake from the mill pond. A second 500-gallon AST would be used to supply fuel for a diesel-powered emergency back-up electrical generator to be used as a power supply in the event of a power failure in the ***proposed*** Cogeneration Facility. These two ASTs would be located northeast of the boiler building. The AST areas would be equipped with sufficient secondary containment to prevent a release of diesel fuel to the environment in the event of a tank leak.

Solvent material would be stored on site for the degreasing of machine parts. YCEP would contract with an outside firm (e.g., Safety-Kleen, Inc.) to provide a self-contained solvent unit. These units generally hold approximately 40.9 kilograms (kg) [90 pounds (lbs)] of solvent material, which remains fully enclosed within the unit. These degreasing units are typically equipped with an apparatus that allows the operator to rinse machine parts and recycle the solvent. Once a month, the contracted firm would service the unit, replace the spent solvent with new solvent, and be responsible for the proper recovery of the spent solvent. Due to the nature of the spent degreasing solvent, this material would be listed and handled as a hazardous waste under the Resource Conservation and Recovery Act ***and under Pennsylvania Hazardous Waste regulations (25 Pennsylvania Code Chapters 260-265, 270).***

The solvent used for degreasing would be the only hazardous waste generated at the proposed facility. Additionally, as a result of the intermittent and limited use of this material, no special regulatory provisions are required for volatile organic compound (VOCs) emission control. The solvent contained in the degreaser is a petroleum naphtha with trace (less than 1 percent) concentrations of benzene, xylene, toluene, and/or 1,1,1-trichloroethane. This solvent is not an extremely hazardous substance under Title III of the Superfund Amendments and Reauthorization Act and therefore, is not subject to the requirements of Section 302. Additionally, because the proposed facility would not store a quantity in excess of 4,536 kg (10,000 lbs) of this solvent on site at any one time, reporting ***of this solvent*** under Section 312 of EPCRA would not be required. During facility construction and operation, the volume of hazardous waste (i.e., spent solvent) generated at the site would be anticipated to be less than 1,000 kg (2,205 lbs) per month. YCEP would obtain an EPA Small Quantity Generator Notification: Hazardous Waste Identification Number for use and handling of the material.

Facility Logistics

Construction. Federally-funded site development would be anticipated to begin ***if*** a favorable outcome ***results from*** this NEPA review and all necessary permits ***are acquired for specific stages of construction***, with construction completed within 36 months. The available local and regional labor force would be utilized to the extent possible for construction of the proposed facility. The following types of skilled workers would be required: carpenters, masons, iron workers, welders, pipefitters, boilermakers, insulators, painters, electricians, technicians, and engineers. Construction worker population would begin at a total of 20 during initial mobilization for clearing and rough grading. Eventually, the number of construction employees would increase to a 3-month maximum of approximately 847, 975, and 884 workers respectively. After reaching the peak construction workforce, the workforce level would gradually decrease until the proposed facility is completed. The typical construction work week would be 40 hours, however, some phases of construction may require up to 60-hour work weeks. Construction work would generally occur during daylight hours.

The construction period would include the following activities: set-up and assembly of a temporary office and warehouse; installation of temporary utilities (i.e., electricity, water, phone, sewage); preparation of construction parking and equipment staging areas; site preparation; preparation of erosion and sedimentation control measures; excavation and construction of foundations; erection of permanent facility buildings and equipment; and installation of permanent utilities.

Construction staging and laydown areas would be established on the proposed site. Staging and laydown areas are further detailed in the Erosion and Sediment Control Plan contained in Appendix K of the EIV (Volume II) which is available in the public reading rooms (Appendix A). These areas would be utilized for storage of bulk material including structural steel, piping, mechanical equipment, electrical equipment, cable reels, and turbine components. Some construction materials may be stored in local warehouses and would be transported to the site by truck on an as-needed basis.

An on-site parking area would be provided for the construction workforce. Temporary construction parking would be developed both on site and on the P. H. Glatfelter Company property to the west of their current entrance road to the Roundwood Facility. The parking area would be divided from the office complex, construction trailers, and laydown area by a security fence. Fencing also would be installed around the perimeter of all off-site jurisdictional wetland areas on P. H. Glatfelter Company property to prevent encroachment on these areas by personnel and vehicles. Chapter 3 includes a more detailed discussion of wetlands on or adjacent to the site.

Operation. The operational facility would employ approximately 70 new workers on a full-time basis. The facility would be operated 7 days a week, 24 hours per day. Weekdays would consist of three 8-hour shifts, with the day shift being staffed by 25 employees, and the swing and night shifts staffed with 15 employees each. Some employees would work a 12-hour shift. Weekends would require a reduced staff of 15 employees for each of the three shifts. The operational facility would employ engineering and operating staff, management, and support personnel. Employees would participate in a comprehensive training and start-up program to ensure safe and efficient operation of the new facility. This training program would be developed by YCEP and supervised by employees with current responsibilities for operations at similar Air Products operated facilities.

Position descriptions and qualification requirements for YCEP operators would be developed in accordance with guidelines and practices established for facilities currently operated by Air Products. In addition, unique aspects of the YCEP facility and organization would be incorporated. For instance, the facility would have a VCR and television available for employee viewing of safety training video tapes. All safety training sessions would be documented and include a listing of employees trained, topics covered and session content, date, and name of instructor. For many required training topics, tests would be incorporated to determine the employee's level of understanding and whether or not retraining is needed. An operator's progression through the entire training cycle would vary based on personal ability and complexity of the operation. A training cycle generally would range from 1-2.5 years and typically would contain the following phases: (1) initial safety training (2-3 weeks), which would include general company training and facility-specific training; (2) detailed process training (2-3 months), which would provide a systematic approach to developing a fundamental understanding of each process system as well as the relationships between process systems; (3) junior operator status (1-2 years), where the operator would accompany a senior operator to gain hands-on experience; and (4) oral boards (4-6 hours) designed to ensure that any employee seeking full operator status would have a thorough understanding of all processes and procedures necessary to operate the plant.

In accordance with land development approval by the North Codorus Township Board of Supervisors, a new parking area for the timber trucks waiting to enter the P. H. Glatfelter Company Roundwood Facility would be designed and constructed. However, potential modification of the existing P. H. Glatfelter Company access driveway is under consideration to address existing concerns about the existing back-up of timber trucks onto York Road (PA Route 116) while waiting to unload at the Roundwood Facility.

2.2 Alternatives

Section 102 of NEPA requires that agencies discuss the reasonable alternatives to the proposed action in an Environmental Impact Statement (EIS). The term "reasonable alternatives" is not self-defining, but rather must be determined in the context of the statutory purpose expressed by the underlying legislation.

Congress established the Clean Coal Technology (CCT) Program with a specific purpose -- to demonstrate the commercial viability of technologies that use coal in more environmentally benign ways than conventional coal plants. Some energy legislation, such as the Energy Policy Act of 1992, address broad policy issues and questions concerning energy choices. In contrast, the CCT legislation has a narrow focus in directing DOE to demonstrate clean coal technologies. Other technologies which cannot serve to carry out the goal of the CCT Program legislation (e.g., natural gas, wind power, conservation) are not relevant to DOE's decision of whether or not to provide cost-shared funding support for the proposed York County Energy Partners, L.P. (YCEP) cogeneration project, and therefore are not reasonable alternatives for this EIS.

Moreover, each of the CCT projects selected for partial funding is unique in that it was selected to fulfill a particular program need (i.e., a specific technology or combination of technologies). The CCT Program only allows for joint funding of proposed projects that have been selected through a solicitation and negotiation process. In 1986, the DOE issued the first of several program opportunity notices soliciting proposals for specific types of projects that would be jointly funded under the CCT Program. Prospective Industrial Participants submitted proposals in response to the notices. A group of proposals were selected for the program which were expected to further the goals of the CCT Program and which represented a cross section of different advanced coal technologies. This proposed project was selected to be a part of the CCT Program specifically because the type of technology proposed was selected for inclusion in the program. DOE's choices were limited by having to choose from the proposals that were submitted under the solicitation process.

The proposed York County Energy Partners, L.P. (YCEP) cogeneration project was selected to demonstrate an atmospheric circulating fluidized bed (ACFB) boiler with in-bed desulfurization at a large utility scale (i.e., 2.1 million pounds per hour of steam). Other projects proposing to demonstrate other technologies are not alternatives to this proposed ACFB project. Other advanced coal-based technologies are either being developed or proposed for demonstration at various sites under the CCT Demonstration Program. There is a "portfolio" of technologies that are included in the CCT Program, which represent a range of technological maturity and risk. The ramifications of selecting technologies within this specific portfolio (as compared to conventional technologies) is the subject of the Programmatic EIS for the CCT Demonstration Program (DOE 1989a). The only way in which DOE could consider other projects offering comparable benefits to the CCT Program would be to decide not to fund the proposed YCEP project and to solicit for additional proposals. The possible results of a new solicitation are totally speculative. All that can be said is that the impacts from the proposed YCEP project would not occur. Even if the procurement process could easily accommodate consideration of other clean coal technologies, these alternatives would need to be offered (or agreed to) by the owner and operator of the proposed facility, since alternatives, if selected, would require feasibility of implementation to be considered executable. The Industrial Participant is currently only interested in AFBC technology; it was the only technology the Industrial Participant proposed to DOE for consideration.

Congress not only prescribed a narrow goal for the CCT Program, but also directed DOE to use a process to accomplish that goal that would result in a minimal role for the Federal government. Instead of requiring government ownership of demonstration projects, Congress provided for cost-sharing in projects sponsored by other parties, with provision for potential repayment of the public funds invested. Therefore, rather than being responsible for the siting, construction, and operation of the projects, DOE has been placed in the more limited role of evaluating applications by project sponsors to determine if they meet the CCT Program's goals. It is well established that an agency should take into account the needs and goals of the applicant in determining the scope of the EIS for the applicant's project. When an applicant's needs and goals are factored into the deliberations, a narrower scope of alternatives may emerge than would be the case if the agency is the proprietor, charged with full decision-making responsibilities for the project. DOE has reviewed YCEP's siting evaluation process, as described in Section 2.2.1.1, and has concluded that no sites other than the North Codorus Township and West Manchester Township sites meet both DOE's purposes and the applicant's purposes.

The possibility of using alternative technologies still exists outside of the proposed action, as part of the no-action alternative. If DOE does not provide cost-shared funding for the proposed project, many outcomes could result. The no-action alternative in the EIS explores the most reasonably foreseeable courses of action that would occur if the proposed action is not undertaken. DOE has examined what have been judged to be the most probable actions that would result from not providing cost-shared funding for the proposed project as is noted in Section 2.2.4, "No-Action Alternative," of the EIS. Due to technological risk factors and the recent history of fuel-conversion plants that are being built, another clean coal technology was not deemed to be a probable selection that would result from the no-action alternative.

Other clean coal technologies may or may not have more beneficial environmental consequences than the proposed project; as noted, a comparison of the proposed project to alternate clean coal technologies has not been made in the EIS for this project. It is not reasonable nor required that DOE assess every possible alternative under the no-action alternative. The main purpose of the no-action alternative, as presented in the EIS, is to provide a baseline for comparing the proposed action and any other alternatives. The most reasonably foreseeable outcomes of the no-action alternative have been assessed in the EIS for this purpose.

2.2.1 Alternative Sites

2.2.1.1 YCEP's Site Selection Process

Air Product's selection of the P. H. Glatfelter Company property for the proposed Cogeneration Facility followed an extensive site search which extended over a period of one and a half years. This site search was initiated in early 1990 as a result of a publicly-announced power generation solicitation on the part of Met-Ed. Air Products, during its normal course of business in the cogeneration industry, had closely followed Met-Ed's need for additional power sources. As a result, Air Products began a search for potential sites in early 1990. This site search involved the balancing of several variables:

- Sites located within Met-Ed's service territory were preferable to sites outside its territory, primarily because of the advantages of producing electricity in the electrical system where it would be used.

- Sites located in or near major electrical load centers were preferable to sites where little or no electrical load exists. Locating outside of load centers would result in transmitting the power to areas where power is needed, thereby causing electrical inefficiencies through resistance losses (i.e., line losses).

- Cogeneration sites must be located near a large user of steam, typically an industrial manufacturing facility.

- Sites must be located near areas where interconnection to the utility's electrical grid is practical.

- Sites for coal-fired facilities must have reasonable access to rail lines for fuel delivery, and must generally have other major infrastructure available (i.e., roads, water supply, wastewater disposal facilities).

- Sites should be either zoned or reserved for industrial or heavy industrial use, or be compatible with such uses.

- Sites should allow development with minimal effect upon environmental resources and avoid environmentally sensitive areas, such as wetlands and endangered species habitat.

During the site search, Air Products evaluated potential sites in Met-Ed's three service areas encompassing large areas of central and eastern Pennsylvania, using the criteria listed above. Several sites were evaluated in the northeastern service territory of Met-Ed (Northhampton, Monroe, and Pike counties in Pennsylvania) but were rejected for the following reasons: the sites were not near Met-Ed electrical load centers, there were insufficient major manufacturers nearby that would be able to utilize steam from the cogeneration process, and several areas did not have adequate rail and water infrastructure. Specific sites were also evaluated in the Berks County area. These sites were rejected due to an inability to locate adequate industrial zoned property near major manufacturers and inadequate rail and water infrastructures.

Three sites were evaluated in the York County area. One was at a manufacturing facility located in the York city area. This site was eliminated early in the selection process due to the unavailability of the required acreage for the project. The second site was the P. H. Glatfelter Company site. Although this site had adequate availability of real estate and met the other requirements as discussed above, YCEP representatives internally concluded that P. H. Glatfelter Company did not need additional steam since it produced a sufficient quantity from its own series of power boilers. Therefore, the P. H. Glatfelter Company site initially was dropped by YCEP from further consideration.

The third site, the one initially selected by YCEP and the alternative site discussed in this statement, was at the J.E. Baker Company in West Manchester Township (Figure 2.2-1). The J.E. Baker Company site met all key site selection criteria discussed above. Specifically, that site had approximately 50 acres (20 hectares) of mostly flat property available that was zoned for industrial use, had access to rail, water, and roadways, was near existing Met-Ed electric lines, and was in close proximity to the required steam user (the J.E. Baker Company).

During development and permitting activities at the West Manchester Township site, YCEP sought to obtain air emission reductions from existing sources within York County. In August 1992, during the process of evaluating offset opportunities, YCEP representatives contacted officials at the P. H. Glatfelter Company to determine what offsets might be available. In October 1992, P. H. Glatfelter Company officials determined that significant offsets would be available only if the P. H. Glatfelter Company Power Boiler No. 4 could be curtailed and if the YCEP facility could provide a large quantity of steam to the P. H. Glatfelter Company mill. This would require the YCEP facility to relocate to North Codorus Township at the P. H. Glatfelter Company site. ***In the case of the West Manchester Township site, YCEP was pursuing the possibility of obtaining a zoning variance from the West Manchester Township Board of Supervisors for building and stack height. The North Codorus Township does not present similar zoning ordinance constraints (e.g., allowable height of stacks).*** In February 1993, YCEP officials determined, upon consideration of all relevant criteria, including the opportunity for significant air emission reductions and the reuse of process wastewater for cooling purposes, that the North Codorus Township site best satisfied the selection criteria listed above. YCEP cited specific advantages of the proposed site as follows:

- Electrical Load Center - The project, located in York County, would be well situated to serve an area with a large electrical demand. York County is the location of many large manufacturing companies and has been an area of heavy growth in recent years. The York County area comprises approximately 40 percent of Met-Ed's system-wide energy consumption.

- Proximity to Steam User - The proposed site would be located adjacent to the industrial steam host, the P. H. Glatfelter Company. Purchasing steam from YCEP would provide P. H. Glatfelter Company with an economical steam source that would meet the mill's projected needs well into the 21st century.

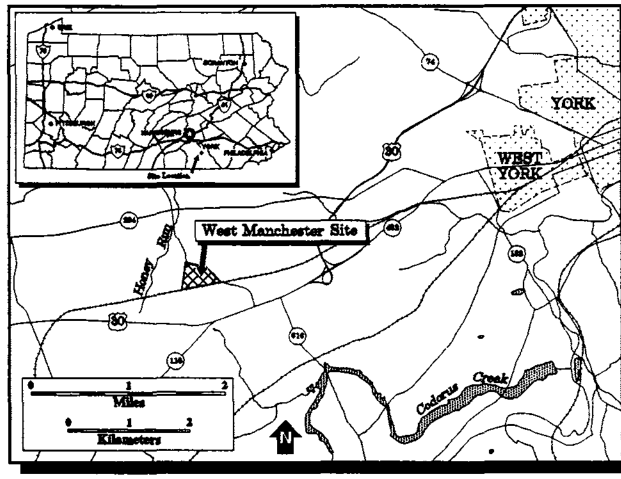

Figure 2.2-1. Regional map showing the location of the alternative West Manchester Township site.

- Appropriate Land Use - North Codorus Township does not have a zoning ordinance, but does have a land development and subdivision ordinance. The proposed project can meet the ordinance requirements and land use would be consistent with the adjoining P. H. Glatfelter Company operations.

- Infrastructure - The proposed site would be located near existing interconnections to Met-Ed electrical lines and the site has good access to rail. The water service and wastewater treatment facilities necessary would also be present.

- Operational Effects - As a result of receiving steam from YCEP, the P. H. Glatfelter Company would be able to curtail operation of an existing coal-fired boiler, thereby significantly reducing air emissions. The reuse of P. H. Glatfelter Company process wastewater as YCEP cooling water eliminates the need of fresh water supply sources. If process wastewater should become unavailable for use at the proposed facility, it would be temporary. During these times, cooling water supply would be provided from other P. H. Glatfelter Company water resources.

Essential to the NEPA review process is examination of reasonable alternatives to the proposed site. DOE has evaluated YCEP's site selection process for the proposed Cogeneration Facility and has verified the reasonableness of YCEP's site selection process.

2.2.1.2 Alternative Site Location

From the perspective of potential environmental impacts, the West Manchester Township site is typical of alternative locations at which the proposed project could be constructed. For that reason, it was selected as representative of a reasonable alternative site to be analyzed for comparative purposes in this ***FEIS***. Earlier in the planning process, the West Manchester Township site was proposed for use by YCEP and was evaluated by the company during its search for a suitable location at which to demonstrate a coal-fired CFB technology with cogeneration at the 250-MW scale. It should be noted, however, that YCEP does not now propose to construct its project at the West Manchester Township site.

The West Manchester Township site (the alternative site) is a 47-acre (19.0-hectare) parcel of land located in West Manchester Township, York County, PA (Figure 2.2-2). The triangular parcel is bounded to the south by an active Yorkrail, Inc. railroad line, to the east and north by Emigs Mill Road, and to the west by the Briarwood golf course. This alternative site currently is vacant and used for agricultural purposes. The alternative site is located approximately 7.3 km (4.5 mi) west of York, PA.

The alternative site is zoned for General Industrial uses, signifying the most intensive level of industrial zoning in West Manchester Township. Mixed land uses surround the alternative site. The J.E. Baker Company dolomite quarrying and brick manufacturing facility, located on Emigs Mill Road opposite the alternative site, is the nearest industrial land use. Commercial, residential, and recreational (***e.g.***, a golf course) land uses are in the vicinity of the alternative site. Five buildings of local historical significance are located within 1.6 km (1 mi) of the alternative site, however, none of these buildings are listed on the Commonwealth or ***the*** Federal Register of Historic Places.

The alternative site, located approximately 0.7 km (0.44 mi) northwest of the intersection of Lincoln Highway (U.S. Route 30) and Emigs Mill Road, has been owned by the J.E. Baker Company since 1962. The property has been used for agricultural purposes for the past 62 years, with no evidence of commercial or industrial use during this period. Currently, the West Manchester Township alternative site is vacant and leased to local farmers.

The alternative site is located near major transportation features. An existing rail line, owned by Yorkrail, is located on the southern boundary of the alternative site and would be available for coal delivery. Additionally, the alternative site's proximity to U.S. Route 30 minimizes the distance along local roadways that would be traversed by construction vehicles, employee vehicles, and limestone and ash trucks.

2.2.2 Summary Description of the Technology

The proposed technology for the alternative site (West Manchester Township) would be similar to that described for the proposed site (North Codorus Township) in Section 2.1.2.

2.2.3 Facility Description at Alternative Site

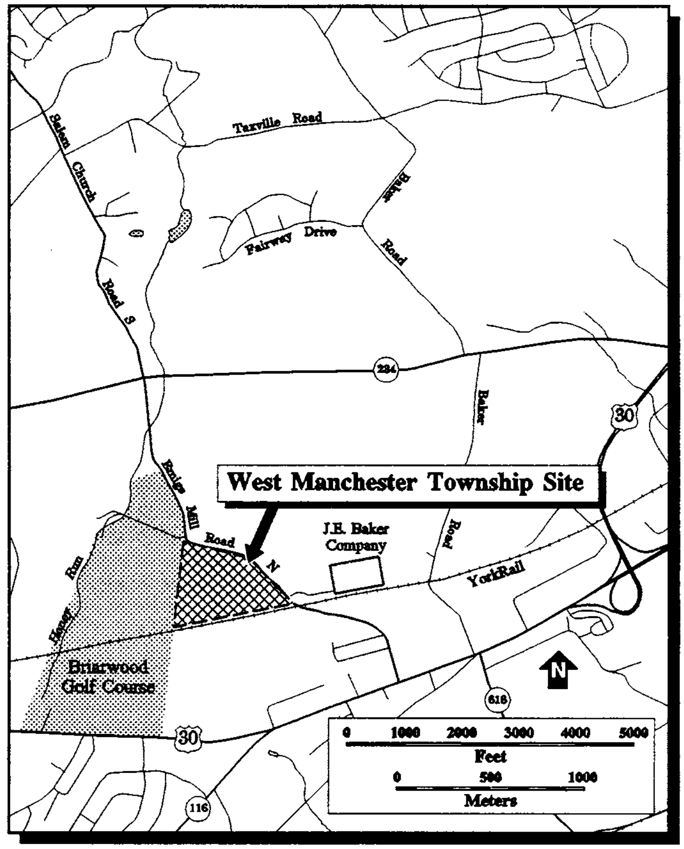

Figure 2.2-2. West Manchester Township location of the proposed YCEP Cogeneration Facility.

The proposed YCEP 227-MW (net) Cogeneration Facility at the alternative site would be similar to that described in Section 2.1.3 (i.e., consist of one CFB boiler and supporting equipment designed to operate continuously (24 hours per day, 365 days per year), with the exception of planned outages for maintenance purposes). The steam generated in the CFB boiler would be used to drive a steam turbine to produce electricity for purchase by Met-Ed, and a portion of the high pressure steam exiting the steam turbine would be sold to the J.E. Baker Company for use in their dolomite brick manufacturing operations. During periods when steam would not be available from the ***proposed*** Cogeneration Facility, the J.E. Baker Company would utilize back-up natural gas boilers to provide steam.

The site plan for the proposed YCEP Cogeneration Facility at the alternative site, indicating the location of major system components, is presented in Figure 2.2-3. Landscaping and berming would be incorporated into the facility design to enhance aesthetics. Additionally, all project operations (e.g., coal handling system, ash handling system) would be completely enclosed. An internal railway circulation line would be designed to ensure that railcars delivering coal to the site would be accommodated completely within the facility boundaries to eliminate potential impacts to rail traffic on the Yorkrail line.

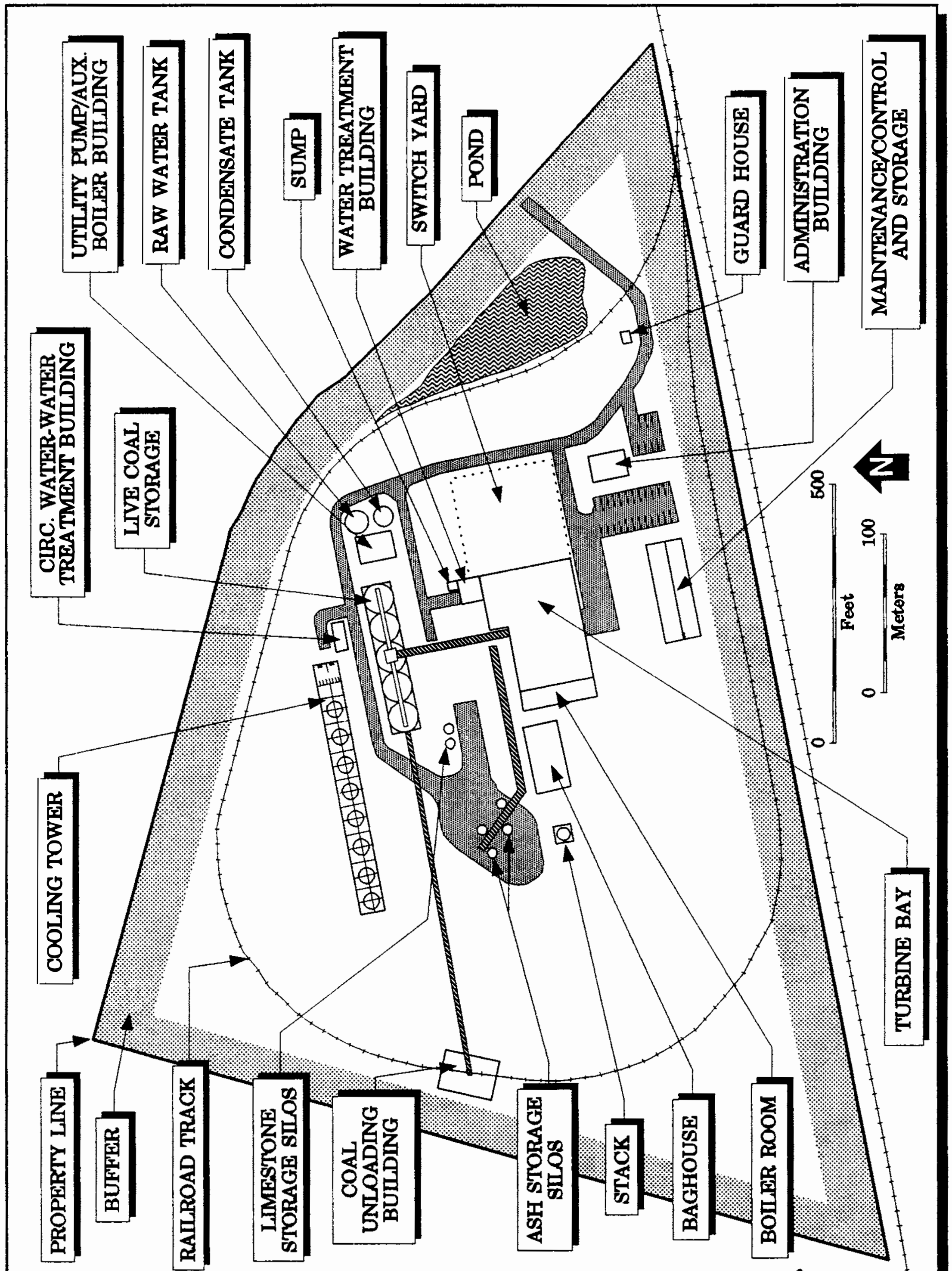

Figure 2.2-3. Proposed YCEP Cogeneration Facility site plan for the alternative West Manchester Township site.

Site access would be provided via a roadway to be constructed from Emigs Mill Road to Lincoln Highway (U.S. Route 30) (designated Realigned Emigs Mill Road), along the west boundary of the alternative site.

General operational characteristics of the proposed YCEP Cogeneration Facility at the alternative site, under full load, are presented in Table 2.2-1. Components of the proposed project that differ from those described in Section 2.1.1.3 are described below. A complete discussion of the proposed facility at the alternative site is provided in Appendix M of the EIV (Volume II), and is available in the ***public*** reading rooms (see Appendix A). ***(DOE notes that some of the air emissions values have changed since issuance of the DEIS. These new values reflect extrapolation of refined performance characteristics information from the North Codorus site to the West Manchester site).***

Facility Inputs

The primary fuel supply would be eastern bituminous coal from western Pennsylvania [Consol's Bailey/Enlow mine approximately 332.8 km (208 mi) west of the alternative site] with an expected sulfur content of two percent or less. Expected properties of the coal would be equivalent to those described in Section 2.1.3 and listed in Table 2.1-2. At 100 percent capacity, the proposed facility would be anticipated to use approximately 2,000 tons of coal per day. This tonnage is less than that anticipated for the North Codorus Township site because the J.E. Baker Company would purchase less high pressure steam than the P. H. Glatfelter Company.

Coal, washed at the coal mine's preparation plant, would be delivered to the proposed facility via covered railcar where it would be unloaded and stockpiled in enclosed storage silos. Coal transfer would occur via enclosed conveyors to minimize noise and dust. One train delivery of 115 cars per week would be required. The 115-car train would be divided into three delivery trains at the Yorkrail yard. These smaller trains would travel to the site separately. The alternative site would be designed to accommodate two such delivery trains to provide adequate on-site storage in the event that immediate return to the main rail line is not possible. While the on-site coal storage capacity is equal to the capacity at the North Codorus Township site, the lower fuel consumption associated with the alternative site would require that an approximately 30,000 ton (or 15-day) supply of coal be maintained in five enclosed storage silos, each with the capacity to store a 3-day supply of coal, to ensure continuous facility operation. Additionally, the internal railway circulation would be designed to ensure that cars delivering coal to the alternative site would be accommodated completely within the facility boundaries to prevent potential impacts to rail

Table 2.2-1. Expected operating characteristics of the proposed YCEP Cogeneration Facility at full load (100% capacity) at the alternative site.

Characteristics	Inputs	Outputs
Capacity, MW		250 gross (227 net)
Capacity to Met-Ed, MW		227
Steam to the J.E. Baker Company		40,000 lbs/hr
Fuel Consumption per year (2,000 tons/day of coal expected at 100% capacity)	730,000 tons/yr	
Limestone Consumption per year (360 tons/day of limestone expected at 100% capacity)	131,000 tons/yr	
Aqueous Ammonia Consumption per year (6.2 tons/day for SNCR system)	2,263 tons/yr	
Natural Gas Consumption (CFB Boiler start-up and steam augmentation)	3,000 MMBtu/start-up event	
Propane Consumption per year (Auxiliary boiler start-up)	3,060 tons/yr	
Air Emissions		
Sulfur Dioxide (SO_2)		2,300 tons/yr
Oxides of Nitrogen (NO_x)		***1,212 tons/yr****
Particulate Matter (PM_{10})		107 tons/yr*
Carbon Monoxide (CO)		***1,454 tons/yr****
Carbon Dioxide (CO_2)		1,989,729 tons/yr
Volatile Organic Compounds (VOC)		39 tons/yr*
Evaporation and Drift		2.5 mgd
Water Requirements		
Cooling Tower Make-Up Water	2.68 mgd	
Boiler Water Make-up and Miscellaneous in-plant use (i.e., routine maintenance and cleaning operations, dust control)	91,560 gpd	
Potable Water	3,500 gpd	
Water Effluents		
Cooling Tower Blowdown		163,892 gpd
Sidestream Filter Backwash		31,062 gpd
Plant Maintenance Wastes (miscellaneous drains and washdown)		42,000 gpd
Sanitary Effluent to York City Wastewater Treatment Plant		
Sanitary Wastewater		3,500 gpd
Regeneration Waste (exchange water and regeneration rinse water)		4,458 gpd
Solid Waste		
Ash Byproduct		149,000 to 200,000 tons/yr

****Personal communication between G. Kinsey, YCEP and J. Garland, EG&G, April 20, 1995.***

Source: ENSR, 1992.

traffic on the existing Yorkrail line. Once stored on site, the coal would be pneumatically conveyed to the boilerhouse.

By virtue of availability of natural gas now provided to the J.E. Baker Company, natural gas would serve as a back-up fuel for facility start-up. Approximately 3,000 MMBtu of natural gas would be consumed per start-up event. Because of the potential for short-term interruption of gas supply, due to infrastructure constraints, on-site storage of propane also would be considered. A 3-day supply of propane would be stored in two 41,000 gallon horizontal tanks adjacent to the auxiliary boiler. Natural gas would provide back-up fuel for both the main and auxiliary boilers. Propane would serve as back-up fuel for the auxiliary boiler only.

Waste dolomite from the J.E. Baker Company would potentially be used as the limestone sorbent in the boiler for sulfur dioxide (SO_2) emissions control. An enclosed conveyance system would be constructed between the J.E. Baker Company and the proposed Cogeneration Facility for transport of the waste dolomite. A secondary option would be to transport the waste dolomite by truck, which would increase truck traffic between the two industrial facilities. Limestone transported by truck would be pneumatically conveyed from the delivery trucks into storage silos. Transfer from the storage silos to the boilerhouse also would occur pneumatically.

As noted in Section 2.1.3 for the proposed site, standard operation of the alternative site facility would require on-site use and storage of chemicals for water treatment. Chemicals would be delivered to the facility in closed bulk containers and stored in the cooling unit treatment building, demineralizer building, or SNCR building, depending on their intended use. Miscellaneous chemicals and equipment lubricants would be stored within the maintenance and storage buildings. Curbs and drains would be installed at chemical treatment areas to route spills to an enclosed sump for treatment. Transport piping would be constructed of compatible material to prevent corrosion or deterioration by the material being transported.

Aqueous ammonia in a 27 percent solution would be required for use in the SNCR system at the alternate site. Aqueous ammonia would be stored on site in a 20,000-gallon storage tank. Deliveries would occur by truck once per week. The aqueous ammonia would be transferred to the storage tank within a fully contained and diked storage area. This contained storage tank area would have 125 percent of the capacity of the actual ammonia storage tank.

The proposed facility would be subject to the emergency planning provisions of ***the Emergency Planning and Community Right to Know Act*** (EPCRA) (Sections 302 and 303) if it stored one or more of the 360 chemicals identified by the EPA as an Extremely Hazardous Substance (EHS) in quantities equal to or greater than the respective Threshold Planning Quantity (TPQ). The facility would be subject to the chemical inventory sections of EPCRA (i.e., Sections 311 and 312) if it stored, at any given time, one or more hazardous chemical, as defined by OSHA as requiring a Material Safety Data Sheet, in quantities equal to or greater than 4,536 kg (10,000 lbs), or one or more EHS in quantities equal to or greater than 227 kg (500 lbs) or its respective TPQ, whichever is less. In addition, the proposed facility would be subject to toxic release reporting requirements of EPCRA (i.e., Section 313) if it manufactured, imported, processed, or otherwise used any of the toxic chemicals, defined by EPA, in quantities greater than their specified thresholds. Thresholds are specified quantities based on the use of the specific toxic chemical. The threshold for the manufacture, import, or processing of a toxic chemical is currently 11,340 kg (25,000 lbs). The threshold for an otherwise used toxic chemical is currently 4,536 kg (10,000 lbs). The threshold value is based on the total annual usage quantity of a toxic chemical. EPA has designated approximately 348 toxic chemicals.

The proposed facility would be considered a small quantity hazardous waste generator due to the use of degreasing agents for the cleaning of mechanical parts. Disposal of these wastes would be arranged through a contracted firm specializing in transport and disposal of hazardous wastes, both at this site and at the proposed site.

Facility Water Usage

Projected water use would range from 5,000 to 15,000 gpd for construction-related activities. During operations, the proposed facility would require a maximum of 3.0 mgd to meet facility needs, the majority of which would be required to satisfy cooling unit make-up requirements. All facility water needs are proposed to be supplied by the York Water Company via their surface water supply resources (Lake Redman and Lake Williams). The water balance for the proposed facility operations is presented in Figure 2.2-4.

The proposed YCEP Cogeneration Facility at the alternative site would require an average of 2.8 mgd for operation purposes. The cooling water system make-up requirements would average 2.7 mgd. The remainder of the water would be used for boiler water make-up, potable water, and miscellaneous in-plant uses (e.g., routine maintenance and cleaning, dust control).

The cooling water system would be similar to the one described in Section 2.1.3 for the proposed site, with the same routine chemical additives. An average of 2.5 mgd of water would be evaporated in the cooling tower. Cooling tower blowdown volume would vary depending on the allowable cycles of operation, but would be anticipated to range from 164,000 gpd to 168,000 gpd. The cooling tower blowdown would be required to prevent the build up of dissolved solids in the recirculation system.

Cooling water consumption would vary with ambient conditions, plant production levels, and cooling water quality. Water consumption attributed to evaporation and drift would be approximately 2.5 mgd. The combined cooling tower discharge (i.e., blowdown and sidestream filter backwash) to the proposed facility's holding pond would be approximately 195,000 gpd on average and 231,000 gpd at maximum flow, as noted in Figure 2.2-4.

To minimize total water demands for the facility, and limit wastewater discharge, internal recycle/reuse would be employed as appropriate. An average of 119,000 gpd, and a maximum of 230,000 gpd, of condensate would be returned from the steam host (the J.E. Baker Company) to the condenser for reuse in the steam generator. Additionally, approximately 45,000 gpd of boiler blowdown would be reused, on average, to offset a portion of the facility's cooling water make-up requirements. A portion of the effluent from the proposed facility's holding pond (3,000 gpd on average) would be used for ash quench. The anticipated net water savings would range between 1,500 gpd and 26,000 gpd during average facility operation.

Air Pollution Control

The proposed project site is located in the Northeast Ozone Transport Region (NOTR) established by the CAA. Additionally, projected oxides of nitrogen (NO_x) emissions from proposed project operation exceed 100 tons/*yr*. Consequently, the facility would be required to offset oxides of nitrogen (NO_x) emissions at a ratio of 1.15 to 1, and would be required to complete a Lowest Achievable Emission Rate (LAER) performance analysis to demonstrate if lower oxides of nitrogen (NO_x) emissions level could be achieved. The LAER performance analysis would be conducted when the proposed facility undergoes a performance test for the PSD Air Quality "Authority to Operate" permit approval; PADER then would determine if a lower emission level would be incorporated into the operating permit.

The proposed facility would also be subject to PSD regulations; therefore, the type of air pollution control equipment associated with the proposed project would be determined through a Best Available Control

Technology (BACT) analysis. Both the BACT analysis and oxides of nitrogen (NO_x) offset plan approvals would be conducted as part of the PSD air quality permit application process. ***Applicable*** information pertaining to the BACT analysis and the sources of oxides of nitrogen (NO_x) offsets is found in the PSD Permit Application (*Weston, 1994d*) and the Response Document for the Department of Environmental Resources, February 8, 1994, Request for Additional Information on the PSD Air Quality Permit Application (*YCEP, 1994b*). These documents are discussed in further detail in Section 4.1.2 of this FEIS. Both documents are publicly available in the reading rooms (Appendix A).

Sulfur dioxide emissions control for the proposed facility would include limestone injection into the CFB boiler combustion chamber. Limestone injection is capable of controlling sulfur dioxide (SO_2) emissions to 0.25 pounds per million Btu (lbs/MMBtu), achieving at least a 92 percent reduction in sulfur dioxide emissions when compared to uncontrolled emissions. Limestone sorbent in the boiler combustion chamber would interact with the sulfur dioxide (SO_2) emitted in the coal burning process to control the sulfur dioxide (SO_2) emissions level. Limestone sorbent would be fed at a maximum rate of 23 tons/hr at the boiler maximum heat input rate to achieve a calcium-to-sulfur ratio of approximately 2.5 to 1. The sulfur dioxide (SO_2) emissions level of 0.25 lbs/MMBtu and 92 percent sulfur dioxide (SO_2) reduction level were confirmed based on a pilot plant test conducted by the boiler manufacturer using the coal and limestone materials expected to be used by the proposed project.

Proposed air pollution control equipment includes the employment of an aqueous ammonia injection technology known as SNCR to minimize emissions of oxides of nitrogen (NO_x) (see Table 2.1-3). During this process, aqueous ammonia would be injected into the boiler exhaust gas to convert the oxides of nitrogen (NO_x) into nitrogen and water. This injection technology would control oxides of nitrogen (NO_x) emissions to 0.125 lbs/MMBtu and achieve a 40 percent or greater reduction in oxides of nitrogen (NO_x) emissions compared to conventional technology. This control technology has been used on other CFB boilers and has been demonstrated to be technically feasible, as discussed in the PSD Permit Application (*Weston, 1994d*) and Response Document (*YCEP, 1994b*).

Particulate emissions would be controlled to 0.011 lbs/MMBtu using a fabric filter collection system (i.e., baghouse) in accordance with PSD permit requirements. The baghouse would be designed to have a minimum of eight compartments, and would remove fine particles from the boiler exhaust stream prior to release of the exhaust gas into the atmosphere. The baghouse would be designed to remove greater than 99.9 percent of particulate matter compared to uncontrolled emissions. This control technology has been used on other CFB boilers and it has been demonstrated to be technically feasible.

From the baghouse, flue gas would be directed to the flue gas stack via an induced draft fan. The proposed stack would be 120.4 m (395 ft) in height and would be provided with Federal Aviation Administration (FAA) aircraft obstruction lighting and markings in accordance with FAA Advisory Circular 70/7460—1H, Chapters 3, 4, 5, and 13.

Each project in the CCT Program is required to develop and implement an Environmental Monitoring Plan (EMP) which addresses both compliance monitoring required under permit conditions and supplemental monitoring. One objective of this monitoring activity is to quantify the mass flow rate of hazardous air pollutants (HAPs) in stack gases emitted to the ambient air at clean coal demonstration project sites, under both baseline and demonstration operating conditions. DOE notes that not all CCT projects are required to collect HAPs monitoring data. In order to obtain air toxics emission data, YCEP would monitor the following HAPs: elements/compounds including antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium; inorganic compounds including chlorine/hydrochloric acid, cyanide compounds, fluorine/hydrogen fluoride, phosphorus/phosphates, and radionuclides; and organic compounds including formaldehyde and those semi-volatile and volatile organics identified by EPA in Title III of the CAA applicable to electric utility facilities.

The proposed facility would also be equipped with a *C*ontinuous *E*missions *M*onitoring (CEM) system located in the flue gas stack, downstream of the pollution control equipment. The purpose of the CEM system would be to monitor the regulated emission components of the flue gas and provide verification of compliance with these regulations to the PADER as stipulated in the PSD air permit. The CEM system would be installed approximately 61 m (200 ft) up in the stack, and would continuously measure and record flue gas volumetric flowrate and temperature; opacity; and sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and either carbon dioxide (CO_2) or oxygen (O_2) concentrations. Monitoring and recording equipment would be installed and operated in accordance with technical specifications, and installation and maintenance requirements under the PADER Continuous Source Monitoring Manual, Revision 5, March, 1993.

Facility Wastes

Pollution Prevention Programs The pollution prevention programs for the proposed West Manchester Township alternative site would be the same as those described for the proposed North Codorus Township site in Section 2.1.3.

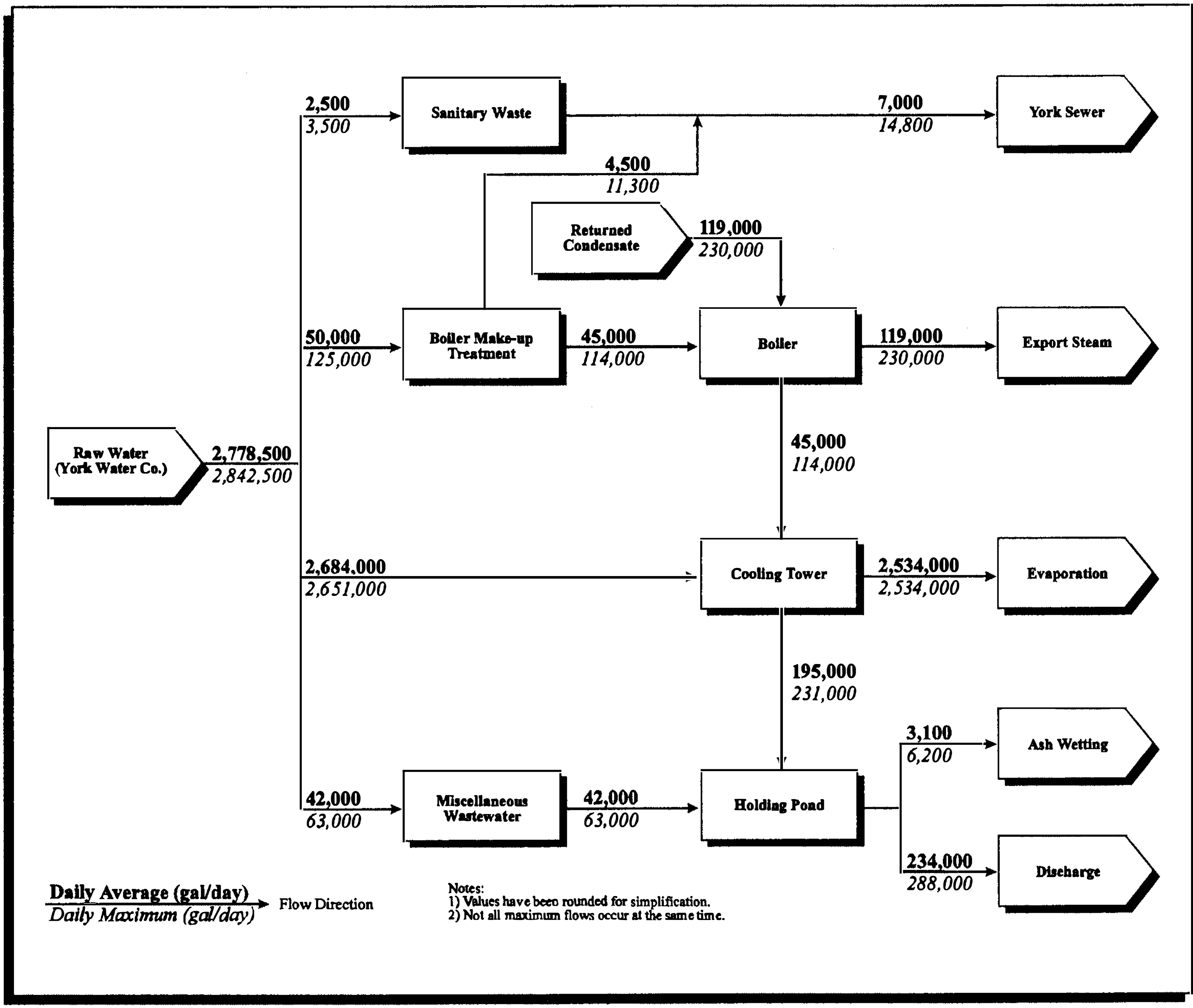

Figure 2.2-4. Water balance diagram for the proposed YCEP Cogeneration Facility at the West Manchester Township site.

Combustion of coal in the CFB unit during facility operation would generate ash byproduct as described in Section 2.1.3. Full operation of the facility would produce up to 200,000 tons of ash byproduct per year. Ash byproduct would be temporarily stored on site in enclosed silos. Conditioned ash (ash dampened with water) would be loaded into 25-ton net capacity trucks for shipment to the surface mine reclamation site in northeastern Pennsylvania. ***Information on this reclamation site is contained in Section 4.1.6.1 of the FEIS.*** Trucks would haul the ash material from the alternative site on a daily basis.

Solid Waste Generation and Disposal Solid waste generation and disposal for the proposed facility at the alternative site would be similar to that described in Section 2.1.3 for the proposed facility at the North Codorus Township location.

Plant operation would generate approximately 3 tons per month of domestic solid waste. A private contractor would be enlisted to dispose of the domestic waste as described in Section 2.1.3 for the proposed facility at the North Codorus Township location.

Coal combustion within the CFB unit during facility operation would produce ash byproduct. The ash byproduct would be handled and disposed of in accordance with the procedures described in Section 2.1.3. The amount of ash byproduct produced would be proportionate to the coal consumed. Ash would be generated at a projected rate of up to 23 tons per hour during normal operation of the facility.

The facility also would be designed to minimize fugitive emissions associated with coal and materials handling. This would occur through the use of covered railcars, enclosed structures and storage silos, and pneumatic conveyors for transfer of incoming coal from the railcars to the ultimate destination in the boilerhouse. Pneumatic conveyors also would be used for transferring a limestone sorbent from delivery trucks to the storage silos, and from the storage silos to the boilerhouse.

Liquid Waste Generation and Disposal During construction, liquid waste generation and disposal would be similar to that described for the proposed project at the North Codorus Township site in Section 2.1.3.

The proposed facility would be designed to operate as a low-discharging facility, through the efficient recirculation and reuse of water in the process system. The majority of the liquid waste streams from the proposed facility would initially be directed into a lined holding pond that would be sized to hold stormwater from a 10-year, 24-hour storm event. The holding pond would allow for settling of suspended solids and cooling of higher temperature waters. Following settling in the holding pond, the water would be pumped along a proposed pipeline to a new discharge outfall on Codorus Creek. This outfall would require an NPDES Industrial Wastewater Discharge Permit, and the proposed discharge of facility wastewater would be consistent with regulatory requirements under the NPDES program.

The majority of facility wastewater (average of 234,000 gpd, maximum of 288,000 gpd) would be discharged to Codorus Creek from the proposed new outfall. Included in the facility wastewater discharge would be utility and process streams such as cooling tower blowdown, plant maintenance wastes, and stormwater runoff. A portion of the effluent wastewater would be directed to the ash conditioning system for reuse. The remainder of the facility wastewaters (i.e., domestic sewage and demineralizer regeneration waste from the boiler make-up water) would be treated at the York City Wastewater Treatment Plant. Prior to discharge to the wastewater treatment plant, the boiler water treatment and regeneration wastewater would be combined in a sump where the pH would be adjusted, thus meeting existing York City Wastewater Treatment Plant statutes and regulations. Currently, adequate capacity exists at the treatment facility to accommodate this discharge.

The constituents of the cooling tower blowdown are presented in Table 2.2-2. These constituent characteristics were developed based on a projected operation of 12 cycles. Cooling tower blowdown would be discharged to the proposed facility's holding pond as previously described. The constituents of this waste stream would include naturally occurring minerals (e.g., calcium, magnesium, sulfate) contained in the raw water make-up. Dissolved solids are built up in a cooling water recirculation system due to the evaporation of water in the cooling tower. Water is gradually removed via a blowdown stream to prevent excessive build up of dissolved materials. An excessive build-up of dissolved materials could cause scale formation on heat exchanger components and/or increase in metal corrosion rates for the system components (piping and pumps). The number of cycles of concentration is the factor by which the recirculation water mineral concentrations are increased due to the evaporation of water that occurs in the cooling tower. Therefore, the number of allowable cycles in a cooling tower is dependent on the quality of water entering the tower.

At the proposed site in North Codorus Township the number of cycles would be 2.5. This operating level would be due to the concentration of dissolved solids in the wastewater which is proposed to be reused in the recirculation system. At the alternative site, the number of allowable cycles in the cooling tower would be 12, due to the higher quality of source water. Water from the York Water Company has fewer dissolved solids and therefore, a higher number cycles of concentration would be achieved.

It should be noted that the amount of water evaporated is not dependent on the quality of the water but the amount of energy, both electrical and thermal, produced by the facility and ambient weather conditions.

Safety Features

The safety features inherent to the proposed Cogeneration Facility at the alternative site would be equivalent to those described in Section 2.1.3, with minor modification for the fire protection water system. The fire protection water system at the alternative site would include on-site water storage in a 400,000-gallon tank.

Table 2.2-2. Water quality characteristics of the cooling system blowdown at the alternative site.

Constituent	Concentration (mg/L)
Calcium	750
Magnesium	275
Sodium	76
Chloride	280
Sulfate	934
Total Dissolved Solids	1,800
Silica	35
Total Suspended Solids	8
Biochemical Oxygen Demand	Believed Absent
Chemical Oxygen Demand	16

Source: ENSR, 1992.

Transportation Features

During peak construction, local traffic volumes would increase with construction worker vehicles and delivery trucks accessing the site regularly. When possible, rail would be used to transport equipment and construction shifts would be scheduled to avoid commuter travel periods.

Project-related vehicular traffic for operation would be limited to the daily commuter vehicles of 70 employees, 8 trucks per day for limestone/waste dolomite delivery, and 24 to 40 trucks per weekday for ash byproduct removal. In addition, coal would be delivered to the site by rail at a frequency of one train delivery (approximately 115 cars) per week. As previously described, the train would be divided into three delivery trains once it reaches the Yorkrail yard, and would travel to the site separately for coal unloading.

Existing roadway infrastructure would potentially be modified to allow more direct connection of the proposed facility to major roads. These modifications would include a new roadway called Realigned Emigs Mill Road that would extend southward from Emigs Mill Road, along the western boundary of the proposed site. The roadway would cross the Yorkrail tracks at the southwestern corner of the site and continue southward to its intersection with Lincoln Highway (U.S. Route 30). This roadway interconnection would be approximately 1.1 km (0.7 mi) in length.

Associated Utility Infrastructure Expansion

Utility infrastructure associated with the proposed West Manchester Township alternative site would include an electric line interconnection to the existing Met-Ed system, at a location approximately 1.6 km (1 mi) west of the alternative site; a steam line connecting the facility with the steam host; a connection to the York Water Company for raw water supply; discharge piping for stormwater and process wastewater flows; and a connection to the York County Wastewater Treatment Plant for domestic/demineralizer wastewater discharge.

In order to access an existing 230 kV Met-Ed transmission line running in a north-south orientation approximately 1.6 km (1 mi) west of the site, the preferred alternative for connecting the proposed facility would be to construct a 230 kV interconnect that would extend directly west from the southwest portion of the site along the Yorkrail right-of-way.

An insulated steam line would be required for transporting process steam from the proposed Cogeneration Facility to the J.E. Baker Company. This line would be supported aboveground on piers, except at points where the line would traverse transportation features. The line would extend from the proposed facility in a southerly direction towards the Yorkrail line where it would pass under the on-site rail loop and the Yorkrail railroad bed. The line would then run aboveground along the southern side of the railbed in an easterly direction towards the J.E. Baker Company. At Emigs Mill Road, the line would pass underground. At the J.E. Baker Company property, the line would pass under the Yorkrail bed and extend to the facility.

Facility water needs would be supplied by the York Water Company. The York Water Company's service area does not currently extend to the proposed West Manchester Township alternative site, consequently a 10-km (6.2-mi) interconnection would be required to meet construction water needs. This interconnection would extend from the site between the Yorkrail rail line and Lincoln Highway (U.S. Route 30) to an existing water main. Operation of the proposed facility would require new water supply infrastructure to the alternative site. The York Water Company would construct and own the water supply connection, and would evaluate the feasibility of implementing one of four alternative routes.

Process ***wastewater and*** storm runoff would be discharged directly to Codorus Creek and to the York City Wastewater Treatment Plant, respectively. The Codorus Creek discharge pipe would exit from the southwest portion of the site and extend to the south, crossing Lincoln Highway (U.S. Route 30), turning northeast along York Road (PA Route 116), and then turning south along Bairs Road to Wolfs Church Road. The discharge pipe would extend northeastward along Wolfs Church Road and turn southeast, following a stream swale across a Penn Central railroad grade. It would then continue east, crossing Graybill Road and continuing to its discharge point at Codorus Creek. The route would be approximately 4.8 km (3.0 mi) in length. The wastewater discharge line to the York City Wastewater Treatment Plant would exit from the southeast portion of the proposed site and extend east and northeast along the existing Yorkrail right-of-way. The wastewater discharge line would pass through a culvert crossing at Lincoln Highway (U.S. Route 30) and connect with the existing sewer line approximately 2.4 km (1.5 mi) away.

The natural gas pipeline route would exit the proposed facility at a point mid-way along the site's northeastern boundary and extend southeastward along Emigs Mill Road. The pipeline route would turn east at the crossing of Emigs Mill Road and the Yorkrail railbed and follow the railroad bed to its interconnection with an existing distribution system. The route would be approximately 0.6 km (0.4 mi) long.

Facility Logistics

Construction. The construction logistics for the proposed West Manchester Township alternative site would be equivalent to those described in the first two paragraphs of construction logistics presented in Section 2.1.3 for the proposed site.

Operation. The operation logistics for the proposed West Manchester Township alternative site would be equivalent to those described in Section 2.1.3 for the proposed site.

2.2.4 No-Action Alternative

Implementation of the no-action alternative would result if DOE does not provide cost-shared financial assistance for the proposed project. Under the no-action alternative, approximately $75 million of Federal funds would not be spent on the proposed project. Consequently, YCEP would not construct the project due to the fact that resulting cash flows, largely driven by the power agreement with Met-Ed, would not provide an adequate return on a stand-alone capital investment in excess of $379 million. This would result in failure to achieve the goal initiated under the CCT Program to further demonstrate the commercial viability of a utility-scale CFB facility. The proposed project would not be constructed without financial assistance from DOE because YCEP would be unable to meet the economics dictated by the agreement to deliver electricity to Met-Ed. YCEP would not construct the proposed project at another site because of timing considerations under the existing power sale agreement with Met-Ed. In addition, commercialization of the proposed technology would be delayed or not occur because utilities and private sector companies would be inclined to choose known and proven technologies.

An additional effect of implementing the no-action alternative would be the loss of the opportunity to reduce emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulates in York County. As discussed in Section 2.1.3, the proposed YCEP facility at the proposed site would result in P. H. Glatfelter Company's curtailing operations of its Power Boiler No. 4. This unit is a 1950s vintage pulverized coal boiler that would continue to operate into the foreseeable future, according to the P. H. Glatfelter Company.

Currently, there are no statutory requirements that would preclude the P. H. Glatfelter Company from continuing to operate Power Boiler No. 4. DOE notes that Power Boiler No. 4 would only operate concurrently with the proposed project for the 720 hours of equivalent oxides of nitrogen (NO_x) emissions per year. Low oxides of nitrogen (NO_x) burners have recently been installed on Power Boiler No. 4 bringing it into compliance with Title I of the CAA Amendments of 1990. The P. H. Glatfelter Company would not be required to limit sulfur dioxide (SO_2) emissions under Title IV of the CAA Amendments of 1990 (Title IV applies only to electric utility power plants; the P. H. Glatfelter Company Power Boiler No. 4 is an industrial boiler). The Title IV requirements are aimed at the control of acid rain and have been designed to employ a market approach to achieve targeted reductions in sulfur dioxide (SO_2). Electric utilities can choose among the following options: to cease operations; to reduce sulfur dioxide (SO_2) emissions (e.g., by installing new emission control equipment, switching to lower sulfur fuel, etc.); or to purchase additional sulfur dioxide (SO_2) "allowances"--generally from

utilities that have "freed up" allowances for sale by reducing their emissions more than required. Within the so-called "opt-in" provisions of Title IV, certain industrial boilers may optionally comply with sulfur dioxide (SO_2) emission reductions and hence create allowances that can be sold on an open market for use by electric utilities. However, without the availability of an alternate source of steam for plant operations, it is unlikely that the P. H. Glatfelter Company would choose to curtail operations of its Power Boiler No. 4 in the foreseeable future. Finally, because "Maximum Achievable Control Technology (MACT)" regulations under the New Emission Sources of Hazardous Air Pollutants (NESHAP) Program (Title III) of the CAA Amendments of 1990 for regulated hazardous pollutants have not yet been issued for specific industry types by the EPA, no presumptions can be made concerning the possible impacts of these requirements. Therefore, in the event that the proposed YCEP project is not constructed at the North Codorus Township location, it is reasonable to assume that the P. H. Glatfelter Company would continue to operate Power Boiler No. 4.

Met-Ed***'s long-term power generation requirements may include*** an additional 500-550 MW of electricity by the year 2000 (see Section 1.3.4). The proposed facility would assist in meeting the energy requirements projected by the Pennsylvania Public Utility Commission (PUC) to occur in the region served by Met-Ed. ***Under the*** the no-action alternative, ***the proposed facility would not*** provide additional capacity to meet ***these requirements.***

Met-Ed's 1993 Annual Resource Plan, submitted in accordance with Pennsylvania law, indicates that ***its projected*** future electricity requirements ***could*** be met by purchasing power from new non-utility generators. For example, another non-utility generator power sale agreement executed by Met-Ed is a 150-MW natural gas-fired facility in Bucks County, PA, known as the Blue Mountain project. Selected from bids submitted to Met-Ed in 1992, this project was developed as an Exempt Wholesale Generator (EWG). An EWG has no associated industrial steam host. Other projects, including a 150-MW coal-fired facility proposing CFB technology and a 200-MW natural gas-fired facility, were also selected from a "short-list" of bidders. Therefore, implementation of the no-action alternative ***could theoretically*** result in Met-Ed conducting a bidding program similar to that conducted in 1992 to contract for additional non-utility generation. ***(It should be noted, however, that more recent bidding programs conducted in New Jersey by Met-Ed's sister company, Jersey Central Power & Light Company (JCP&L) resulted in no selections from non-utility generation suppliers.)*** It is also reasonably foreseeable that ***in order to supplement other sources of electrical capacity,*** either a coal-fired or natural gas-fired facility ***could*** be selected to enter into a power sale agreement with Met-Ed to meet projected energy ***requirements. In addition, Met-Ed has recently stated that there are other options available in the short term for***

economically meeting projected energy and capacity needs, including short-term energy and capacity purchases from the power pool. Met-Ed has stated that there is ample energy and capacity available on the market from which Met-Ed could satisfy its needs. Because of excess electric generating capacity presently available in the Mid-Atlantic region, there are abundant supplies of very low cost capacity and energy from which Met-Ed would meet its needs over the next 2-6 years in the absence of the proposed YCEP project.

To analyze and make comparisons between the proposed action and the reasonably foreseeable consequences of the no-action alternative, the proposed Cogeneration Facility is compared to the following ***alternatives for meeting projected capacity requirements***.

- a 227-MW natural gas-fired combined-cycle or Cogeneration Facility with no associated steam host; and

- a 227-MW coal-fired facility consisting of two 114-MW CFB units with no associated steam host or associated air emission reductions.

- ***short-term purchasing of 227-MW of "excess" electricity from the Pennsylvania-New Jersey-Maryland (PJM) power pool.***

On the basis of current information, it is not reasonable to attempt to select a specific site location or layout for ***the first two alternatives***, or to describe the proposed setting. ***Met-Ed has stated to DOE that "the location of a power plant is rarely related to the specific electric needs of any particular community within the territory. Rather, power plants are built based upon the electric capacity and energy needs of the entire Met-Ed electric system, and located on those sites that permit the most cost-effective and environmentally benign construction. It is not correct to assume that if a power plant was built to serve the needs of all of Met-Ed's customers, such a facility would be constructed in York County" (written communication from Seltzer to Van Ooteghem, January 27, 1995; letter contained in Appendix E).*** Therefore, the analysis of the ***first*** two potential no-action alternatives would be conducted as if each project would be constructed at an appropriate "generic" site. It is assumed, for the purpose of this comparison, that the generic site is appropriately zoned, has access to all required infrastructure to support the project (e.g., rail service, natural gas transmission lines, water supply, wastewater discharge facilities), does not contain archeological or historic features of significance, has no known threatened or endangered species associated with it, and otherwise is in an appropriate location to provide for Met-Ed's power needs. As a result, certain sections of the impact analysis require a qualitative evaluation while others, such as air quality, may be analyzed quantitatively. ***Air emission reductions (i.e., those associated with the curtailment of P. H. Glatfelter Company's Power Boiler No. 4) were not factored into the analysis of the no-action alternatives primarily because it would be highly speculative to assume which specific sites would be generating the electricity under the no-action alternatives. Since the air emissions reductions are specific to the cogeneration operations of the proposed project and P. H. Glatfelter Company's paper mill operations at the Spring Grove site (i.e., the steam sent to the paper mill from the proposed project would provide the opportunity to curtail the operation of Power Boiler No. 4), these air emission reductions would not be "transferrable" to a generic site at a different location.***

A description of the ***three*** potential no-action alternatives is presented below.

2.2.4.1 227-MW Natural Gas-Fired Combined-Cycle Facility

New facilities having the potential to emit in excess of 100 tons/*yr* of certain air emissions must meet the criteria set forth in the New Source Performance Standards as part of the permitting process. Additional requirements must also be met and may include New Source Review regulations and application of BACT requirements. The air emission levels after considering BACT for the potential 227-MW gas-fired combined-cycle facility, are presented in Table 2.2-3.

The primary fuel for this facility would be natural gas supplied by a single pipeline to the facility. This pipeline would be supplied through a series of gas transmission lines most likely originating from a source of supply in the Gulf of Mexico area. ***For the purposes of this analysis, it is assumed that gas conditioning (i.e., additional sulfur removal) would not occur at the site of use.*** The 227-MW gas-fired combined-cycle facility has an expected gas consumption rate of 16 million cubic feet per year. A back-up fuel supply (typically fuel oil) would be required to supply the facility during times when natural gas supply is interrupted.

It is assumed that this facility would consumptively use approximately 1 mgd of fresh water for cooling purposes. Additionally, approximately 200,000 gpd would be required for boiler make-up purposes and to meet potable water requirements. With the cooling tower operating at 8 cycles, the liquid waste stream would include approximately 400,000 gpd of cooling tower water and sanitary wastewater discharge to an on-site treatment facility prior to further discharge to a surface waterway. Eight cycles were chosen

Table 2.2-3. Estimated air emissions levels for a 227-MW gas-fired combined cycle facility in Pennsylvania.

	Tons per year (*tons/yr*)				
	SO_2	NO_x	PM_{10}	CO	VOC
227-MW Gas-fired Combined Cycle Facility after NO_x Offsets[1]	26	(36)	23	144	35

[1] NO_x offsets are required in Pennsylvania due to the inclusion of Pennsylvania in the NOTR. NO_x offsets included in this calculation assumed a 1.15:1 offset ratio for oxides of nitrogen. This offset accounts for the net reduction in NO_x emissions.

( ) Indicates a reduction in emissions. ***The NO_x emissions from the facility would be 240 tons/yr which would require 276 tons/yr of offsets to generate the net reduction of 36 tons/yr.***

because the quality of the water sources was not known. Eight cycles assumes that a reasonably low amount of dissolved solids is contained in the water source.

The gas-fired combined cycle facility would not generate ash byproducts since the facility uses gaseous (i.e., natural gas) rather than solid fuel (coal). The primary solid wastes generated from operation of the gas-fired combined-cycle facility would be industrial and municipal-type wastes, such as trash, that would be disposed of at a local municipal landfill. The volume would be expected to be less than a coal-fired CFB Cogeneration Facility due to the smaller operating staff and reduced complexity of a gas-fired facility.

During operation, the 227-MW gas-fired combined-cycle facility would employ approximately 25 to 30 full-time persons. During construction, employment would average approximately 180 persons.

It is assumed that the gas-fired combined-cycle facility footprint would not impinge on floodplains or wetlands. The combined-cycle facility would have a smaller footprint than the CFB facility, and could be constructed on as few as 10 acres (4 hectares). Moreover, the gas-fired facility would have a lower stack height [e.g., 46 to 61 m (150 to 200 ft)] and a lower building height [e.g., 30.5 to 46 m (100 to 150 ft)] than the proposed CFB Cogeneration Facility.

2.2.4.2 227-MW Coal-Fired Twin-Boiler CFB Facility

The second reasonably foreseeable consequence of the no-action alternative would be a CFB facility burning coal in two boilers. It is assumed that this project would not provide steam to an adjacent host or cause a corresponding reduction of emissions from an existing source of air emissions.

A conservative estimate of permitted air emissions from a 227-MW coal-fired twin-boiler facility using two CFB boiler units would be equivalent to those from the proposed action if the proposed action were not to supply steam to the P. H. Glatfelter Company paper mill. The alternative 227-MW coal-fired twin boiler CFB facility would produce approximately 15 percent lower emission levels because it ***would be*** producing less energy (and this ***would*** require less coal) by not supplying steam to an adjacent host. Conversely, there would be no related air emission reductions from curtailment of an existing source of air emissions. The estimated emission level (after considering BACT) from the potential 227-MW coal-fired twin-boiler facility are presented in Table 2.2-4.

Fuel supply and resource availability would be identical to those described in Section 2.1.3 for the proposed action at the North Codorus Township site.

It is assumed that the potential facility would consumptively use approximately 2.5 mgd of fresh water for cooling purposes. Additionally, approximately 350,000 gpd would be required for boiler make-up and to meet potable water requirements. The liquid waste stream would include approximately 400,000 gpd of cooling tower water blowdown at 5 cycle operations and sanitary wastewater discharge to a treatment facility prior to further discharge to a surface waterway.

The 227-MW coal-fired twin-boiler CFB facility would produce the same ash byproduct as the proposed action. However, approximately 10 to 15 percent less volume would be produced because the facility would not be providing steam for a steam host. This ash byproduct from the alternative site would be disposed of as described in Section 2.1.3 for the proposed facility.

Operation and construction of the potential twin-boiler CFB facility would involve employment comparable to the proposed action.

It is assumed that the coal-fired twin-boiler CFB facility footprint would not impinge on floodplains or wetlands. The facility would represent a nearly identical visual impact, and require nearly identical

Table 2.2-4. Estimated air emissions levels for a 227-MW coal-fired CFB facility in Pennsylvania.

	Tons per year (tpy)				
	SO_2	NO_x	PM_{10}	CO	VOC
227-MW Coal-fired twin-boiler CFB Facility after NO_x Offsets[1]	2,456	(184)	108	1,474	41

[1] Oxides of nitrogen (NO_x) offsets are required in Pennsylvania due to the inclusion of Pennsylvania in the NOTR. NO_x offsets included in this calculation assumed a 1.15:1 offset ratio for oxides of nitrogen. This offset accounts for the net reduction in NO_x emissions. Sulfur dioxide (SO_2) reductions were not included in this table because it is not reasonable to assume that these reductions would occur within the same air quality region.

( ) Indicates a reduction in emissions. ***The NO_x emissions from the facility would be 1,226 tpy which would require 1,410 tpy of offsets to generate the net reduction of 184 tpy.***

acreage requirements, as the proposed action. Moreover, the twin-boiler CFB facility would have a comparable stack height and a comparable building height to the proposed CFB Cogeneration Facility.

2.2.4.3 PJM (Pennsylvania-New Jersey-Maryland) Interconnection Power Pool

Another option available for meeting Met-Ed's projected power needs in the absence of the proposed YCEP Project would be short-term energy and capacity purchases from the PJM power pool. This is an attractive short-term alternative if excess electricity is available for purchase on the open market. The PJM power pool consists of 538 generating units representing an installed capacity of 55,575 MW, connected to approximately 6,800 miles of high voltage transmission lines throughout the PJM region. PJM's energy is primarily obtained from coal and nuclear generation, with the remainder coming from natural gas, hydroelectric and oil generation, and purchases.

2.2.5 Alternatives and Issues Dismissed from Further Consideration

The following sections discuss alternatives and issues that were raised during public scoping meetings, or in written correspondence during the scoping process (Section 1.5), and during further planning for the proposed project.

DOE's role is limited to providing the cost-shared Federal funding for YCEP's proposed project. As such, the alternatives that meet the goals of demonstrating this technology are narrowed due to the proposal selection process that DOE must follow by law.

2.2.5.1 Alternatives Related to the Utility Corridors

Four alternative routes for the electrical interconnection were originally considered by YCEP ***and reviewed by DOE***. These routes were considered based on guidance received from Met-Ed requiring that the line from the proposed Cogeneration Facility interconnect with either the existing substation located in Bair, Pennsylvania, or the existing substation located on East Berlin Road in Jackson Township, Pennsylvania. The following four routings from the proposed Cogeneration Facility were evaluated:

(1) FCP - to the Bair Substation via Flood Control Property (FCP), ***under jurisdiction of the Army Corps of Engineers (ACOE); the FCP route is the preferred alternative;***

(2) MPR - to the Bair Substation via the Maryland & Pennsylvania Railroad (MPR) Corridor;

(3) MECO - to the Bair Substation via the Met-Ed (MECO) Trolley Line Corridor; and

(4) WMR - to the Jackson Substation via the Western Maryland Railroad (WMR) Corridor.

An initial review of these alternative routes resulted in the WMR corridor option being eliminated by Met-Ed due to operational ***in***efficiency and because siting was congested. Preliminary discussions with the Pennsylvania Game Commission and the ACOE also resulted in three variations of the FCP route, which ***begin*** east of Martin Road to a point east of Sunnyside Road. These variations of the FCP route include:

(1) FCP/***CC*** - follow (FCP/***CC***) Codorus Creek;

(2) FCP/MP - to Maryland & Pennsylvania Railroad (FCP/MP) north of Martin Road; and

(3) FCP/ME - to Met-Ed trolley line (FCP/ME) north of Martin Road.

Four major factors were considered in determining the preferred alternative for the utility corridor: 1) achieving Met-Ed's guidelines for siting new electrical lines; 2) satisfying certain land use objectives; 3) minimizing environmental impacts; and 4) providing accessibility for construction and maintenance. For each of these four factors, evaluation criteria were identified and determined to be of either

primary or secondary concern. These criteria are listed in Table 2.2.4a and are discussed more fully below.

Siting Guidelines. Met-Ed requires an easement minimum of 30.5 meters (100 feet) in selecting electrical transmission corridors. ***In addition, Met-Ed design guidelines specify a minimum setback of 100 meters (328 feet) from residences, schools, churches, and other places of public gathering for the siting of new electric lines. After construction, Met-Ed would be responsible for operating and maintaining the line. Consequently, reasonable access is required for both routine and emergency maintenance.***

Land Use Objectives. The potential encroachment of the right-of-way on private land ***should be minimized*** to reduce the probability of existing and future land use conflicts and/or socioeconomic impacts. Pennsylvania allows "Eminent Domain" condemnation of private land for utility corridors for a distance of 100 meters (328 feet) on either side of the corridor centerline. Electric transmission lines can only be located within 100 meters (328 feet) of residences, schools, or places of worship if voluntary easement is granted by the property owners. Mindful of this, YCEP evaluated the proposed electrical interconnect corridor alternatives to minimize the number of residences within 100 meters (328 feet) of the corridor centerline and the amount of private property affected. There is a growing level of public concern about human exposure to electromagnetic fields (EMF), although the scientific community has not reached a consensus regarding potential electromagnetic field effects on human health. As a result, public agencies, utilities, and private companies have adopted a general policy of "prudent avoidance" when siting new electric lines. The key to prudent avoidance is increasing the distance between the electric line and residential units, future residential developments, churches, schools, and playgrounds. Public concern regarding EMF has resulted in the potential for socioeconomic impacts associated with the siting of electric lines near or on private property.

Environmental Issues. ***The riparian forest borders the aquatic habitat of the western bank of Codorus Creek, provides food and cover for wildlife, contains flood waters, and acts as a buffer strip between farm fields and the creek, which helps to control erosion and sedimentation. Along the flood control property, shrub and agricultural habitat include a pattern of alternating food plots (grain fields) and hedgerows producing a thick cover and berry production. Mature shrubs could be replaced and fields could be returned to a vegetative state if disturbed. The wooded upland areas provide nesting sites,***

Table 2.2.4a. Utility corridor selection criteria.

Guidelines for Siting	
• Easement corridor width of 30.5 meters (100 feet)	Primary
• Siting setback guidance of 100 meters (328 feet)	Primary
• Adequate maintenance vehicle access	Primary
Land Use Objectives	
• Minimize encroachment on private property	Primary
• Maximize use of existing utility and transportation corridors, industrial zoned land, and compatible government land	Primary
• Maximize setback of electric line under "prudent avoidance" criteria	Primary
Environmental Issues	
• Minimize and mitigate the amount of riparian forest disturbed by electrical line	Primary
• Minimize amount of shrub and cultivated fields disturbed by construction of electrical line	Secondary
• Minimize amount of wooded upland disturbed by construction of electrical line	Secondary
• Endangered species	Not Applicable
• To protect aquatic species and wetlands, minimize and mitigate the amount of bank and bed disturbed and shade lost as a result of the electrical line	Secondary
• Minimize impact to receptors that have a long view duration	Primary
• Minimize impact to areas that have a high number of viewers	Primary
Construction	
• Minimize construction impact by selecting a route with construction access and foundation placement areas, and which can maximize the ability to rehabilitate the affected area	Secondary
• Route around existing utilities	Secondary

Source: ERM, 1994b.

cover, and food for wildlife along with the riparian forests. All proposed electric interconnect corridors would span the Codorus Creek, which is designated as a warm water fishery. The landscape of the study area consists of industrial tracts, rural countryside, transportation corridors, and interspersed residentially developed areas. Potential visual impacts could result from site clearing and earth work activities that would require linear cuts along the corridor's edge or through forested areas. The visual sensitivity to the electric line would vary and depend on location, number of viewers, and the viewer activity. The chosen route should attempt to minimize impacts to these environmental resources.

Construction. Complete clearing within the right-of-way would be limited to a 12.2-meter (40-foot)-wide portion directly under the wire zone and to the pole structure locations. Selective clearing, leaving compatible tree and brush species, would be practiced in the edge zone (on either side of the wire zone). Temporary roads would be needed to provide access for construction equipment; those roads not needed for future access would be removed, and the disturbed areas would be returned to pre-construction condition. Placement of steel pole foundations would require drilled shafts which would be 1.2-1.5 meters (4-5 feet) in diameter and 4.6-7.6 meters (15-25 feet) deep. Sloped terrain could require foundations to be 30-40 percent deeper. Met-Ed requires that pole structures be located 6.1 meters (20 feet) from existing underground pipelines and utilities.

Each of the electrical interconnection corridor alternatives were evaluated relative to the above factors. A summary of selection criteria and a comparative analysis of the electrical interconnection route options with respect to these criteria are included in Tables 2.2-5 *and 2.2-6. Table 2.2-6 focuses on the quantitative differences between the preferred route and the five alternatives identified for interconnection at the existing Met-Ed Bair substation. It therefore does not reflect the residences within the town of Bair which are equally affected by any of the stated alternatives. There are five homes in Bair which are within 100m (328 ft) of the existing Met-Ed substation and 115 kV line at the interconnect point. Dwellings within Bair which have an unobstructed view of the existing Met-Ed substation, 115 kV and 69 kV lines, would also be able to view portions of the YCEP interconnect line and those portions of the switchyard that cannot be completely screened by landscaping.*

FCP Route*: to Bair Substation via ACOE Flood Control Property (preferred alternative)*

Siting Guidelines: The easement width can be achieved throughout the corridor, and easements would not be required from private property owners. There are no residences within 100 meters (328 feet) along the entire length of the FCP corridor. Thus, all setback *guideline* [100 meter (328 feet) setback]

Table 2.2-5. Summary of selection criteria and comparative analysis of alternative electrical interconnection routes.

Selection Criteria	Rank	FCP*	FCP/*CC*	FCP/MP	FCP/ME	MPR	MECO
Met-Ed Guidelines							
Easement width 100 ft	P	●	●	●	●	x	x
Setback 100 m	P	●	x	x	x	x	x
Maintenance access	P	●	●	●	●	●	●
Land Use							
Minimize encroachment on private property	P	●	●	x	x	x	x
Maximize siting on compatible land use	P	●	●	●	●	x	x
Environmental Issues							
Minimize disturbance *to* riparian *forest*	P	x	x	●	●	●	●
Minimize disturbance *to* shrub and *cultivated fields*	S	●	●	●	●	●	●
Minimize disturbance to *wooded* upland	S	●	●	x	x	x	x
Minimize loss of shade to creek	S	x	x	●	●	●	●
Minimize visual impact	P	●	●	●	x	x	x
Construction Issues							
Minimize construction impact	S	●	x	x	●	x	x

Notes: P denotes primary.
S denotes *secondary*.
● meets criteria.
x does not meet criteria.
****Preferred alternative***

can be achieved along the entire corridor. ***The alignment would generally follow and cross Codorus Creek. Pole placement would be on level terrain and could be accessed with minimal placement of access roads.***

Land Use: ***By utilizing P. H. Glatfelter Company property, flood control property under ACOE jurisdiction, and existing utility/rail corridors, the route would maximize use of land compatible with an electrical line.***

Table 2.2-6. Electric interconnect alternatives analysis.

CRITERIA	FCP	FCP/CC	FCP/MP	FCP/ME	MPR	MECO
Siting Guidelines						
Number of restricted units[a] within 100 ft of easement area	0	0	0	0	1	1
Number of restricted units[a] within 100 m of electric line[b]	0	0	1	4	7	6
Number of easements needed from private property owners	0	0	2(3)	4(5)	6	10
Land required for easements from private property owners (acres)	0	0	2.6(2.74)	3.9(4.0)	15.85	13.0
Affected Vegetation						
Riparian habitat (acres)						
- total area	*0.9*	*2.5*	*0.9 (0.24)*	*0.7 (0.2)*	*2.2*	*2.2*
- cleared area	*0.3*	*1.4*	*0.3 (0.10)*	*0.3 (0.1)*	*0.9*	*0.9*
Wooded upland areas (acres)						
- total area	*3.7*	*3.8*	*6.0*	*6.1*	*7.2*	*7.4*
- cleared area	*1.5*	*1.5*	*2.4*	*2.4*	*2.9*	*3.0*
Visual						
Number of *existing* residential dwellings in view of line[c]	*7*	*9*	*9*	*10*	*11*	*12*
Number of recreational areas in view of line	1	1	1	1	1	1
Construction Access Road Impacts						
Earth Removal (yd^3)	-	2,500	2,500	-	2,500	-

[a] *Restricted units are defined as residences, churches, schools and playgrounds.*
[b] *"Number of restricted units within 100m of electric line" does not include the five houses in the town of Bair which are within 100m of the existing Met-Ed substation and 115 kV power transmission line at the interconnect point.*
[c] *"Number of existing residential dwellings in view of the line" includes only those residential dwellings with viewsheds currently unaffected by the existing Met-Ed substation, 115 kV, and 69 kV lines.*
( ) Shows potential results of adjustment of line for the FCP/MP and FCP/ME routes.

<u>Environmental Issues</u>: Within the flood control portion of this route, there are approximately 40 acres (16.2 hectares) of riparian habitat; within the 30.5-meter (100-foot) wide right-of-way, there is approximately 0.9 acre (0.4 hectares) of riparian habitat at the three crossings of Codorus Creek. Within the right-of-way, 12.2 meters (40 feet) would be completely cleared within the wire zone, while

the remaining 18.3 meters (60 feet) would stay vegetated with compatible trees and shrubs. Cultivation activities have already encroached upon the riparian habitat at two of the three crossings. Cultivated fields would be encountered within the flood control portion of the route. Approximately 16.4 acres (6.6 hectares) of the flood control property have been requested from the ACOE for the new electrical line easement, of which 15.2 acres (6.15 hectares) are currently within cultivated fields. Temporary impacts to vegetation from the installation of the estimated 15 poles would be 4.6 square meters (50 square feet) per pole; permanent impacts would total 34.9 square meters (375 square feet) or less than 1 percent of the farm land. Total woodlands disturbed would be 3.7 acres (1.5 hectares). Shade along the banks of Codorus Creek would be lost at the three stream crossings because of vegetative clearing. Approximately 12.2 meters (40 feet) of stream bank would be cleared at each crossing. Permanent disturbance of wetlands would not occur. This proposed corridor would be in the sight of five residential dwellings on parcels 44E, 44P, 45B, 1A and 58, as depicted on the map of the electric interconnection alternatives (*ERM, 1994b*). The visual impact of the line of sight would be somewhat diminished by the relatively large distance between the line and the dwellings and the visual backdrop to the line. By utilizing P. H. Glatfelter Company property and existing transportation corridors, this route would maximize the use of land which is generally compatible with an electrical line.

Construction:* *Within the flood control property, approximately 1,646 linear meters (5,400 linear feet) of temporary access roads would be required.

FCP/*CC* Route*:* ***Codorus Creek***

Siting Guidelines: The ***30.5-meter*** (100-foot) easement width could be achieved throughout the corridor, and easements would not be required from private property owners. In addition, all setback requirements [100 meter ***(328 foot)*** setback] could be achieved along the entire corridor. ***Vehicle and equipment access for maintenance would require permanent access roads along the west bank of Codorus Creek north of Martin Road.***

Land Use: By utilizing P. H. Glatfelter Company property, flood control property, and existing utility/rail corridors, the route would maximize use of land compatible with an electrical transmission line.

Construction: ***Within the flood control property, approximately 1,332 linear meters (4,368 linear feet) of temporary access roads would be required. Construction access roads along the west bank of Codorus Creek north of Martin Road would remain for maintenance uses.***

Environmental Issues: ***Within the 30.5-meter (100-foot) wide right-of-way, approximately 2.5 acres (1.0 hectares) of riparian habitat would be affected; 1.4 acres (0.6 hectares) would be cleared for a stream crossing and for lateral encroachment on the creek bank. Of the 30.5-meter (100-foot) width of right-of-way, approximately 12.2 meters (40 feet) within the wire zone and 3.0 meters (10 feet) for a permanent access road would be completely cleared; the remaining 15.2 meters (50 feet) would be kept vegetated with compatible trees and shrubs. Approximately 0.03 percent of the flood control area used for agricultural crops would be permanently impacted. Total area of disturbed woodlands would be 3.8 acres (1.5 hectares). Loss of creek shade would occur from 1.4 acres (0.6 hectares) of vegetative clearing at stream crossing and along Codorus Creek north of Martin Road. Permanent disturbance of wetlands would not occur.*** This proposed corridor would be in the site of seven residential dwellings. Similar to the FCP route, the visual impact of the line of site for parcels 44E, 44P, 45B, 1A and 58 [as depicted on the map of the electric interconnection alternatives (*ERM, 1994b*)] would be diminished by the distance between the line and the dwellings and the visual backdrop to the line. For parcels 44Q and 44R, visual impact would be greater due to a combination of necessary clearing of the tall vegetation along the west bank and the topographical conditions within this area.

FCP/MP Route*:* ***To Maryland & Pennsylvania Railroad North of Martin Road***

Siting Guidelines: The easement width could be achieved throughout the corridor. Since the right-of-way width for the railroad would be 12.2 meters (40 feet), easements would be required from two residential private properties to satisfy the ***30.5 meters (***100 ft***)*** corridor width requirement. A total of 2.6 acres (1.0 hectares) would need to be acquired from private property owners. This route would impact residential dwellings. The residential dwelling on parcel number 44R, however, would not meet the 100 meter ***(328 foot)*** setback requirements. ***Vehicle and equipment access for maintenance would require permanent access roads along the railroad right-of-way south of Sunnyside Road.***

Land Use: ***By utilizing P. H. Glatfelter Company property, flood control property, and existing utility/rail corridors, the route would use land compatible with an electrical line.***

Construction: ***This route would require approximately 1,331 linear meters (4,368 linear feet) of temporary access roads on flood control property .***

Environmental Issues: ***Within the 30.5-meter (100-foot) wide right-of-way, the total area of riparian habitat would be 0.9 acres (0.4 hectares); 0.3 acres (0.1 hectares) would be cleared. Impact to the riparian habitat could be reduced by 0.2 acres (0.08 hectares) by revising the alignment to avoid two attached parcels. Using the revised alignment, the area of riparian habitat within the 30.5-meter (100-foot) wide corridor would be approximately 0.7 acres (0.3 hectares). Approximately 0.03 percent of the flood control area currently used for agricultural crops would be permanently impacted. The total area of disturbed woodlands would be 6.0 acres (2.4 hectares). Shade to Codorus Creek would be lost at the stream crossing with 0.3 acres (0.1 hectares) of the corridor being totally cleared. Permanent disturbances of wetlands would not occur.*** The proposed corridor would be in the site of seven residential dwellings. Similar to the FCP and FCP/CC route, the visual impact of the line of site for parcels 44E, 44P, 45B, 1A and 58 would be somewhat diminished by the relatively large distance of the line to the dwellings and the visual backdrop to the line. However, for parcels 44Q and 44R, visual impact would be more significant due to a combination of necessary clearing of the tall vegetation within the right-of-way, the need to clear for access roads, and the topographical conditions within this area. The visual impact to these parcels would increase if the route was located on them to avoid the impact to upland woodland areas. This route may somewhat lessen the visual impact of the electric line to the game lands north of Martin Road.

FCP/ME Route*:* ***To MECO Trolley Line North of Martin Road***

Siting Guidelines: The easement width could be achieved throughout the corridor. Since the right-of-way width for the trolley line is 18.3 meters (60 feet), easements would be required from four private properties with residential dwellings to satisfy the ***30.5-meter*** (100-foot) corridor requirement. For parcel 44Q, the electrical line would traverse the east and west boundary of the plot of land. A total of 3.9 acres (1.6 hectares) would need to be acquired from private properties. This route would impact residential dwellings. Four residential dwellings would not meet the 100-meter (328-foot) setback requirement. ***Vehicle and equipment access for maintenance would require permanent access roads along the railroad right-of-way south of Sunnyside Road.***

Land Use: ***By utilizing P. H. Glatfelter Company property, flood control property, and existing transportation corridors, the route would use land compatible with an electrical line.***

Environmental Issues: ***Within the 30.5-meter (100-foot) wide right-of-way, the total area of the riparian habitat would be 0.7 acres (0.3 hectares); 0.3 acres (0.1 hectares) would be cleared. Approximately 0.03 percent of the flood control area currently used for agricultural crops would be permanently impacted. Impact to the riparian habitat could be reduced by 0.2 acres (0.08 hectares) by revising the alignment avoid some parcels. The total area of disturbed woodlands for this alignment would be 6.1 acres (2.5 hectares). Shade to Codorus Creek would be lost at the stream crossing with 0.2 acres (0.08 hectares) of the corridor being totally cleared. Permanent disturbances of wetlands would not occur.*** The proposed corridor would be in the sight of nine residential dwellings. Similar to the FCP/MP route, the visual impact in the line of sight for parcels 44E, 44P, 45B, 1A and 58 would be somewhat diminished by the relatively large distance of the line to the dwellings and the visual backdrop to the line. However, for parcels 44Q, 44R, 44B, 44V and 44, visual impacts would be more significant due to the close proximity of the line to the dwellings and the need to clear the tall vegetation within the right-of-way. Parcel 44Q would have a direct line of sight to the electrical line from two locations on the property.

Construction: ***Within the flood control property, approximately 1,331 linear meters (4,368 linear feet) of temporary access roads would be required.***

MPR Route*:* ***To Bair Substation via Maryland & Pennsylvania Railroad Corridor***

Siting Guidelines: The easement width could not be achieved throughout the corridor without the need to relocate occupants of the residence on parcel 1B. Since the right-of-way width for the railroad is 12.2 meters (40 feet), easements would be required from a minimum of six residential private properties to satisfy the ***30.5-meter*** (100-foot) corridor width requirement. A total of 15.85 acres (6.3 hectares) would need to be acquired from these properties. This route would impact residential dwellings. Seven residential dwellings would not meet the 100-meter (328-foot) setback requirement. ***Vehicle and equipment access for maintenance would require permanent access roads along the railroad right-of-way south of Sunnyside Road.***

Land Use: ***By utilizing P. H. Glatfelter Company property and existing utility/rail corridors, the route would use land compatible with an electrical line. In addition to the railroad corridor which is 12.2 meters (40 feet) wide, this route would require 3.4 kilometers (2.2 miles) of 18.3-meter (60-foot) wide easement across private property.***

Construction: Access road construction would be required in the areas of the corridor around the P. H. Glatfelter Company-owned land, Rockery Road, and the joined MECO trolley line and Maryland and Pennsylvania Railroad right-of-way (northeast of Sunnyside Road and southwest of Martin Road).

***Environmental Issues:* Within the 30.5-meter (100-foot) wide right-of-way, the total area of the riparian habitat would be 2.2 acres (0.9 hectares); 0.9 acres (0.4 hectares) would be cleared. Many of the private property owners impacted by this route utilize the land for farming. Temporary impacts from installing an estimated 28 poles would be approximately 4.6 square meters (50 square feet) per pole; permanent impacts would total 65 square meters (700 square feet). Total area of disturbed woodlands would be 7.2 acres (2.9 hectares). Loss of shade to Codorus Creek would occur at the stream crossing with 0.9 acres (0.4 hectares) of the corridor being totally cleared. Permanent disturbance of wetlands would not occur.** The proposed corridor would be in the sight of nine (9) residential dwellings. For parcels 60, 58 and 1B, the visual impacts would be significant due to the proximity of the electrical line to the residences. Similar to the FCP/MP route, in the vicinity north of Martin Road, this route would visually impact parcels 44Q and 44R.

MECO Route: ***to Bair Substation via Metropolitan Edison Company (MECO) Trolley Line Corridor***

Siting Guidelines: The easement width could not be achieved throughout the corridor without the need to relocate occupants of a residence on parcel number 5. Since the right-of-way width of the trolley line corridor would be 18.3 meters (60 feet), easements would be required from ten residential private properties to satisfy the ***30.5-meter*** (100-foot) corridor width ***guideline***. A total of 13 acres (5.3 hectares) would need to be acquired from these properties. This route would impact six residential dwellings. Six residential dwellings would not meet the 100-meter (328-foot) setback requirement. ***Vehicle and equipment access for maintenance would require permanent access roads in the densely vegetated portion of the trolley line south of Sunnyside Road.***

Land Use:* By utilizing P. H. Glatfelter Company property and existing transportation corridors, the route would use land compatible with an electrical line. Because the trolley line is only 18.3 meters (60 feet) wide, a 12.2-meter (40-foot) wide easement 2.6 kilometers (1.6 miles) in length would be required from private property owners.

Environmental Issues:* Within the 30.5-meter (100-foot) wide right-of-way, the total acreage of the riparian habitat would be 2.2 acres (0.9 hectares) and 0.9 acres (0.4 hectares) would be cleared. Four

private property owners that utilize the land for farming would be affected by this route. Total area of disturbed woodlands would be 7.4 acres (3 hectares). Loss of shade to Codorus Creek would occur at the stream crossings where 0.3 acres (0.1 hectares) of the corridor would be totally cleared. Permanent disturbance of wetlands would not occur. The proposed corridor would be in the site of ten residential dwellings. Due to the close proximity of many of the dwellings, and the need to clear vegetation along the corridor for the electrical line, this route would be expected to result in visual impacts to the residential dwellings. At mile 2.6, the electrical line would run along property which has been approved by Jackson Township for a 45-lot residential subdivision.

Construction: ***New access road construction would be required in the areas of the corridor around the P. H. Glatfelter Company-owned land, Rockery Road, and the joined MECO trolley line and Maryland and Pennsylvania Railroad right-of-way.***

A comparison of these six alternate routes shows that no route would meet all of the criteria. The FCP route would meet more criteria than the other five, satisfying six of the primary criteria and three of the secondary criteria (see Table 2.2-5). Therefore, YCEP initially identified the FCP route (without the variations) as the preferred alignment because it would ***do the following***:

(1) decrease impacts to private residences;
(2) decrease impacts to private land holders;
(3) decrease the need to seek easements;
(4) decrease visual impacts:
(5) maximize use of compatible land;
(6) minimize environmental impacts; and
(7) allow for maintenance access without the need for permanent roads.

Based, in part, on its review of the utility corridor alternative analysis conducted by YCEP, DOE has determined that the FCP route is the preferred electric interconnect corridor alternative. DOE, in addition, made site visits to view first-hand the various routes and to assess the potential impact of placing the electric interconnections through these corridors. In particular during these site visits, DOE examined the locations of residences and sensitive habitats. In addition, in a letter dated January 30, 1995, to DOE, the Pennsylvania Game Commission, the current leasee of the FCP lands, concurred with DOE's analysis in arriving at a preferred corridor alternative stating: "The Pennsylvania Game Commission has completed its review of the Draft Environmental Impact Statement

for the above referenced project. Based on that review, a field view of the project site conducted on January 6, 1995, by Roland Bergner of my staff, and the meeting at our office on January 23, 1995, we concur with the selection of the Flood Control Property (FCP) alternative as the preferred electric interconnect alternative. We feel that this alternative meets project needs and objectives with the least impacts to residences and private property owners. Even though there will be some impacts to wildlife habitat, these can be addressed through proper mitigation."

2.2.5.2 Alternative Technologies

YCEP and this proposed project were selected to demonstrate a particular type of technology. Other CCT projects would not achieve this goal. Furthermore, in the context of the no-action alternative, a coal-fired plant and a gas-fired plant are the only reasonable technologies to site in the study area because of fuel availability. In addition, the use of other technologies to meet Met-Ed's need for power (e.g., wind power, solar energy, and conservation) would not achieve the goals of the CCT Program.

2.2.5.3 Other Projects

Environmental comparisons between the offerors for the CCT Program were made as a part of the preselection review (Section 1.5). DOE is in the process of negotiating, or has negotiated, cooperative agreements with the sponsors of all selected projects. Therefore, they are not alternatives to each other. In addition, the proposed YCEP project is the only selected project that would accomplish the goal of demonstrating this technology.

2.2.5.4 Other Alternatives and Issues

Other alternatives, such as delaying or reducing the size of the proposed project, have been dismissed as not reasonable. Delaying the project would not result in any reduction of impacts once it is implemented, but would adversely affect DOE's schedule for demonstrating the technology and YCEP's ability to meet the needs of its customers. The nominal 250-MW design size of the YCEP project was chosen by the participant in order to be able to demonstrate the atmospheric CFB combustor technology at the large scale that could make use of commercial-size components.

2.3 Comparison of Alternatives

Features of and the potential impacts from the proposed action, the alternative site, and the no-action alternatives are summarized in Table 2.3-1. Impacts from both the proposed action, the alternative site, and the no action alternatives would be similar for aesthetics, land use, cultural resources, and soils and geology. Health and safety impacts would be minimized for the proposed action, the alternative site, and the project that would be most likely constructed as a result of the no-action alternative, by updating health and safety programs and instituting engineering controls. Neither the proposed action nor the alternatives would be expected to result in an adverse impact to worker or public health and safety. Impacts associated with biological resources would be similar, but the degree of impact would be less for the natural gas no-action alternative, because less land, a total of approximately 10 acres (4 hectares), would be utilized and less surface water would be consumed. Noise levels from ***two of*** the no-action alternatives, (the natural gas plant ***and PJM International Power Pool)***, are expected to be less than those for the proposed action because ***new*** coal processing equipment would not be required. Adequate labor force, housing, and public services would be available for the proposed action, the alternative site, and for the potential projects that could result from the no-action alternative. The beneficial impact of increased tax revenue would be less if the natural gas ***or PJM Interconnection Power Pool*** no-action alternative were selected because ***either no or*** fewer construction workers and employees would be required. ***However, there would be a socioeconomic benefit associated with the sale of 227 MW of excess capacity within the PJM power pool.*** Additionally, the opportunity to reduce air emissions through curtailment of P. H. Glatfelter Company Power Boiler No. 4 would be lost under the alternative site or no action alternatives. However, approximately $75 million proposed as cost-shared Federal funding support for this project would not be expended.

Table 2.3-1 Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Technology Description	The Cogeneration Facility would demonstrate the commercial viability of a larger scale [250-MW (gross)] coal-fired, single-boiler CFB. The goals of the CCT Program would be met with successful demonstration.		The proposed technology would be similar to the Proposed Action; process procedures, however, may differ. The goals of the CCT Program would be met with successful demonstration.
Construction Activities	Substantial construction activities would be required. Approximately 30 percent of the 38-acre (15.4-hectare) site [11.4 acres (4.6 hectares)] would be developed.		Substantial construction activities would be required. Approximately 20 percent of the 47-acre (19-hectare) site [9.4 acres (3.8 hectare)] would be developed.
Setting	Additional structures added to the existing site would alter the visual quality but would be in keeping with the existing industrial setting. The tallest structures would be the exhaust stack [120.4 m (395 ft)] and the CFB boiler and the coal fuel storage facility, both of which would be 54.9 m (180 ft) high. ***The visual impacts of the facility were evaluated from nine viewshed receptor locations. The dominant visual element is the P. H. Glatfelter Company facilities.*** A visual impact to the Lions Club picnic pavilion and fish area ***and to various residential areas*** would result.	***The potential scenic impacts of the proposed electrical interconnection corridor were evaluated from five critical viewpoint locations.*** The electrical interconnection corridor to Bair would be the prominent view for two critical viewpoints.	The impact to the setting would be similar to that of the Proposed Action. The tallest structures would be the exhaust stack [106.7 m (350 ft)] and the fuel silo [67.1 m (220 ft)].

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
A 227-MW natural gas combined cycle EWG or Cogeneration Facility with no associated steam host would be built.	A 227-MW twin-boiler coal-fired EWG facility consisting of two 114-MW CFB units with no associated steam host or associated air emissions reductions would be constructed.	***Met-Ed would purchase excess electricity in the short-term from the PJM Power Pool, which consists of 538 generating units representing an installed capacity of 55,575 MW.***
Substantial construction activities would be required. Approximately 10 acres (4 hectares) would be developed.	Substantial construction activities would be required. The number of acres developed would be similar to that for the Proposed Action.	***No construction would be required. Existing PJM facilities would be utilized.***
It is assumed that the additional structures would not alter visual quality. The exhaust stack would be between 45.7 and 61 m (150 and 200 ft) tall.	It is assumed that the additional structures would not alter visual quality. The tallest structures would be similar in height to those of the Proposed Action.	***There would be no new structures to alter visual quality.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Atmospheric Conditions (including Health Effects)	Air quality impacts during construction would be temporary. ***Permitted*** air emission rates ***(maximum potential to emit)*** during operation before offsets would include: 2,891 tons/yr of SO_2; 127 tons/yr of PM_{10}; 1,437 tons/yr of NO_x; 1,726 tons/yr of CO; and 48 tons/yr of VOCs. Modeling results indicate that pollutant levels would be in compliance with the NAAQS. Both Class I and Class II PSD increment analyses indicate no significant degradation of air quality would result in either the Shenandoah National Park (Class I), Gettysburg National Military Park (Class II), or the surrounding community (Class II). The proposed site would be located in the NOTR established by the CAA, and, thus NO_x offsets would be required. With the curtailment of P. H. Glatfelter Company Power Boiler No. 4 (and modification of other sources for additional NO_x offsets), air emission rates compared ***on a permit to permit basis*** would be a reduction of 2,419 tons/yr of SO_2; a reduction of 65 tons/yr of PM_{10}; and a reduction of ***272*** tons/yr of NO_x. ***If actual (or estimated) air emissions rate were used in the comparative analysis, the emission rates would be a reduction of 650 tons/year of SO_2; a reduction of 415 tons/year of NO_x; a reduction of 7 tons/year of PM_{10}, and an increase of 1,350 tons/year of CO, and 35 tons/year of VOC. In addition, radionuclide emissions would increase by approximately 225 mCi/yr.*** The results of the visibility analysis indicate that visual impacts would be below the screening criteria for all impact categories.	Air quality impacts associated with construction vehicular and fugitive dust emissions would be temporary.	Air quality impacts during construction would be temporary. Anticipated air emission rates during operation would include: ***2,300*** tons/yr of SO_2; ***107*** tons/yr of PM_{10}; ***1,212*** tons/yr of NO_x; ***1,454*** tons/yr of CO; and ***39*** tons/yr of VOCs. The alternative site would be located in the NOTR established by the CAA, and, thus NO_x offsets would be required such that overall (net) NO_x levels would be reduced by ***182*** tons/yr. A greater health risk could exist when compared to the proposed action due to higher net levels of emitted air pollutants.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
Air quality impacts during construction would be temporary. Anticipated air emission rates during operation would include: 26 tons/yr of SO_2; 23 tons/yr of PM_{10}; 240 tons/yr of NO_x; 144 tons/yr of CO; and 35 tons/yr of VOCs. ***Radionuclide emissions would be much lower from a gas-fired facility when compared to the two other coal-fired options.*** The no-action site would be located in the NOTR established by the CAA, and, thus NO_x offsets would be required such that an overall (net) NO_x reduction of 36 tons/yr would be achieved.	Air quality impacts during construction would be temporary. Anticipated air emission rates during operation would include: 2,456 tons/yr of SO_2; 108 tons/yr of PM_{10}; 1,226 tons/yr of NO_x; 1,474 tons/yr of CO; and 41 tons/yr of VOCs. The no-action site would be located in the NOTR established by the CAA, and, thus NO_x offsets would be required such that an overall (net) NO_x reduction of 184 tons/yr would be achieved.	***No increases in air emissions at existing PJM facilities would occur. Met-Ed would utilize 0.4 percent of the existing total capacity of these facilities.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Atmospheric Conditions (cont.)	No adverse fogging or icing impacts related to the proposed action are anticipated. ***Reports received from York County medical societies and EPA were reviewed for application to the proposed project. Reports indicated that there are associations between particles and health effects. However, extrapolation down to the particle levels associated with proposed project indicated little impact, especially since 92 percent of the time particle loadings would decrease compared to baseline.*** Cumulative cancer risk from all routes of exposure to emissions from proposed facility would ***be in the order of 3*** in a million. ***Most of this risk is due to radionuclide emissions.*** Cumulative hazard index for exposure to noncarcinogenic emissions from proposed facility is less than 1, indicating no adverse effects on human health expected to result from operation of proposed facility. With regional air quality improvements resulting from *f*ederally enforceable emission reductions ***for key air pollutants (SO_2, NO_x and particles),*** net effect on human health from the proposed project could be positive.		
Geology and Soils	No need for rock excavation would exist. Due to the relatively flat topography, soil erosion would be minor. An Erosion Control Plan has been developed for the proposed site. An estimated 37,464 m^3 (49,000 yd^3) of soil would be displaced during construction; the same amount of material with appropriate support characteristics would be imported to the site. No activity planned would impact soil quality.	***Approximately 8,572 cubic yards of material would be excavated, with total displaced material after backfilling being 3,212 cubic yards. Over half of the excavation and displacement is associated with the wastewater return/primary cooling line.***	Varying amounts of rock excavation would be required. No importation of soil having support characteristics would be required. No activity is planned that would impact soil quality.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
It is assumed no impacts resulting from soil or geology would result because of the location selected. No activity would impact soil quality.	It is assumed no impacts resulting from soil or geology would result because of the location selected. No activity would impact soil quality.	***No construction activity would impact geology or soils.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Water Resources	Projected water demand during construction would be between 5,000 and 15,000 gpd. Water supply requirements during operation would average 4.2 mgd; 4.0 mgd would be utilized for cooling unit make-up requirements. ***As a maximum, 2.8 mgd would be evaporated.*** No additional water releases from Lake Marburg would be required; monthly average and minimum flows from mill pond would not be affected. The P. H. Glatfelter Company would be able to provide SRBC-required flows of 7.62 cfs. The Codorus Creek flow downstream would decrease to *84* cfs (from *88* cfs) during normal flow periods and to ***41*** cfs (from *45* cfs) during low-flow ***years. Minimum flow would decrease to about 17 cfs (from 21 cfs).*** This loss would be attenuated downstream. Wastewater would be used as the supply source for a cooling tower that would operate at 2.5 cycles.	Removal of streamside vegetation would result in slight increases in water temperature. Ten to 14 utility poles would be sited within ACOE flood controlled property. Four to eight utility poles would be sited on land owned by the P. H. Glatfelter Company.	Projected water demand during construction would be between 5,000 and 15,000 gpd. Water supply requirements during operation would range between 2.8 and 3.0 mgd; 2.7 mgd would be utilized for cooling unit make-up requirements. Adequate surface water resources would be available to meet water supply needs during normal and excess rainfall periods. Approximately 1.6 mgd would be discharged from the cooling tower.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
1 mgd would be required for cooling. 200,000 gpd would be used for boiler make-up. Approximately 200,000 gpd would be discharged.	2.5 mgd would be required for cooling. 340,000 gpd would be used for boiler make-up. Approximately 400,000 gpd would be discharged.	***No increases in water supply requirements or wastewater discharge would occur from the purchase of existing electrical capacity.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Water Resources (cont).	Approximately 1.9 mgd would be discharged from the cooling tower. The proposed project would increase total dissolved solids concentrations in the combined P. H. Glatfelter Company/YCEP wastewater discharge because flows would decrease from 12.5 mgd to 9.7 mgd. The mass of total suspended solids would decrease approximately 4 percent and BOD would decrease due to treatment requirements for cooling tower. Decreased discharge to Codorus Creek would translate to a *10* percent increase in concentration of most chemical species in the Creek during low-flow conditions. ***During lowest flow conditions (as determined by SRBC requirements) an increase on the order of 20 percent would be expected, (approximate).*** Temperature would decrease and the DO concentration would increase in Codorus Creek during facility operation. Approximately 1.1 acres (0.4 hectares) of the proposed facility would be located in the 100-year floodplain due to construction of ladder tracks, rail spur, and steam and condensate return lines. No impact to groundwater resources would occur. The P.H. Glatfelter Company's retention basin would be capable of handling runoff for 24-hour, 10-year, and 25-year storm events.	Approximately 0.013 acres (0.005 hectares) of the utility corridor would be located in the 100-year floodplain due to placement of between 14 and 22 utility poles.	The increase in TDS concentration within the zone of initial dilution would be approximately 100 mg/L; in-stream concentration would probably remain below the 500 mg/L standard. BOD would remain below 25 mg/L. The PADER thermal discharge would be met. DO concentration would vary but should stay below the criterion of 5.0 mg/L. A stormwater retention basin would be designed to accommodate 24-hour, 10-year, 25-year storm event. No construction would occur in a 100-year floodplain.

No Action		
Gas-Fired Facility	Coal-Fired Facility	PJM Interconnection Power Pool

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Biological Resources	Stormwater from construction activities would be diverted to a stormwater retention pond. A spill and erosion control plan would be implemented to preclude impacts to aquatic ecosystems. During operation of the proposed project, the projected concentrations of manganese, selenium, and chloroform, in Codorus Creek, would be less than the EPA ambient water quality criteria, for both low- and mean-flow conditions. The projected chloride concentration in Codorus Creek during low-flow would not exceed the EPA acute ambient water quality criteria, but would marginally exceed the EPA chronic ambient water quality criteria by a factor of 1.1. However, the projected low-flow concentration of chloride is less than the chronic maximum acceptable toxicant concentration for the most sensitive species. ***Any other changes in concentration (due to the proposed project) of other water quality parameters that showed potential for exceedances during baseline Codorus Creek sampling events (i.e., copper, total dissolved solids, phenolics, chloroform) would not substantially lead to potential exceedances upon further detailed analysis when parameters such as in-stream water hardness and the presence of more tolerant aquatic taxa are considered.*** No significant impacts to the biodiversity of organisms in Codorus Creek is anticipated. No threatened or endangered species would be affected. Approximately 0.3 acres (0.12 hectares) of wetlands would be impacted by construction and maintenance of steam and condensate return lines.	Approximately 0.2 acres of wetlands would be disturbed due to construction and vegetation maintenance of cooling tower supply and return pipelines. Removal of vegetation would affect some wildlife. In addition, short-term impacts to wildlife habitats would occur during periodic maintenance of the interconnection corridors. No impact to threatened or endangered species would occur. ***Planting of low-growing shrub species in riparian habitats, placing water fowl nesting structures along Codorus Creek, placing wildlife nesting structures on transmission line pools, planting warm season grass species to provide wildlife cover, and creation of brush piles from cleared vegetation to provide wildlife cover are deemed to be appropriate mitigation measures for wildlife effects.***	Stormwater from construction activities would be diverted to stormwater retention ponds. A spill and erosion control plan would be implemented to preclude impacts to aquatic ecosystems. The facility would operate in compliance with all water quality criteria and pretreatment standards for TDS, DO, thermal discharge, and chlorine. No construction of site facilities would take place in a wetlands; however, electric transmission lines and non-contact discharge pipelines would cross narrow wetlands. A permit to construct utility corridors would be obtained. No adverse impacts to any endangered or threatened species would occur.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
It is assumed that because of site selection, no impacts to biological resources or biodiversity would occur.	It is assumed that because of site selection, no impacts to biological resources or biodiversity would occur.	***No new construction would impact biological resources or biodiversity.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Health and Safety	Compliance with health and safety programs and implementing engineering controls would minimize potential impacts. Approximately 7,646 m^3 (10,000 yd^3) of construction waste would be generated. Approximately 3 tons/month of municipal waste and 270,000 tons/yr of ash byproduct would be produced during operation. Adequate disposal capacity would be available, including beneficial use of ash for mine reclamation.	A general policy of "prudent avoidance" would be implemented in residential areas, near schools, churches, and other public gathering places to reduce the potential for impacts from EMFs.	Impacts would be similar to those presented for the Proposed Action. Generation of ash byproduct would be 200,000 tons/yr.
Noise	During construction, measures would be taken to minimize the impact to local residents from the short-term impacts associated with purging dirt and debris from the steam systems. Measures include advanced notice, scheduling activities during less sensitive hours, and the use of silencers. Primary sources of proposed project operation noise would derive from steam venting, and railcar coupling. A vent silencer would be installed to lessen the noise associated with the release of steam. Coupling activities would be of short duration, and not adverse. No adverse impacts from increased noise levels are expected during operation.	Noise associated with the construction and operation of utility interconnection corridors would be short-term.	Noise impacts would be similar to the Proposed Action.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
There would be no coal handling requirements or mitigation measures needed. Instead, special procedures for natural gas (e.g., leak detection) would be implemented. Less municipal waste, compared to the Proposed Action, would be generated and no ash byproduct would be produced.	Impacts would be similar to those presented for the Proposed Action; however, approximately 10 to 15 percent less ash byproduct would be generated.	***Current facility health and safety procedures would not be affected, and no impacts to the health and safety of employees or the local population would occur.***
A comparison of noise impacts cannot be made at this time; however, it is anticipated that noise levels would be equivalent to those of the Proposed Action.	A comparison of noise impacts cannot be made at this time; however, it is anticipated that noise levels would be equivalent to those of the Proposed Action.	***No increase in operating activity at existing facilities would impact existing noise levels.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Transportation and Traffic	Vehicular traffic would increase by 712 vehicles per day during construction and by 125 vehicles per day during operation, degrading traffic flow Level of Service in both the A.M. and P.M. peak hours. Delays would be exacerbated because two key intersections (York Road/Jefferson Road/ Lehman Road and York Road/Roundwood Facility Access Drive) are not signalized. ***The impact of the proposed projects on the intersection's (York Rd./Jefferson Rd.) level of service would be reduced by the planned installation of a traffic signal.*** Existing rail facilities would be able to accommodate the increase in rail traffic.	A Highway Occupancy Permit would be obtained for boring beneath York Road (Route 116). Construction and maintenance operations would slow traffic but measures would be taken to minimize the impact.	Traffic studies indicate that traffic flow is already slow in many of the areas that would be affected. Vehicles associated with construction and operation of the facility would worsen the situation. However, plans are underway, independent of this project, to improve highway conditions. Existing rail facilities would be able to accommodate rail traffic.
Land Use	The location of the proposed facility is designed for industrial use and would be purchased by YCEP before construction. Project approval must be obtained under the North Codorus Township Land Development Ordinance.	Approximately 25 square feet of prime farmland, wooded uplands, or industrial property, would be temporarily disturbed for each utility pole; there would be no permanent conversion. A total of 46 acres (18.6 hectares) would be affected due to right-of-way and maintenance activities of the utility corridors. An electrical interconnection corridor would traverse lands licensed to the State Game Commission from ACOE. ***The addition of the electric switchyard would require approximately 1 acre (0.4 hectares) of an 18-acre (7.3-hectare) parcel presently zoned for agricultural use be re-zoned for special use.***	The location of the proposed facility is designed for industrial use. Utility interconnection corridors may require a Conditional Use Permit. Zoning ordinances would be met.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
It is assumed that the *operation* impacts to transportation and traffic would be ***less than*** those projected for the Proposed Action ***due to reduced employment levels. In addition, impacts from rail traffic for coal delivery and truck traffic for limestone and ash removal would be avoided. In the event of an interruption of the gas supply, the back-up fuel would likely be fuel-oil. An emergency supply of oil would be stored on site with continuing supplies being delivered by tanker trucks, thus impacting transportation infrastructure. It is assumed that the construction impacts to transportation and traffic would be similar to those projected for the Proposed Action.***	It is assumed that the impacts to transportation and traffic would be similar to those projected for the Proposed Action.	***No additional impacts to traffic and transportation would occur.***
It is assumed that the site selected would not result in any impacts to land use.	It is assumed that the site selected would not result in any impacts to land use.	***Existing infrastructure and facilities would not be affected and would not additionally impact land use.***

Table 2.3-1 (continued). Comparison of the potential impacts from the proposed YCEP Cogeneration Facility and alternatives.

	Proposed Action		Alternative Site (West Manchester)
	Main Facility	Utility Corridors	
Pollution Prevention	Existing programs such as those adopted under the Pollution Prevention Code would continue. Emission control equipment would be installed. Ash byproducts would be reused. A Preventive Maintenance program would be implemented.		The same procedures described for the Proposed Action would be implemented.
Cultural Resources	The proposed location would not disturb archeological sites. ***Impacts to previously identified historic properties would not result from proposed project. During a site survey, three districts and eight individual properties were identified as National Register Eligible. One district (the Hill) was deemed to be adversely visually impacted; however, non-traditional mitigation measures would offset the adverse visual effects.***	***As a result of the survey conducted, 1 additional district and 3 individual properties were determined to be eligible for the National Register. One individual property was deemed to be adversely visually impacted by electric interconnect corridor; however, non-traditional mitigation measures would offset visual effects.*** Phase I archeological investigations have been conducted for several corridors. No evidence of archeological resources was discovered.	No historical sites would be impacted. A Phase I archeological survey would be conducted.
Socio-economic Resources	No significant ***long-term*** socioeconomic impacts are anticipated to be associated with the proposed project. Adequate labor force, housing, schools, police protection, fire protection, and medical services would be available. A beneficial impact of increased tax revenue is expected. ***Based on Met-Ed's projections, short-term electric utility rates could increase.***	Construction of proposed utility corridors would produce a share of the economic benefits approximately equal to their proportion of the total construction cost. Utility corridors would not generate any measurable demographic or service impacts.	Impacts to socioeconomic resources would be similar to those described for the Proposed Action. The Briarwood golf course would be visually impacted.
Environmental Justice	No disproportionate ***adverse*** impacts to minority or low income populations would result.	No disproportionate ***adverse*** impacts to minority or low income populations would result.	A greater percentage of low income residences would be in proximity to the alternative site than to the proposed site.

No Action		
Gas-Fired Facility	**Coal-Fired Facility**	**PJM Interconnection Power Pool**
It is assumed that the facility would utilize pollution prevention methods. Solid ash waste would not be generated.	It is assumed that the facility would incorporate pollution prevention methods.	***Existing pollution prevention measures at PJM facilities would be employed.***
It is assumed that no cultural *re*sources would be impacted.	It is assumed that no cultural *re*sources would be impacted.	***No construction would affect cultural resources.***
The payment of property tax would be approximately 40 to 60 percent less than for the Proposed Action. Employment would be 25 to 30 workers compared to 70 employees for the Proposed Action. Construction personnel would average 180 per month compared to 350 per month for the Proposed Action. $75 million in Federal funds would not be expended for the proposed project.	It is assumed that socioeconomic impacts would be similar to those of the Proposed Action. $75 million in Federal funds would not be expended for the proposed project.	***Socioeconomic resources would benefit from the sale of 227 MW of excess capacity within the PJM power pool.***
No disproportionate *adverse* impacts to minority or low income populations would result.	No disproportionate *adverse* impacts to minority or low income populations would result.	***No disproportionate adverse impacts to minority or low income populations would occur.***

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3. AFFECTED ENVIRONMENT

This chapter describes the existing environmental and socioeconomic resources in the vicinity of the proposed and alternative York County Energy Partners (YCEP) Cogeneration Facility sites. The extent of each description differs as a function of the resources being discussed and the extent of the potential impact.

3.0 Summary of Major Changes Since the DEIS

In Section 3.1.2 (Air Quality), information was added on the inventory of chloroform present in the York area air basin due to industrial operations. The fog subsection has been expanded to incorporate and explain the reported occurrences of fog events in the Spring Grove area. A discussion on existing odors has been added to this section. Information has been added to Section 3.1.4.1 (Surface Water) that expands the discussion of the current water quality in Codorus Creek, particularly with respect to P. H. Glatfelter Company effluent, and which clarifies expected minimum flows. Section 3.1.6.1 (Health Risk Assessment) has been expanded to include information from the American Lung Association on populations at risk for adverse health effects in York County. Sections 3.1.11.1 and 3.1.14.11 (Historical Resources) have been expanded to discuss the results of a survey that was conducted to assess the eligibility for inclusion in the National Register of additional properties in the area. Information on a recreation trail planned for York County by the York County Rail/Trail Authority is discussed in a subsection (Parks and Recreation) of Section 3.1.12.3 (Public Services). Section 3.1.14.6 (Human Health and Safety) was expanded to include background information, including a discussion of guidelines related to electromagnetic fields and their effect on health. Results of recent epidemiological and laboratory studies are also presented.

3.1 Proposed Site

Resources at the proposed North Codorus Township site (Figure 3.1-1) are described in this section. The local and regional environment is characterized as appropriate.

3.1.1 Setting

This section describes the elevation, locations, and aesthetics of the vicinity of the proposed Cogeneration Facility at the North Codorus Township site.

Proposed Project Site

The proposed site for the YCEP Cogeneration Facility is approximately 12.9 kilometers (km) [8 miles (mi)] southwest of York, Pennsylvania (PA) in North Codorus Township, York County, southwest of the borough of Spring Grove (see Figure 2.1-1). Other townships surrounding the site are Heidelberg, Jackson, and West Manchester. The proposed site is located within the Conestoga Valley section of the Piedmont physiographic province. It is generally level at an elevation of approximately 140.2 meters (m) [460 feet (ft)] mean sea level (msl) in the northern portion, rising to approximately 146.3 m (480 ft) msl at the southern site boundary. The surrounding area to the south and west of the proposed facility (within North Codorus Township) is characterized primarily by crop and animal farming, open space, scattered homesteads, and residential development. The surrounding area to the north (within Jackson Township), especially along Spring Grove Road (SR 3072), consists of similar land uses. The land immediately surrounding the proposed site in Spring Grove Borough is primarily industrial, dominated by the buildings of the P. H. Glatfelter Company paper mill. The remainder of the borough is located to the northeast of the existing mill and consists of residential, institutional, and commercial land uses.

The proposed facility would be visible from certain locations in both North Codorus Township and Spring Grove Borough and from locations in Jackson Township north of Codorus Creek. ***Nine*** locations relative to the proposed site, as shown in Figure 3.1-2, have been selected as potentially sensitive visual receptors to represent views from all compass directions. The dominant visual elements are the P. H. Glatfelter Company facilities. A description of each visual receptor and the corresponding views are provided in Appendix C.

3.1.2 Air Quality

This section describes existing ambient air quality conditions, atmospheric visibility, climate, and meteorology of the areas surrounding the proposed site in North Codorus Township. Ambient air quality data are presented to indicate the baseline air quality of the region. In addition, a discussion of pertinent ambient air quality standards [such as National Ambient Air Quality Standards (NAAQS)] is provided

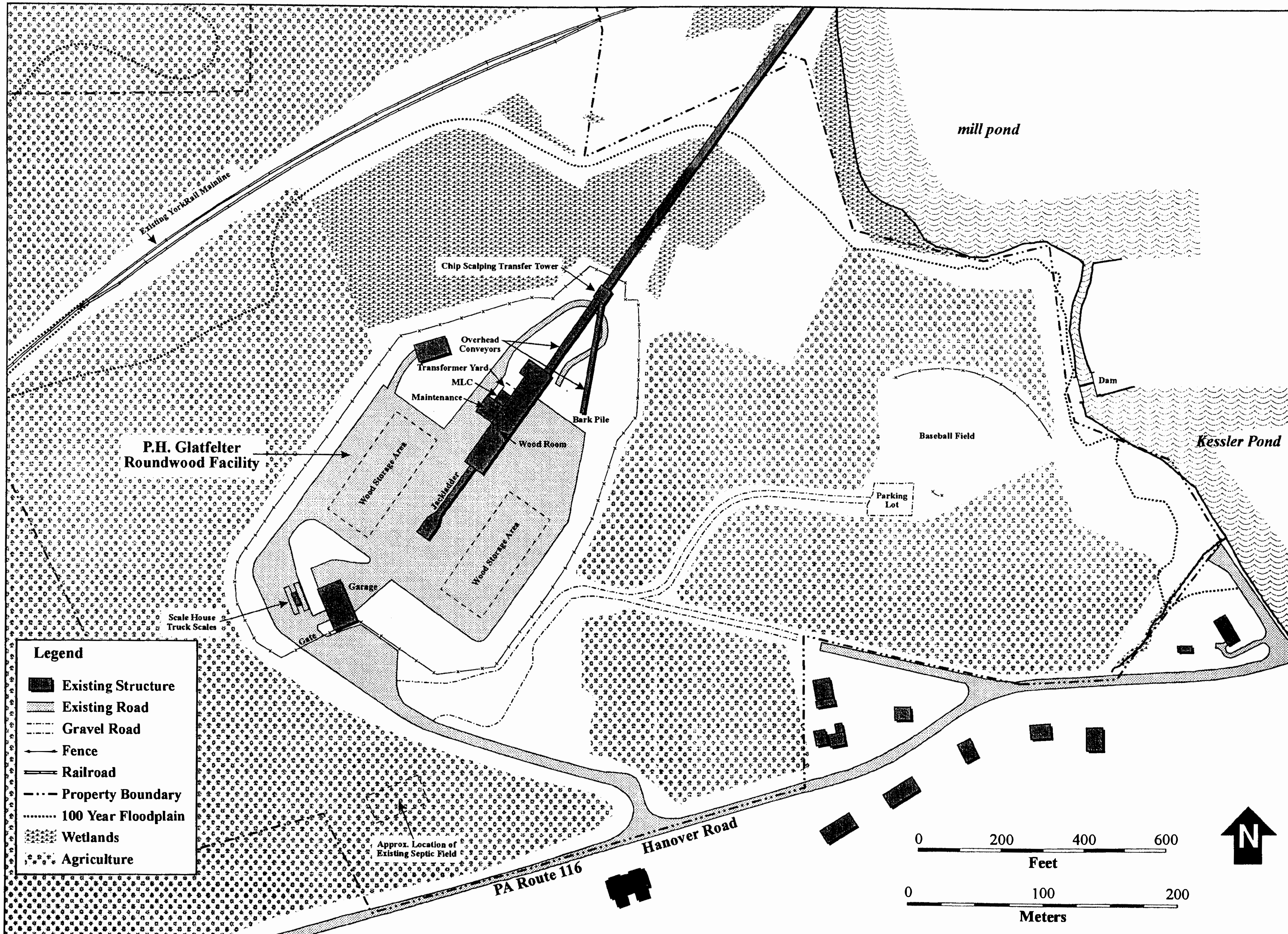

Figure 3.1-1. Existing conditions at the North Codorus Township site.

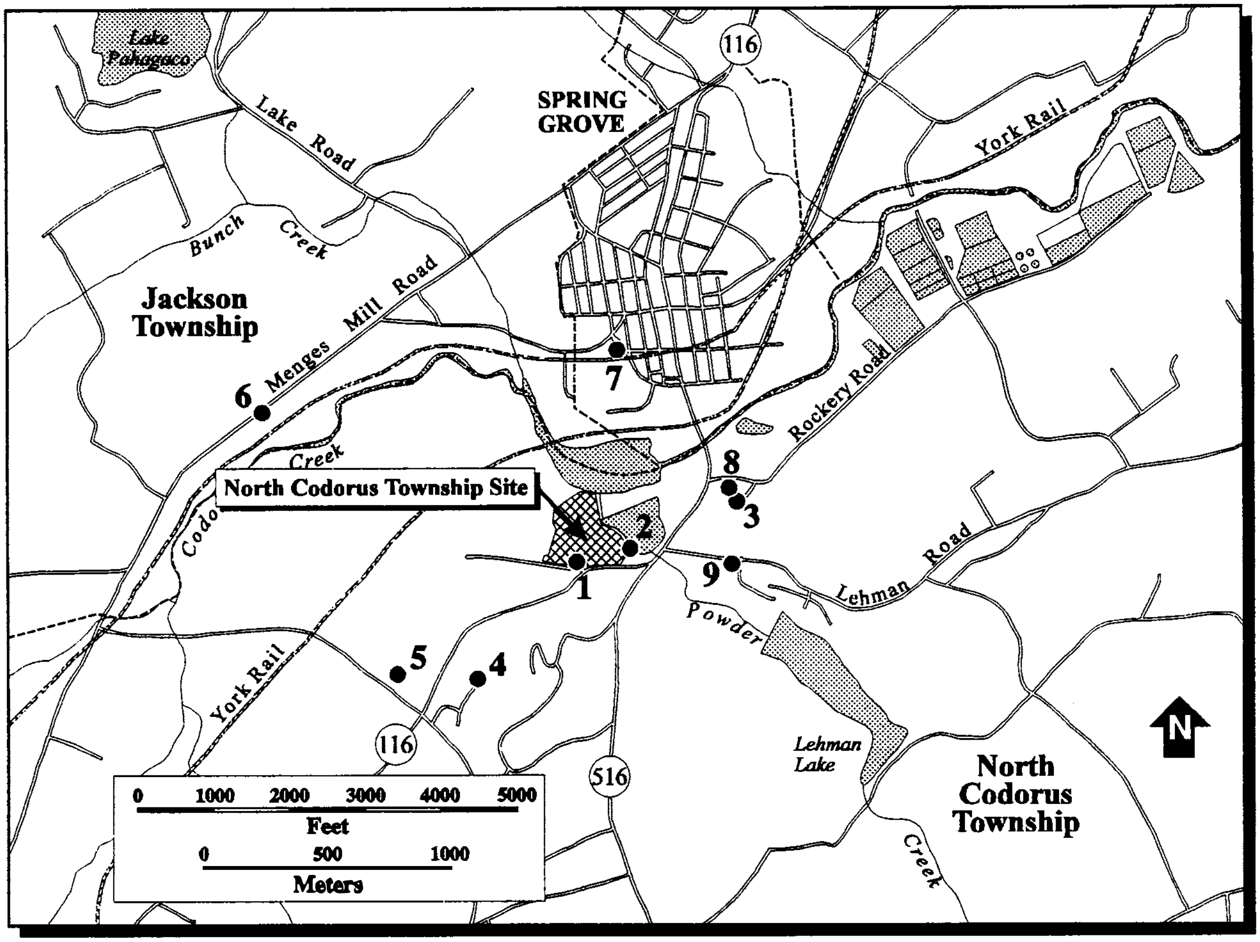

Figure 3.1-2. Locations of potentially sensitive visual receptors.

to assist in the understanding of the current air quality baseline. Extensive discussion of air quality regulations as they apply to both point sources and ambient environment is contained in Section 4.1.2.1 of this ***Final*** Environmental Impact Statement (***F***EIS). Ground level meteorological data were obtained from the National Weather Service (NWS) Station at Harrisburg, PA, and the meteorological station in West Manchester Township. Upper air data were obtained at the NWS Station at Dulles International Airport in Sterling, Virginia, the nearest station that reports upper air data. Air quality data were also obtained from three monitoring stations operated by the Pennsylvania Department of Environmental Resources (PADER): York East, West York, and York Central.

Atmospheric Conditions

The climate of the region is characteristic of the northeastern United States, including relatively large diurnal and seasonal temperature changes. The terrain of the area, which consists of valleys and ridges, contributes to an expanded period of freezing temperatures. Nighttime radiational cooling allows for the movement of cooler, denser air into lower elevations; consequently, the accumulation of cold air at the surface enhances the potential for freezing temperatures to occur later in the spring and earlier in the fall. Temperatures recorded at the NWS station at Harrisburg, Pennsylvania (40.2 km (25 mi) northwest of the proposed site) show an average maximum temperature of 16.3°C (61.4°F), an average minimum temperature of 6.7°C (44.0°F), and an annual mean of 11.5 °C (52.7°F) *(NOAA, 1992, as cited in ENSR, 1994)*.

The humid continental climate in the area is influenced by systems originating in the Great Plains that migrate in an easterly direction across the continental United States, and by systems originating in the Caribbean Sea or Gulf of Mexico that migrate in a northerly direction up the Atlantic Coast. The regional average annual rainfall is 97.1 cm (38.2 inches) per year *(NOAA, 1992, as cited in ENSR, 1994)* (based on State climatic data collected from 1962 to 1991), with a range of 76.2 to 152.4 cm (30 to 60 inches) per year. Winter precipitation is produced primarily by storms moving along the Appalachian Mountains. Annual snowfall ranges from 33.0 to 190.1 cm (13 to 75 inches).

Data used to prepare a meteorological profile of the region were obtained from the NWS station at Harrisburg, PA [approximately 40.2 km (25 mi) north-northwest of the proposed project site] for surface and various troposphere levels; from the YCEP-operated local meteorological station in West Manchester Township [9.7 km (6 mi) northeast of the proposed site] for surface and elevated levels of the local basin; and from the NWS station at Dulles International Airport in Sterling, Virginia [approximately 120.7 km (75 mi) south-southwest of the proposed site] for the upper troposphere levels. Dulles International Airport is the nearest station where data on upper troposphere levels can be obtained.

Wind speed and directional data, collected at the Harrisburg NWS station for the 5-year period from 1985 to 1989, at a level of 6.7 m (22 ft) above ground level (AGL), are summarized in the wind rose presented in Figure 3.1-3. A wind rose is a pictorial representation of the frequency and direction of wind speeds at a site; the total length of the bar at each major compass heading is proportional to the frequency with which the wind blows from each direction; bar divisions indicate the amount of time the wind blows at the various velocity reference categories *(Holzworth, 1972, as cited in ENSR, 1994)*. Winds from the

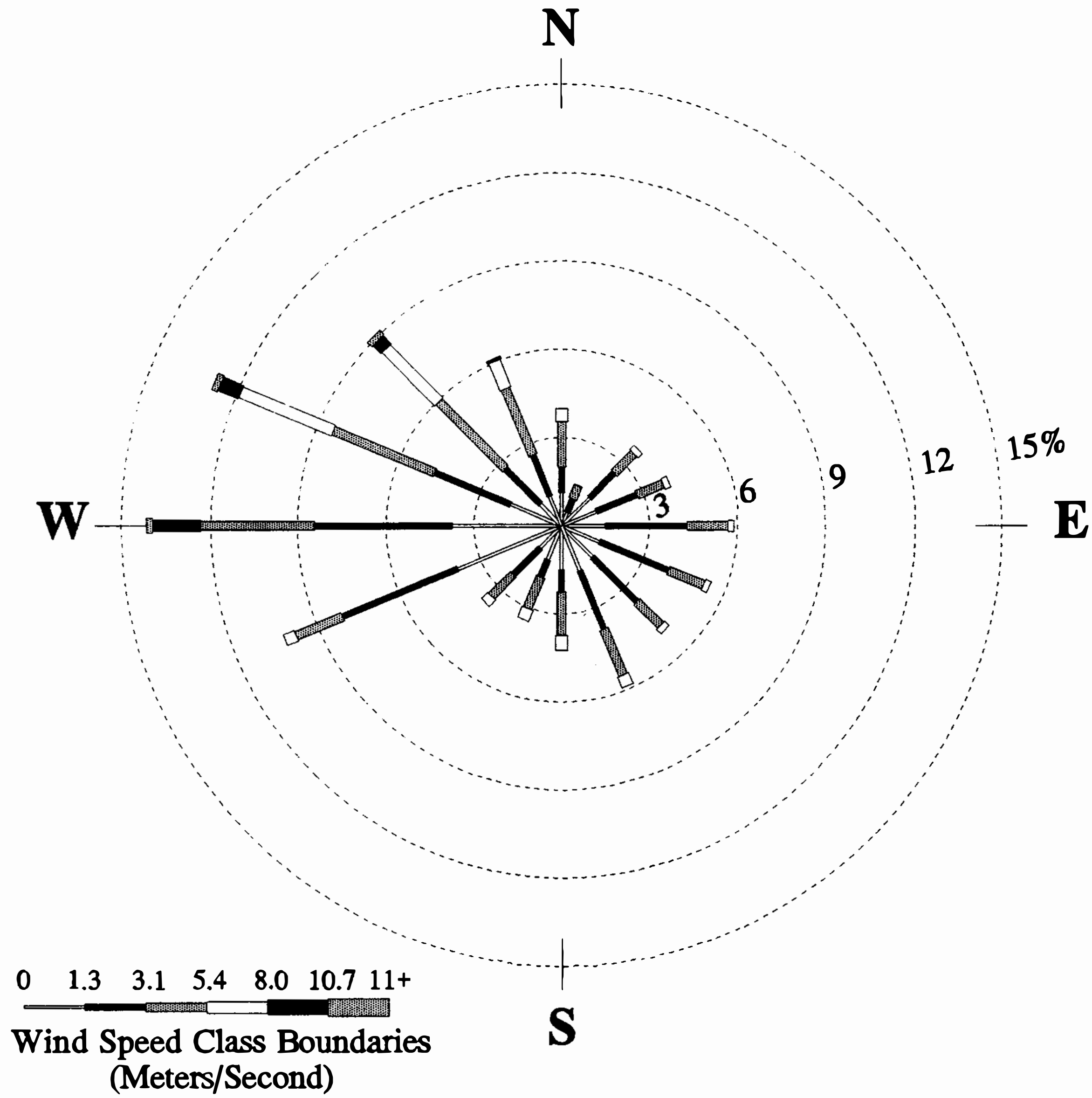

Figure 3.1-3. Wind rose for Harrisburg, Pennsylvania.

southwest, west, and northwest dominate at this station. A similar pattern is exhibited in the wind rose prepared from data collected by YCEP in 1992 at the West Manchester air quality monitoring site (Figure 3.1-4). [The use of meteorological data from the West Manchester site is consistent with the recommendations in Subsection 6.6 of ***United States*** Environmental Protection Agency's (EPA) On-Site Meteorological Program Guidance for Regulatory Modeling Applications *(EPA, 1987a)* and meets PADER, Bureau of Air Quality Control requirements *(Simonson, 1994)*.]

Atmospheric stability is the atmosphere's tendency to either promote or suppress vertical air motion (i.e., mixing). Stability information is used in air quality modeling analysis to determine ground level impacts from air pollutants. An unstable atmosphere promotes vertical mixing. The conditions that contribute to instability are increased turbulence and diffusion, usually occurring during daylight hours when solar heating warms the lower layer of the atmosphere. The suppression of mixing allows for a stable atmosphere with decreased turbulence and diffusion, which usually occurs during nighttime hours. A stable atmosphere is characterized by clear skies and light winds when radiational heat loss tends to cool the lower layer of the atmosphere. In between the extremes of atmospheric stability is a median area of neutral stability in which surface heating or cooling and/or moderate to strong winds are reduced because of cloudy skies. Atmospheric stability for this region, as assessed by observations made at the Harrisburg NWS station over the 5-year period from 1985 to 1989, showed stable conditions 33 percent of the time, unstable conditions 17 percent of the time, and neutral conditions 50 percent of the time *(ENSR, 1994)*.

Mixing height is the distance above the surface at which vertical air motion (i.e., mixing) occurs. These data are collected from upper air meteorological observations and are utilized to determine the potential for elevated surface concentrations of atmospheric pollutants. Decreases in mixing height cause a reduction in the atmosphere's ability to vertically dilute and disperse pollutants, and thus increase the potential for elevated concentrations of pollutants at the surface. Mixing heights are commonly lowest late at night or early in the morning when there is less solar radiation. Solar heating of the earth's surface in the afternoon tends to increase mixing heights. Fall and winter mixing heights usually are lower because there is increased stability of the lower layers of the atmosphere. Generally, highest afternoon mixing heights occur during spring and summer because of increased solar heating of the surface and increased atmospheric turbulence. The mean seasonal and annual mixing heights for morning and afternoon at the Dulles International Airport NWS are presented in Table 3.1-1.

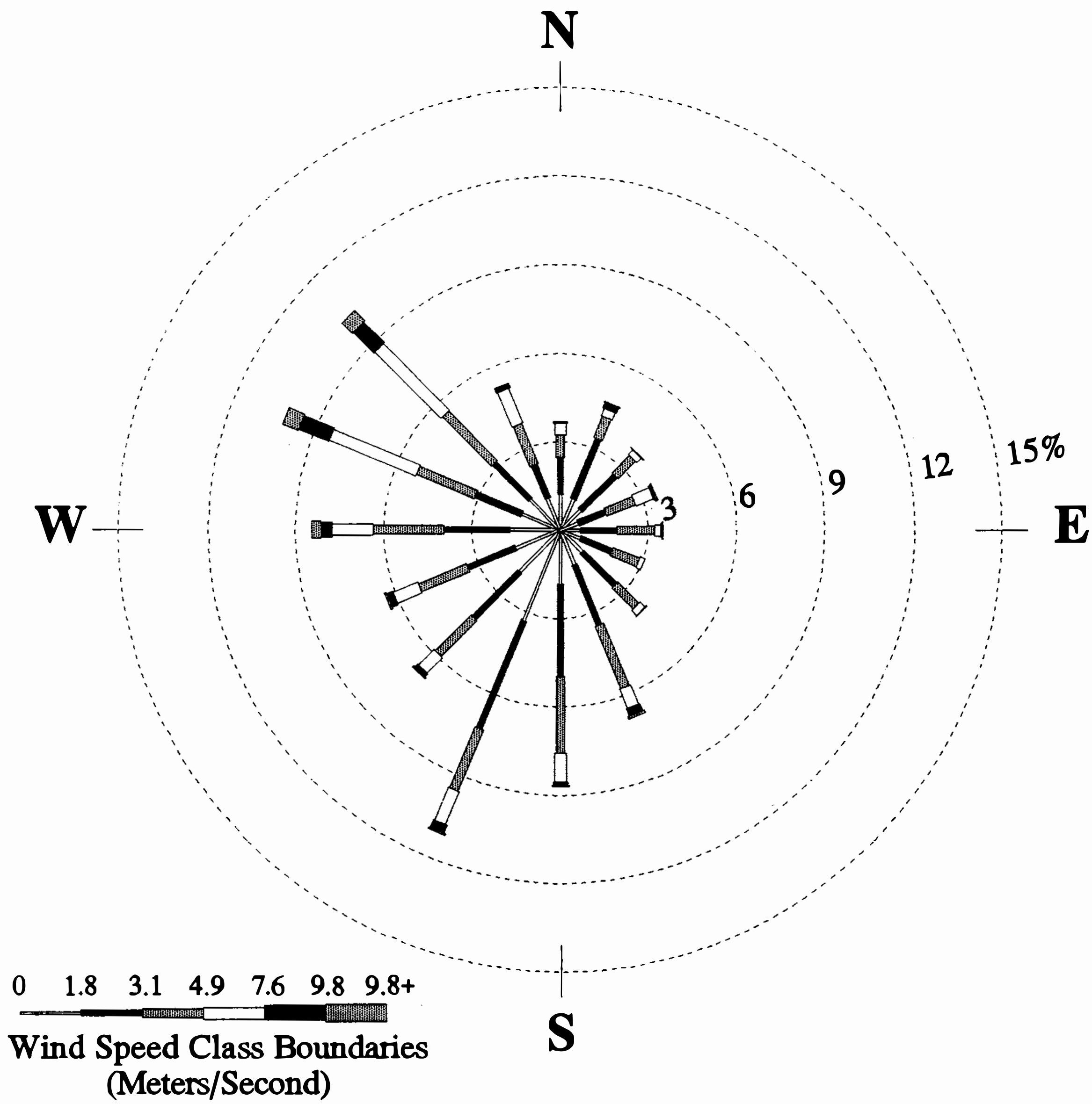

Figure 3.1-4. Wind rose for air monitoring station West Manchester, Pennsylvania.

Table 3.1-1. Mixing heights recorded at Dulles International Airport NWS.

Time of Day	Winter (m)	Spring (m)	Summer (m)	Fall (m)	Annual (m)
Morning	750	700	500	600	600
Afternoon	1,000	1,800	1,800	1,400	1,500

Source: Holzworth, 1972.

Air Quality

This section provides current background air quality data related to NAAQS and State AAQS.

Sections 109 and 301(a) of the Clean Air Act, as amended in 1990 (CAA) [42 U.S.C. 7409 (a)], and implementing regulations (40 CFR Part 50) define primary and secondary NAAQS for the following "criteria" pollutants: sulfur dioxide (SO_2), particulate matter (PM_{10}) — particulates with aerodynamic diameters equal to or less than 10 microns, carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). Primary NAAQS, established to protect human health, were developed according to observable human health responses and were set at levels to provide an adequate safety margin for sensitive segments of the population. Secondary NAAQS were established to protect public interests other than human health including structures, vegetation, and livestock. PADER has adopted the Federal NAAQS by reference under Title 25 of Pennsylvania's Air Pollution Control Regulations. The Pennsylvania regulations also include AAQS for settleable particulates, fluorides, beryllium (Be), sulfates, and hydrogen sulfide (H_2S). Specific NAAQS and Pennsylvania AAQS are presented in Chapter 9 on regulatory compliance.

Geographic areas are officially designated by EPA as being in attainment or nonattainment for pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCR). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area is designated as unclassifiable when insufficient monitoring data exist. The proposed site in North Codorus Township is located within the South Central Pennsylvania Intrastate AQCR. Under the CAA, this area is also part of the Northeast Ozone Transport Region. Air quality within the South Central Pennsylvania Intrastate AQCR is in attainment with NAAQS for all pollutants except ozone (O_3). This AQCR has been classified as a marginal nonattainment area for ozone (O_3). A nonattainment area is described in Section 107(d) of the CAA [42 U.S.C. 7407] as any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the primary or secondary NAAQS for the pollutant. Each area that is designated as nonattainment for ozone is further classified as a marginal, moderate, serious, severe, or an extreme area based on the design value for the area as designated in Section 181(a)(1) of the CAA [42 U.S.C. 7511]. The design value for a marginal nonattainment area for ozone is 0.121 mg/*L* to 0.138 mg/*L*. Under this classification, the marginal nonattainment area is to achieve the primary NAAQS for ozone within three years after the enactment of the CAA Amendments of 1990.

Additional regulations that influence air quality include Prevention of Significant Deterioration (PSD) requirements specified under Section 160 of the CAA for Class I and Class II areas. Class I areas could include National Parks (e.g., Shenandoah National Park) that are subject to the highest degree of air quality protection. The York air basin is currently classified as a Class II area. For point sources, New Source Performance Standards could be required, as contained in the CAA. All of these requirements are explained in detail in the air quality regulatory section of Chapter 4.

Air quality monitoring stations are operated by PADER at numerous locations throughout Pennsylvania to measure ambient pollutant levels and assess attainment of State and Federal standards. Data from the monitoring stations nearest to the proposed project site were used to establish baseline air quality. The identity and locations of the monitoring stations, as well as the pollutants monitored at each, are presented in Table 3.1-2. Ambient air quality data collected from 1990 to 1992 at these stations for sulfur dioxide (SO_2), particulates (PM_{10}), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), and lead (Pb) are presented in Table 3.1-3. With the exception of ozone (O_3), pollutant levels measured by the PADER are below all applicable State and Federal standards. The highest of the second-highest short-term concentrations and/or the highest long-term concentration (i.e., annual measurement) measured at the monitors are compared against the standards for each pollutant for each averaging period. Because one exceedance of the short-term ambient standard is allowed under Federal and State standards without causing the AQCR to be designated as a nonattainment area for that pollutant, the maximum second-highest measured short-term concentration is the value used for assessing air quality relative to the applicable short-term standard.

<u>Sulfur Dioxide.</u> The maximum annual average concentration for sulfur dioxide (SO_2) of 18 $\mu g/m^3$ recorded at the York East monitor during the 3-year period is approximately 23 percent of the primary standard. The maximum second-highest 3-hour and 24-hour average concentrations were recorded in

Table 3.1-2. Locations of PADER ambient air quality monitoring sites.

Monitoring Station ID No.	Location	Distance from Proposed Site (mi)	Direction from Proposed Site	Pollutants Monitored
42-133-0008	York East	11.4	NE	SO_2, O_3, NO_2, CO
42-133-0321	West York	8.3	NE	PM-10
42-133-0322	York Central	10.4	NE	Pb

Source: Pennsylvania Air Quality Data for 1990 as cited in ENSR, 1994.

1990 and 1992, respectively, ***and*** are 18 and 25 percent of their respective standards (Table 3.1-3). YCEP also conducted air quality monitoring at the location in West Manchester Township [PADER Bureau of Air Quality Control authorized the use of West Manchester data (*Simonson, 1994*)]. Only ambient sulfur dioxide (SO_2) data were recorded from January to December 1992 (Table 3.1-4) because it was the only pollutant that was shown in the air quality model to have a ground level impact above the monitoring threshold. The maximum annual concentration of 26 $\mu g/m^3$ recorded during the 1992 monitoring year is 33 percent of the standard. The highest 3-hour and 24-hour average concentrations measured are 19 and 31 percent of their respective standards. The second-highest monthly maximum 3-hour and 24-hour average concentrations measured were 13 and 27 percent of their respective standards.

Particulate Matter. The maximum annual average particulate (PM_{10}) concentration recorded during the 3-year monitoring period at the West York monitor was 32 $\mu g/m^3$ (1991), 64 percent of the ambient standard. The maximum second-highest 24-hour concentration was 69 $\mu g/m^3$ (1991), approximately 46 percent of the ambient standard.

Nitrogen Dioxide. The maximum annual average nitrogen dioxide (NO_2) concentration recorded at the York East monitor over the 3-year period was 41 $\mu g/m^3$ (1990). This concentration was 41 percent of the ambient standard.

Ozone. The second-highest 1-hour ozone (O_3) concentrations measured at the York East monitor ranged from approximately 198 $\mu g/m^3$ in 1992 to 237 $\mu g/m^3$ in 1990, or 84 to 101 percent of the ambient standard.

Table 3.1-3. Summary of air quality monitoring data from stations nearest the proposed YCEP Cogeneration Facility site.

Pollutant	Station	Averaging Period	Concentration ($\mu g/m^3$)[1] 1992 H	1992 2ndMax	1991 H	1991 2ndMax	1990 H	1990 2ndMax	National Ambient Air Quality Standard ($\mu g/m^3$)
SO_2	York East	3-hour	246	225	230	183	233	233	1,300
		24-hour	92	92	68	60	71	66	365
		Annual	18	NA	18	NA	18	NA	80
PM_{10}	West York	24-hour	51	47	76	69	91	63	150
		Annual	27	NA	32	NA	30	NA	50
NO_2	York East	Annual	38	NA	40	NA	41	NA	100
O_3	York East	1-hour	202	198	228	224	251	237	235
CO	York East	1-hour	8,000	8,000	13,000	8,000	13,000	11,000	40,000
		8-hour	5,000	4,000	5,000	4,000	6,000	5,000	10,000
Pb	York Central	3-month	<0.1	NA	<0.1	NA	0.1	NA	1.5

[1] Highest (H) and second-highest (2ndMax) short-term concentrations are listed.
NA Not Applicable.

Source: Pennsylvania Air Quality Data for 1990, 1991, 1992 as cited in ENSR, 1994.

Table 3.1-4. Ambient sulfur dioxide data monitored in West Manchester Township (January - December 1992).

Pollutant	Averaging Period	Concentration ($\mu g/m^3$) H[1]	Concentration ($\mu g/m^3$) 2nd Monthly Max[2]	National Ambient Air Quality Standard ($\mu g/m^3$)
SO_2	3-hour	236	173	1,300
	24-hour	113	100	365
	Annual	26	NA[3]	80

[1] Highest (H) short-term concentrations are listed.
[2] Second highest monthly maximum concentration is listed.
[3] Not applicable.

Source: ENSR, 1994.

Carbon Monoxide. The maximum second-highest carbon monoxide (CO) concentration over a 1-hour average was 11,000 $\mu g/m^3$ (1990), approximately 28 percent of the NAAQS. The maximum second-highest 8-hour average concentration was 5,000 $\mu g/m^3$ (1990), or 50 percent of the standard.

Lead. The quarterly average lead (Pb) concentrations measured at the York Central monitoring station during the 3-year (1989-1991) monitoring period were 0.1 $\mu g/m^3$ or less, well below the standard of 1.5 $\mu g/m^3$ (approximately 7 percent of the standard).

Chloroform.* *Chloroform is not a criteria air pollutant. Therefore, ambient air concentrations of chloroform have not been measured. However, chloroform is not excluded by EPA as a photochemically reactive volatile organic compound (VOC) as are some volatile organics [40 CFR 51.100(s)(1)]. VOCs play a role as precursors to the formation of ozone (O_3), which is a criteria pollutant. The P. H. Glatfelter Company plant adjacent to the site of the proposed YCEP project emits chloroform in sufficiently large amounts to require annual reporting to EPA pursuant to the requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act). Air emissions of 115.5 tons per year (tons/yr) of chloroform were recorded by P. H. Glatfelter Company in their 1994 report to EPA ("Form R, Toxic Chemical Release Inventory Reporting Form").

Fog Conditions

Long-term, quantified, meteorological measurements--including fogging or visibility records--were reviewed to determine the occurrence of fogging or icing in the region of Spring Grove, the site of the current P. H. Glatfelter Company paper plant. The closest site of meteorological record was at West Manchester, approximately 10 km (6.27 mi) to the northeast, where surface data had been collected for the 1-year period, January through December 1992. These data were used for the ISC2 and BEE-X modeling to predict ambient concentrations of air emissions from the proposed YCEP project. However, this 1-year record consisted only of temperature and wind speed data; fog or visibility data were not recorded nor could they be derived from those measurements. The next-nearest site was a voluntarily operated site in York approximately 25 km (15.6 mi) from the proposed site. However, these data were limited to records of temperature and precipitation; no fogging or visibility data were recorded. More complete meteorological records were available from Flight Service observations made at Lancaster airport approximately 40 km (25 mi) to the north-northeast. However, these data were limited to restricted hours of operations and did not provide a continuous 24-hour record. The nearest continuous records of visibility or fogging were available from the National Weather Service (NWS) station at Harrisburg, 40 km (25 mi) north of the proposed site. In the absence of any other pertinent meteorological monitoring data, the meteorological data at Harrisburg were considered to be the best metric of regional fogging. On a 10-year average, fog (defined as a quarter-mile or less visibility) occurs 17.5 days per year in Harrisburg. In Philadelphia, PA, approximately 175 km (109 mi) east of the proposed site, the average occurrence of fog is also 17.5 days per year.

Photographic and videographic evidence of fogging in the Spring Grove region was provided to DOE by a local resident in testimony during the December 14, 1994, public hearing and through written correspondence on March 5, 1994, prior to the start of the public comment period (see Volume III for some reproductions of photographs submitted during the public comment period). The photographs were submitted as having been taken in the vicinity of the Spring Grove area and the P. H. Glatfelter Company plant on 4 days during the winter months in early 1994. On 3 of these 4 days, fog and low visibility were recorded at Harrisburg. The local resident also provided a videotape recording the conditions around the Spring Grove/Creek Valley area in the early morning hours for 5 days in the fall and winter of late 1994. Review of these videos was consistent with the characteristics of ground fog formed in the cold morning hours along the base of a river valley when winds are light or calm, and where temperature inversion can occur. These were the general conditions that prevailed at

Harrisburg–wind speeds ranged from calm to 5 knots/hour, and early morning fog or haze was reported on 3 of those 5 days.

Odors

Ambient odors are noticeable in the Spring Grove area. These odors appear to be from industrial sources, and most probably come from the existing P. H. Glatfelter Company. The EPA has recognized that pulp and paper mills are a significant source of community odors, and has proposed guidelines (58 FR 66077) that should indirectly reduce the emissions of Total Reduced Sulfur compounds (TRS), which are responsible for the malodors often associated with pulp and paper production. These TRS compounds are of low molecular weight, have limited solubility in water, and are easily volatized. The EPA cites pulp mill process wastewater as a potential source of TRS emission.

3.1.3 Geology and Soils

The proposed site in North Codorus Township is within the Conestoga Valley section of the Piedmont physiographic province. Geologic features typical of this region are the presence of sedimentary and metamorphic rocks including shale and phyllite. No significant soil constraints were noted on either the site or along the associated utility interconnection routes *(ENSR, 1994)*.

3.1.3.1 Geology

Topography

The proposed facility site is located in the Hanover-York Valley lowland, within the Piedmont physiographic province of the Appalachian Highlands. The valley crosses York County from the Susquehanna River northeast of the city of York, southwest to Hanover. Bounded to the south and east by the Stoner Overthrust and the Southeastern Upland, and to the north and west by the Gettysburg Plain and Hellam and Pigeon Hills, the valley is generally about 6.4 km (4 mi) wide. However, the northeast end of the Pigeon Hills causes a narrowing of the valley at the location of the proposed facility, to a width of approximately 3.2 km (2 mi). Codorus Creek follows a meandering path through the valley, passing along and forming the northern border of the site. Topography of the site itself is generally level, with a slight rise from the northern portion elevation of approximately 140.2 m (460 ft) above mean sea level (msl) to approximately 146.3 m (480 ft) above msl at the southern site boundary *(ENSR, 1994)*.

Geology

The proposed facility site is located close to a geologic contact between the Upper Cambrian-age Kinzer Formation and a geologic unit that is mapped as a grouping of the Antietam Formation and the Harpers Phyllite, which are both Lower Cambrian-age *(PADER, 1980)*. The Cambrian-age is the earliest period of the Paleozoic era which occurred from 570 to 500 million years ago. The contact between the formations is mapped as a thrust fault (a thrust fault is a low-angle (less than 45° dip) rock fracture along which the ***rock above the fracture*** has moved up relative to the rock ***below the fracture***. The movement along this fault has placed the older Antietam and Harpers Formations on top of the younger Kinzer Formation, reversing the normal stratigraphic order. Geologic information from on-site borings *(ENSR, 1994)* indicate that the site is underlain by unconsolidated materials (soil, fill material, residual soil, and weathered rock), which are up to 10.7 m (35 ft) thick. These unconsolidated materials are underlain by bedrock, which has been logged as shale and phyllite *(ENSR, 1994)* suggesting that it is the Antietam/Harpers Unit. If this is correct, it would be expected that the Antietam/Harpers Unit is underlain by the Kinzer Formation, with a thrust-fault forming the boundary; however, there are no on-site data from sufficient depths to confirm this relationship. Descriptions of the Harpers Phyllite, the Antietam Formation, and the Kinzer Formation follow:

- Kinzer Formation (Cambrian, overlies Vintage Formation and Antietam Formation) — The Kinzer Formation is divided into three distinct members: Earthy Buff Limestone, Pure Limestone, and Shale. The total estimated thickness is 61.0 m (200 ft). Earthy Buff Limestone member is gray-brown to tan, sandy, porous, leached limestone containing dark, argillaceous, and shaly interbeds. Pure Limestone member is dark gray to blue-gray crystalline limestone of variable composition; it is altered to marble and dolomite locally. Shale member is dark gray, weathers to buff, iron-stained, and fissile shale.

- Antietam Formation (Lower Cambrian, overlies Harpers Phyllite) — Antietam Formation is light gray, fine to medium grained, hard, vitreous quartzite. Weathered surfaces are iron stained. The lower portion becomes laminated, phyllitic, and micaceous, grading into the Harpers Phyllite. The estimated thickness is 61.0 m (200 ft).

- Harpers Phyllite (Lower Cambrian) — The Harpers Phyllite is a dark green-gray, quartzose phyllite with quartz zones that are parallel to well-developed cleavage. Mica flakes are outstanding on cleavage. The estimated thickness is 85.3 m (280 ft).

No visible sign of dolomitic sinkholes is present at the proposed site. ***Seismic activity is infrequent and of low intensity*** *(ENSR, 1994).*

3.1.3.2 Soils

The property on which the proposed site would be located has been described by the ***United States*** Department of Agriculture (USDA) Soil Conservation Service (SCS) in the York County, Pennsylvania Soil Survey *(SCS, 1991).* Survey mapping indicates that site soils are composed of silt loams of the Altavista, Chewacla, Glenville, and Wickham soil series. Each is briefly described below:

Altavista: Altavista silt loam, zero to three percent slope (AaA) — This soil occupies most of the site with the exception of the area surrounding the small stream feeding into the reservoir, a small portion adjacent to York Road (Route 116), and the wooded area bordering the mill pond. Altavista soils are typically deep, moderately well drained, ***but*** somewhat poorly drained soils on stream terraces. These soils have formed from old alluvium washed from materials underlain by schist and phyllite. Bedrock is below 1.22 m (4 ft) and the seasonal high water table is found between 45.7 and 91.4 cm (18 and 30 inches) ***below*** the soil surface. These soils are not usually subject to stream overflow. Subgroup: Aquic Hapludults.

Chewacla: Chewacla silt loam (Ck) — This series occupies the wooded floodplain area surrounding the mill pond. Chewacla soils are deep, moderately well drained, nearly level soils located on floodplains. These soils have formed from material washed from uplands underlain by schist, phyllite, diabase, and metabasalt. Bedrock typically occurs at greater than 1.2 m (4 ft), and the seasonal high water table between 45.7 and 91.4 cm (18 and 30 inches) of the surface. These soils are subject to periodic stream overflow. Subgroup: Fluvaquentic Dystrochrepts.

Glenville: Glenville silt loam, zero to three percent slope (GnA) — The Glenville series occurs in a thin band surrounding the small stream discharging into the water reservoir. Glenville soils are deep, moderately well drained, ***but*** somewhat poorly drained soils on uplands. These soils are formed in material weathered from schist and phyllite. Depth to bedrock is more than 0.9 m (3 ft) and the seasonal high water table ranges between 45.7 and 91.4 cm (18 and 30 inches) from the surface. Subgroup: Aquic Fragiudults.

Wickham: Wickham silt loam, three to eight percent slope, moderately eroded (WkB2) — This series occupies a small portion of the site adjacent to York Road (Route 116) and west of the Glenville series. Wickham soils are deep, well-drained, level or gently sloping soils on stream terraces. These soils are formed of alluvium washed from schist and phyllite. Depth to bedrock is more than 1.2 m (4 ft), and the seasonal high water table ranges between 0.9 and 1.5 m (3 and 5 ft). Subgroup: Typic Hapludults.

A summary description of these soils with regard to certain physical and engineering properties is presented in Table 3.1-5. During the 1950s and 1980s, a portion of the site was used for the deposition of sediments dredged from the mill pond situated north of the site. The sediment material depth varies between 0.3 and 3.7 m (1 and 12 ft) with an average depth of 2.4 m (8 ft). This dredge material consisted of unconsolidated materials characterized by gray clays and silts settled to the bottom from agricultural runoff. An on-site subsurface investigation was conducted to assess the dredge material; the results are presented in the following paragraphs *(ENSR, 1994)*.

- The soil layer covering the site consists of silty sand and clay soils with a thickness ranging from 0 to 0.6 m (0 to 2 ft). In the area of the site where mill pond dredge material is absent, this layer is the natural soil layer. In the on-site areas where the sediment material is located, the soil layer appears to be a natural soil material that has been placed above the dredge material. The soil layer was added as part of the reclamation to stabilize the dredge material in order to facilitate revegetation.

- The unconsolidated materials comprising the mill pond dredge material are characterized by gray clays and silts containing plant material and having a natural organic odor. The dredge material ranges in thickness from 0.3 to 3.7 m (1 to 12 ft), and covers 12 acres (4.9 hectares) of the 38-acre (15 hectare) site.

Table 3.1-5. Summary of on-site soil characteristics.

Soil Name	Slope[1] (%)	Present On-site (%)	Depth to Bedrock (in.)	Permeability[2]	Available[3] Water Holding Capacity	Depth of Water Table (when present)	Productivity[4]	Capability Subclass[5]
Altavista silt loam (AaA)	0-3	70	48-84	moderately slow	high > 5.2"	1.5-2.5 feet	high	2W
Chewacla silt loam (Ck)	—	5	48-72	moderate	medium 3.2 - 5.2"	1.5-2.5 feet	very high	2W
Glenville silt loam (GnA)	0-3	10	36-84	slow	medium	1.5-2.5 feet	moderate	2W
Wickham silt loam (WkB2)	3-8 (mod. eroded)	15	48-84	moderate	medium	3.0-5.0 feet	very high	2E

[1] The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100.

[2] The characteristic that enables soil to transmit water or air.

[3] The capacity of soils to hold water available for use by most plants. It is expressed as inches of water per inch of soil (the capacities provided are for a 40-inch profile).

[4] Productivity refers to the capability of a soil to produce a specified plant or sequence of plants under specific management.

[5] Capability Subclass Key:
2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
W - water in or on the soil interferes with plant growth or cultivation.
E - the main limitation is risk of erosion unless close-growing plant cover is maintained.

Source: SCS, 1991.

- Native soils are located beneath the dredge material and in areas of the proposed site where dredge material is absent. They consist of unconsolidated silty sands and clays derived from the weathering of the underlying bedrock. This unit ranges in thickness from approximately 3.0 m (10 ft) to more than 12.2 m (40 ft).

- Weathered bedrock is present at depths of 6.1 to 12.2 m (20 to 40 ft) below the ground surface.

- The bedrock units beneath the proposed site consist of the Harpers Phyllite, quartzite of the Antietam Formation, and limestone and shale of the Kinzer Formation.

The soil/sediment quality data indicated the presence at several locations of trace levels of the pesticide compound dichlorodiphenyldichloroethane (4,4-DDD), commonly known as Rhothane, a pesticide that is no longer manufactured. The presence of this compound most likely is attributed to the application of agricultural chemicals to the site soils. The concentrations were detected at levels close to the method detection limit. The trace levels of this compound would be expected to be attenuated in the shallow soil zone, and would not leach to the underlying groundwater. The concentrations of metals found in the samples are indigenous to the natural soils of the area and are within the range of concentrations of metals found in eastern United States soils reported by Shacklette and Boerngen *(1984, as cited in ENSR, 1994).* (Table 3.1-6).

3.1.4 Water Resources and Water Quality

This section addresses surface water and groundwater resources associated with the proposed site. Descriptions of water use, consumption, and availability are included.

3.1.4.1 Surface Water

The proposed site in North Codorus Township lies in the *l*ower Susquehanna River *b*asin, adjacent to Codorus Creek, a 77.2-km (48-mi) long tributary of the Susquehanna River located in southeastern Pennsylvania. The drainage area of Codorus Creek is approximately 720 km^2 (278 mi^2). The P. H. Glatfelter Company and other industries use Codorus Creek as a source of process water; and several municipalities and industries discharge treated wastewater to the stream. Codorus Creek and ***several of its tributaries*** also serve as the water supply source for the Borough of Spring Grove and the city of York *(ERM, 1994a).*

A major ***impoundment*** in the Codorus Creek watershed is Lake Marburg, a 15.8 billion gallon reservoir with a surface area of 1,275 acres (520.4 hectares) and 41.8 km (26 mi) of shoreline.

Physical Characteristics

Codorus Creek, the primary surface water source in close proximity to the proposed facility site, originates in southern York County near Lineboro, Maryland (Figure 3.1-5). The headwaters of Codorus Creek are at an elevation of 311 m (1,020 ft) above mean sea level (msl) (*Shaw, 1984 as reported in ENSR, 1994*). Major tributaries of Codorus Creek upstream of the proposed project include the West

Table 3.1-6. Comparison of metals in on-site soils to naturally occurring range in eastern *United States* soils.

Element	Naturally Occurring Concentration	Proposed Site Sediments (mg/kg)
Arsenic	≤0.1 to 73	2 to 5
Lead	≤10 to 300	8 to 44
Chromium	1 to 1,000	8 to 28
Nickel	≤5 to 700	10 to 30
Zinc	≤5 to 2,900	≤40 to 500

Source: Shacklette, H.T. and J.G. Boerngen, 1984.

Branch [***River Mile*** (RM) 32.6] and Oil Creek (RM 27.7). Codorus Creek flows northwest and merges with the West Branch where it continues generally northward to its confluence with Oil Creek near Spring Grove. It then curves northeast to its confluence with the South Branch of Codorus Creek, south of the city of York. From York, it flows northeast to its confluence with the Susquehanna River near Singinaw, PA. The elevation at the mouth is 73.5 m (241 ft) above msl *(Shaw, 1984 as reported in ENSR, 1994).* The creek is characterized as having a dendritic drainage pattern; a regular channel pattern; rock units consisting of schist, shale, dolomite, and limestone; a meander ratio of 1.18; a relief ratio of 16.2; and a channel slope of 1.1 m/km (6 ft/mi).

The Codorus Creek basin contains the following ***large*** impoundments:

- Indian Rock Dam, and flood retention basin;
- Lake Williams;
- Lake Redman;
- Lake Marburg;
- Lake Pahagaco; and
- Lake Lehman.

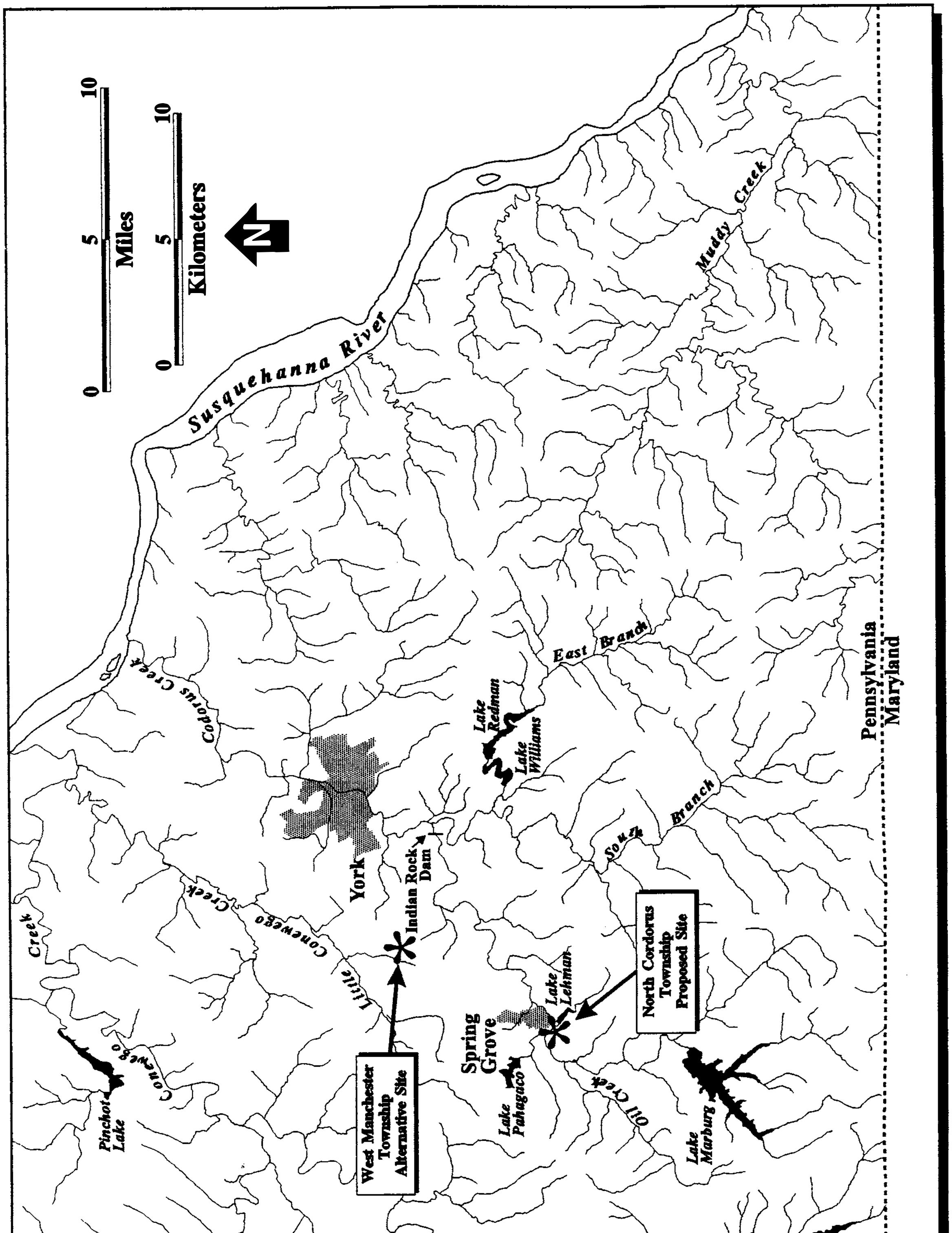

Figure 3.1-5. Surface water resources in the vicinity of the proposed Cogeneration Facility.

Indian Rock Dam is located approximately 4 km (2.5 mi) southwest of York on the main stem of Codorus Creek, about 213.4 m (700 ft) upstream of its confluence with the South Branch of Codorus Creek *(SRBC, 1991b as reported in ENSR, 1994).* The ***United States*** Army Corps of Engineers (ACOE) operates Indian Rock Dam, which primarily serves for flood control purposes. Lake Williams and Lake Redman, on the East Branch of Codorus Creek, serve as water supply reservoirs for the York Water Company.

Lake Marburg was constructed by the P. H. Glatfelter Company in the late 1960s on the West Branch of Codorus Creek to satisfy the water demands of the P. H. Glatfelter Company, which withdraws water directly from Codorus Creek at Mill Dam in Spring Grove. Lake Marburg continues to be maintained as a cooperative project by the Commonwealth of Pennsylvania and the P. H. Glatfelter Company for recreation and low-flow augmentation. Codorus Creek drains approximately 194.3 km^2 (75 mi^2) at Spring Grove. Because historic stream flows during drought periods were not sufficient to satisfy water demands, the P. H. Glatfelter Company constructed two small impoundments to augment its water supply source: Lake Lehman, a 120 million gallon reservoir constructed in 1942, and Lake Pahagaco, a 1.3 billion gallon reservoir built in 1955. However, each lake's small drainage area of 6.5 km^2 (2.5 mi^2) was better suited for emergency use, rather than normal use. Consequently, the 15.8 billion gallon Lake Marburg was constructed in the late 1960's to meet the company's water requirements.

Lake Marburg has a surface area of 1,275 acres (520.4 hectare), 41.8 km (26 mi) of shoreline, and a normal maximum elevation of 189.9 m (623 ft). The agreement executed between the P. H. Glatfelter Company and the Commonwealth of Pennsylvania established a minimum elevation of 182.9 m (600 ft). The lake was designed and constructed to provide an average daily inflow to the mill pond of 50 cubic feet per second (cfs) [32.5 million gallons per day (mgd)]. Its drainage area equals 62.9 km^2 (24.3 mi^2). The P. H. Glatfelter Company constructed and maintains a diversion dam and pumping station on ***Codorus Creek*** immediately upstream of the confluence with the West Branch. The pumping station consists of five pumps and pumps up to 50 cfs (32.4 mgd) to the lake to maintain water elevations ***so*** that P. H. Glatfelter Company's water supply needs are met. **W**ater is pumped by P. H. Glatfelter Company from the diversion dam to Lake Marburg ***while maintaining at least 3.7 cfs (2.4 mgd) flow by the diversion dam.*** The diversion dam has a drainage area of approximately 40.2 km^2 (15.5 mi^2). The combined drainage area of Lake Marburg and the diversion dam and pumping station equals 103.1 km^2 (39.8 mi^2) *(ERM, 1994a).*

Codorus Creek Flow Characteristics

The ***United States*** Geological Survey (USGS) monitors stream flow in Codorus Creek at Spring Grove (Station 5745) and York (Station 5755). The Spring Grove gaging station is nearest to the proposed facility site. The flow record for Codorus Creek can be divided into two periods: pre- and post-Lake Marburg. Prior to the completion of Lake Marburg in 1970, the average annual flow at the Spring Grove gaging station, ***including the discharge from the P. H. Glatfelter Company,*** was approximately 88 cfs (57 mgd); and the average annual flow at the York gaging station was 247 cfs (160 mgd).

Stream flow is often described in terms of ***the*** average annual flow and ***the*** Q_{7-10}. ***The Q_{7-10} flow is the "estimated lowest seven consecutive-day average flow that occurs once in ten years for a stream with unregulated flow or the estimated minimum flow for a stream with regulated flow" (25 Pennsylvania Code § 93.1).*** The Q_{7-10} value generally represents drought conditions and is the stream flow rate used by the Commonwealth of Pennsylvania in establishing limits for regulating wastewater discharges and for determining the assimilative capacity of receiving waters. Prior to completion of Lake Marburg in 1970, the Q_{7-10} flow at Spring Grove, ***including the discharge from the P. H. Glatfelter Company,*** was 7.4 cfs (4.8 mgd) *(Page and Shaw, 1977)* and the Q_{7-10} flow at the York gaging station was approximately 15 cfs (9.7 mgd).

Because of the P. H. Glatfelter Company's ability to regulate flows from Lake Marburg, a ***natural*** Q_{7-10} flow no longer can be measured for Codorus Creek. Since 1970, flow augmentation from Lake Marburg has resulted in consistently higher Codorus Creek low-flows; ***minimum*** flows have averaged 23.0 cfs (14.9 mgd) for the Spring Grove Station ***(which includes the P. H. Glatfelter Company's discharge)*** and 40.5 cfs (26.2 mgd) for the York Station. Since 1970, average annual flow at the Spring Grove gaging station has been 88 cfs (57 mgd), ranging from a low of 45 cfs (29 mgd) in 1981 to a high of 160 cfs (103 mgd) in 1972. Average flow at the York gaging station has been 250 cfs (161 mgd) since 1970. These data provide the most recently available low-flow data and were developed using a Log-Pearson Type III duration-frequency analysis, the same statistical procedure used by PADER and the USGS to develop Q_{7-10} flows.

Average annual discharge data from 1970 to late 1990 for Spring Grove Station 5745 [drainage area of 195.5 km^2 (75.5 mi^2)] and York Station 5755 [drainage area of 575 km^2 (222 mi^2)] are presented in Figures 3.1-6 and 3.1-7. Average monthly discharge data for both of these stations are presented in Table 3.1-7. (It should be noted that, even though the Spring Grove gaging station is located upstream

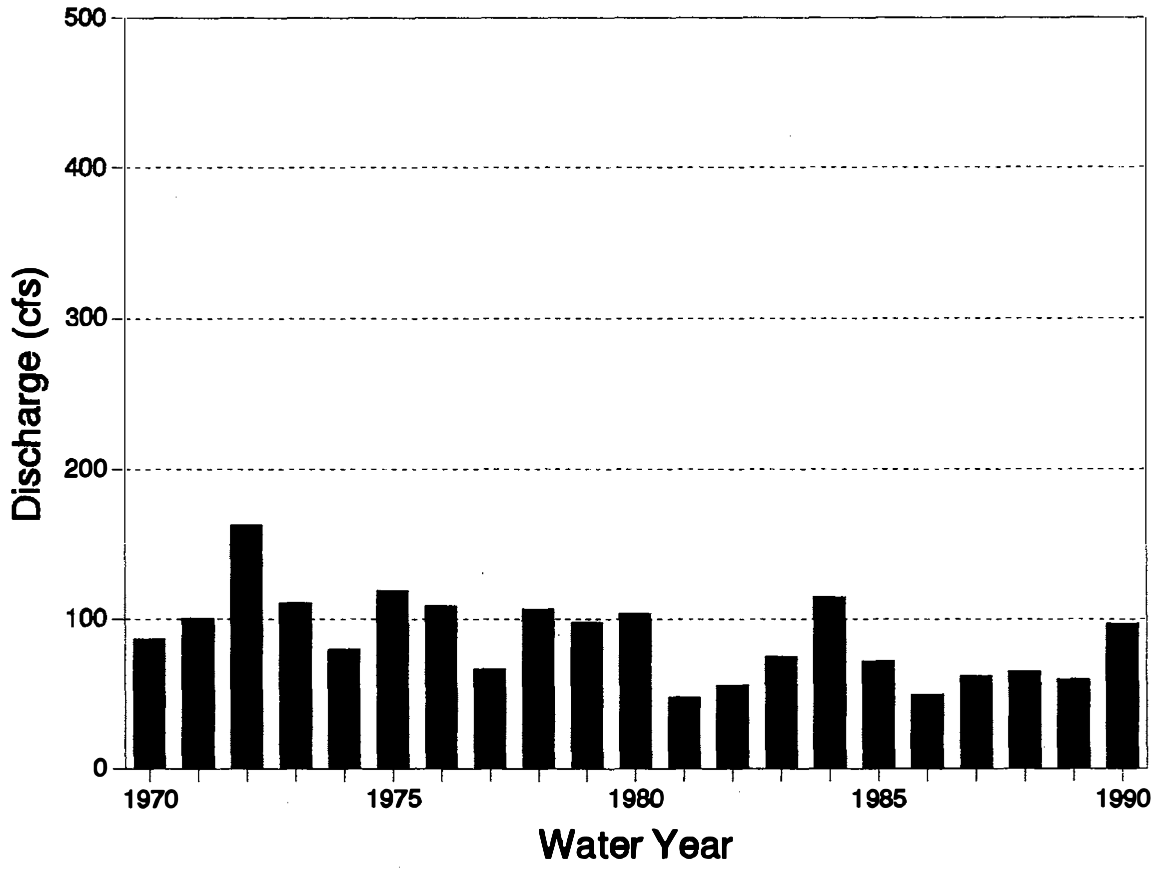

Figure 3.1-6. Average annual discharge of Codorus Creek at the Spring Grove USGS gaging station.

from the P. H. Glatfelter Company discharge, the flow data are corrected to include P. H. Glatfelter Company discharge flow). Daily flows in excess of 125 cfs (80.7 mgd) are characteristic for the Spring Grove station during the spring, and daily flows of 50 to 70 cfs (32 to 45 mgd) are typical of summer and early fall.

Precipitation in the watershed averages 97.1 cm/year (38.2 inches/year), with a high of 152.4 cm/yr (60 inches/year) and a low of 76.2 cm/year (30 inches/year). Precipitation is typically well distributed throughout the year with a low of 6.9 cm/year (2.7 inches) in February and a high of 9.7 cm/year (3.8 inches) in May.

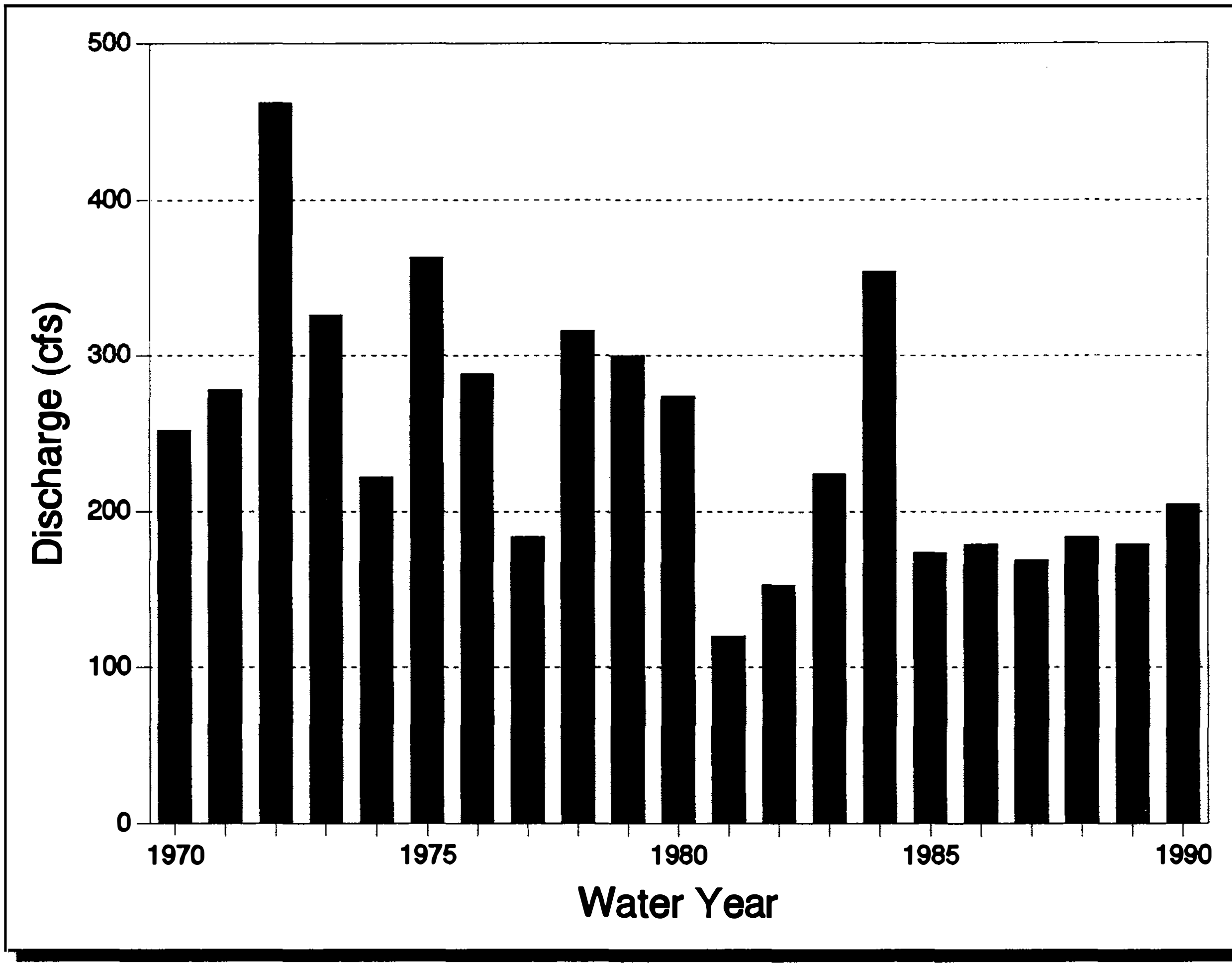

Figure 3.1-7. Average annual discharge of Codorus Creek at the York USGS gaging station.

Codorus Creek Water Quality

PADER classifies Codorus Creek as a priority waterbody (PWB). PWBs include watersheds having public water supplies, evidence of fish and aquatic life toxicity, and major National Pollutant Discharge Elimination System (NPDES) permit dischargers. PADER also has designated the main stem of Codorus Creek from its confluence with Oil Creek downstream to the Susquehanna River for use as a warm water fishery (WWF). Upstream of its confluence with Oil Creek to its confluence with West Branch Codorus Creek, PADER has designated Codorus Creek as a cold water fishery (CWF), because cold water is released from Lake Marburg. Codorus Creek has been the subject of several water quality studies over the past 20 years. Historic data suggest that water quality ***in the main stem*** of Codorus Creek, ***from its confluence with Oil Creek to the Susquehanna River,*** has been ***severely*** degraded by municipal and

Table 3.1-7. Average monthly discharge data for the Spring Grove and York gaging stations.

Month	Spring Grove[a] Station 5745 (cfs)	York Station 5755 (cfs)
January	89	279
February	114	366
March	112	346
April	129	403
May	100	306
June	105	285
July	70	171
August	57	114
September	70	159
October	70	167
November	64	165
December	79	245
ANNUAL	88	250

[a]Spring Grove USGS gaging data includes the P. H. Glatfelter Company's secondary treatment plant effluent flow. This flow is a monthly average of 19.3 cfs (12.5 mgd).

Source: USGS gaging data from 1/1/70 through 9/30/90.

industrial point source discharges, as well as by agricultural runoff. Degraded water quality under low-flow conditions has occurred from high concentrations of nutrients, heavy metals, dissolved solids, and organic ***compounds***. Point source sampling has indicated a relationship between metal concentrations in the stream and point source discharges. According to PADER and ***the*** Susquehanna River Basin Commission (SRBC) studies, the water quality of Codorus Creek has shown improvement over the last 20 years as a result of upgraded municipal and industrial treatment facilities, as well as from low-flow augmentation from reservoirs such as Lake Marburg (***see Table 3.1-8 for summaries of selected recent studies***).

Table 3.1-8. Summary of Codorus Creek water quality studies.

Report Title	Author	Major Points	Date
Codorus Creek Water Quality Investigation Report	EPA Region III	Summary of all information indicates conditions of gross pollution from municipal and industrial sources. Agricultural runoff contributes to pollution.	March 1972
Second Assessment of the Water Quality of Streams in the Susquehanna River Basin	SRBC/Rudisill	Clean water upstream of the P. H. Glatfelter Company and degraded water quality and benthic community dominated by pollution tolerant forms downstream of the P. H. Glatfelter Company.	1979
Priority Water Body Survey Report Water Quality Standards Review - Codorus Creek	PADER	Instream physical characteristics are generally good; benthic community dominated by tolerant species and a good warm water fishery. Some improvement over past studies is noted.	September 1985
Codorus Creek TMDL/WLA Report - York County	PADER	Parameters of concern based on design flow conditions in Codorus Creek were a suite of metals, chloroform, phenolics and several organic pollutants from multiple sources, but screening results indicated that all but phenols and chloroform conform to water quality standards after mixing with receiving waters.	February 1990
Codorus Creek Priority Water Body Survey Report - Water Quality Standards Review	SRBC/Edwards	DO concentrations meet water quality standards at all stations. Most water quality parameters are in compliance. Copper and lead were elevated but are attributed to unknown sources. Stream shows marked and steady improvement mainly because of improvements to wastewater treatment and mixing of high quality water from tributaries.	January 1991

The most recent water survey was conducted during August and September of 1990 by the SRBC Resource Quality Management and Protection Division (*SRBC, 1991a*). ***SRBC measured 10 water quality parameters at 12 sample sites on Codorus Creek. Three sites were sampled twice.*** Samples were also obtained from major industrial and municipal point source discharges. Samples were analyzed in the field for temperature, dissolved oxygen, specific conductivity, and pH. Laboratory analyses were performed for cyanide, alkalinity, hardness, total copper, total lead, and total zinc ***to investigate***

previously identified (PADER, 1990) parameters of concern. Water quality criteria do not exist for two of these parameters (specific conductivity and total hardness). However, these parameters are general indicators of water quality and overall trends. Of the eight parameters for which water quality criteria currently exist, six (dissolved oxygen, pH, temperature, alkalinity, free cyanide, and zinc) met applicable water quality standards at all locations. Exceedances were found for the other two parameters (lead and copper) at two sample sites downstream from York.

Exceedances of EPA's chronic fish health criteria (continuous concentration) ***were found for copper*** (maximum of 28.5 µg/L) at RM 5.03 and lead (maximum of 21.2 µg/L) at RM 6.*6* (*SRBC, 1991a*). The proposed facility would be located at RM 2*4.5 **(according to SRBC, 1991a)***. These exceedances were all observed ***approximately 28 km (18 mi)*** downstream of the P. H. Glatfelter Company NPDES-permitted outfall, with ***at least six*** other permitted ***dischargers*** between the P. H. Glatfelter Company outfall and the monitoring stations where the exceedances occurred ***(see Figure D-2 in Appendix D of Volume III in this FEIS)***. These data represent a single monitoring event and are not adequate to allow determination of the frequency and duration of the exceedances.

The high levels of copper and lead were <u>total</u> metal concentrations. Studies by Nebeker, et al. (1986) have demonstrated that it is not the total concentration of metals present that is responsible for adverse impacts. Metal toxicity is greatly influenced by water quality characteristics, especially pH, hardness, alkalinity, total dissolved solids (TDS), and total organic carbon (TOC) (EPA, 1985e; McGrady and Chapman, 1979). High hardness and suspended or dissolved particulates in receiving waters provide binding sites for metal ions, decreasing toxic effects of copper, lead, and other metals. Chapman (1985) and McCrady and Chapman (1979) document the ability of aquatic communities to "acclimate" to chronic metal concentrations without adverse effects on survival or reproducing populations.

Water quality data from the SRBC (1991a) study are presented in Table 3.1-9 for two sample sites upstream of P. H. Glatfelter Company's effluent discharge and for four sample sites downstream of the discharge. These six monitoring sites are the monitoring sites closest (in the SRBC study) to the P. H. Glatfelter Company, providing representative in-stream water quality data within the vicinity of the proposed facility. These measurements were taken during a period of below average flow (compare flow rates in Table 3.1-9 with the average flow at Spring Grove gage, 88 cfs, and the average flow at York gage, 250 cfs). The data illustrate the degree and trend of water quality degradation downstream of P. H. Glatfelter Company's discharge prior to Pulp Mill modernization. For example, conductivity (related to the concentration and charge of ions) increases sharply from 260 µmhos/cm upstream of

the P. H. Glatfelter Company outfall to 1,100 μmhos/cm downstream of the outfall; and hardness increases from 78 mg/L to 224 mg/L. At the stream flow rates occurring during the period of sampling, the applicable standards for each of the parameters were met at all six sample sites shown in Table 3.1-9. For information on water quality at a site upstream of the P. H. Glatfelter Company's discharge point, please see Table 3.1-10.

Although Table 3.1-9 illustrates the trends in water quality in the vicinity of the proposed project site, it fails to present all the water quality issues. The major issues relate to suspended solids (i.e., organics), temperature, dissolved oxygen, color, chloride, cyanide, total dissolved solids, phenolics, chloroform, and odor. The following paragraphs discuss some of the major issues and describe conditions in Codorus Creek as they have existed since 1986. Those issues that are not discussed below are briefly discussed in the Table of Exceedances of Environmental Regulations and Guidelines (Table 9-4). The P. H. Glatfelter Company's Pulp Mill (and wastewater treatment) Modernization Project should improve in-stream water quality below its outfall.

PADER (1989) reported a high stream loading of organic matter, which was labeled "suspended solids," downstream of the P. H. Glatfelter Company's outfall. Solids settled on the stream bottom in places free from scour, such as pools and between cobbles. Based on the results of their investigation, PADER drew the following conclusions:

> *The constant loading has resulted in severe physical degradation of the streambed and limits colonization by both macroinvertebrates and periphyton. The filling in of the interstitial areas of the substrate (hyporheic zone) severely decreases the total area available for colonization by macroinvertebrates. Furthermore, if the material has any oxygen demand associated with it, the substrate becomes even more uninhabitable. Not only is the hyporheic zone important as a nursery area for early instars of macroinvertebrates but it also serves as a refugia for developing fish eggs and fish larvae. (p. 10).*

PADER (1995) now believes this material is a combination of dead bacterial growths and flocculent material from the discharge. A report prepared by Dames and Moore (Hatcher, 1975), concluded that "[t]he exact nature of this sediment is not known, but at least part of it was probably dead and detached Sphaerotilus mats." Large Sphaerotilus mats, which are masses or clumps of bacteria and trapped solids, were observed growing at Martin Road bridge, and smaller mats were observed at other sites. The growth of these bacterial mats were attributed to favorable conditions of warm organically enriched water (Hatcher, 1975). PADER (1989, 1995) noted that the continuous deposition of this *material on the substrate restricted periphyton growth in addition to impeding macroinfaunal colonization.*

In a 1988 investigation, PADER (1989) found that the number of taxa found in sample sites downstream of the P. H. Glatfelter Company's discharge were about half the number found in clean-water upstream sites and included worms and other species that indicated organic overloading. PADER recommended that P. H. Glatfelter Company reduce its loading of organics and heat.

According to PADER (1989), thermal loading occurs both at the mill pond and at the P. H. Glatfelter Company's wastewater outfall. Water released from the mill pond is warmer than stream water further upstream as a result of cooling water discharges from the P. H. Glatfelter Company and from natural processes (i.e., solar absorption). During the cooler months, the warm water flows over the pond surface, due to density differences, and continues downstream. Increased water temperatures in the cooler months could affect egg and juvenile development in the mill pond and immediately downstream. In the warmer months, more algae is produced in the pond, leading to an altered community dominated by filter feeders immediately downstream.

Seasonal temperature variations have not been assessed. PADER (1987) found a 6°C (11°F) temperature change between sample sites (4 and 5) above and below the mill pond when measurements were made in October of 1986; the SRBC (1991a) data suggest a similar increase when they measured temperatures in August of 1990.

Downstream from the P. H. Glatfelter Company's wastewater outfall, water temperature increases again from the wastewater discharge. ENSR (1994) reports a current average temperature at low-flow during the summer of 27°C (81°F) and a current average temperature during the winter of 14°C (57°F) for a monitoring point downstream from the outfall. These average wintertime temperatures are 9°C (17°F) higher than the maximum in-stream (i.e., in Codorus Creek as opposed to the discharge) temperatures allowed from thermal discharges into a warm-water fishery in Pennsylvania during January and February (maximum permitted temperature = 40°F). The SRBC (1991a) found a 4.5°C (8.1°F) temperature increase between upstream and downstream sample points when measured during August of 1990. The PADER (1989) survey found that temperature increased between upstream and downstream sample sites by 3.1°C, 1.5°C, and 3.1°C when measurements were made during April, May, and June, respectively, of 1988. PADER (1987) found a 5°C (9°F) increase on measurements taken in October of 1986. The greatest deviation from the normal in-stream temperatures occurs *during the cooler months. The possible consequences for the aquatic community include impaired life cycles of some species, as described above for the mill pond. PADER (1995) contends that the thermal loading has rendered miles of Codorus Creek uninhabitable for many species of macroinfauna.*

As a result of the thermal and organic loading, Codorus Creek downstream of the P. H. Glatfelter Company holds less dissolved oxygen (see SRBC, 1991a; PADER, 1989; PADER, 1987). Immediately downstream from the outfall, dissolved oxygen concentrations are frequently in the range of 5 to 7 mg/L. While these concentrations are within the Pennsylvania water quality criteria (5.0 mg/L for the minimum daily average, 4.0 mg/L minimum), dissolved oxygen concentrations are below the concentrations observed upstream of Spring Grove (7.8 to 10.8 mg/L). PADER (1987) reports a downstream dissolved oxygen concentration of only 4.8 mg/L at one of their sample sites. For several miles downstream from the P. H. Glatfelter Company's outfall, dissolved oxygen may become critically low, especially for benthic fauna, during summer low-flow periods (PADER, 1989).

The P. H. Glatfelter Company's effluent makes the water in Codorus Creek a tea-brown color, impairing the aesthetic value and perhaps the primary productivity of the creek. Water color in Codorus Creek resulting from waste discharges is regulated in Pennsylvania under 25 Pa. Code § 93 (protection of recreational uses). The water quality criterion is listed as "maximum 50 units on the platinum-cobalt scale; no other colors perceptible to the human eye." No color criterion for the protection of aquatic life has been promulgated for any surface waters in Pennsylvania.

The P. H. Glatfelter Company entered into a consent agreement with PADER that allows in-stream color, measured at a specified downstream monitoring point, up to the following limits (as of July 1, 1994): (1) the limit not to be exceeded is 375 color units; (2) the monthly average limit is 225 color units; and (3) the annual average limit is 200 color units. The P. H. Glatfelter Company is required to submit to PADER every two years a report on technological advances that might reduce the color impact of their effluent.

On three different occasions during 1988, PADER (1989) measured water color at three sites near the P. H. Glatfelter Company's outfall. Upstream colors ranged from fewer than 5 color units to 40 color units. Downstream color on the three dates of measurement were 320, 140, and 200 color units. According to R. Callahan (P. H. Glatfelter Company, personal communication), upstream color usually averages 30 to 50 color units, while downstream color, prior to the Pulp Mill Modernization Project, averaged around 220 color units. However, as a result of the Pulp Mill Modernization Project, the

P. H. Glatfelter Company achieved reductions in the color-producing tannins and lignins in its wastewater effluent. After modernization, downstream color has averaged 150 to 160 color units (R. Callahan, P. H. Glatfelter Company, personal communication).

Prior to modernization of the pulp mill, color was thought to reduce primary productivity in Codorus Creek (PADER, 1989; EA Inc., 1989; Environ, 1994a). PADER (1989) found an 11-fold decrease in chlorophyll-A production at a site located 1.2 miles downstream of the discharge. PADER (1989, 1995) maintains that the color reduced the penetration of light, causing a loss of photosynthetic activity and, consequently, a reduction in food supply for the macroinfaunal community. The Pulp Mill Modernization Project is expected to improve primary productivity, although the degree of improvement remains undetermined.

The P. H. Glatfelter Company adds a substantial chloride load to Codorus Creek. PADER (1989) measured chloride concentrations in April, May, and June of 1988 at three sample sites near the P. H. Glatfelter Company's outfall. Concentrations ranged from 14 to 23 mg/L at two sites upstream from the P. H. Glatfelter Company's outfall. Downstream, the concentrations ranged from 124 to 395 mg/L. PADER did not report the stream flow for these measurements. According to ENSR (1994), concentrations immediately downstream averaged 379 mg/L at average annual low-flow and 319 mg/L at average flow prior to the Pulp Mill Modernization Project. After pulp mill modernization, ENSR (1994) predicted concentrations immediately downstream would average 223 mg/L at low-flow and 191 mg/L at average flow. At minimum flow (21 cfs), concentrations after pulp mill modernization should be around 311 mg/L. These concentrations approach or exceed the EPA's ambient water quality criteria of 230 mg/L (EPA, 1991) for chronic exposure of aquatic life to chloride. Environ (1994a) claims, however, that the EPA's criteria for the protection of fish and aquatic life are highly conservative because they are based in part on sensitive cold water species and because the chronic maximum acceptable toxicant concentrations for the species tested are greater than the EPA's chronic exposure limit by a factor of at least 1.6.

During past episodes of minimum flow, chloride concentrations may have exceeded EPA's acute exposure criterion for aquatic organisms. Based on typical background concentrations and typical chloride loadings by the P. H. Glatfelter Company, DOE calculates minimum flow (21 cfs) concentrations would have been on the order of 600 to 1,000 mg/L. Thus, concentrations could have exceeded the EPA's (1991) acute exposure criterion of 860 mg/L (as cited in Environ, 1994a).

Odor arises from Codorus Creek downstream of P. H. Glatfelter Company's outfall most probably as a result of the decay of organic matter. The odor is not harmful but is objectionable. The possibility of methyl mercaptan, chloroform, and sulfides being discharged from the P. H. Glatfelter Company in sufficient concentrations to cause odor was considered, but this was dismissed based on reviews of available information and the solubilities of expected odor-causing compounds that would be expected in P. H. Glatfelter Company wastewater (see Section 3.1.2).

The odor is not the typical "sulfurous" odor associated with most paper mills. According to an investigation by Dames and Moore (Hatcher, 1975), the odor is described as a "musty" or "rotten cabbage" smell. The report claims that odors of this type come from a group of bacteria called actinomycetes and a type of blue-green algae (Symploca muscorum). Both groups of organisms are associated with high concentrations of organic matter, and the algae is associated with warm water. These organisms are known to produce a compound call geosmin (trans-1,10,-dimethyl-trans-9-decanol), which creates the odor described above. Geosmin is sensed by humans in low concentrations and is water soluble, so it can be carried long distances from its source.

Samples of actinomycetes from several locations on Codorus Creek were cultured. The test demonstrated higher numbers (by a factor of 2.5 to 8.5) of actinomycetes downstream of the P. H. Glatfelter Company's outfall, with a decrease in numbers below the confluence with South Branch. No effort was made to find and sample the blue-green algae, so its role in the odor production was undetermined. The author believed the odor of Codorus Creek comes from actinomycetes, which feed on the lignins, tannins, and cellulose discharged in the wastewater of P. H. Glatfelter Company.

Recent wastewater treatment modifications aimed at lowering the concentrations of tannins and lignins (color producing agents) in the P. H. Glatfelter Company's wastewater should reduce this odor problem on Codorus Creek.

Regarding the issue of dioxin levels in Codorus Creek, P. H. Glatfelter Company has tested its effluent numerous times for the presence of dioxin at the request of the EPA and PADER. Dioxin has never been detected in P. H. Glatfelter Company's effluent (at detection limits as low as 4 parts per quadrillion) *(YCEP, 1994a)*. Dioxins, a family of 72 chlorinated compounds, are produced by the manufacture of pesticides and industrial products ***(such as chlorine bleaching of wood pulp)***, motor vehicles, incinerators, forest fires, and residential wood-burning. The most toxic of these dioxin compounds have caused cancer, liver damage, and birth defects in laboratory animals.

Table 3.1-9. ***Recent* Codorus Creek water quality *data from sample sites near the proposed project.***

Parameter[a]	Applicable Standard[b]	RM 27.70 (CWF)[1]	RM 24.60 (WWF)[2]	RM 21.50 (WWF)[3]	RM 18.57 (WWF)[4]	RM 13.27 (WWF)[5]	RM *11.90* (WWF)[6]
Sample Date	***NA***	***8-28-90***	***8-28-90***	***8-28-90***	***8-29-90***	***9-5-90***	***9-5-90***
Dissolved Oxygen (mg/L)	CWF: 5.0 WWF: 4.0	9.5	7.3	6.3	6.4	7.6	***8.9***
Conductivity (μmhos/cm)	NA	168	260	1100	1060	890	***950***
pH (standard units)	6.0 - 9.0	8.1	8.1	7.7	7.6	7.9	***8.0***
Alkalinity (mg/L)	≥ 20.0	44	74	98	106	100	***100***
Hardness (mg/L)	NA	57	78	224	223	199	***197***
Total Copper (μg/L)	21.4	<4.0	9.0	11.3	10.0	7.1	***6.6***
Total Lead (μg/L)	7.7	<1.5	1.9	4.0	3.6	<1.5	***1.9***
Total Zinc (μg/L)	191	<5.0	14.0	21.6	16.8	7.0	***5.7***
Free Cyanide (μg/L)	5.0	<1.0	<1.0	1.0	1.0	<1.0	1.0
Flow Rates (cfs)	***NA***	***42.2***	***35.7***	***70.1***	***46.8***	***79.1***	***76.1***

Notes:

RM River Mile
CWF Cold Water Fishery
WWF Warm Water Fishery
NA Not Applicable

[a] Each stream sample consisted of a composite of 4 to 6, depth-integrated samples collected across the stream sections.

[b] Pennsylvania Water Quality Standards (based on a hardness value of 200 mg/L for metals).

Source: SRBC, 1991a.

Locations:

[1] Upstream of Oil Creek
[2] Upstream of P. H. Glatfelter Company outfall
[3] Downstream of P. H. Glatfelter Company outfall
[4] Downstream of P. H. Glatfelter Company outfall, Route 616 near Graybill
[5] Downstream of P. H. Glatfelter Company outfall, at USGS Gage West York
[6] Downstream of P. H. Glatfelter Company outfall, ***near York***

The P. H. Glatfelter Company facility is one of several major water users and wastewater dischargers that affect water quality in Codorus Creek. Figures D-1 and D-2 (Appendix D, ***Volume III***) show four other major water users and eight other wastewater dischargers. One major water user and one major discharger are located upstream from the P. H. Glatfelter Company discharge point. The major wastewater discharger located upstream from the P. H. Glatfelter Company facility is the Penn Township sanitary treatment plant on Oil Creek (Figure D-2, Appendix D). It is expected that this facility ***also*** reduces the water quality of Codorus Creek in the vicinity of the P. H. Glatfelter Company facility. The city of Hanover, the town of Spring Grove, communities, farms, homes, and the acts of individuals within the watershed also affect water quality in Codorus Creek.

Table 3.1-10. Summary of instream Codorus Creek water quality above the mill pond.

Parameter	Applicable Standard	Above P. H. Glatfelter Company Intake
Total Dissolved Solids (mg/L)	500	200
Chloride (mg/L)	***230***	42
Sulfate (mg/L)	250	39
Calcium (mg/L)	NA	26
Sodium (mg/L)	NA	21
BOD (mg/L)	NA	0
COD (mg/L)	NA	0
Temperature-Average Summer (°F)	83	70
Temperature-Average Winter (°F)	42	42

Note: Sample station above the P. H. Glatfelter Company outfall but not necessarily at RM 24.6.

Source: EPA, 1972; PADER 1985, 1990; SRBC 1991a.

Water Use and Availability

A maximum allocation of 46.4 cfs (30 mgd), permitted by the Commonwealth of Pennsylvania in 1966, is available for use by the P. H. Glatfelter Company and the Spring Grove Water Company (Appendix H, ***Volume III***). However, the P. H. Glatfelter Company facility currently withdraws ***an average of 19.0 cfs (12.2 mgd), with*** an average weekly maximum of 23.2 cfs (15 mgd), from a surface water intake adjacent to the mill dam on Codorus Creek. To fulfill average daily water demands, the natural flow of ***Codorus Creek*** is augmented by three reservoirs controlled by the P. H. Glatfelter Company: (1) the 120 million gallon [10 acres (3.9 hectares)] Lake Lehman, built in 1942; (2) the 1.3 billion gallon [96 acres (39.1 hectares)] Lake Pahagaco, built in 1955; and (3) the 15.8 billion gallon [1,275 acres (520.4 hectares)] Lake Marburg, built in 1969. Lake Marburg, an impoundment of the West Branch of Codorus Creek, is located several miles east of Hanover and approximately 9.7 km (6 mi) southwest of Spring Grove. By the use of controlled releases at these reservoirs, a monthly average flow of 50.2 cfs (32.4 mgd) is maintained at the intake location. Lake Marburg was designed to provide a guaranteed 46.2 cfs (30 mgd) of flow, and a minimum streamflow of 3.8 cfs (2.4 mgd) past the facility intake, as well as to maintain a minimum lake elevation of 183 m (600 ft). The flows at Spring Grove originate from controlled, partially controlled, and uncontrolled resources. The controlled flow (approximately 33 percent of the total drainage area to Spring Grove) comes from the drainage area upstream of Lake Marburg and is stored by the dam until low-flow augmentation is necessary. Partially controlled flows (approximately 20 percent of the total area draining to Spring Grove) originate from the drainage area upstream of the diversion dam on Codorus Creek. Water from this area can be diverted to Lake Marburg at a rate of 50 cfs (32.4 mgd) if storage is available and ***if*** a minimum downstream flow ***of 3.7 cfs (2.4 mgd)*** is maintained ***at the diversion dam on Codorus Creek***; however, the flow is unregulated when the pumping station is not in use. Uncontrolled flows (approximately 47 percent of the total area draining to Spring Grove) originate from the drainage area between the diversion dam and Spring Grove. The water from this area flows naturally ***into*** Codorus Creek.

Make-up water for the P. H. Glatfelter Company is withdrawn from the mill pond, chemically treated, clarified, filtered, and disinfected for facility use. In addition, the mill pond acts as a secondary water withdrawal source and water treatment site for the Spring Grove municipal distribution system. Kessler Pond serves as the primary water supply for the Spring Grove Water Company.

Following the use of make-up water and reuse and recycling of internal waste streams, the P. H. Glatfelter Company mill effluent is treated for discharge to Codorus Creek. Effluent is treated with primary clarifiers, aerated equalization, activated sludge, and secondary clarification. Sludge from the primary and secondary clarifiers is processed through a gravity thickener and dewatered. The residual sludge is either composted, landfilled, ***or incinerated (permit pending) in P. H. Glatfelter Power Boiler No. 5.*** Treated effluent is discharged through an outfall to Codorus Creek. The P. H. Glatfelter Company discharges approximately 83 percent of the original ***23.2 cfs (***15 mgd***) average weekly maximum*** withdrawal back into Codorus Creek. The remaining ***17*** percent of its original withdrawal is lost through evaporation, plant process requirements, and losses in the water supply distribution and wastewater collection system (e.g., residential discharges to septic tanks instead of the sewer system) *(ERM, 1994a)*.

In 1993, approval for a requested increase in industrial consumptive use of water was granted to the P. H. Glatfelter Company by the Susquehanna River Basin Commission, which stated that the proposed mill modernization project would not conflict with the Comprehensive Plan, and would not adversely influence present or planned uses of the water resources of the basin. Approval was granted with the requirement that the P. H. Glatfelter Company must maintain a minimum flow of 7.62 cfs (4.93 mgd) over the mill dam *(ERM, 1994a)*.

Stormwater from the existing site drains to two primary areas. Stormwater from the majority of the site drains into an existing sediment/stormwater management basin that currently services the P. H. Glatfelter Company Roundwood Facility located adjacent to the proposed site. The total drainage area for this basin is approximately 55.8 acres (22.6 hectares). The remainder of the stormwater drains in a northeasterly direction to the Kessler Pond and the mill pond, ***for*** a combined drainage area of approximately 12 acres (4.8 hectare). The water is ultimately released to Codorus Creek *(ENSR, 1994)*.

3.1.4.2 Groundwater

Groundwater yield for bedrock aquifers in the proposed site area ***is*** inadequate to meet large (i.e., industrial, municipal) needs. The highest reported well yield in York County is 250 gallons per minute (gpm) in a Dover township well. There are no wells in the Spring Grove area that approach this quantity *(Young, 1994)*. The Kinzer formation has a maximum reported yield of 111 gpm. Based on specific capacity data, it is rated as inadequate for large supplies. The Harper Formation is reported to yield 1 to 100 gpm with an average yield of 10 gpm *(ENSR, 1994)*. Because of the relatively low yields of bedrock aquifers, groundwater development in the Spring Grove area is limited to domestic and relatively small scale municipal and industrial withdrawals. The bulk of water use in the region is obtained from surface water intakes. Domestic use in the vicinity of the site is divided into surface water use north of the site in Spring Grove and private wells south and east of the site. The area south and east of the site has a relatively low population density and available data indicate that there are fewer than 50 private wells in a 1.6 km (1 mi) radius. In addition, these wells are upgradient of the proposed site.

On-site testing revealed that groundwater is present beneath the proposed facility site in unconsolidated overburden sediments over bedrock. Groundwater is present from depths of 3.1 to 4.6 m (10 to 15 ft) below the surface. Groundwater also occurs in bedrock units beneath the site. The yield of these units, as indicated by the hydrogeology of the area, is expected to be relatively low. Groundwater generally flows from south to north, bending along site boundaries, toward Codorus Creek and Kessler Pond. Groundwater recharge to the overburden probably occurs in the upland area south of the proposed site, with discharge occurring in Codorus Creek and Kessler Pond. The groundwater recharge rate for carbonate rocks of the upland recharge area is estimated to be 350 gallons per minute per square mile. Withdrawals in excess of the recharge rate could cause a progressive lowering of water levels and reduce the flow of streams *(ENSR, 1994)*.

In the five municipalities surrounding the proposed site: Heidelberg, Jackson, North Codorus, West Manchester and Spring Grove, approximately 15,000 people, slightly less than half the population, rely on groundwater for domestic use *(Young, 1994)*. While some of this population is served by public water authorities that rely on groundwater (e.g., West Manchester Township Authority, Heidelberg Township Municipal Authority, Jackson Township Water District), the majority of users rely on private wells.

The two industrial users of water in the area are the P. H. Glatfelter Company pulp mill in Spring Grove and Bowen-McGlaughlin-York (BMY) in North Codorus. The P. H. Glatfelter Company, which receives its water supply from surface water, withdraws 15 mgd and delivers 0.25 mgd to Spring Grove, which also receives 0.0288 mgd of groundwater *(SRBC, 1991b)*. BMY uses groundwater for 66 percent of its water needs, withdrawing 0.045 mgd from its wells; surface water supplies the remaining water needs *(SRBC, 1991b)*. York Water Company, a municipal water supplier, and the largest supplier of public water in the area, relies solely on surface water for its water needs. Daily water use data from PADER State Water Plan Division, indicate peak water withdrawal rates from underground sources or springs do not exceed 0.1 mgd (100,000 gpd) from any single source in the basin; fewer than fifty percent of the wells reported have a withdrawal in excess of 0.01 mgd (*ENSR, 1994*).

YCEP installed five monitoring wells on the proposed project site, and tested groundwater samples collected from these wells (Table 3.1-11). Laboratory analysis revealed trace levels (ranging from 11 to 18 parts per billion) of the herbicide 4-methyl-2-pentanone, MIBK, in three of the five wells. These three wells were upgradient from the two wells showing no trace of MIBK, indicating the possibility of contaminant migration from off-site sources. Historically, the project site has supported agricultural uses adjacent to and down-gradient from other intensive off-site agricultural activities. It is possible that herbicides associated with these past agricultural activities are the source of contaminants detected in groundwater samples. The small concentration of contaminants observed are well below the threshold

Table 3.1-11. Groundwater monitoring well data for the proposed Cogeneration Facility at the North Codorus Township site.

Parameter	Laboratory Detection Limits	Monitoring Well							Applicable Standards
		Up-Gradient MW-1	MW-2	MW-3	MW-3 (Dup)	Up-Gradient MW-4	Up-Gradient MW-5	TB-1	
pH (field)	NA	6.80	6.60	6.50	NA	5.70	6.10		NA
Specific Conductance (µmhos/cm)	NA	195	280	260	NA	95	110		NA
Temperature °C	NA	11	12	12	NA	14	12		NA
Major Cations (mg/L)									
Calcium	<0.2	34.9	51.0	44.5	46.3	5.9	8.6		NA
Magnesium	<0.1	4.8	9.6	9.8	9.8	3.5	4.3		NA
Sodium	<0.4	7.2	13.2	8.7	7.6	9.5	10.2		NA
Potassium	<0.5	1.8	1.0	1.1	1.3	1.8	4.1		NA
Iron	<0.1	<1.0	0.3	0.1	<0.1	<0.1	<0.1		0.3 mg/L
Manganese	<0.1	20	1.1	1.7	1.8	0.1	0.08		0.5 mg/L
Major Anions (mg/L)									
Ammonia Nitrogen	<1	<1	<1	<1	<1	<1	<1		NA
Bromide	<0.5	<0.5	<0.5	0.7	0.7	<0.5	<0.5		NA
Chloride	<1	10	8	10	10	10	10		250 mg/L
Fluoride	<0.1	<0.1	<0.1	1	<0.1	<0.1	<0.1		2.0 mg/L
Nitrate Nitrogen	<0.5	9	0.2	<0.5	<0.5	6.7	9.7		10 mg/L
Nitrite Nitrogen	<0.1	<0.1	1.1	<0.1	<0.1	0.9	<0.1		NA
Ortho-phosphate	<1	<1	<1	<1	<1	<1	<1		NA
Sulfate	<0.5	13	64	64	63	2.1	0.9		250 mg/L
Trace Constituents (µg/L)									
Aluminum	<200	<200	<200	<200	<200	<200	<200		NA
Antimony	<200	<200	<200	<200	<200	<200	<200		NA
Arsenic	<10	<10	<10	<10	<10	<10	<10		50 µg/L
Barium	<100	300	100	<100	<100	<100	700		1,000 µg/L
Beryllium	<10	<10	<10	<10	<10	<10	<10		NA
Cadmium	<10	<10	<10	<10	<10	<10	<10		10 µg/L
Chromium	<50	<50	<50	<50	<50	<50	<50		50 µg/L
Cobalt	<50	<50	<50	<50	<50	<50	<50		NA
Copper	<20	<20	<20	<20	<20	<20	<20		1,000 µg/L
Lead	<3	<3	<3	<3	<3	<3	<3		50 µg/L
Mercury	<0.2	<0.2	<0.2	0.7	0.7	<0.2	<0.2		2 µg/L
Nickel	<50	<50	<50	<50	<50	<50	<50		NA
Selenium	<3	<3	<3	<3	<3	<3	<3		10 µg/L
Silver	<20	40	<20	<20	<20	<20	<20		NA
Thallium	<10	<10	<10	<10	<10	<10	<10		NA
Vanadium	<10	<10	<10	<10	<10	<10	<10		NA
Zinc	<40	40	130	90	<40	<40	130		5,000 µg/L
Total Cyanide	<5	<5	<5	<5	<5	<5	<5		NA
Volatile Organics (µg/L)[a]									
4-Methyl-2-Pentanone	<10	11	<10	<10	<10	18	12	<10	NA
Toluene	<10	<10	<10	<10	<10	2	<10	2	NA
Semivolatile Organics (µg/L)[b]									
bis(2-Ethylhexyl) phthalate	<10	2 J	2 J	2 J	8 J	3 J	7 J	<10	NA

[a] Includes 33 EPA TCL volatile compounds; the two compounds listed were detected.
[b] Includes 64 EPA TCL semivolatile compounds; the compounds listed were detected.
J denotes that compound was detected at a concentration less than the detection limit. Value is an estimate.
NA Not Available.
Analysis conducted by Lancaster Laboratories, Inc., Lancaster, PA.
Source: YCEP collected data.

of concern indicated by EPA Maximum Contaminant Levels. Two other contaminants, toluene and bis (2-Ethylhexyl) phthalate (BEHP), were detected below the normal detection limit concentrations in samples from two of the wells. Both toluene and BEHP can be artifacts of laboratory analysis, and the concentrations detected are below regulatory limits of concern.

3.1.4.3 Floodplains

The major components of the proposed facility would be constructed outside of the 100- and 500-year floodplains. Small areas of the Codorus Creek 100-year floodplain would be unavoidably impacted by development in order to connect the proposed project with existing rail service and utility (electric) substation facilities, and to locate 12 to 20 pipe supports for the steam supply and condensate return pipelines spanning Codorus Creek. Additionally, segments of some service roads would fall within the 500-year floodplain of Codorus Creek. The floodplain area that would be affected by these proposed facilities is shown on Figures 3.1-8 and 4.1-3.

3.1.5 Biological Resources and Biodiversity

This section describes the aquatic and terrestrial environments potentially impacted by the project at the proposed site in North Codorus Township. Codorus Creek, the primary aquatic ecosystem in the area of the proposed project, is approximately 18.3 m (60 ft) wide in the section adjacent to the P. H. Glatfelter Company facility. The average annual flow rate as measured at the Spring Grove gaging station is 8*8* cfs (57 mgd) ***including effluent discharged from the P. H. Glatfelter Company***. The stream is made up of both riffles and pools, and has a gravel bottom substrate. The stream bank structure is stable in this area, and has approximately 85 percent stream shading. Land use in the area is 40 percent industrial, 30 percent woodland, and 30 percent agricultural *(Environ, 1994a)*. Land use at the proposed project site is primarily agricultural, although the terrestrial ecosystems in the area also include dredge spoils, hardwood forest, maintained land, residential land, and industrial land.

3.1.5.1 Aquatic Ecosystems

This section describes aquatic organisms and important aquatic habitats, primarily Codorus Creek, in the vicinity of the proposed site.

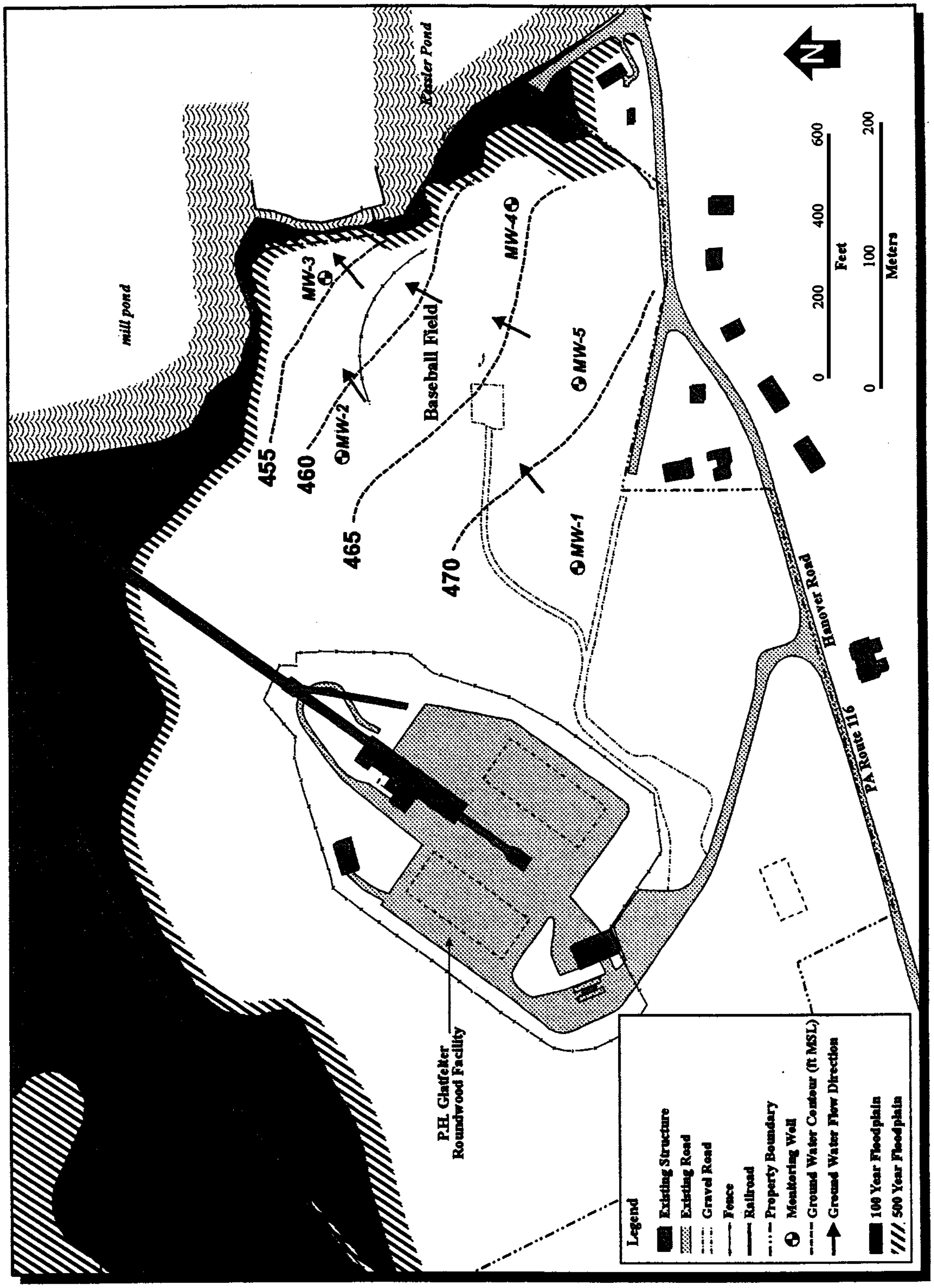

Figure 3.1-8. Locations of the 100- and 500-year floodplains.

Aquatic Organisms

Because benthic macroinvertebrates and fish are organisms having the potential for maximum exposure to physico-chemical parameters of aquatic ecosystems, they are good indicators of water quality. Consequently, it is assumed that water quality criteria designed to protect fish and benthic macroinvertebrates also protects semi-aquatic organisms such as amphibians, as well as some mammals, birds, and reptiles.

Benthic macroinvertebrate data are also useful for evaluating localized impacts to habitats because of their limited mobility and their range of sensitivities to environmental stressors. Benthic macroinvertebrate species that have been found in Codorus Creek in the vicinity of the P. H. Glatfelter Company facility include fishflies and dobsonflies (*Corydalidae*), mayflies (*Ephemeroptera*), caddisflies (*Trichoptera*), stoneflies (*Plecoptera*), flatworms (*Turbellaria*), earthworms and leaches (*Annelida*), sowbugs (*Isopoda*), scuds (*Amphipoda*), crayfish (*Decapoda*), damselflies and dragonflies (*Odonata*), beetles (*Coleoptera*), true flies (*Diptera*), snails and limpets (*Gastropoda*), and clams (*Pelecypoda*) *(PADER, 1987)*.

Two major benthic macroinvertebrate studies have been conducted on Codorus Creek in recent years - PADER *(1987)* and Denoncourt *(1985, 1987, 1989, 1990, and 1992)*; ***the two*** differed in the seasons in which the studies were conducted, as well as in their sample locations, and collection and identification methodologies. Consequently, the data from the two studies can not be combined ***for data analysis***, however, they can be used to characterize ***qualitative*** biological conditions in Codorus Creek.

PADER collected qualitative benthic macroinvertebrate data at 16 Codorus Creek stations in 1986. Sampling was conducted in riffle areas usually consisting of rubble and gravel substrates. Six sampling stations upstream and downstream of the P. H. Glatfelter Company were used to characterize Codorus Creek in the vicinity of the P. H. Glatfelter Company outfall. Four stations were located between RM 33.76 and a point 182.9 m (600 ft) downstream of the confluence of Codorus Creek and Oil Creek. These stations were located upstream of Spring Grove and the P. H. Glatfelter Company outfall. Benthic macroinvertebrate data collected at these stations showed the presence of pollution-sensitive organisms including fishflies and dobsonflies, mayflies, caddisflies, and stoneflies. The total number of taxa per station ranged from 17 to 22 *(Environ, 1994a)*.

One station, located at RM 25.11 [0.8 km (0.5 mi) downstream of Spring Grove [near York Road (Route 116)], but upstream of the P. H. Glatfelter Company outfall], exhibited fewer taxa (a total of six) compared to the other four stations upstream of the outfall. Most pollution-sensitive species such as fishflies, dobsonflies, mayflies, and stoneflies were not observed; one pollution-sensitive species, the caddisfly, was observed at this station. However, observations were rare compared to the abundance observed at other upstream stations *(Environ, 1994a)*.

One station, located at RM 23.89 (Township Road 448 bridge), approximately 2.0 km (1.25 mi) downstream of the P. H. Glatfelter Company outfall, had 16 taxa. No pollution-sensitive mayflies or stoneflies were observed, but ***elmid beetles*** and dobsonflies were reported in abundance, and caddisflies were reported as common in occurrence *(Environ, 1994a)*.

The PADER study concluded that the combination of industrial wastes, urban runoff, and treated sewage entering Codorus Creek at Spring Grove contributes to the deterioration of the biological community in the stream *(Environ, 1994a)*.

The Denoncourt benthic macroinvertebrate studies included quantitative data for each individual taxa observed, the number of taxa observed, and an analysis of organic stream pollution using Hilsenhoff's *(1987)* biotic index. Hilsenhoff's index assigns numeric values to benthic macroinvertebrate species on the basis of individual pollution tolerance. The pollution tolerance values range from one (1), indicating the most pollution-sensitive species, to ten (10), indicating the most pollution-tolerant species. These numeric values, along with abundance data for each species collected, are utilized to calculate the biotic index for a stream community. The biotic index values range from 1 to 10; lower biotic index values indicate a benthic community that is more sensitive to organic pollutants (representing higher water quality) and higher biotic index values indicate a more pollution-tolerant community (representing degraded water quality) *(Environ, 1994a)*. Denoncourt's *(1989, 1992)* interpretation of Hilsenhoff's Biotic Index (HBI) is presented below:

HBI = 3.51-4.50: Good water quality with the potential of slight organic pollution;

HBI = 4.51-5.50: Good water quality with some organic pollution;

HBI = 5.51-6.50: Fair water quality with fairly significant organic pollution; and

HBI = 6.51-7.50: Fairly poor water quality with significant organic pollution.

The Denoncourt data show a general trend towards improving water quality over the 8-year sampling period (1985-1992). In ***September*** 1988, ***24*** taxa were identified at a sampling station in Spring Grove [150 m (492 ft) downstream of the Route 116 bridge], ***25*** taxa were identified at a station upstream of the P. H. Glatfelter Company outfall [300 m (984 ft) upstream of the Hershey Road bridge], and ***23*** taxa were identified at a station immediately downstream of the P. H. Glatfelter Company outfall. The HBI values for these stations in 1988 were 6.***37***, 6.3***9***, and ***6.30***, respectively, indicating a fairly significant degree of organic pollution or fair water quality. In ***September*** 1992, 22 taxa were identified at the Spring Grove station, 22 taxa were identified at the station upstream of the P. H. Glatfelter Company outfall, and 24 taxa were identified at the station downstream of the P. H. Glatfelter Company outfall. The HBI values for these stations in 1992 were 4.35, 4.10, and 4.10, respectively, indicating good water quality *(Environ, 1994a)*.

PADER (1995) disputes Denoncourt's claim of generally improving water conditions based on numbers of fish and macroinfauna. PADER points to Denoncourt's data collected between 1978 and 1987 showing a reduction in the number of fish taxa below the industrial waste discharge and a reduction in macroinfauna taxa below mill pond, which receives cooling water from the P. H. Glatfelter Company. PADER (1995) also claims that the improving HBI scores reported by Denoncourt reflect Denoncourt's 1992 modification of the scores given to various taxa, rather than improving in-stream conditions. According to PADER (1995) "[a]nalyzing the 1992 data using the actual Hilsenhoff scoring system still shows that fairly significant organic pollution still existed below the waste discharge in 1992."

There are no known commercial fisheries within Codorus Creek. However, there are recreational cold water and warm water fisheries. A designated CWF extends from Lake Marburg to the confluence of Codorus Creek with Oil Creek and is located 3.2 km (2 mi) upstream of the proposed project. The East Branch of Codorus Creek also is designated as a CWF. The remainder of the Codorus Creek system, including all reaches of the creek downstream of the proposed site, are designated as a warm water fishery (see Figure 3.1-5). (These designations are published in Title 25 of the Pennsylvania Code, Chapter 93, Water Quality Standards.)

Fish species typically found in the warm water fishery reaches of Codorus Creek include the stoneroller (*Campostoma anomalum*), carp (*Cyprinus carpio*), golden shiner (*Notemigonus crysoleucas*), satinfin shiner (*Notropis analostanus*), blacknose dace (*Rhinichthys atratulus*), longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus corporalis*), white sucker (*Catostomus commersoni*), yellow bullhead

(*Ictalurus natalis*), green sunfish (*Lepomis cyanellus*), pumpkin seed (*Lepomis gibbosus*), and largemouth bass (*Micropterus salmoides*). Of these, carp, golden shiner, green sunfish, and largemouth bass are introduced species.

Codorus Creek fish community data were collected for the P. H. Glatfelter Company by Denoncourt *(1985, 1987, 1989, 1990, and 1992)*. These studies assessed the taxa present, community structure, and biological factors. The 1990 and 1992 Denoncourt data best represent current conditions in Codorus Creek.

According to Denoncourt (1992), a diverse fish community was present above and below the P. H. Glatfelter Company's wastewater outfall. There were several species of insectivores, bottom feeders, and piscivores in each area. The largest number of species (19) was found 300 m (approximately 1,000 ft) above the Hershey Road bridge. Slightly fewer species (17) were found below the Route 116 bridge in Spring Grove. The next highest number (15) was found near the confluence with South Branch. Immediately below the P. H. Glatfelter Company outfall, the number of species dropped to 11. Further downstream from the outfall, 14 species were found at Martins Road bridge, 6 species were found at Sunnyside, and 9 species were found near Graybill.

Karr's Index of Biological Integrity (IBI), which scores the fish community in much the same way as HBI scores the macroinfaunal community, indicates poor conditions downstream of the discharge in the vicinity of Sunnyside and Graybill (IBI = 32 and 34, respectively). The fish community in this area is "dominated by omnivores, tolerant forms and habitat generalists." Carp, white suckers, and green sunfish tend to dominate the biomass. Immediately downstream of the wastewater discharge, however, conditions are not as bad as observed at Sunnyside and Graybill. Nevertheless, conditions immediately downstream were only "fair" (IBI = 42 and 40) and showed signs of deterioration with the loss of intolerant forms and the existence of a skewed trophic structure. More species are present in this reach than at Sunnyside and Graybill, but carp dominate the biomass. Near the Hershey Road bridge, upstream of the wastewater discharge, the fish community showed some stress and a loss of intolerant forms (IBI = 52) but conditions were generally good. Further upstream on Oil Creek, the IBI indicated only "fair" conditions (IBI = 42), similar to that observed immediately below the P. H. Glatfelter Company discharge.

Toxicity of Codorus Creek and the P. H. Glatfelter Company Discharge

The results of two studies suggest that the toxicity of Codorus Creek water does not vary significantly between points upstream and downstream of the P. H. Glatfelter Company outfall. The tests also indicate that the P. H. Glatfelter Company effluent does not cause acute or chronic toxicity to aquatic organisms. ***Thus, the observed differences between upstream and downstream aquatic communities result from in-stream conditions (e.g., temperature and organic loading) other than the toxicity of the waste stream. The relevant findings from these two studies, Priority Water Body Survey Report Water Quality Standards Review (PADER, 1987) and Toxicity and Color Effects of the P. H. Glatfelter Pulp and Paper Mill Effluent on the Biological Community of Codorus Creek (EA, Inc., 1989), are provided below.***

The Priority Water Body Survey Report Water Quality Standards Review summarized a 1986 study of the toxicity of Codorus Creek water, as well as the P. H. Glatfelter Company wastewater discharge *(PADER, 1987)*. Test organisms consisted of fathead minnows (*Pimephales promelas*) and a type of aquatic invertebrate (*Ceriodaphnia dubia*). The Codorus Creek water (collected upstream of the P. H. Glatfelter Company outfall) and the P. H. Glatfelter Company wastewater were analyzed individually and as a combination that represented a low-flow dilution of the wastewater in creek water at a 1:1 ratio. Both the creek water and the wastewater were collected and replenished daily in the test chambers over a 7-day study period *(Environ, 1994a)*.

The fathead minnow survival was 95 percent in Codorus Creek water, 95 percent in the P. H. Glatfelter Company wastewater, and 100 percent in the wastewater diluted in creek water. Growth data were assessed by examining mean dry weights of the minnows, which were 0.44 mg in creek water, 0.33 mg in wastewater, and 0.44 mg in wastewater diluted in creek water. These latter data suggest the occurrence of a sublethal effect in minnows exposed to undiluted wastewater, which was reduced when the wastewater was diluted with creek water *(Environ, 1994a)*.

Aquatic invertebrate survival was 0 percent in Codorus Creek water, 70 percent in the P. H. Glatfelter Company wastewater, and 0 percent in the wastewater diluted in creek water. The results indicated that the creek water both upstream and downstream of the P. H. Glatfelter Company outfall was more toxic than the P. H. Glatfelter Company wastewater. PADER identified toxic stormwater runoff as a potential cause of the 100 percent mortality rate, because the toxicity occurred following a major storm event. Waste lagoons, combined sewer overflows, and the Spring Grove sewage treatment plant, all located upstream of P. H. Glatfelter Company outfall, were identified as potential contributors to toxic stormwater runoff *(PADER, 1987)*. A lower survival rate in wastewater diluted with creek water may also have occurred from creek water contaminated with toxic stormwater runoff *(Environ, 1994a)*.

A 1988 study *(EA, Inc., 1989 as cited in Environ, 1994a)* assessed the impacts of the P. H. Glatfelter Company wastewater discharge on plant and animal organisms. Whole effluent and ambient toxicity testing were conducted in June and September 1988. Acute toxicity of the whole effluent from the P. H. Glatfelter Company treatment plant was conducted with *Ceriodaphnia dubia* (a 48-hr renewal test), fathead minnows (a 96-hr, renewal test), and Microtox. A 7-day ambient chronic toxicity test was conducted simultaneously with the acute toxicity test, using *C. dubia* and Codorus Creek water collected both upstream and downstream of the P. H. Glatfelter Company outfall. The September 1988 study consisted of 7-day toxicity tests on *C. dubia* using the P. H. Glatfelter Company effluent and Codorus Creek water samples *(EA, Inc., 1989 as cited in Environ, 1994a)*.

The acute and chronic effluent bioassays conducted in June and September 1988 showed no acute or chronic toxicity associated with the P. H. Glatfelter Company wastewater effluent samples. The June 1988 ambient toxicity testing showed a significant difference between the mean number of young produced per female at stations upstream of the P. H. Glatfelter Company outfall compared to those downstream of the P. H. Glatfelter Company outfall. This difference was believed to have been caused by residual effects of a P. H. Glatfelter Company wastewater treatment plant upset that occurred in the week prior to the collection of test water samples. The upset resulted in unusually high biochemical oxygen demand (BOD) concentrations in the discharge to Codorus Creek, which may have impacted reproduction. The September 1988 ambient toxicity test did not reveal a significant difference in the mean number of young produced per female between stations upstream and downstream of the P. H. Glatfelter Company outfall *(EA, Inc., 1989)*. The complete study prepared by EA, Inc. (*1989*), is included in the Biodiversity Study for Codorus Creek (*Environ, 1994a*), which is available in the ***public reading rooms (Appendix A)***.

Several factors affect the measurement of toxicity of metals in an aquatic environment. These include the chemical form of the metal, the type of toxicity test, the characteristics of water quality (particularly water hardness), and the sensitivity of the organism used in the test. Studies indicate that metals in the free cation state (positively charged atom) are usually the most toxic. Flow-through laboratory toxicity tests (in which the water containing the metals flows across the organisms increasing metal availability and contact) tend to maximize the presence of metals in the free cation state. However, as

concluded by EA, Inc. (1989), in static and static-renewal toxicity tests, the total metal tested may not be exerting a toxic effect. Therefore, exposure to the toxic effects of metals might be decreased when measured in static tests (Nebeker et al., 1986).

In both toxicity tests and in wastewater effluents, some of the metals present will slowly form suspended or settled precipitates. Hardness levels in water are an important factor in formation of metal precipitates which remove free cation metals from the aquatic system. Metals historically have been measured in the effluent, not in the receiving waters where precipitation would occur. Therefore, the toxic effects of total metal concentrations were being evaluated. However, this is not the actual concentration that exerts a toxic effect or adversely impacts the downstream aquatic community. It is the chemical form of metal in the receiving water that matters, not that in the effluent per se (Chapman 1991, personal communication).

Dioxin Levels in Aquatic Species in Codorus Creek

A consumption advisory had been in effect since February 1990 for green sunfish caught in Codorus Creek from the mill dam in Spring Grove to the Susquehanna River, and in the South Branch of the Codorus Creek from the York County Water Co. dam to the main branch of Codorus Creek, due to high levels of dioxins. The most toxic of dioxins, a family of 72 chlorinated compounds, has produced cancer, birth defects, liver damage, chloracne, and reproductive problems in laboratory animals.

In July 1994, PADER and the Pennsylvania Fish and Boat Commission lifted the advisory for portions of the Codorus Creek near Spring Grove, York County, since dioxin levels were below Federal Food and Drug Administration (FDA) guidelines. The FDA advises that fish fillets containing between 25 and 50 parts per trillion (ppt) of dioxin should not be consumed more than twice a month.

A total of 28 samples of both whole fish and fish fillets were taken during 1990, 1991, and 1993. In addition to green sunfish, carp, white sucker, pumpkinseed, bluegill, golden shiner, brown trout, redbreast sunfish, and largemouth bass were sampled. Dioxin levels in the 16 whole fish samples ranged from 0.09 to 13.4 ppt. The 12 fillet samples showed a range of 0.26 to 2.3 ppt of dioxin *(PADER, 1994)*.

3.1.5.2 Terrestrial Ecosystems

Concurrent with a wetlands investigation conducted in April 1993, a survey of existing habitats (including dominant plant species and indicators of wildlife) was conducted in the area of the proposed site in North Codorus Township. For each habitat type observed, a classification of vegetation and a notation of dominant plant species were made, as well as an estimation of the cover type, size, and a listing of wildlife observations. A brief description of each habitat type observed follows.

- Cultivated Land — This habitat type, consisting primarily of agricultural corn, makes up 65-75 percent [25-29 acres (10-12 hectares)] of the proposed project site.

- Dredge Spoils Basin — This area is a depressional scrub/shrub area that is permitted and used for disposal of dredge spoils from the mill pond. The dominant plant species in this area include pokeweed *Phytolacca americana)*, Canada thistle *(Cirsium arvense)*, common reed *(Phragmites australis)*, evening primrose *(Oenothera biennis)*, bull thistle *(Cirsium vulgara)*, blackberry *(Rubus allegheniensis)*, multiflora rose *(Rosa multiflora)*, elderberry *(Sambucus sp.)*, silky dogwood *(Cornus amomum)*, and an unidentified species of goldenrod *(Solidago sp.)*.

- Hardwood Forest — This riparian community serves as a buffer between the mill pond and Kessler pond, and the majority of the proposed site. The dominant vegetation in this habitat consists of red maple *(Acer rubrum)*, silky dogwood, black walnut *(Juglans nigra)*, multiflora rose, tartarian honeysuckle *(Lonicera tatarica)*, green ash *(Fraxinus pennsylvanica)*, American sycamore *(Platanus occidentalis)*, common privet *(Ligustrum vulgare)*, shingle oak *(Quercus imbricaria)*, weeping willow *(Salix babylonica)*, staghorn sumac *(Rhus typhina)*, red raspberry *(Rubus idaeus)*, and Japanese honeysuckle *(Lonicera japonica)*.

- Maintained Area — This area consists of an existing softball field and mowed grass fields.

- Successional Field — This habitat includes areas adjacent to the cultivated lands and maintained areas. Herbaceous plants dominating this area include soft rush *(Juncus sp.)*, rye grass *(Lolium sp.)*, jewelweed *(Impatiens sp.)*, dodder *(Cascuta sp.)*, false nettle, avens *(Geum sp.)*, multiflora rose, Japanese honeysuckle, an unidentified species of goldenrod, and an unidentified sedge *(Carex sp.)*.

- Disturbed Land — Disturbed land consists of the Roundwood Facility, commercial and industrial lands, and residential areas.

The wildlife observed at the proposed site is representative of fauna typically associated with cultivated croplands and edge habitats in southeastern Pennsylvania. Observed birds and evidence of bird activity included ringneck pheasants *(Phasianus colchicus)*, Canada geese *(Branta canadensis)*, mourning doves *(Zenaida macroura)*, killdeer *(Charadrius vociferus)*, blackcapped chickadees *(Parus atricapillus)*, brown cowbirds *(Molothrus ater)*, eastern blue birds *(Sialia sialis)*, northern cardinals *(Cardinalis cardinalis)*, and various unidentified songbirds. Other wildlife observations included cottontail rabbits *(Sylvilagus floridanus)*, field mice, and indications of white-tailed deer *(Odocoileus virginianus)*. Species that were not observed either directly or by signs of activity but are known to forage and inhabit similar cultivated fields and edge habitats include red-tailed hawks *(Buteo jamaicensis)*, American kestrel *(Falco sparverius)*, common crows *(Corvus brachyrhynchos)*, turkey vultures *(Cathartes aura)*, migrating waterfowl (due to proximity to aquatic habitats), sparrows, eastern meadowlarks *(Sturnella magna)*, American goldfinches *(Carduelis tristis)*, striped skunks *(Mephitis mephitis)*, groundhogs *(Marmata monax)*, opossum *(Didelphis marsupialis)*, red fox *(Vulpes vulpes)*, and various reptiles including eastern box turtles *(Terrapene carolina carolina)*, and garter snakes *(Thamnophis sirtalis sirtalis)*.

3.1.5.3 Threatened and Endangered Species

No threatened or endangered species are known to occur in the proposed project area. Direct consultations were conducted with the Pennsylvania Fish Commission, Pennsylvania Game Commission, Pennsylvania Natural Diversity Inventory, and United States Fish and Wildlife Service regarding threatened and endangered species. Subsequent correspondence received from these agencies stated that "except for occasional transient species, no federally listed or proposed threatened or endangered species are known to exist in the project impact area," and "except for occasional transient individuals, no State listed endangered or threatened species are known to occur within the proposed project area." The ***United States*** Fish and Wildlife Service further stated that "no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the Fish and Wildlife Service." Letters from these agencies are provided in Appendix E.

Virtually the entire proposed site has been previously disturbed by agricultural, industrial, or dredge disposal activities. Current uses of the property, such as the existing softball field, mowed grass fields, and areas of agricultural corn production, indicate that no suitable high quality habitat is available for threatened and endangered species. Surrounding areas have been similarly disturbed by agricultural, industrial, or residential activities.

3.1.5.4 Biodiversity

Biodiversity indicates the variety of species, communities, gene pools, ecosystems, and ecological functions. It includes the sum total of all the plants, animals, fungi, and microorganisms in an area, all of their individual variances, and all of the interactions between them. The basic unit of biodiversity is the species. Species make up ecosystems and communities and these aggregations of living organisms also are considered within the concept of biodiversity. One way of measuring biological richness is to enumerate the species in an area. However, there are other components of biodiversity that should be considered, such as genera and family diversity, community diversity, and ecosystem diversity. Codorus Creek, the primary aquatic ecosystem in the vicinity of the proposed site, showed a moderately high diversity of fish species in 1992, and benthic macroinvertebrate data indicated good water quality in 1992 (see Section 3.1.5.1). The terrestrial ecosystems at the proposed site include disturbed lands, cultivated lands, and maintained areas (mowed areas or recreational/athletic fields), as well as a small area of hardwood forest. The biodiversity of the disturbed areas is limited. Wildlife observed at the proposed site is representative of fauna typically associated with cultivated croplands and edge habitats in southeastern Pennsylvania.

3.1.5.5 Wetlands

A wetlands investigation was conducted by Environmental Resources Management, Inc. *(ERM, 1993)* at the proposed facility site in May of 1993 in accordance with the ***United States*** Army Corps of Engineers Wetlands Delineation Manual *(ACOE, 1987)*. ACOE conducted a field investigation in June 1993 and verified ERM's findings (Appendix E). The study area for the wetlands investigation is depicted in Figure 3.1-9. Approximately 9.5 acres (3.8 hectares) of freshwater wetlands (a total of 10 wetland areas) were identified in the wetlands delineation (Figure 3.1-10). The proposed facility would generally avoid development in wetlands. However, small areas of identified Wetland B (shown on Figure 3.1-10) and Codorus Creek would be unavoidably traversed by the steam supply and condensate return pipelines to the P. H. Glatfelter Company. Approximately 0.05 acres (0.02 hectares) of Wetland B would be traversed by these pipelines, along with 0.25 acres (0.1 hectares) of Codorus Creek.

- Wetland A is an 8.09-acres (3.3 hectares) scrub-shrub/open water wetland located on the northwestern portion of the North Codorus Township site and includes the stormwater retention pond and associated fringe wetlands.

- Wetland B is a 1.0-acre (0.4 hectare) scrub-shrub/emergent/forested fringe wetland complex beginning on the southeastern corner of the property and extending in a northwestern direction along the mill pond and Kessler Pond to the railroad tracks. The southeastern portion of Wetland B is associated with a small stream flowing into Kessler Pond. The remaining areas of Wetland B are fringe wetlands associated with the mill pond and Kessler Pond. Dominant vegetation within Wetland B includes red maple, silky dogwood, broad-leaf cattail, jewelweed, black walnut, multiflora rose, and tartarian honeysuckle. The hydrology criterion observed was wetland drainage patterns and saturated soil conditions.

- Wetland C is a 0.2-acre (0.1 hectare) emergent wetland located on the northern side of the stormwater retention pond berm, south of the railroad tracks.

- Wetland D is a 0.06-acre (0.02 hectare) emergent wetland located in the northeastern portion of the study area under the conveyor.

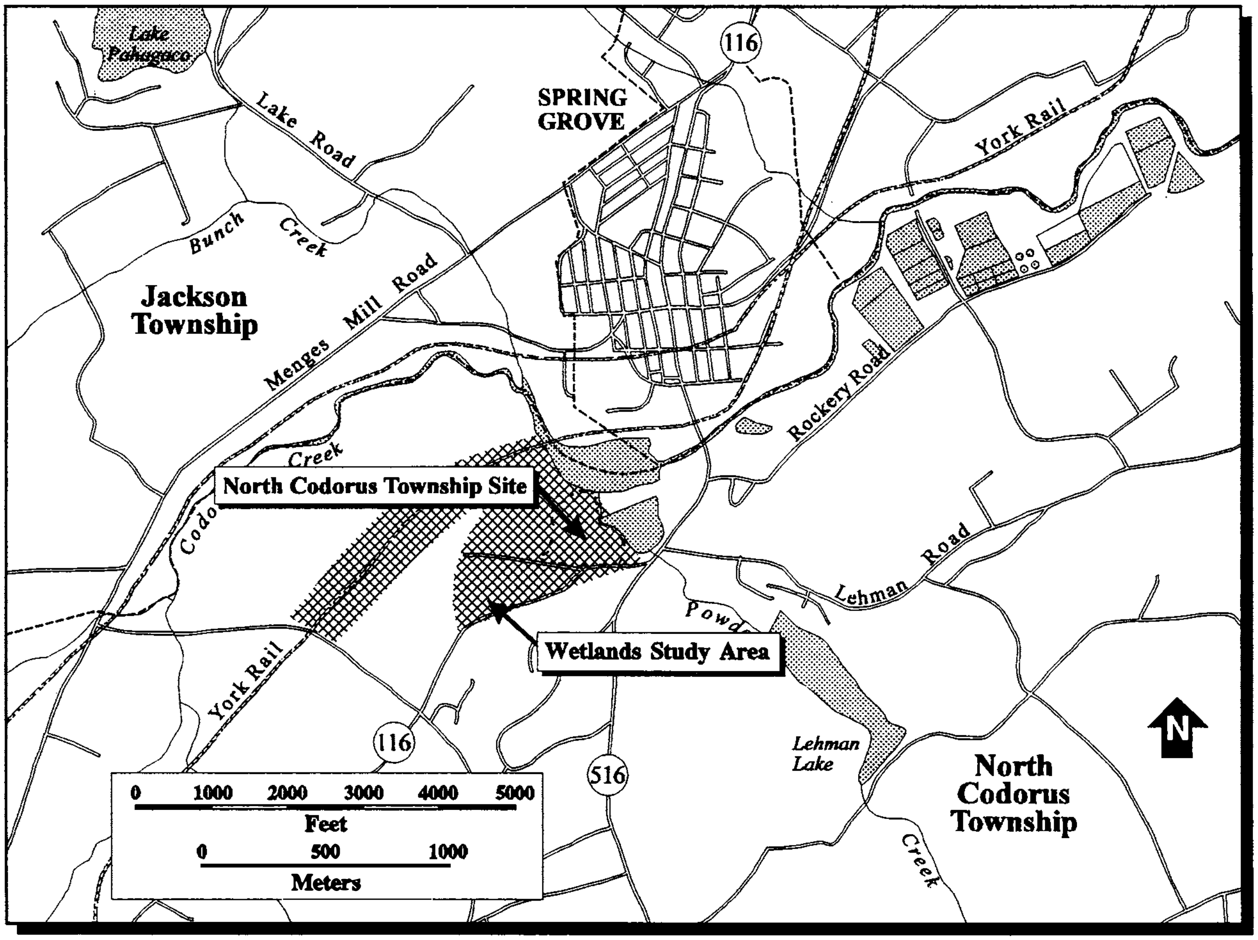

Figure 3.1-9. Wetlands study area for the proposed site.

- Wetland E is a 0.4-acre (0.2 hectare) forested wetland located just north of Wetland D and just south of the railroad tracks on the northeastern corner of the property.

- Wetland F is a 0.6-acre (0.2 hectare) forested wetland located approximately 152.4 m (500 ft) northeast of the intersection of Colonial Valley Road (Route 3053) and the Western Maryland Railroad.

- Wetland G is a 0.1-acre (0.04 hectare) forested wetland located approximately 15.2 m (50 ft) southeast of Wetland F.

- Wetland H [estimated to be less than 0.3 acres (0.1 hectares)] is the local (on-site) portion of a scrub-shrub/emergent wetland associated with the floodplain of Codorus Creek located north of the railroad tracks in the northeastern portion of the study area.

- Wetland I is a 0.2-acre (0.1 hectare) open water wetland approximately 7.6 m (250 ft) long by 9.1 m (30 ft) wide located just west of Wetland H and north of the railroad tracks.

- Wetland J is a 0.02-acre (0.01 hectare) emergent wetland located approximately 30.5 m (100 ft) northeast of Wetland C.

The Final Wetland Investigation Report is provided in Volume III of the Environmental Information Volume (EIV) (*ENSR, 1994*) and is available in the ***public*** reading rooms (Appendix A).

3.1.6 Human Health and Safety

This section provides a summary of health statistics in York County, the number and location of solid waste landfills in the region, and applicable hazardous and toxic materials and wastes standards and regulations.

3.1.6.1 Health Risk Assessment

During scoping meetings, the public expressed concern over the perceived pre-existing poor air quality in the county and the potential of the proposed project to cause further deterioration. In addition, some of the medical community in York County has expressed opposition to the location of a coal-fired power plant in York County due to concerns for air quality in the York air basin.

The NAAQS for ***nitrogen dioxide*** (NO_2), ***sulfur dioxide*** (SO_2), and ***particulate matter*** (PM_{10}) are 100 $\mu g/m^3$, 80 $\mu g/m^3$, and 50 $\mu g/m^3$ annual mean, respectively. Current background NO_x concentration in York County is measured at 41 $\mu g/m^3$ annual mean; current annual mean background SO_2 concentration is 26 $\mu g/m^3$ *(Environ, 1994b)*. PADER reports the background concentration for PM_{10} in York County at 27 $\mu g/m^3$ annual mean (see Table 3.1-3). All of these background values are below the NAAQS standards, and suggest that the current ambient air quality in York County is within national guidelines.

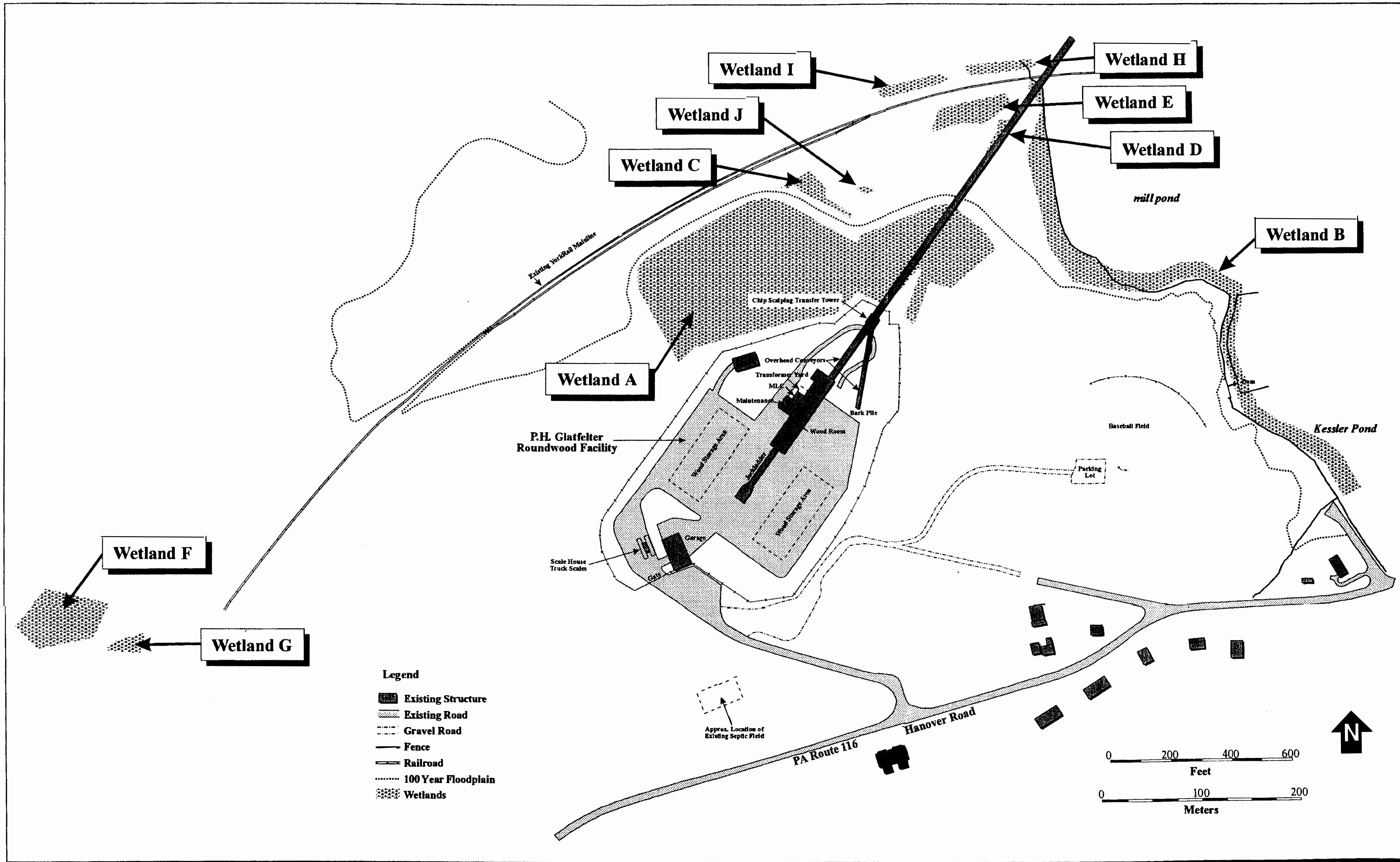

Figure 3.1-10. Location of wetlands identified in the wetlands investigation at the proposed site and adjacent areas..

The State Center for Health Statistics and Research — Pennsylvania Department of Health ***maintains*** statistics on the causes of mortality by county. Table 3.1-12 presents the most recently tabulated resident death rates for selected causes in York County, adjacent counties, and Pennsylvania as a whole. As shown in Table 3.1-12, the five leading causes of death in York County are the same as those for Pennsylvania as a whole: heart disease, cancer, stroke, chronic obstructive pulmonary disease, and accidents (including motor vehicle accidents). The age-adjusted death rate data also indicate that death rates for all causes and for the selected causes indicated above, except motor vehicle accidents, are no greater in York County than for the State as a whole. Age-adjusted death rates from respiratory illness — including chronic obstructive pulmonary disease, and pneumonia and influenza (two categories that could be relatively high if substandard regional air quality exists) are the lowest of the nearby counties and lower than the State mean. Also, the age-adjusted death rate from cancer in York County is lower than the State as a whole and the death rate from cancer in York County is not appreciably different than other surrounding counties. Similarly, the death rate from leukemia is lower in York County than in the nearby counties or the State as a whole. These data indicate that the population surrounding the proposed site are at no higher risk than other residents in the State.

Additionally, in 1993 the American Lung Association (ALA) released its Breath in Danger II (American Lung Association, 1993) report listing populations deemed to be "at-risk" because of their location in areas in nonattainment for one or more of six criteria pollutants covered by a NAAQS. For ozone nonattainment areas (populations in York and surrounding counties are in nonattainment for ozone, but are in attainment for other criteria pollutants), the ALA identifies as "at-risk" persons with pre-existing respiratory disease, elderly persons, and pre-adolescent children. Data from the ALA report were extracted for York and surrounding counties to evaluate whether "at-risk" populations in York County are disproportionately larger than for surrounding counties. These data are tabulated in Table 3.1-12a.

According to the ALA report, more than 150 million people (more than 60 percent of the United States population) reside in an ozone nonattainment area. As a percentage of total population, the enumerated at-risk populations for York County (pre-adolescent and the elderly) are very similar to those in surrounding counties in Pennsylvania. Moreover, the pre-adolescent at-risk populations in York and surrounding counties appear to be very similar on a percentage basis to pre-adolescent at-risk populations in the United States as a whole. As a percentage of total population, the elderly (aged 65+) population for York County is similar to that of surrounding Pennsylvania counties, but is greater than that in the United States as a whole.

Table 3.1-12. Resident death rates per 100,000 population for selected causes in Pennsylvania and York and nearby counties.

Cause	Pennsylvania	York County	Adams County	Cumberland County	Dauphin County	Lancaster County
Heart Disease	357.8 (163.2)	268.1 (148.6)	274.5 (138.3)	301.8 (147.2)	332.6 (165.0)	279.2 (131.6)
Cancer	251.4 (139.5)	212.3 (131.4)	227.7 (130.3)	215.3 (125.7)	239.2 (138.8)	201.2 (124.8)
Respiratory	69.5	56.6	40.6	62.4	52.7	50.9
Leukemia	9.4	6.6	8.6	9.4	10.3	8.3
Cerebrovascular Disease (Stroke)	63.8 (25.6)	56.6 (23.9)	50.5 (22.3)	61.7 (24.4)	73.1 (28.0)	61.0 (23.9)
C.O.P.D.[1]	39.6 (17.8)	31.1 (16.5)	36.9 (16.6)	35.8 (18.8)	40.1 (17.6)	34.8 (16.6)
Accidental Death	33.7 (28.4)	29.7 (27.0)	38.2 (30.2)	23.3 (20.5)	28.6 (27.8)	26.5 (23.0)
Motor Vehicle	13.3 (14.4)	14.0	22.2	11.4	11.2	12.7
Pneumonia & Influenza	33.5	22.3	30.8	29.8	34.3	28.1
ALL CAUSES	1023.4 (521.1)	800.4 (460)	822.3 (450)	868.2 (450)	986.7 (520)	813.7 (440)

[1] Chronic Obstructive Pulmonary Disorder: This category includes deaths due to bronchitis, emphysema, asthma, and allied conditions.

NOTE: Numbers in parentheses ( ) are **Age-Adjusted Average Annual** Death Rates for the period 1988-1992. Age-adjusted rates are artificial measurements used to calculate what death rate would be expected for a selected population if the selected population had the same age distribution as the standard population (1940 United States standard million population). Age-Adjusted Average Annual Death Rates are not available for all subcategories listed in the table.

Source: Pennsylvania Department of Health, 1994.

Table 3.1-12a. Populations in York, nearby counties, and United States "at-risk" due to residence in an ozone nonattainment area.

County	Pre-adolescent	Elderly	Pediatric Asthmatics	Adult Asthmatics	COPD[1]
Adams	15,442 (19.7)	10,634 (13.6)	1,129	2,128	4,480
Cumberland	33,240 (17.0)	26,141 (13.4)	2,473	5,526	11,152
Dauphin	44,194 (18.6)	34,012 (14.3)	3,204	6,610	13,734
Lancaster	89,499 (21.2)	55,469 (13.1)	6,448	11,270	24,061
York	64,755 (19.1)	44,443 (13.1)	4,738	9,338	19,381
United States[2]	29,906,621 (19.9)	17,929,500 (11.9)	2,167,600	4,076,011	8,402,935

Numbers in parentheses are percentages of total County populations or total United States population residing in ozone nonattainment areas (150,177,154).
[1] Chronic Obstructive Pulmonary Disease.
[2] Estimated United States populations residing in ozone nonattainment areas.
Note: Estimates of the numbers of pediatric and adult asthmatics and of those suffering from COPD are based on national prevalence rates and do not include factors which may affect local prevalence.

Source: *(American Lung Association, 1993)*

3.1.6.2 Domestic Solid Waste

The Modern Landfill, a commercial facility in Windsor/Lower Windsor Township that would accept municipal waste from the proposed facility, is the primary operational landfill in the county. The Modern Landfill facility is authorized to accept up to 5,000 tons of waste per day with a 4,667 tons per day average. An estimated 1,098,730 cubic meters (m^3) [1,437,000 cubic yards (yds^3)] of capacity was available at the beginning of 1990; with approval for an additional 17-acre (6.9 hectare) expansion, added capacity of 1,598,014 m^3 (2,090,000 yds^3) would become available *(ENSR, 1994)*.

The only other operating landfill, the York County Sanitary Landfill in Hopewell Township, stopped accepting general municipal waste in December 1989. A portion of the facility continued use as a monofill, accepting resource recovery process residue from the York County Resource Recovery Center. A Memorandum of Understanding between Hopewell Township and the York County Solid Waste and Refuse Authority has allowed the landfill to remain open until filled. The Memorandum of Understanding also allows for discussion concerning potential use of the landfill as a landfill mining project, which would remove waste from the closed, unlined section of the landfill. This program would allow for a small portion of the mined area to be lined and used for management of ash from the York County Resource Recovery Center. This action would extend the life of the landfill beyond 1996.

Other solid waste disposal facilities in the county include the following:

- The York County Resource Recovery Center in Manchester Township can burn about 1,300 tons per day of waste. Approximately 1,100 tons per day of The Resource Recovery Center's capacity is currently being used *(York County Solid Waste and Refuse Authority, 1994)*.

- America's Recycling Center, located in the city of York, receives recyclables from all sources. Newsprint, corrugated paper, aluminum, bimetal cans, glass and plastics are accepted.

- The Modern Landfill Recycling and Processing Facility can receive an average of 325 tons per day each month but not more than 600 tons of waste in any one day *(ENSR, 1994)*.

Landfill capacity (typically up to 500 tons per day) is also available within a 70-mi radius of the proposed site in the neighboring counties of Cumberland, Franklin, Lancaster, Lebanon, and Berks.

3.1.6.3 Hazardous and Toxic Materials and Wastes

The proposed YCEP facility, regardless of site, would be subject to ***United States*** Occupational Safety and Health Administration (OSHA) General Industry standards (29 CFR Part 1910). During construction, YCEP would comply with OSHA Construction Industry standards (29 CFR Part 1926). These standards establish practices, chemical and physical exposure limits, and equipment specifications to preserve employees' health and safety. A program requiring Boiler Installation Plan Approval registers boilers in the State and requires that appropriate design standards are met.

Federal and State community right-to-know statutes require coordination with the local emergency planning committee to ensure that information with regard to public safety is readily available to concerned parties. The proposed facility must provide specified information regarding the presence or release of hazardous substances at or from the facility. The Hazard Communication Program ensures that Material Safety Data Sheets (MSDSs) are available and appropriate labels are visible to employees for all products to which they might be exposed in the course of their work day.

3.1.7 Noise

There are no formal Federal, State, or local noise criteria applicable to the proposed site. A noise monitoring study was performed to characterize existing noise levels on and in the vicinity of the North Codorus Township site. Noise levels on the site were continuously monitored over a 24-hour period; during the same period, noise levels at seven sensitive receptor locations in the vicinity of the site were measured. Two sets of measurements were taken at each sensitive receptor location, one during the day (7 A.M. to 11 P.M.) and one during nighttime conditions (11 P.M. to 7 A.M.). Noise levels were found to be related to existing noise from traffic on York Road (Route 116) and operation of the P. H. Glatfelter Company paper mill and Roundwood Facility *(ENSR, 1994)*.

The two principal noise metrics employed to evaluate the noise environment in the vicinity of the proposed facility site were the residual noise level (L_{90}) and the equivalent noise level (L_{eq}). The L_{90} metric is the sound level exceeded 90 percent of the measurement time. Since providing an approximate level of background noise is useful for the general characterization of community noise environment, this metric was employed in monitoring existing community noise levels around the proposed facility site *(ENSR, 1994)*.

The L_{eq} metric is defined as the equivalent constant noise level having the same acoustic energy as the actual time varying sound level. It is sometimes referred to as the energy average sound level. Because it is simple, accurate, and lends itself to use with monitors left unattended in public areas for long periods of time, the L_{eq} is the EPA-preferred environmental noise descriptor *(EPA, 1974, as cited in ENSR, 1994)*.

All measurements were conducted in A-weighted decibels (dBA), a procedure that adjusts the level values at various frequencies to correspond to the frequency response of the human ear. The middle frequencies (1,000 to 2,000 Hertz), to which human hearing is most sensitive, are therefore assigned a greater weight than the frequencies closer to the higher and lower limits of human audio perception *(ENSR, 1994)*.

To provide a continuous noise record over the period during which monitoring was conducted, a monitor was placed at the backstop of the existing baseball field on the site. This monitor was run continuously over the 24-hour period in which the daytime and nighttime noise sampling at the sensitive receptor locations was in progress (Table 3.1-13). The record from this monitor provided a complete record of existing noise at the site, allowing the temporal variation of sound characteristic of the location to be determined. This monitor also provided a record against which the individual measurements at different locations could be compared and their consistency verified *(ENSR, 1994)*.

In addition to the continuous monitor placed on site, seven other locations in the vicinity of the proposed site were chosen to represent land uses sensitive to potential noise. The locations chosen, shown in Figure 3.1-11, are described in Appendix F.

The results of the noise level analyses conducted at the seven sensitive receptors are presented in Table 3.1-14. The proximity of the main mill (which operates 24 hours/day), the Roundwood Facility, and the traffic from York Road (Route 116) are important contributors to noise levels near the site. Receptor 1 levels were very similar to those recorded by the continuous monitor on the site because Receptor 1 is approximately 91.4 m (300 ft) from the site. Receptor 2 was quieter than Receptor 1, probably because it is farther away from the mill. Receptor 3 was noisier during the day because of its proximity to the Roundwood Facility and York Road (Route 116). Receptor 4 was noisier at night because of its close proximity to the mill (which operates at night). Receptor 5 has noise levels midway between Receptors 3 and 4, indicating a relationship to noise source proximity [mill, Roundwood Facility, and York Road (Route 116)] *(ENSR, 1994)*.

Noise Receptors 6 and 7 possess different noise conditions from Receptors 1 through 5. Daytime L_{90} background levels at Receptor 6 were more than 10 dBA lower than the lowest level measured at the five locations closer to the proposed site. Daytime levels for Receptor 7 were greater than 5 dBA lower than the five sites closer to the proposed site. Nighttime levels were around 35 dBA for Receptors 6 and 7 which indicated quiet conditions during that time of day. These results correlated with the greater distance of these locations from the dominant noise sources of the mill, Roundwood Facility, and York

Table 3.1-13. Results of 24-hour continuous noise monitor at proposed site.

Date	Interval Start Time (hh:mm:ss)	Interval Duration (hh:mm:ss)	Time of Day	Noise Levels (dBA) L_{90}	Noise Levels (dBA) L_{eq}	Maximum Noise Levels
5/12/93	20:02:33	1:00:00	Day	47	52	76
5/12/93	21:02:33	1:00:00	Day	46	50	68
5/12/93	22:02:33	1:00:00	Night	46	50	65
5/12/93	23:02:33	1:00:00	Night	46	52	74
5/13/93	0:02:33	1:00:00	Night	45	48	62
5/13/93	1:02:33	1:00:00	Night	44	49	65
5/13/93	2:02:33	1:00:00	Night	45	48	60
5/13/93	3:02:33	1:00:00	Night	44	48	59
5/13/93	4:02:33	1:00:00	Night	45	50	64
5/13/93	5:02:33	1:00:00	Night	49	55	70
5/13/93	6:02:33	1:00:00	Night	58	63	84
5/13/93	7:02:33	1:00:00	Day	58	59	71
5/13/93	8:02:33	1:00:00	Day	57	59	74
5/13/93	9:02:33	1:00:00	Day	58	65	78
5/13/93	10:02:33	1:00:00	Day	58	60	68
5/13/93	11:02:33	1:00:00	Day	58	65	89
5/13/93	12:02:33	0:24:10	Day	59	60	67
5/13/93	12:28:50	1:00:00	Day	54	62	83
5/13/93	13:28:50	1:00:00	Day	53	62	66
5/13/93	14:28:50	1:00:00	Day	53	56	72
5/13/93	15:28:50	1:00:00	Day	53	62	88
5/13/93	16:28:50	1:00:00	Day	53	56	73
5/13/93	17:28:50	1:00:00	Day	53	55	66
5/13/93	18:28:50	1:00:00	Day	51	54	64
5/13/93	19:28:50	0:33:23	Day	51	53	65

Source: ENSR, 1994.

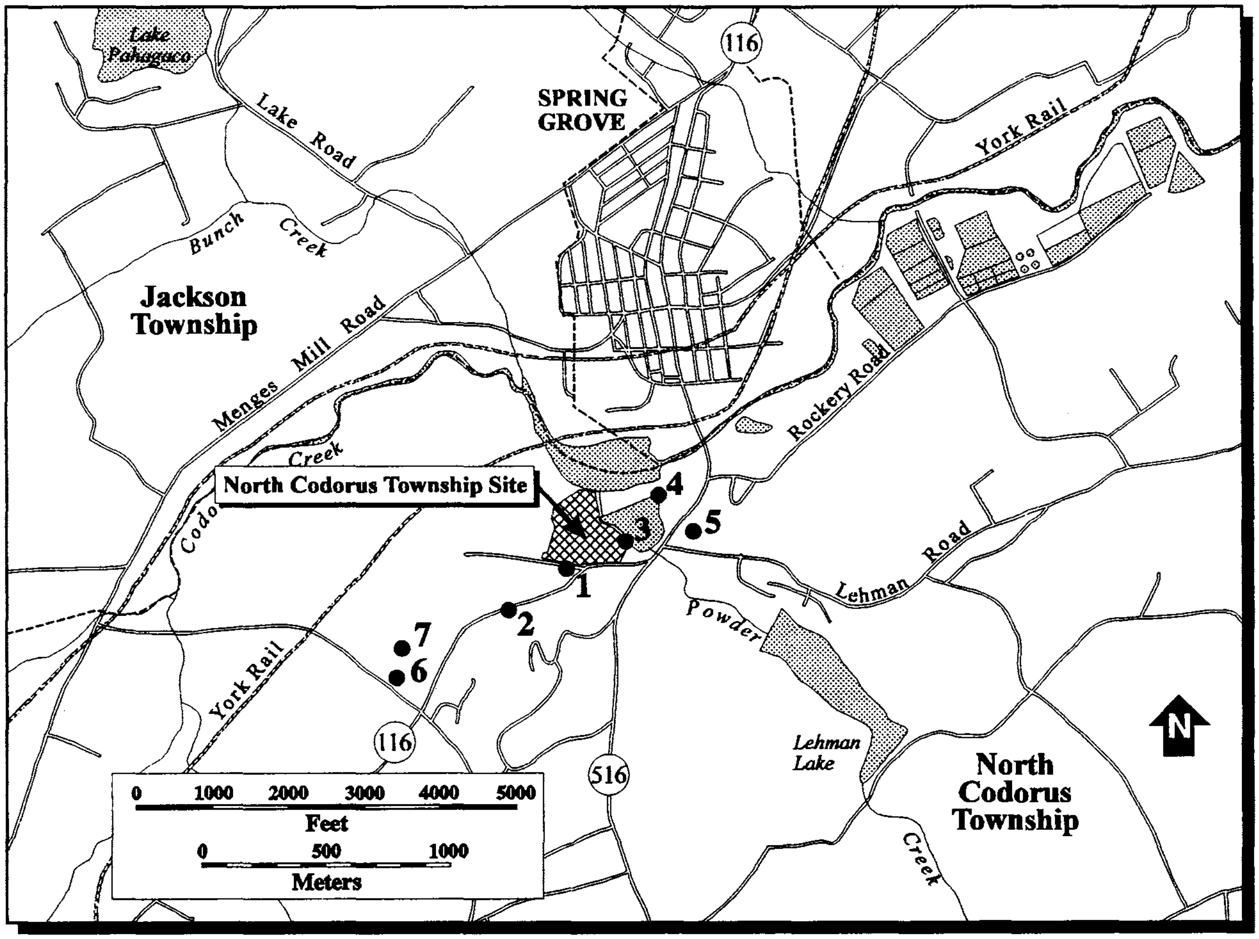

Figure 3.1-11. Locations of noise-sensitive receptors.

Road (Route 116). The higher daytime noise levels at Receptor 7 could be attributed to the operation of ventilation fans at the chicken house and the close proximity to the Roundwood Facility. This interpretation is supported by the smaller difference in noise levels at Receptors 6 and 7 during nighttime when fan usage is decreased and the Roundwood Facility is inactive.

Other noise metrics and octave band frequency levels also were measured in the monitoring program to supplement information from the two primary metrics. These results are presented in Appendix I of the EIV (*ENSR, 1994*) which is available in the public reading rooms (Appendix A).

Table 3.1-14. Noise levels at sensitive receptor locations.

Receptor	Time	Date	Start Time (hh:mm)	Duration (mm:ss.ss)	Noise Levels (dBA)	
					L_{90}	L_{eq}
1	Day	5/13/93	12:46	20:41.51	58	61
1	Night	5/12/93	23:35	21:48.50	44	50
2	Day	5/13/93	16:10	20:33.00	53	65
2	Night	5/13/93	00:10	20:46.00	39	56
3	Day	5/13/93	13:13	20:11.25	58	60
3	Night	5/13/93	00:41	23:09.50	48	52
4	Day	5/13/93	13:41	24:30.75	54	57
4	Night	5/13/93	01:11	20:15.50	54	55
5	Day	5/13/93	14:13	20:42.50	56	60
5	Night	5/13/93	01:40	20:57.25	51	55
6	Day	5/13/93	15:35	22:02.50	41	46
6	Night	5/13/93	02:12	19:58.50	34	40
7	Day	5/13/93	15:08	21:16.50	47	51
7	Night	5/13/93	02:43	19:59.50	36	43

Source: ENSR, 1994.

3.1.8 Transportation and Traffic

An inventory and analysis of the existing traffic conditions and transportation facilities were conducted to characterize the existing conditions of these elements in the study area. Study locations were confirmed with both the North Codorus Township Engineer and the York County Planning Commission. Through a review of available traffic data and in-field measurements, existing traffic conditions along several roadways were identified, and vehicle movements at selected intersections were characterized.

Manual turning movement counts, as well as automatic traffic recorder (ATR) counts, were performed in February and March 1993. Average daily traffic (ADT) counts, a measure of traffic volume equivalent to the average number of vehicles that travel a roadway over a 24-hour period, were determined for York Road (Route 116), Jefferson Road (Route 516), Colonial Valley Road (Route 3053), Lehman Road (Route 3078), and Access Drive, and are presented in Table 3.1-15.

Traffic count data were also collected at three intersections (Figure 3.1-12):

- York Road (Route 116) and Colonial Valley Road (Route 3053);
- York Road (Route 116) and Roundwood Facility Access Drive; and
- York Road (Route 116), Jefferson Road (Route 516), and Lehman Road (Route 3078).

It was determined that the A.M. peak hour occurs prior to 7 A.M. The P. H. Glatfelter Company's work shift also changes prior to 7 A.M., and the traffic generated during this shift change affects traffic peaking conditions.

A capacity analysis of the roads in the project area was conducted based on the existing traffic volumes. A capacity analysis is used to estimate the traffic-carrying ability of a facility over a range of defined operational conditions. The capacity analysis uses Levels of Service (LOS) to describe these operational conditions. Levels of Service are assigned letter designations "A" to "F," with "A" being the most desirable operating conditions. A Level of Service "D" is generally acceptable according to Institute of Transportation Engineers standards. Brief descriptions of the various Levels of Service are presented below and in Table 3.1-16.

- **Level of Service A** — A condition of free flow with low traffic density and high maneuverability within the traffic stream. No vehicle waits longer than one signal indication.

- **Level of Service B** — Stable flow of traffic with negligible impact from other vehicles in the traffic stream. On a rare occasion, drivers wait through more than one signal indication.

- **Level of Service C** — Still in the zone of stable flow but ability to select operating speed and maneuver is restricted. Intermittently, drivers must wait through more than one signal indication and backups may develop behind left-turning vehicles.

Table 3.1-15. Existing road network.

Road	1993 ADT	Approximate Width	Speed Limit
York Road (S.R. 0116)	7,000 - 9,000	24 feet (10 feet shoulders)	35/45 MPH
Jefferson Road (S.R. 0516)	1,600	20 feet (2 feet shoulders)	45 MPH
Colonial Valley Road (S.R. 3053)	300-600	21 feet	40 MPH
Lehman Road (S.R. 3078)	4,000	20 feet	35 MPH
Access Road (Private)	400	24 feet	35 MPH

Source: ENSR, 1994.

- **Level of Service D** Approaching instability; drivers restricted in their freedom to change lanes. Delay of approaching vehicles may be substantial during peak hour.

- **Level of Service E** Traffic volumes near or at capacity on the arterial. Long queues of vehicles may create lengthy delays, especially for left-turning vehicles.

- **Level of Service F** Congested condition of forced traffic flow where travel is slowed by stop-and-go conditions. Queued backups from locations downstream restrict or prevent movement of vehicles out of the approach, creating a storage area during part or all of the peak hour.

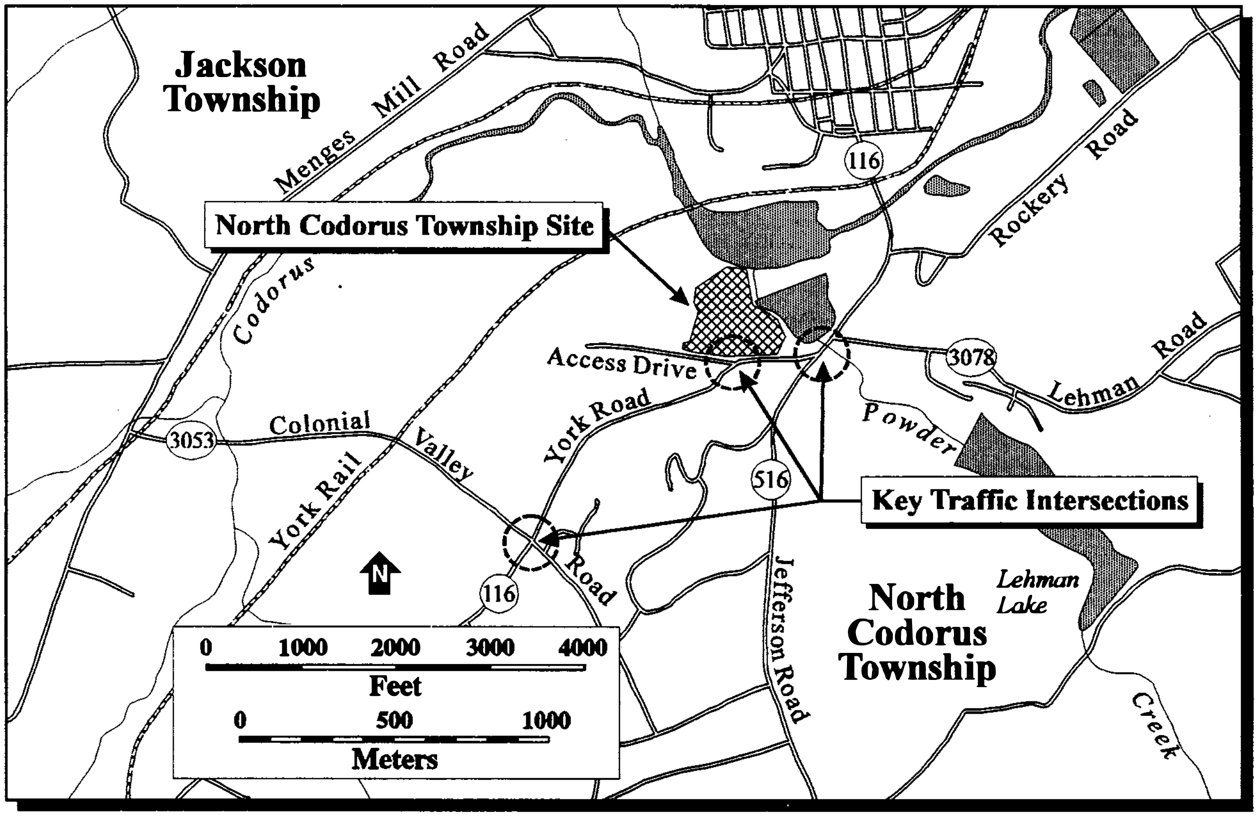

Figure 3.1-12. Key traffic intersections surrounding the North Codorus Township site.

A comprehensive traffic study performed in the vicinity of the proposed site indicated the following:

- Along the roadway network providing access to the facility site, all roadway segments presently operate with significant excess capacity. York Road (Route 116), the primary access route to the proposed site, currently operates at less than 50 percent of capacity during peak demand periods.

- The intersection of York Road (Route 116), Jefferson Road (Route 516)/Lehman Road (Route 3078) and the intersection of Roundwood Facility Access Drive and York Road (Route 116) presently experience peak period capacity deficiencies in traffic operational performance. The intersection approaches of Colonial Valley Road (Route 3053) and York Road (Route 116) operate at A.M. peak hour LOS of A (north and southbound) and C (east and westbound) and a P.M. peak hour LOS A (north and south bound), C (westbound), and D (east bound). These LOS are generally considered acceptable.

Table 3.1-16. Level of service characteristics.

Service (LOS)	Unsignalized Intersection		Signalized Intersection	
	Reserved Capacity (PCPH)	Expected Delay to Minor Street Traffic	Stopped Delay Per Vehicle (Seconds)	Expected Problems to Intersection
A	≥ 400	Little or no delay	≤ 5.0	Very low delay
B	300 - 399	Short traffic delays	5.1 to 15.0	
C	200 - 299	Average traffic delays	15.1 to 25.0	Number of vehicles stopping is significant
D	100 - 199	Long traffic delays	25.1 to 40.0	Influence of congestion becomes more noticeable
E	0 - 99	Very long traffic delays	40.1 to 60.0	Limit of acceptable delays
F	*	Extreme delays - usually warrants improvement to the intersection	> 60	Oversaturated and unacceptable

LOS Denotes Level of Service.
PCPH Denotes Passenger Cars Per Hour.

Source: TRB, 1985.

Based upon the previous 5-year accident history of the roadway network providing access to the proposed site, and upon a field survey of roadway geometry, controls and sight distances, it was found that, except for two locations, generally safe conditions characterize site access roadways. The two locations noted to have a degree of safety deficiency are:

- The unconventional intersection configuration of York Road, (Route 116) Jefferson Road (Route 516), and Lehman Road (Route 3078), with closely spaced minor approaches entering the York Road (Route 116) major approach from the same direction, appears to create confusion regarding right-of-way. Normal difficulties experienced when entering major stream traffic flow are exacerbated by this configuration. Traffic accident history reflects this situation.

- The primary safety issue at the intersection of the Roundwood Facility access drive and York Road (Route 116) involves spillover onto York Road (Route 116) of the truck queue awaiting entrance to the Roundwood Facility.

The road network in the vicinity of the proposed site is not expected to change in the near future. A recent York Road (Route 116) improvement project was completed in the summer of 1994. This PennDOT project was unrelated to the proposed project and merely served to widen and resurface existing lanes and roadway shoulders.

The York Area Transit Authority (YATA) serves the York region. The nearest bus service to the proposed site is to Fayette and West Market Streets in West York. No public transit service currently serves the proposed project area. The proposed site is served by Yorkrail which connects to Conrail in York [20.9 km (13 mi) to the north], and CSX at Porters [4.8 km (3 mi) to the south].

3.1.9 Land Use

The proposed site is an approximately 38-acre (15.5 hectare) parcel of land in North Codorus Township, located in the southwestern portion of York County, PA. The property is located within a predominantly agricultural area of the county; however, it is adjacent to the more densely populated Borough of Spring Grove and to the P. H. Glatfelter Company paper mill, a large industrial employer.

3.1.9.1 Existing Land Use

The proposed site is located on the northern side of Pennsylvania Route 116 (York Road) just before it crosses into Spring Grove Borough from the west. The site property is currently owned by the P. H. Glatfelter Company, a manufacturer of high quality paper, headquartered in the adjacent Borough of Spring Grove. The proposed site has been intermittently vacant or used for agricultural or recreational purposes for approximately 40 years, with no evidence of commercial or industrial use during this period. The central and northern sections of the proposed site were used for the disposition of dredge spoil from the adjacent mill pond impoundment of Codorus Creek from 1947 to 1982.

The site is presently undeveloped, with the southern section leased to a local farmer for corn production, and the central section used as a baseball field by P. H. Glatfelter Company employees. A dirt and gravel road enters the parcel from the west, permitting access to the baseball field from the driveway to the P. H. Glatfelter Company Roundwood Facility, which is located along the site's western boundary.

Mixed land uses within a 1.6-km (1-mi) radius of the proposed site include residential, industrial, agricultural, recreational, institutional, and commercial uses (Figure 2.1-2). The site property is bounded along its southern edge by York Road (Route 116) with two residences and a monument business situated on a small triangular parcel between York Road (Route 116) and a portion of the facility boundary. On the southern side of York Road (Route 116), six residences, a gas station, and an autobody shop extend along the roadway to its intersection with Jefferson Road (Route 516) a few hundred feet east of the southeast corner of the facility site. Land south of the narrow band of development along York Road (Route 116) consists of forested, hilly land with scattered residences and farms.

The western boundary of the site is bordered in its entirety by the P. H. Glatfelter Company Roundwood Facility. The prominent features of the Roundwood Facility include a trailer storage and parking area, the main processing building in which logs are converted to chips, the overhead conveyor by which wood chips are conveyed to the main mill across Codorus Creek to the northeast, and a stormwater retention pond near the northwest corner of the site. The land west of the Roundwood Facility is used for agricultural purposes. A large commercial chicken breeding facility (T & J Breeder Farm) is located in this agricultural area about 0.8 km (0.5 mi) from the proposed site. At *a* distance of approximately 1.6 km (1 mi) from the proposed site are a small number of residences and farms that stretch in a north-south direction along Colonial Valley Road (Route 3053). The Yorkrail mainline extends through this area with a southwest to northeast alignment, crossing Codorus Creek near the Roundwood conveyor at the northwest corner of the facility site.

The mill pond (an impoundment of Codorus Creek) and Kessler Pond are located along the northern and northeastern site boundaries. The mill pond is maintained by the P. H. Glatfelter Company and is used for influent water in their manufacturing process, as well as for supplying backup water to the Spring Grove Water Company. Kessler Pond is the primary water supply for the Spring Grove Water Company. Neither of these ponds receives process wastewater from the P. H. Glatfelter Company facility. Immediately to the north of the mill pond is the P. H. Glatfelter Company facility which covers an extensive area on the northern bank of Codorus Creek. To the north of the P. H. Glatfelter Company facility lies the western, predominantly residential portion of Spring Grove. At the northwestern corner of Spring Grove, approximately 1,066.8 m (3,500 ft) north of the proposed facility site, is the Spring Grove High School and its athletic fields. ***Most*** of Spring Grove lies northeast of the proposed site, beyond the ponds and the main P. H. Glatfelter Company Facility. In addition to its residential and commercial aspects, this area consists of churches, government offices, schools, and recreational areas, all within 1.6 km (1 mi) of the proposed site.

A small parcel of land owned by the P. H. Glatfelter Company and leased to the local Lions Club is located to the southeast corner of the proposed site and is used as a picnic and recreational area. This parcel also contains a fishing area on the western bank of Kessler Pond that is open to the public. A P. H. Glatfelter Company trailer parking area is located on the north side of York Road (Route 116), east of the recreational area and Kessler Pond. Further to the east, the P. H. Glatfelter Company research building is located south and uphill from York Road (Route 116). Further east of this area, there is a small residential development located on Rockery Road behind the research building. Beyond this residential area, at a distance of approximately 0.8 km (0.5 mi), the land is generally undeveloped or used for farming.

3.1.9.2 Land Use Trends and Controls

No zoning classification applies to the proposed site; however, proposed land uses require filing with North Codorus Township under a Land Development and Subdivision Ordinance to ensure that project concept and details are consistent with community development goals and standards. Ownership of the site by the P. H. Glatfelter Company and the existing nature and visibility of P. H. Glatfelter Company's industrial operations on adjacent parcels indicate that a future industrial use is compatible with existing land use trends and controls for the site.

3.1.10 Pollution Prevention

It is the national policy of the United States that pollution should be prevented or reduced at the source. In a memorandum dated January 14, 1993, the Council on Environmental Quality (CEQ) provided guidance to encourage all Federal agencies to incorporate pollution prevention principles into their planning and decision-making processes and to evaluate and report those efforts, as appropriate, in National Environmental Policy Act (NEPA) documents. The Pollution Prevention Act of 1990 gives the force of law to the common sense notion that the best, most economically efficient way of reducing the impact of society's waste on the environment is to make less of that waste in the first place. Pollution prevention means changing the way the Nation produces and consumes both goods and services so that fewer pollutants are generated and consequently, fewer pollutants are released to the environment.

The Pollution Prevention Act of 1990 establishes an environmental hierarchy, with pollution prevention/source reduction as the most desirable environmental management option. If pollution cannot be prevented, then, in descending order of preference, environmentally sound recycling, treatment, and disposal are listed as alternative risk management options.

Since the proposed project would be a new facility, regardless of site, no existing pollution prevention measures currently exist.

3.1.11 Cultural Resources

Cultural resource investigations are mandated under various historic preservation legislation instruments, including the National Historic Preservation Act of 1966 (Pub. L.89-665), the Archaeological and Historic Preservation Act of 1969 (Pub. L. 91-700), and the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 80, 36 CFR Part 60, 36 CFR Part 63, 36 CFR Part 66, and 36 CFR Part 800). Cultural resource research is also mandated by NEPA guidelines. Investigations conducted under these laws and regulations are loosely referred to as the "Section 106" process.

A survey of cultural resources within the site vicinity was performed. As a part of this review, existing information at the Historical Society of York County, Historic York Inc., and the York Planning Commission was also examined. The results of these studies are presented below.

3.1.11.1 Historical Resources

The York Planning Commission identified selected historical sites within York County during a study conducted in 1975. ***Historic York, Inc. (Historic York, 1995) indicated that*** Spring Grove Borough was declared a historic district on May 25, 1984, ***and*** has records identifying numerous historic structures located within the borough. ***Five of these historical sites are located in the central lowland portion of York County in the vicinity of the proposed site. These are listed below, and identified in Figure 3.1-13.***

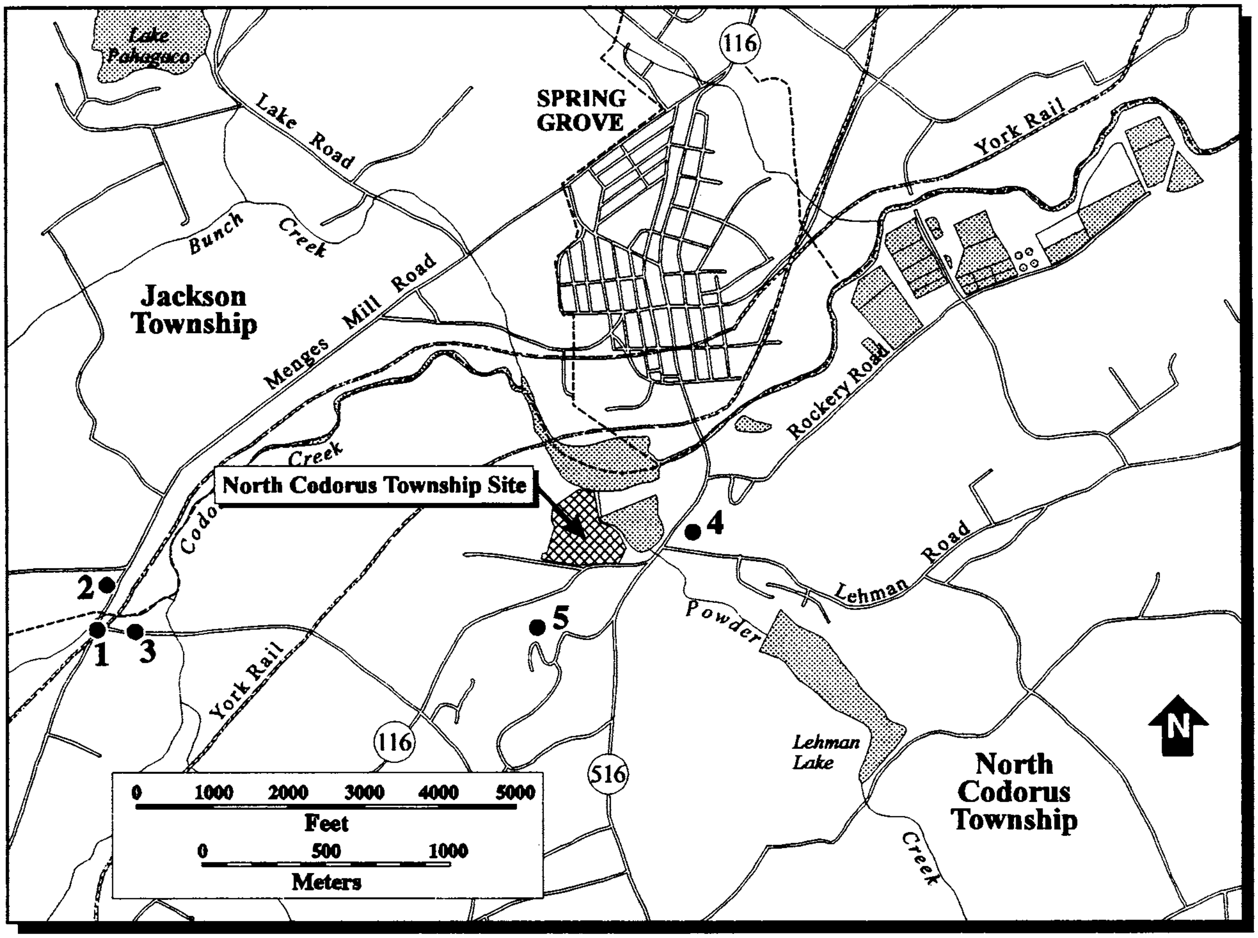

Figure 3.1-13. Locations of historical sites *identified prior to the 1995 survey that are* in the vicinity of the proposed Cogeneration Facility.

- Site 1 - log cabin claimed to be the oldest house in Menges Mills
- Site 2 - stone Germanic-style house
- Site 3 - museum that was originally built as a home in 1783
- Site 4 - Georgian half house circa 1790
- *Site 5 - Glatfelter residence (a.k.a. Hill District)*

Following the review of the DEIS, the Pennsylvania Bureau for Historic Preservation requested that a Pennsylvania Historic Resource Survey be completed for all properties constructed prior to 1945 in or near the project area viewshed. The Bureau defined the viewshed as the area surrounding the

proposed Cogeneration Facility site, the site of the proposed substation (switchyard), including the town of Bair, and a 3,000-foot corridor along the proposed electric interconnect route.

DOE submitted a Historic Sites Survey (Historic York, 1995) to the Bureau on March 17, 1995, which identified 187 resources as being within the defined viewshed. Of these resources, 32 were evaluated as individual resources and 157 were considered as part of 1 of 5 historic districts (two individual properties were also counted as part of the Menges Mills historic district). The Bureau determined that 11 of the 32 individual resources and 4 of the 5 districts were eligible for listing in the National Register of Historic Places. A description of the eligible resources follows, and their location is indicated in Figure 3.1-13a.

Individual Resources Determined Eligible for Listing in the National Register of Historic Places

- *FF-30* — *Pennsylvania German farmhouse (c. 1785); Sweitzer barn; summer kitchen*
- *FF-39D* — *18th Century log churches and associated graveyard*
- *FF-74A* — *Georgian farmhouse (c. 1798)*
- *FF-74B* — *Queen Anne style residence*
- *FF-88* — *Georgian farmhouse (c. 1872); Sweitzer barn; springhouse; summer kitchen*
- *FF-90A* — *Pennsylvania German vernacular farmhouse (c. 1895); barn*
- *FF-91* — *Georgian farmhouse (c.1870); summer kitchen; smokehouse; springhouse*
- *GG-5* — *Pennsylvania German vernacular farmhouse (c. 1837); Sweitzer barn; cemetery*
- *GG-44E* — *Pennsylvania German vernacular farmhouse (c. 1845); summer kitchen; Broom factory; Sweitzer barn*
- *GG-45B* — *Vernacular farmhouse (c. 1850) Sweitzer barn*
- *Swartz House* — *Eclectic Queen Anne architecture*

Districts Determined Eligible for Listing in the National Register of Historic Places

Bair	*62 resources (51 contributing, 11 non-contributing)*
The Hill	*14 resources (12 contributing, 2 non-contributing)*

Menges Mills	*71 resources (59 contributing, 12 non-contributing)*
Old Forge Heights	*9 resources (all contributing)*

A district is comprised of a number of resources. These resources can be classified as being individually eligible for listing (contributing) or non-eligible (non-contributing).

3.1.11.2 Archaeological Resources

The proposed site has been impacted by agricultural production and disturbed by past filling practices for several years. A document and library research effort was conducted to identify and gather information about archaeological resources in the vicinity of the proposed site. A review of the Pennsylvania Archaeological Site Survey files did not indicate the presence of prehistoric sites in the project area.

Coordination with the Pennsylvania Historical and Museum Commission identified the need for a geomorphological study and a Phase I archaeological survey to be conducted on the proposed site. The geomorphological study was conducted in July 1993 to determine the approximate age of the terraces and associated soils, and the depth to which the cultural resources investigation should extend. Results of this study revealed recent and disturbed soils as well as colluvial material deposited on valley slopes. Based on these findings, no deep testing was required.

A Phase I archaeological survey was conducted in July and August 1993. The objectives of the study were to define undisturbed areas to ensure the recovery of any significant cultural resources, determine the presence of any cultural resources within the proposed project area, and interpret the significance of any resources encountered. The Phase I survey indicated that no prehistoric or historic sites are present in the study area and that no further cultural resource studies are required. The Bureau for Historic Preservation reviewed the finding of the Phase I survey and agreed that construction on the proposed site would have no effect on archaeological resources (see letters in Appendix E).

3.1.12 Socioeconomic Resources

The Commonwealth of Pennsylvania is divided into 67 counties, encompassing 40 labor market areas, 12 Metropolitan Statistical Areas (MSAs), and three Primary Metropolitan Statistical Areas (PMSA's). North Codorus Township in York County is part of the York MSA, composed of York and Adams Counties.

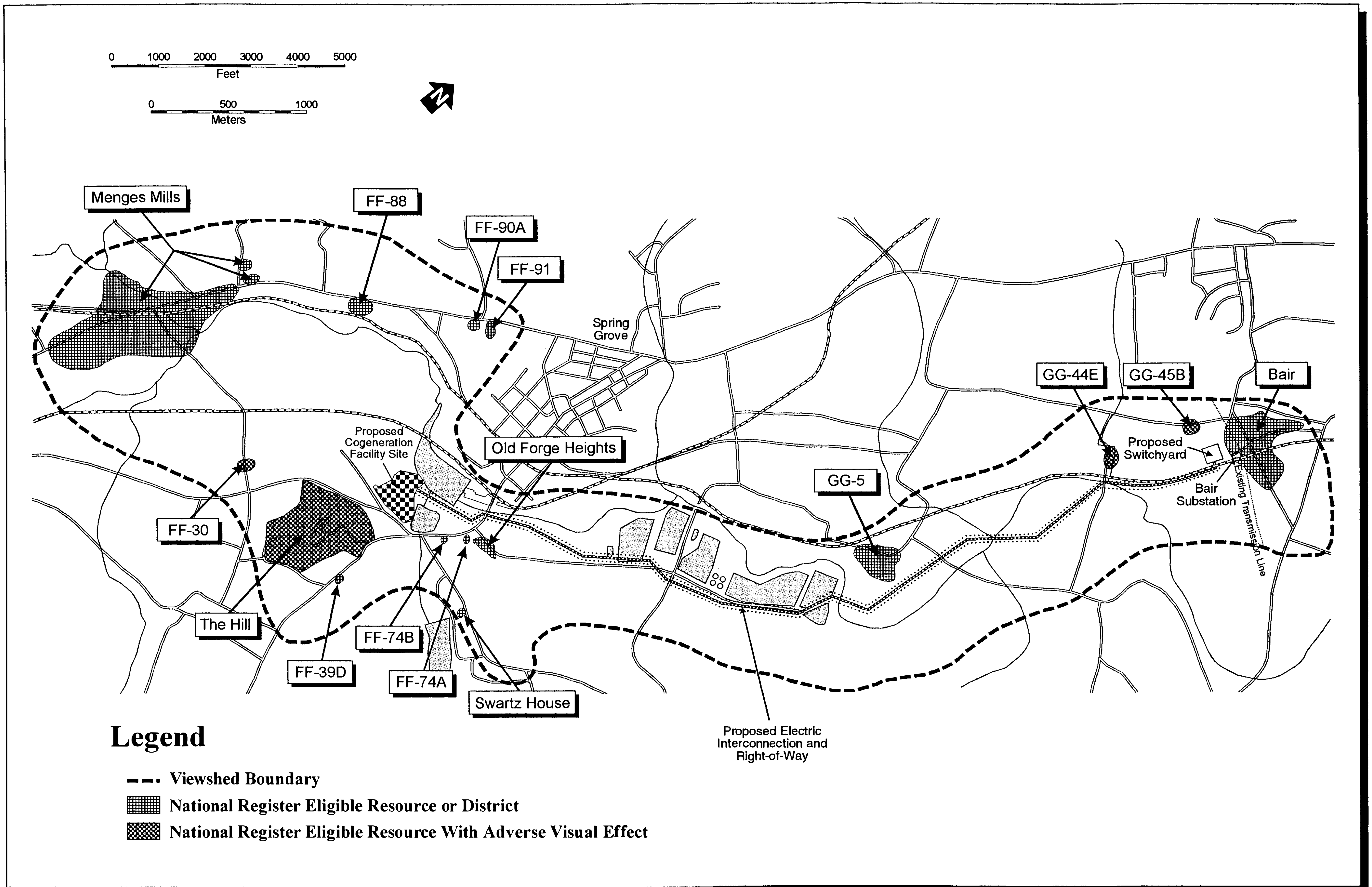

Figure 3.1-13a. Historic Districts and Individual Resources eligible for National Register Listing in the viewshed of the proposed Cogeneration Facility and proposed electric interconnection corridor.

3.1.12.1 Demographics

This section describes local population and housing characteristics.

Population

The Commonwealth of Pennsylvania has exhibited a slow-growth trend over the last 11 years according to "The Pennsylvania State Data Center (PSDC) News" *(PSDC, 1992 as cited in ENSR, 1994)*. Pennsylvania's population grew from 11,864,751 in 1980 to 11,881,643 in 1990, an increase of approximately 0.14 percent (16,892 residents). The slow-growth trend has been attributed to outward migration of Pennsylvania residents to other states; however, the PSDC's population estimates for 1991 anticipated a small in-migration. Population statistics for the Commonwealth of Pennsylvania, as well as North Codorus Township, Spring Grove Borough, Jackson Township, and York County are presented in Table 3.1-17.

The population growth trend for York County has not followed the same pattern as the Commonwealth of Pennsylvania. Statistics have shown yearly population increases in York County during the previous decade. York County's population increased by 8.5 percent from 1980 to 1990 ***(0.8 percent annually)*** and is anticipated to continue to grow (at a slower rate) through 1996 (Table 3.1-17) *(PSDC, 1987, 1993 as cited in ENSR, 1994)*.

North Codorus Township and Jackson Township have exhibited higher population growth rates over the past decade than both York County and the Commonwealth of Pennsylvania. The North Codorus Township population increased by approximately 10 percent, and Jackson Township by 16.8 percent, from 1980 to 1990. The population of Spring Grove Borough increased by only 1.69 percent over the same ten-year period.

Housing

Based on the 1990 Census, there were 2,688 total housing units in North Codorus Township, of which 2.0 percent (54 units) were vacant. This is considered a relatively low vacancy rate compared to the 4.5 percent county vacancy rate and the 9 percent Commonwealth vacancy rate. A large majority of the occupied housing (85 percent) was owned, with the remainder being renter-occupied. The 85 percent owner-occupied rate was substantially higher than the county and Commonwealth rates of 71 and 64

Table 3.1-17. Population statistics for North Codorus Township, Spring Grove Borough, York County, and Pennsylvania.

Area	1991 Estimated	1990	1980	% Change 1980-1990	1996 Projected
N. Codorus Township	NA	7,583	6,854	+10.64	NA
Spring Grove Borough	NA	1,863	1,832	+1.69	NA
Jackson Township	NA	6,244	5,347	+16.8	NA
York County	345,598[1]	339,574	313,024[1]	+8.50	354,845[4]
Pennsylvania	11,961,000[2]	11,881,643	11,864,751[3]	+0.14	NA

1 Estimate published in the "Pennsylvania County Data Book for York County, 1993," Commonwealth of Pennsylvania, Bureau of Policy, Planning and Systems Development, Pennsylvania State Data Center, March 1987.

2 Estimate published in "The PSDC News," Pennsylvania State Data Center, Vol. 10, No. 1, February 1992.

3 Figure published in "Pennsylvania Occupational Trends and Outlook for Total Civilian Employment 1984 and Projected 1995," Commonwealth of Pennsylvania, Department of Labor and Industry, Office of Employment Security, Research and Statistics Division, 1987.

4 Estimate published in the "Pennsylvania County Data Book for York County, 1987," Commonwealth of Pennsylvania, Bureau of Policy, Planning and Systems Development, Pennsylvania State Data Center, March 1987.

Source: Pennsylvania State Data Center, April 1992, except as noted.

percent, respectively. North Codorus Township experienced an 18 percent growth rate in total housing units between 1980 and 1990, which was a higher growth rate than the county (15 percent) and the Commonwealth (10 percent) during the same period. The median value of an owner-occupied housing unit in North Codorus Township was $86,500, approximately $7,000 more than the county median value and approximately $17,000 more than the Commonwealth median value. The median monthly contract rent in North Codorus Township was $413, which was comparable to county and Commonwealth figures. There were a total of 63 new residential building permits issued in North Codorus Township in 1990 *(PSDC, 1993, as cited in ENSR, 1994).*

Data describing available housing in the areas surrounding the proposed site are presented in Table 3.1-18.

Table 3.1-18. Housing data for the York County area.

Area	Total Housing Units	Occupied Housing Units[1]	Vacant Housing Units[2]	Total Vacancy Rate (%)
N. Codorus Township	2,688	2,634	54	2.0
Spring Grove Borough	748	735	13	1.7
Jackson Township	2,177	2,143	34	1.6
York County	134,761	128,666	6,095	4.5

[1] Includes owner occupied and renter occupied.
[2] Includes housing units for rent; for sale; rented or sold; not occupied; seasonal, recreational, or occasional use; for migrant workers; and other vacant units.

Source: The Research Center of the York County Chamber of Commerce and the York County Industrial Development Corporation, 1994.

3.1.12.2 Local and Regional Economic Activity

Employment

Since the 1950's and especially in the last decade, the Commonwealth of Pennsylvania's economy has been undergoing a shift from the goods-producing sector (mining, construction, and manufacturing) to the service-producing sector. Total manufacturing dropped by 18.4 percent from 1975 to 1985 and is anticipated to drop an additional 12.5 percent from 1985 to 1995. Accordingly, total nonmanufacturing positions have grown from 70 percent of all jobs in 1975 to 77 percent in 1985, and are projected to total more than 81 percent of all jobs in 1995. An expanded Pennsylvania service industry is anticipated between 1985 and 1995, with increased private health services, businesses services, and social services *(Pennsylvania Department of Labor and Industry, 1987 as reported in ENSR, 1994).*

The York Metropolitan Statistical Area (MSA) is projected to have the third highest job growth rate of Pennsylvania's Major Labor Market Areas from 1985 to 1995. An increase of 10.1 percent in nonagricultural wage and salary employment is anticipated for this time period *(Pennsylvania Department* *of Labor and Industry, 1987 as reported in ENSR, 1994).* The highest employment growth rates are anticipated to occur in the Finance, Insurance, and Real Estate sector (28.9 percent) and the Services sector (28.7 percent). A 20.4 percent employment growth rate is anticipated for the Wholesale and Retail Trade, as well as a 12.5 percent increase in Mining and a 13.6 percent increase in Construction *(Pennsylvania Department of Labor and Industry, 1987 as reported in ENSR, 1994).* The composition of the civilian nonagricultural work force in the York MSA reflects the growth rate trends exhibited by the Commonwealth and the Nation (i.e., a shift from the goods-producing sector to the service-producing sector) (Table 3.1-19).

Total civilian employment in York County is anticipated to be 153,400 in 1995, an increase of 10.4 percent from 1984 (employment level 138,950). York County's employment growth is expected to undergo trends similar to that of the Commonwealth, with rapid growth in health and service occupations, decreased growth of the agricultural sector [according to Census data for York County, the employment growth rate for all persons, 16 years and older for Farming, Forestry, and Fishing has declined from approximately 3.1 percent in 1970 to approximately 1.5 percent in 1990], increased white-collar occupations, and decreased blue-collar occupations. Service occupations are projected to increase from 11.5 percent of all jobs in 1984 to 13.1 percent of all jobs in 1995 *(Pennsylvania Department of Labor and Industry, 1988 as reported in ENSR, 1994).*

Unemployment

Related unemployment trends have been exhibited by the Commonwealth of Pennsylvania and York County from 1981 to 1992; however, York County has had consistently lower average annual unemployment rates than the Commonwealth (Table 3.1-20). Following the 1982-1983 recession, the unemployment rate for York County decreased on a yearly basis reaching 4.1 percent in 1989. An unemployment rate of five percent is considered "full employment" by most economists *(ESC/LMI, 1989 as reported in ENSR, 1994).* The average annual unemployment rate for York County began to rise after 1989 and reached 6.8 percent in 1992. Similar unemployment rates of 7.5 percent and 7.4 percent were reached for the Commonwealth of Pennsylvania and the United States, respectively (Table 3.1-20).

Income

In the past, York County's economy has been healthier than that of both the Commonwealth of Pennsylvania and the United States. The 1988 average per capita income in York County was $17,532,

Table 3.1-19. Composition of the York MSA's (Adams and York Counties) civilian nonagricultural work force from 1985 to projected 1995 expressed in percentages* by industry.

Industry	Projected 1995+	1991	1990	1989	1988	1987	1986	1985
Mining	0.25	0.28	0.28	0.28	0.28	0.24	0.24	0.25
Construction	5.18	5.04	5.62	5.79	5.93	5.48	4.99	4.91
Manufacturing (durable and non-durable goods)	31.53	30.98	31.42	33.46	34.92	34.69	35.24	36.48
Transportation, Communications, and Utilities	4.14	4.59	4.41	4.30	4.18	4.24	4.20	4.29
Wholesale and Retail Trade	25.62	26.11	25.52	24.59	24.12	24.20	23.92	23.49
Finance, Insurance, and Real Estate	3.27	3.03	2.92	2.87	2.77	2.89	2.86	2.80
Services	19.71	19.38	19.29	18.63	18.02	17.67	17.65	16.84
Government (Federal, State, and local)	10.30	10.59	10.53	10.14	10.23	10.66	10.83	10.94

* Percent of total nonagricultural work force.

\+ Figures based on projection data published in "Statewide Major Labor Market Areas Industry Trends and Outlook for Nonagricultural Wage and Salary Workers, 1985 and Projected 1995," Commonwealth of Pennsylvania, Department of Labor and Industry, Office of Employment Security, Research and Statistics Division 1987.

Source: Department of Labor, 1992 as cited in ENSR, 1994.

eight percent higher than the Pennsylvania average ($16,219) and 26 percent higher than the national average. In 1989 the average per capita income for York County exceeded the averages for both Pennsylvania and the United States, with Pennsylvania being the lowest of the three. The 1989 average per capita income in York County was $18,575, compared to an overall average for the Commonwealth of Pennsylvania equalling $17,269 *(Bureau of Economic Analysis, as cited in PSDC 1992 as reported in ENSR, 1994)*. The 1989 average per capita income for the United States was approximately $17,596 *(United States Bureau of the Census, 1991 as cited in ENSR, 1994)*. York County was ranked eighth among counties in the Commonwealth in both 1988 and 1989 based on average per capita income.

Table 3.1-20. Average annual rates of unemployment* for York County, the Commonwealth of Pennsylvania and the United States.

Location	1992	1991+	1990+	1989	1988	1987	1986	1985	1984	1983	1982	1981
York County	6.8	6.2	5.0	4.1	4.3	4.6	5.8	7.2	7.5	10.2	10.3	7.2
Commonwealth of Pennsylvania	7.5	6.9	5.4	4.5	5.1	5.7	6.8	8.0	9.1	11.8	10.9	8.4
United States	7.4	6.7	5.5	5.3	5.5	6.2	7.0	7.2	7.5	9.6	9.7	7.6

* Rates not seasonally adjusted.

+ 1990 and 1991 annual averages provided by the Bureau of Research and Statistics, Pennsylvania Department of Labor and Industry, March 1992.

Source: *ENSR, 1994.*

Over the 6-year period from 1985 through 1990, the wage structure of the York County economy remained relatively consistent (Table 3.1-21). Throughout this time period, the Transportation and Public Utilities sector reported the highest average wage; the Mining or Manufacturing sectors reported the second and third highest average wages; the Agriculture, Forestry, and Fishing sector reported the second lowest average wage; and the Retail Trade sector reported the lowest average wage. During the same 6-year period (1985 to 1990), York County has maintained a lower average annual wage than the Commonwealth of Pennsylvania, in direct contrast to the trend shown by average per capita income (Table 3.1-22).

3.1.12.3 Public Services

This section will describe public and community services including education, health care and human services, police and fire protection, parks and recreation, and utilities.

Education

According to Census data, approximately 73 percent of the population in North Codorus Township over 25 years of age have completed high school, which is comparable to Commonwealth and county figures. However, only 11 percent have completed college, which is lower than the county figure of 14 percent,

Table 3.1-21. Wage data by industry for York County, Pennsylvania from 1985 to 1990.

Industry	1990		1989		1988	
	Annual Average	Percent Change*	Annual Average	Percent Change*	Annual Average	Percent Change*
Agriculture, Forestry, and Fishing	$14,175	9.0	$13,010	1.1	$12,868	5.7
Mining	28,174	11.5	25,264	-1.0	25,519	-4.0
Construction	25,297	5.1	24,060	1.0	23,814	7.4
Manufacturing	27,295	5.0	25,994	2.5	25,356	5.0
Transportation and Public Utilities	33,177	4.0	31,892	5.2	30,308	4.8
Wholesale Trade	24,748	4.6	23,660	2.0	23,196	7.6
Retail Trade	12,732	2.6	12,408	3.6	11,974	5.7
Finance, Insurance, and Real Estate	22,455	9.3	20,546	4.1	19,741	8.1
Services	18,377	5.0	17,503	6.7	16,404	5.8
Local Government	21,524	6.3	20,246	4.9	19,306	7.8
State Government	24,855	12.5	22,084	9.5	20,164	1.9
Industry	**1987**		**1986**		**1985**	
	Annual Average	Percent Change*	Annual Average	Percent Change*	Annual Average	Percent Change*
Agriculture, Forestry, and Fishing	$12,179	7.3	$11,345	1.1	$11,228	4.6
Mining	26,589	8.8	24,436	2.6	23,806	6.8
Construction	22,182	8.3	20,474	-3.5	21,220	12.9
Manufacturing	24,149	4.6	23,076	5.0	21,968	5.3
Transportation and Public Utilities	28,928	6.3	27,206	3.3	26,345	8.4
Wholesale Trade	21,560	5.4	20,462	4.1	19,660	4.7
Retail Trade	11,323	6.3	10,649	7.1	9,946	3.1
Finance, Insurance, and Real Estate	18,261	7.2	17,028	7.2	15,885	8.9
Services	15,499	9.9	14,102	4.9	13,447	5.1
Local Government	17,909	6.0	16,903	4.0	16,253	4.6
State Government	19,785	4.6	18,920	3.8	18,232	4.5

* Percent change represents change from previous year.

Source: *Pennsylvania Department of Labor and Industry, Research Center for average annual wage statewide by industry, and by county and industry, calendar years 1985 through 1990. Data were derived from the Unemployment Compensation Program, which tracks approximately 95% of workers.*

Table 3.1-22. Total annual average wage for York County and the Commonwealth of Pennsylvania from 1985 to 1990.

Area	1990	1989	1988	1987	1986	1985	% Change 1985-1990
York County	$21,918	$21,056	$20,436	$19,333	$18,294	$17,674	24.01
Commonwealth of Pennsylvania	$23,262	$22,152	$21,325	$20,281	$19,218	$18,434	26.19

Source: Pennsylvania Department of Labor and Industry, Research Center. Data were derived from the Unemployment Compensation Program, which tracks approximately 95% of workers.

and substantially lower than the Commonwealth figure of 18 percent. Approximately 4 percent of the over-25 population in North Codorus have a graduate or professional degree, which is equivalent to the county-wide figure, but lower than the Commonwealth figure of 7 percent.

The Spring Grove School District is one of 16 public school districts located within York County. There are 10 existing schools in the Spring Grove School District. The closest schools to the proposed project site are located within a 1.6 km (1 mi) radius north of the site (Figure 3.1-14). The St. Francis school located 0.5 km (0.3 mi) south of the proposed site has been converted to an alternate use. Table 3.1-23 provides a listing of the schools located in close proximity to the proposed site.

York County public school enrollment increased from 48,951 in 1985 to 49,281 in 1990, remaining relatively stable. During that time, the percentage enrollment in private schools was approximately 10 percent and conversely, approximately 90 percent in public schools. In North Codorus, 62 percent of the students were enrolled in public schools at the pre-primary level, 92 percent at the elementary/high school level, and 64 percent at the college level; these data were consistent with Commonwealth and county enrollment trends. The relative enrollment percentages for elementary versus secondary schools changed from 1985 to 1990. In 1985, elementary schools accounted for approximately 49.4 percent of total enrollment and secondary schools accounted for 50.6 percent of total enrollment. However, in 1990, the percentage of total enrollment in elementary schools was 55.4 percent and the percentage

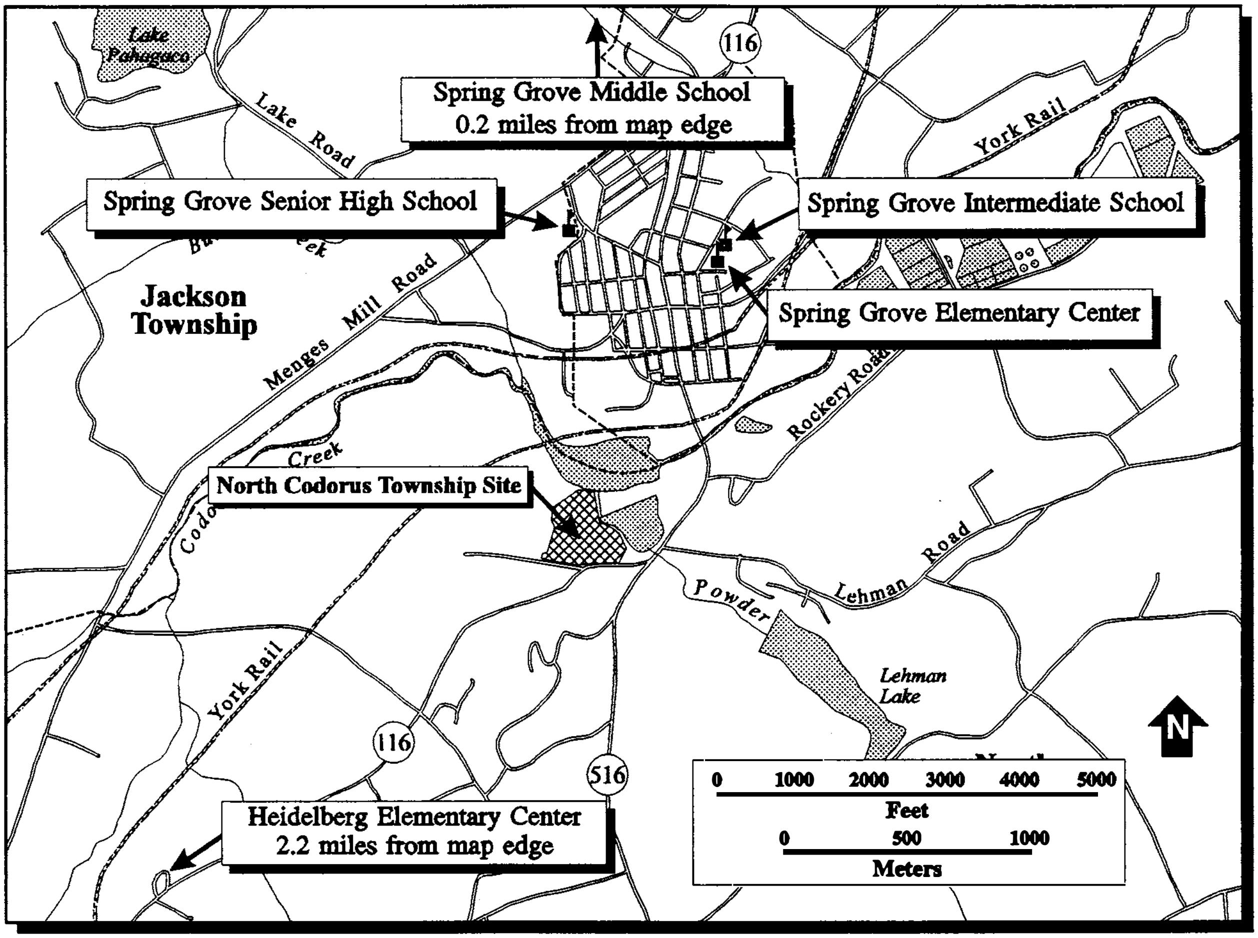

Figure 3.1-14. Location of schools in proximity to the North Codorus Township site.

enrollment in secondary schools was 44.6 percent *(York County Planning Commission, 1992).* The average pupil-to-teacher ratio for York County in 1987 was 17.9 to 1 *(York County Area Chamber of Commerce, 1994).*

In addition, the York County Vocational-Technical School offers specialized training. This vocational school experienced a decreasing total enrollment from 1985 to 1990. Lincoln Intermediate Unit #12, encompassing York, Adams, and Franklin Counties, provides special education services within existing public school systems. York College of Pennsylvania and the Pennsylvania State University-York Campus provide services for higher education *(York County Planning Commission, 1992).*

Table 3.1-23. Schools near the proposed site in North Codorus Township.

Heidelberg Elementary Center
R.D. #3, Spring Grove
Enrollment: 136
Total Capacity: 264

Spring Grove Elementary Center
College Avenue, Spring Grove
Enrollment: 580
Total Capacity: 595

Spring Grove Area Intermediate School
50 North East Street, Spring Grove
Enrollment: 686
Total Capacity: 646

Spring Grove Area Middle School
R.D. #4, Spring Grove
Enrollment: 663
Total Capacity: 913

Spring Grove Area Senior High School
Hanover and Jackson Streets, Spring Grove
Enrollment: 1,034
Total Capacity: 1,255

Source: Spring Grove Area School District, Superintendent's Office, 1994.

Health Care and Human Services

Three hospitals serve the project area: (1) York Hospital in York; (2) Memorial Hospital in York; and (3) Hanover Hospital in Hanover. All three hospitals have helicopter access. York Hospital serves as the trauma center for the county and Hershey Medical Center in Hershey, PA, approximately 45 km (28 mi) from the proposed site, serves as the regional trauma center. Transport to Hershey Medical Center from the site is approximately 20 minutes by helicopter. Generally, burn patients are treated at York Hospital; however, for severe burn treatments, patients are allowed to stabilize at York Hospital and then are transported via helicopter to the Johns Hopkins facility in Baltimore, Maryland.

The York County Emergency Management Agency is responsible for coordination of emergency medical services. Basic life support services closest to the YCEP site are provided by the Spring Grove Fire Company where two ambulances and volunteer support staff are available to respond to emergency situations. Advanced life support services are available from York Hospital and Hanover Hospital. In addition to these services, a network of volunteer rescue units known as Quick Response Teams also provides emergency services. The teams consist of Emergency Medical Technicians and typically provide services for ***first-responder medical emergencies***.

Police Protection

The North Codorus Township police force would be the primary source of police protection for the proposed site. The township police force consists of three full-time police officers headquartered at the Municipal Building. The Spring Grove police force would also be available; however, Spring Grove obtains police services from Jackson Township on a contractual basis. As a result, Jackson Township's eight police officers are available to serve Spring Grove on an as-needed basis as defined by the existing contractual agreement.

Fire Protection

York County is served by a total of 72 volunteer fire companies in addition to the paid fire protection staff at the city of York fire department. Generally, fire protection response includes support from a number of local fire companies depending upon equipment needs.

There are five volunteer fire companies in the North Codorus Township and Spring Grove area. The Spring Grove fire company is closest to the proposed site with a response time of approximately 2 minutes from alarm to site arrival. The Spring Grove company is equipped with two fire engines, one truck with an extendable ladder, one service vehicle for extra equipment, and two ambulances. The Jackson Township fire company has a response time to the site of 3 to 5 minutes and can provide two fire engines, one tanker, one service truck, and one brush truck (i.e., capable of negotiating rough terrain for brush fires). Three additional fire companies have response times to the site of 5 to 10 minutes: (1) the North Codorus Township fire company can supply two fire engines, two tankers, one brush truck, and one rescue truck; (2) the Porters Sidling fire company (south of the site) can provide two fire engines, one tanker, one service truck, one brush truck, and one attack truck; and (3) the Nashville fire company (north of the site) can supply one fire engine, three tankers, one brush truck, and one attack truck.

Parks and Recreation

York County owns and operates approximately 3,600 acres (1,460 hectares) of park land including the following six county parks: (1) Rocky Ridge Park; (2) Richard M. Nixon Park; (3) Apollo Park; (4) John Rudy Park; (5) Spring Valley Park; and (6) William H. Kain Park. The county also is participating in the development of a 28.8 km (18-mi) rail corridor between York and New Freedom for use as a recreational hiking, bicycling, and horseback riding trail *(York County Planning Commission, 1992)*.

There are three State Parks located within York County including the 71-acre (29 hectare) Samuel S. Lewis State Park, the 3,320-acre (1,340 hectare) Codorus State Park, and the 2,339-acre (946 hectare) Gifford Pinchot State Park. ***Lake Marburg is located within Codorus State Park. This location features activities which include boating, camping, fishing, hiking, hunting, and swimming.*** An additional 4,006 acres (1,620 hectares) of State Game Lands are located within York County *(York County Planning Commission, 1992)*.

The nearest recreational area to the proposed site is the small parcel of land used as a picnic and recreational area located adjacent to the southeast corner of the proposed site. This parcel of land is owned by the P. H. Glatfelter Company and ***is*** leased to the local Lions Club. It includes a public fishing area along the western bank of Kessler Pond *(ENSR, 1994)*.

A designated Class A wild brown trout cold water fishery (CWF) extends from Lake Marburg to the confluence of Codorus Creek with Oil Creek which is located 3.2 km (2 mi) upstream of the proposed project. The East Branch of Codorus Creek has also been designated a CWF. The remainder of the Codorus Creek system, including all reaches of the creek downstream of the proposed site, has been designated as a warm water fishery.

During the public comment period for the DEIS, several comments were received regarding the proposed project's potential impact on a recreation trail (a.k.a. bike trail) planned for this area of York County. DOE contacted Mr. Timothy Fulton, Chairman of the York County Rail Trail Authority, to obtain some historical background information on the proposed trail, and to determine the status of the trail's development.

In 1977, a York Metropolitan Area Bike Route Plan was prepared under direction from the York County Board of Commissioners. This study was initiated because of the increasing bicycling demands in the York Area. The study highlighted certain areas to be developed for bicycle paths and trails. However, for several years, funding constraints and other limiting factors precluded development of potential trails identified in that study. There were two major trails identified in the 1977 study: the 20.5-mile corridor along the former Northern Central Railroad right-of-way, which runs from the city of York to the Maryland State line; and the 15-mile corridor between the city of York and the town of

Hanover, PA, that was formerly the route for the York-Hanover trolley. The location of both trail routes is depicted in Figure 3.1-14a.

The trolley ceased operation years ago, and the corridor has since been acquired by the Metropolitan Edison Company (Met-Ed) for use as an electric utility corridor. The old trolley tracks have been removed, and a 13.6 kV local distribution powerline has been installed along the route. Following the Bike Route Plan Study in the late 1970's, Met-Ed signed an agreement with the York County Commissioners to allow for development of a recreation trail within this corridor, paralleling their 13.6 kV distribution line. Since that time, this agreement has not been implemented through active development on the part of York County.

In 1990, the York County Rail/Trail Authority was established by the York County Board of Commissioners. The purpose of the authority is to acquire, construct, improve, maintain, and operate projects for transportation and for parks, recreation, and grounds and facilities in and along the former Northern Central Railway line, along any other rail line, or other property acquired or held by the authority or other land that may be designated by the York County Commissioners. The goal of the authority is to provide a safe, convenient, non-motorized use transportation corridor for the Greater York Area, connecting parks, boroughs, townships, and open space.

The York County Rail/Trail Authority is considering the development of two major trails identified in the 1977 study. The highest priority trail is the 20.5-mile corridor along the former Northern Central Railroad right-of-way. The "greenway" runs from the city of York to the Maryland State line. This trail is currently under construction. The 15-mile former York-Hanover trolley corridor (now the Met-Ed trolley corridor) between the city of York and the town of Hanover is the second priority for development. This trail remains in the conceptual planning stage due to the higher priority of completion of the Northern Central Rail/Trail. No design work, pre-construction planning, or preliminary survey alignment work has been conducted on the York-Hanover route at this time, nor has a date been established to begin preliminary design work for the York-Hanover Rail/Trail.

Chairman Fulton indicated the rail/trails in York County are designed to accommodate hiking, biking, nature walks, bird watching, horseback riding, and handicap access. Their intended use is to provide a relaxed recreation opportunity for York County residents. The typical trail design would be a trail tread approximately 3m (10 ft) wide, excavated to a minimum depth of 46 cm (18 inches), and backfilled with compacted larger stone as a base course, with 5 to 10 cm (2 to 4 inches) of smaller

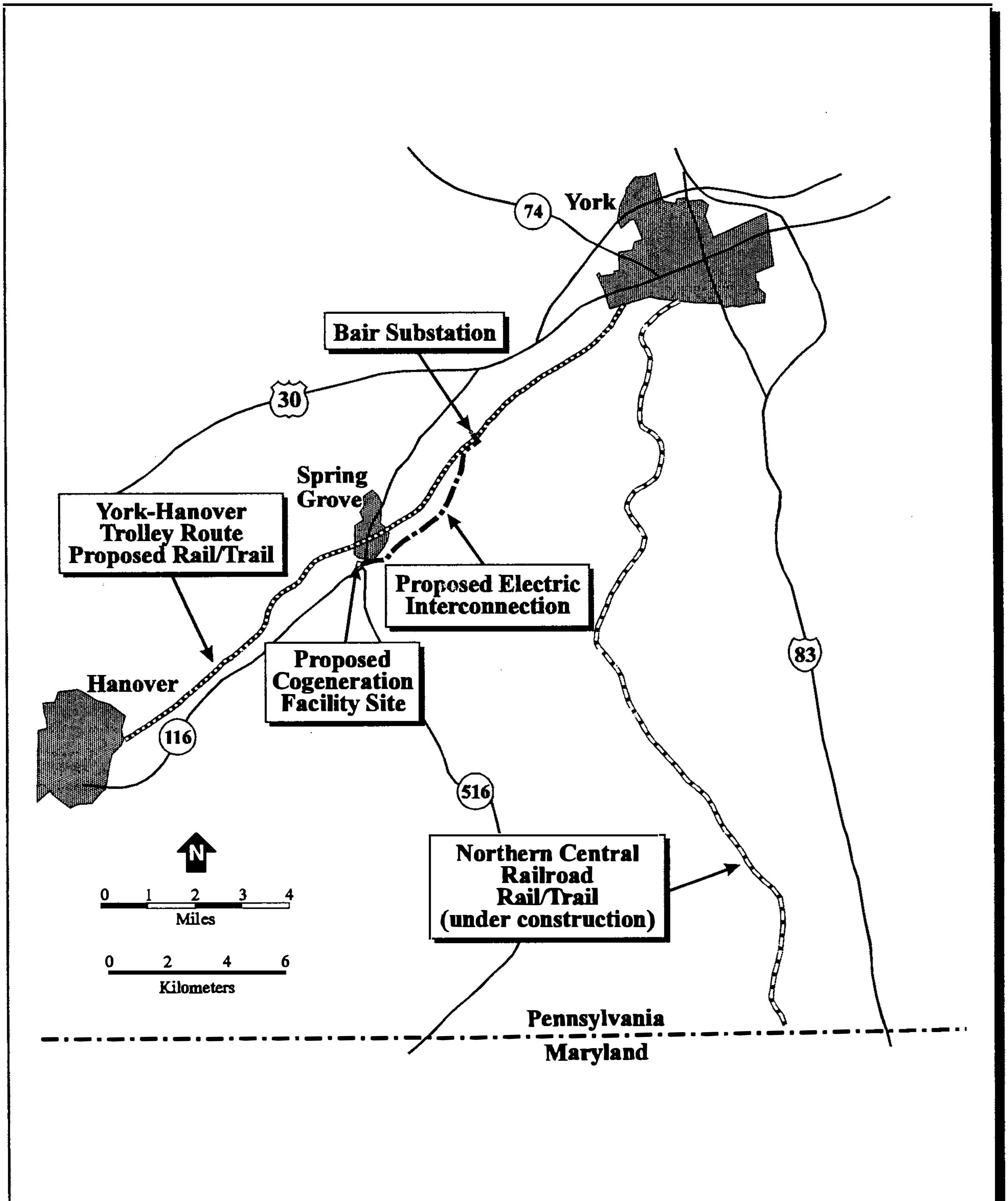

Figure 3.1-14a. Location of "Rail/Trail" routes in York County.

compacted stone above that, capped by a 5-cm (2-inch) surface layer of compacted finer material, similar to crusher screenings. This would provide an all-weather tread, hard enough to support bicycle and handicap access, but flexible enough to provide a good surface for jogging and horseback riding. This type of trail is typically located in utility corridors, so that "dual use," combining utility service and recreation, is possible utilizing the same land resources.

In the case of the proposed YCEP electric transmission line from the proposed Cogeneration Facility in Spring Grove to the existing Met-Ed Substation in Bair, the YCEP power transmission line would "share" the same corridor as the proposed rail/trail for approximately one-half mile, beginning at the point where the YCEP power transmission line would cross Sunnyside Road at the bridge across Codorus Creek, proceeding northeast to its terminus at Bair, at a proposed switchyard near the existing electrical substation. A typical cross-section of this corridor is provided in Figure 3.1-14b. The YCEP right-of-way would be approximately 30.5 m (100 ft) wide, would parallel the Maryland & Pennsylvania Railway right-of-way (which varies in width), and would be situated on the east side of the rail tracks. The existing 18-m (60-foot) wide Met-Ed right-of-way, which would contain the proposed trail, is on the west side of the Maryland & Pennsylvania rail tracks, and would parallel the YCEP power transmission line. The old York-Hanover trolley route would cross directly under the proposed YCEP power transmission line at one point, which is at the line's terminus at the proposed new switchyard in Bair (see Figure 3.1-14c).

Utilities

Spring Grove Borough is served by the Spring Grove Borough Water System. The York Water Company is the major regional water system within York County. Its service area covers almost half of the total area served by public water systems. York Water Company customers comprise approximately three-fourths of the total of water system users in York County *(York County Planning Commission, 1992)*.

York County contains a total of 19 municipal wastewater treatment plants. Spring Grove Borough is served by the Spring Grove Borough Sewer Authority Wastewater Treatment Plant *(York County Planning Commission, 1992)*. The Spring Grove system does not have adequate available capacity to handle the volume of wastewater expected to be produced by the proposed Cogeneration Facility. However, the P. H. Glatfelter Company wastewater treatment plant has adequate capacity to accommodate the volume of wastewater that would be generated by the proposed Cogeneration Facility.

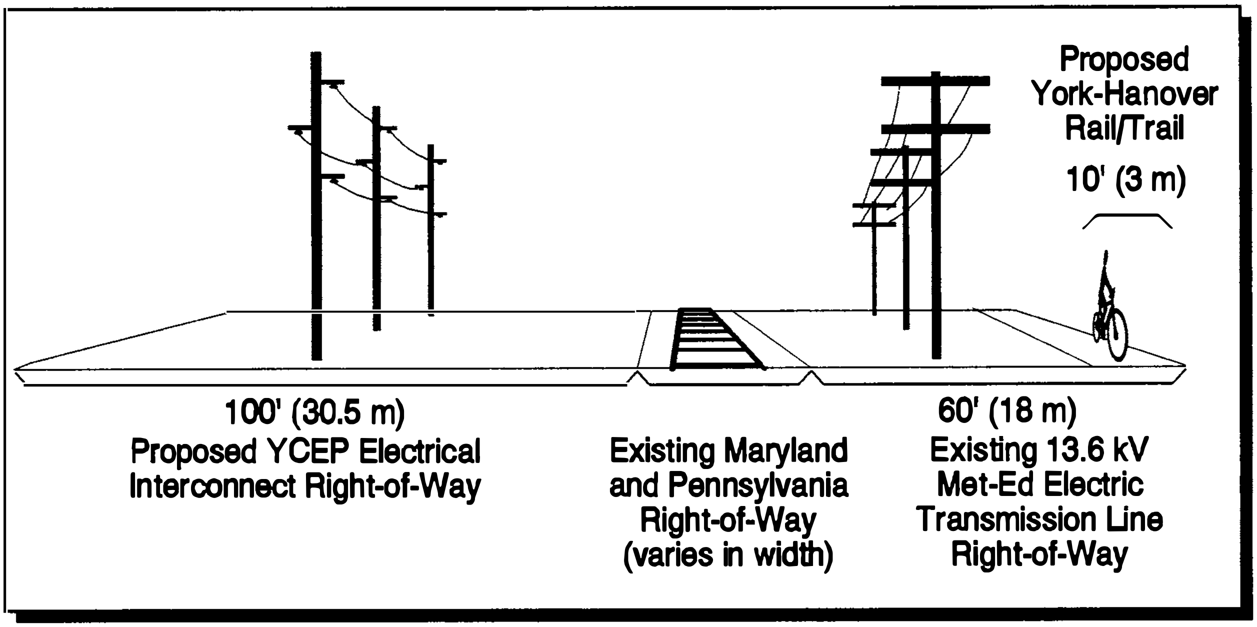

Figure 3.1-14b. *Typical cross-section of proposed utility, rail, and rail/trail corridor.*

York County is served by four electric companies: Adams Electric Cooperative, Inc., Met-Ed, Pennsylvania Power and Light, and Philadelphia Electric Company. Met-Ed serves the majority of York County *(York County Area Chamber of Commerce, 1994).*

Natural gas service is provided to York County by the Columbia Gas Company of Pennsylvania and the UGI Corporation. Columbia Gas Company of Pennsylvania serves most of York County *(York County Area Chamber of Commerce, 1994).*

3.1.13 Environmental Justice

On February 11, 1994, Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was published in the Federal Register (59 FR 7629). The order required Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Although no formal guidelines have yet been adopted to implement the Executive Order, EPA has published relevant studies and information on environmental justice and is leading an interagency ***Federal Working Group*** to address environmental justice ***issues and to provide guidance***. DOE is a participating member of this ***working group***. In July 1993, DOE issued a memorandum stating the Agency's commitment to implement the environmental justice executive order, provide information

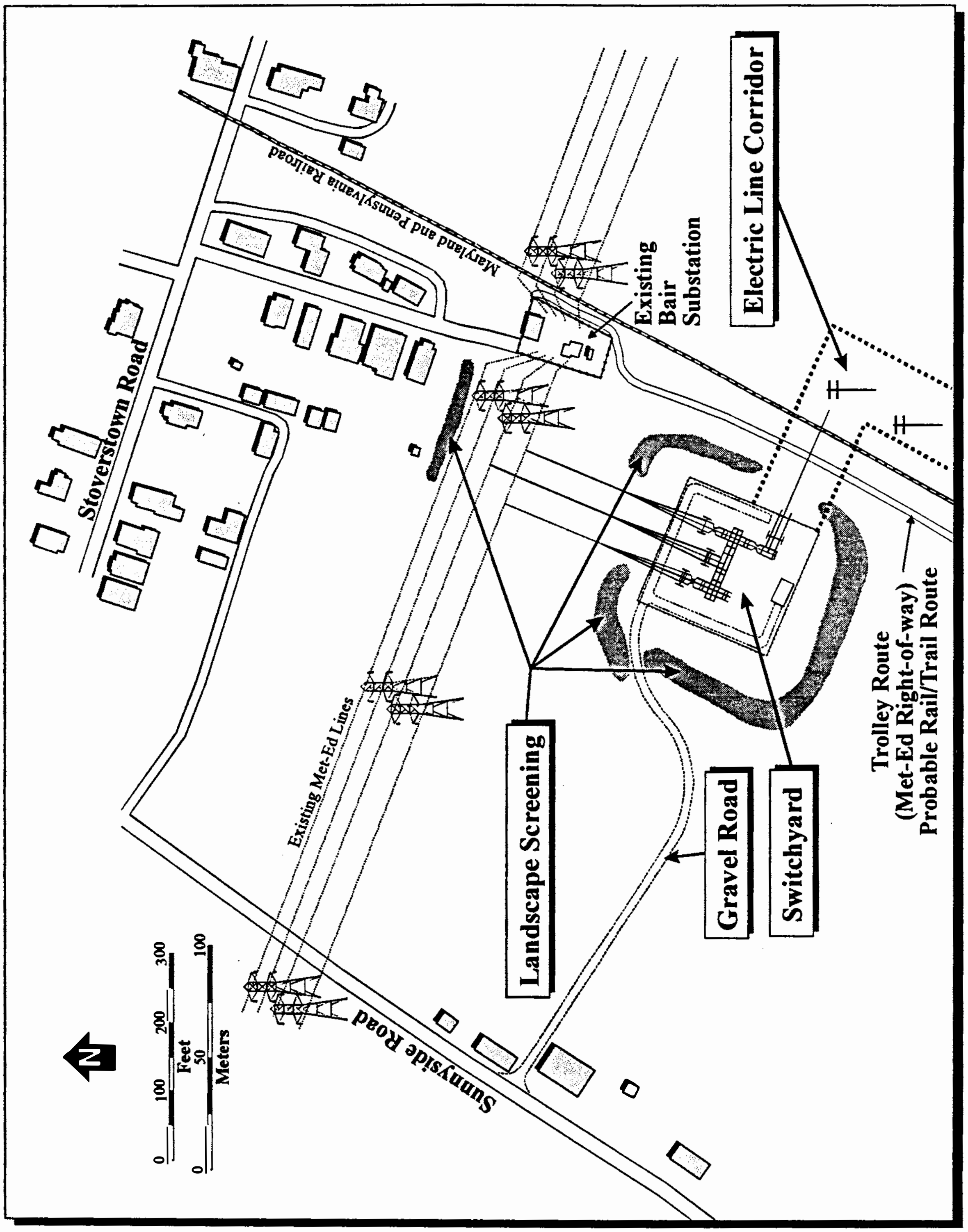

Figure 3.1-14c. ***Location of potential rail/trail alignment (Met-Ed trolley route) and proposed switchyard visual screening.***

to better understand environmental justice issues, and receive input on how DOE should consider environmental justice in its NEPA documents *(DOE, 1993b)*. ***In April 1995, DOE submitted its Environmental Justice Strategy to the Federal Working Group.***

For the North Codorus Township site, land use information and ***United States*** Department of Housing and Urban Development information was reviewed to identify minority and low income populations. The 1990 minority population in York County, including York City, was 4.6 percent (5,840 persons) of the total York County population. Exclusive of York City, the minority population in the county was 1.6 percent of the total county population. A minority community, as defined by the ***United States*** Department of Housing and Urban Development, is a census tract block group with a minority population greater than the county average, in this case 4.6 percent. No minority communities are present in either North Codorus Township, or in Heidelberg Township to the southeast of the proposed project site. The only minority community within a 10 km (6.2 mi) radius of the proposed site is in Jackson Township, approximately 5 km (3.1 mi) northeast of the proposed site. The minority population in Jackson Township is located in census tract 020520, block group 2, northeast of the town of Spring Grove, near the community of Nashville. The minority population in this block group is 12.2 percent. ***The consumptive pattern of this minority population is not known to include reliance on fish from the Codorus Creek for subsistence.***

The median family income in York County is $37,590 compared to a national median family income of $35,939. Low-income households are defined as households that earn fifty percent of the median income or less. Based on a review of census tract block groups in York County, no low-income concentrations (areas where more than 51 percent of the residents are low income) were identified. This includes all areas within the townships of North Codorus, Heidelberg, and Jackson. The closest low-income groups are approximately 8 km (5 mi) northeast of the proposed site in West Manchester Township.

3.1.14 Affected Environment of the Proposed Utility Corridors

This section describes the environmental and socioeconomic resources in the vicinity of potential utility corridors associated with the proposed site in North Codorus Township. The utility corridors are expected to cover approximately 6.1 km (3.8 mi). The affected environment described in this section pertains primarily to the electrical interconnection alignment, which extends beyond the boundaries of the P. H. Glatfelter Company property, since the affected environment for pipelines proposed to be located on P. H. Glatfelter property has previously been described.

3.1.14.1 Setting

Agricultural and rural residential land uses predominate in York County, with agricultural/open land comprising 73 percent of the land uses in York County. The Borough of Spring Grove, located near the proposed site, is not one of five projected future urban growth areas listed in the York County Comprehensive Plan *(York County Planning Commission, 1992)*.

The proposed site is located in a predominantly agricultural area of York County. In the immediate vicinity of the proposed site, there are scattered residences and farms, a monument business, a gas station, an autobody shop, the P. H. Glatfelter Company facility, and the Borough of Spring Grove, which is more densely populated than the remainder of land adjacent to the proposed site. The distribution of the population by race for North Codorus Township, Spring Grove Borough, Jackson Township, and York County is presented in Table 3.1-24.

The proposed site selected for the proposed YCEP Cogeneration Facility would be adjacent to the P. H. Glatfelter Company facility in North Codorus Township, York County, PA. The electrical connection alignment would be approximately 30.5 m (100 ft) wide and ***would*** extend from the site of the proposed Cogeneration Facility through Jackson Township, to the Bair substation operated by Met-Ed in West Manchester Township, approximately 6.1 km (3.8 mi) from the proposed site.

Visual resources within the study area are predominately industrial ***or*** rural countryside, with a few interspersed residential areas. A visual assessment was conducted to obtain a comprehensive analysis of the visual resources within the proposed project corridor. The assessment process included identifying and characterizing the visual resources, defining the visual corridor boundaries, and identifying critical viewpoints within these boundaries. These viewpoints were further analyzed to determine potential visual effects of the proposed electrical interconnection alignment.

Utilizing the Forest Service Visual Resource Management process, the following elements were evaluated in detail for the visual corridor: classification of landscape visual units, sensitivity levels of the visual units, extent of viewshed boundaries, visual qualities of the landscape units, and identification of critical viewpoints. The process provided a means to assess the existing visual conditions and ***to*** evaluate the potential visual impacts of the proposed interconnection.

Table 3.1-24. Population distribution by race for N. Codorus Township, Spring Grove Borough, Jackson Township, and York County.

Area	% Caucasian	% African American	% American Indian, Eskimo, or Aleut	% Asian or Pacific Islander	% Other
N. Codorus Township	99.38	0.16	0.04	0.25	0.17
Spring Grove Borough	99.41	0.00	0.11	0.16	0.32
Jackson Township	98.80	0.35	0.10	0.54	0.21
York County	95.22	3.23	0.12	0.62	0.80

Source: The Research Center of the York County Chamber of Commerce and the York County Industrial Development Corporation, 1994.

Landscape visual units provide a descriptive inventory of the landscape within the study area, and are determined according to the landscape character type and variety class. Character type is determined by assessing areas of land with common distinguishing characteristics of landform, rock formations, water forms, and vegetative patterns. Variety class is determined based on the degree of diversity of landform, water forms, rock formations, and vegetative patterns. Variety class is broken down into three classes, designated Class A (distinctive), B (common), or C (minimal). All the visual units within the corridor were classified as Class B or common, signifying areas where features have variety in form, line, color, and texture, but ***whose*** features tend to be nondistinctive and common throughout the character type.

The delineation of the viewshed boundaries ***was*** defined by the potential viewing distance from the location of the proposed electrical interconnection corridor. The limits of the viewshed boundary are often defined by vegetation and significant changes in the topography. All areas within the viewshed of the proposed electrical interconnection were classified with viewing distances of approximately 0.8 km (***0.5*** mi) or less.

Sensitivity level evaluation analyzes access points and use areas, viewing characteristics, and sensitivity level. Travel routes, use areas, and water bodies are identified and variables involving the viewer are defined. Based on these variables (e.g., number of viewers, viewer duration, angle and distance of viewer, degree and type of activity of viewers), sensitivity level importance may be determined. As with assessing landscape visual units, there are three levels of this parameter with Level 1 having the most sensitivity and Level 3 having the least. One area along the proposed corridor fits into Level 1 (i.e., a residential visual unit located near the Bair substation), the remainder fit into Level 2 (i.e., two residential units along Martin Road, two units adjacent to Martin Road where the proposed electrical interconnection would traverse the road, an agricultural hedgerow unit located within Game Commission land, and meadow and agricultural units along the portion of the proposed electrical interconnection prior to the substation area) and Level 3 (i.e., areas adjacent to two significantly visually impacted travel routes, York Road (Route 116) and Jefferson Road (Route 516).

3.1.14.2 Air Quality

The atmospheric conditions and air quality in the vicinity of the proposed utility corridors are the same as the characterization of air quality for the proposed site in North Codorus Township presented in Section 3.1.2.

3.1.14.3 Geology and Soils

This section discusses the geologic features, stratigraphy, topography, and terrain encompassing and surrounding proposed utility corridors.

Geology

The topography of the land in the vicinity of the utility corridors would be similar to that described in Section 3.1.3.1 for the proposed site in North Codorus Township. The elevation in the area of the proposed utility corridors ranges from 128.0 m (420 ft) to 143.3 m (470 ft) above msl.

The proposed electrical interconnection and utility corridors would be located close to a geologic contact where the Lower Cambrian Antietam Formation and Harpers Phyllite overlie the Upper Cambrian Kinzer

Formation (see Section 3.1.3.1 for further details). The geologic units found within the area of the proposed utility corridors are as follows:

- Harpers Phyllite — Lower Cambrian [thickness estimated at 243.8 m (800 ft)];
- Antietam Formation — Lower Cambrian [thickness estimated at 61.0 m (200 ft)]; and
- Kinzer Formation - Cambrian [total thickness estimated at 61.0 m (200 ft)] composed of three members (Earthy Buff limestone, pure limestone, and shale).

Soils

Twenty soil series would be traversed by the utility corridors. Two types, the Altavista silt loam (AaA) and Chewacla silt loam (Ck) soils, would be with the proposed electrical ***intra***connection, wastewater return line and water line, and steam and condensate return lines. In addition, the proposed water lines would traverse Manor channery loam (MfC2 and MfC3). All soil types, with the exception of the Altavista silt loam, would be traversed by the proposed 6.1 km (3.8 mi) electrical interconnection. A complete summary of the physical characteristics of each soil series are presented in Table 3.1-25. These characteristics describe how soils can affect land use. Slope is the inclination of the land surface from the horizontal. Permeability describes the ease with which a soil can transmit water or air. Productivity is an indicator of the soils capability for producing a specified plant or sequence of plants under a specified system of management.

3.1.14.4 Water Resources and Water Quality

This section describes water resources in the vicinity of the proposed utility corridors associated with the proposed North Codorus Township site.

Surface Water

The main water source near the utility corridors is Codorus Creek. A complete description of Codorus Creek and the surface waters associated with the proposed site in North Codorus Township is presented in Section 3.1.4.1.

Table 3.1-25. Soils traversed by the proposed utility corridors for the North Codorus Township site.

Soil Name	Slope (%)	Depth to Bedrock (in.)	Permeability	Available Water Holding Capacity	Water Table (when present)	Capability Subclass*	Productivity
Altavista silt loam (AaA)	0-3	48-84	moderately slow	high	1.5-2.5 ft	2W	high
Bedford silt loam (BdA)	0-3	48-84	slow	medium	1.5-2.5 ft	2W	moderate
Cardiff slaty loam (CaB2)	3-8	18-36	moderate	low	>6.0 ft	3E	moderate
Cardiff slaty silt loam (CaC2) (moderately eroded)	8-15	18-36	moderate	low	>6.0 ft	4E	low
Cardiff slaty silt loam (CaC3) (severely eroded)	8-15	18-36	moderate	low	>6.0 ft	6E	low
Cardiff slaty silt loam (CaD2)	15-25	18-30	moderate	low	>6.0 ft	6E	low
Chester silt loam (ChB)	3-8	48-72	moderate	medium	>6.0 ft	2E	very high
Chester silt loam (ChB2) (moderately eroded)	3-8	48-72	moderate	medium	>6.0 ft	2E	very high
*Chewacla silt loam (Ck)	---	48-72	moderate	medium	1.5-2.5 ft	2W	very high
Conestoga silt loam (CoB2)	3-8	48-72	moderate	medium	>6.0 ft	2E	very high
Conestoga silt loam (CoB3) (severely eroded)	3-8	48-72	moderate	medium	>6.0 ft	3E	very high
Duffield silt loam (DuB2)	3-8	36-72	moderate	high	>6.0 ft	2E	very high
Elk silt loam (ElA)	0-3	36-84	moderate	high	>6.0 ft	1	very high
*Glenville silt loam (GnA)	0-3	36-84	slow	medium	1.5-2.5 ft	2W	moderate
*Huntington silt loam (Hn)	---	>60-99	moderate	high	3.0-6.0 ft	1	high
*Lindside silt loam (Ls)	---	36-84	moderately slow	high	1.5-2.0 ft	2W	high
Manor channery loam (MfC)	8-15	24-48	moderate	medium	>6.0 ft	4E	moderate
Manor channery loam (MfC2) (moderately eroded)	8-15	24-48	moderate	medium	>6.0 ft	4E	moderate
Manor channery loam (MfD3)	15-25	24-48	moderate	medium	>6.0 ft	7E	low
*Melvin silt loam (Mm)	---	48-84	moderate	very high	0.0-1.0 ft	3W	low

*Denotes hydric soils and/or hydric soil inclusions.

*Capability Subclass Key:
1 - soils have slight limitations that restrict their use.
2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
3 - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.
6 - soils have severe limitations that make them generally unsuitable for cultivation.
7 - soils have very severe limitations that make them unsuitable for cultivation.
E - the main limitation is risk of erosion unless close-growing plantcover is maintained.
W - water in or on the soil interferes with plant growth or cultivation.

Source: SCS, 1991.

Groundwater

A complete description of groundwater characteristics relevant to utility corridors associated with the proposed site in North Codorus Township is presented in Section 3.1.4.2.

Floodplains

The location of the FEMA-mapped 100-year floodplain for Codorus Creek with respect to the proposed electrical interconnection corridor is presented in Figure 3.1-15. The ACOE controls portions of the land within this floodplain, and has leased approximately 1,540 acres (623 hectares) to the Pennsylvania Game Commission for wildlife conservation. Approximately 17.3 acres (7.0 hectares) of 1,759 acres (711.4 hectares) of land controlled by the ACOE (less than 1 percent) would be spanned by the proposed electrical interconnection corridor. Approximately 37 percent of the proposed electrical interconnection corridor would be located on land controlled by the ACOE. In addition, approximately 60 percent of the floodplains impacted by the electrical interconnection corridor would be contained within land controlled by the ACOE. Approximately 15.2 acres (6.2 hectares) of the affected Army Corps of Engineers-controlled land is cultivated and used to grow corn. The remaining acreage is covered by native vegetation.

3.1.14.5 Biological Resources and Biodiversity

Aquatic Ecosystems

According to Chapter 93, Water Quality Standards, Title 25 of the Pennsylvania Code, portions of the Codorus Creek drainage basin have been designated as cold water fisheries (CWF) and warm water fisheries (WWF). All reaches of the creek directly associated with the 6.1 km (3.8 mi) electrical interconnection are designated as WWF. A list of fish species and benthic macroinvertebrate species that are typically found in the warm water fishery reaches of Codorus Creek is presented in Section 3.1.5.1, along with a characterization of the quality of the Codorus Creek ecosystem in the vicinity of the proposed site, with respect to the organisms present.

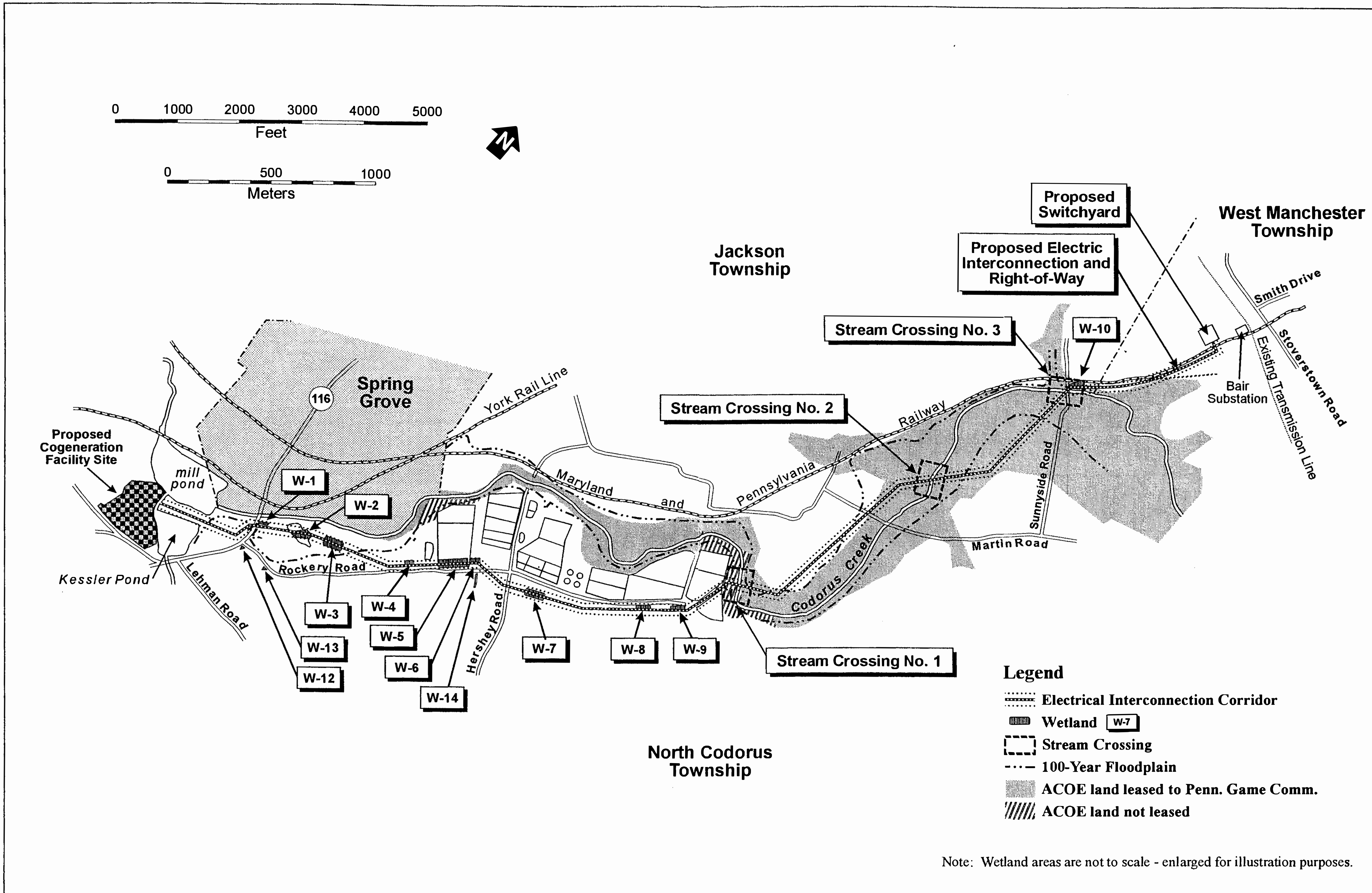

Figure 3.1-15. Proposed electrical interconnection corridor for the North Codorus Township site.

Terrestrial Ecosystems

The electrical interconnection, steam/condensate return lines, the potable water supply line, and the wastewater return/primary cooling tower lines located on YCEP and the P. H. Glatfelter Company properties, have ecosystems indicative of heavy industrial areas. Once off these properties, the various lines would traverse open water habitat, developed land, breakwater areas, and identified wetlands. Land use along the proposed electrical interconnection corridor includes industrial, agricultural, rural residential, undeveloped woods, undeveloped floodplains, and transportation. The proposed electrical interconnection right-of-way would also traverse several wetland areas, stream crossings, and ACOE flood control lands within the Indian Rock Dam Reservoir Project (Figure 3.1-15). Approximately 46 acres (18.6 hectares) would be affected due to right-of-way and maintenance activities associated with the ***electric interconnection*** corridor. In 1958, ACOE granted the Pennsylvania Game Commission (PGC) a 25-year license to use and occupy 1,539 acres (623 hectares) of the Indian Rock Dam flood control areas for wildlife management and public hunting. This license was renewed in 1983 for a second 25-year term. PGC is authorized to plant or harvest crops, either directly or by sharecrop agreement with local farmers, to provide food and/or habitat for the development and conservation of land, fish, wildlife, forests, and other natural resources.

The utility corridors would have three major stream crossings of Codorus Creek that would occupy approximately 1.6 acres (0.6 hectares) along the right-of-way (Figure 3.1-15). These crossings would have the potential to impact the dominant tree species and wildlife located along the Codorus Creek riparian zone. Dominant tree species in this zone includes green ash, American sycamore, black walnut, box elder, bladdernut, tulip tree, slippery elm, shagbark hickory, and black locust. The shrub understory is dominated by multiflora rose, common privet, white mulberry, blackberry, and Japanese honeysuckle vine. The wildlife typical of these areas includes white-tailed deer, gray squirrel, raccoon, groundhog, wood duck, mallard, ring-neck***ed*** pheasant, red-headed and red-bellied woodpeckers, common flicker, tufted titmouse, American robin, house wren, mourning dove, red-winged blackbird, mockingbird, American goldfinch, and northern cardinal.

The portions of the ACOE flood control lands that are maintained by the PGC contain a variety of vegetation maintained as hedgerows and cultivated fields. This vegetation includes white mulberry, autumn olive, black cherry, multiflora rose, blackberry, tartarian honeysuckle, wild grape, black and red raspberry, pokeweed, and goldenrod. Typical wildlife include white-tailed deer, gray squirrel, eastern cottontail, ring-necked pheasant, wood duck, and mourning dove.

Threatened and Endangered Species

The following Federal and State agencies were contacted to determine the presence of endangered or threatened plant or animal species within the proposed project corridors: ***United States*** Fish and Wildlife Service, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission - Division of Fisheries Management, and Pennsylvania Department of Environmental Resources - Bureau of Forestry. According to correspondence received from these organizations, no species of concern reside in the immediate vicinity of the proposed site or utility lines (Appendix E).

Biodiversity

A discussion of biodiversity applicable to the vicinity of the proposed utility corridors is presented in Section 3.1.5.4.

Wetlands

The wetland delineation of the proposed site, performed in fall 1993, included adjacent areas potentially impacted by utility infrastructure elements. A wetland assessment was conducted in April 1994 along the proposed 6.1 km (3.8 mi) electrical interconnection alignment and other utility corridors. Eleven wetland areas and three riverine wetlands were initially identified during this April 1994 study (Figure 3.1-15). The eleven identified wetlands compose a total of 1.4 acres (0.5 hectares) along the electrical interconnection, the majority of which (Wetlands 1,2, and 4-10) are associated with the developed lands along the P. H. Glatfelter Company property, and consist of scrub-shrub and emergent wetland vegetation. Wetland 2 is associated with a man-made overflow detention basin and is the largest of the scrub-shrub or emergent wetlands at a size of approximately 0.4 acres (0.2 hectares). The remaining scrub-shrub or emergent wetland areas (Wetlands 1 and 4-10) are natural and man-made drainage channels and compose approximately 0.2 acres (0.01 hectares) along the right-of-way. Wetland 3, a wooded-shrub-emergent wetland associated with an unnamed tributary of Codorus Creek, occupies approximately 0.7 acres (0.3 hectares) along the right-of-way. Wetlands 9 and 11 are not associated with the proposed right-of-way alignment. Because Wetlands 2, 5, 8, 9, and 10 are man-made wetland areas and not a result of required mitigation, these areas are anticipated to be non-Jurisdictional Wetlands and not subject to PADER or ACOE regulation. In addition, it should be noted that the proposed electrical interconnection corridor would not require placement of any utility poles within any identified wetland areas along the 6.1 km (3.8 mi) electrical interconnect route. However, coordination with the ACOE would occur to confirm the wetland assessment conducted and identify any subsequent mitigation actions required.

Three additional wetland areas (Wetlands 12-14) were identified in June 1994. The proposed utility corridor for the supply pipeline from P. H. Glatfelter Company to the YCEP cooling tower, and the return pipeline from the YCEP cooling tower to the P. H. Glatfelter Company's secondary treatment plant may impact identified Wetlands 12, 13, and 14 (*ERM, 1994b*). Approximately 0.2 acres (0.1 hectares) of wetland may be affected by placement of these pipeline facilities.

These shrub-scrub and emergent vegetation areas comprise less than 0.2 acres (0.1 hectares) along the proposed utility corridor, and are associated with developed lands along the P. H. Glatfelter Company property. The three major stream crossings along Codorus Creek span riverine wetlands bordered by narrow bands of riparian vegetation.

Wetland 12 is a small emergent and scrub-shrub wetland located just southeast of the intersection of York Road (Route 116) and a private road owned by the P. H. Glatfelter Company. Dominant vegetation within Wetland 12 includes hydrophytic species such as common elderberry, silky dogwood, jewelweed, bittersweet nightshade, marsh pepper, swampweed, moneywort, curled dock, and unidentified grasses. The wetland hydrology criterion was met by indications of periodically inundated soil conditions. In addition, it appears that the area may receive stormwater runoff from adjacent areas.

Wetland 13 is a forested/scrub-shrub/emergent wetland complex beginning approximately 30 m (100 ft) southeast of Wetland 12 and continuing in an eastern and northeastern direction along an unnamed tributary towards the P. H. Glatfelter Company's private road and ultimately to the West Branch of Codorus Creek. Predominant hydrophytic vegetation within Wetland 13 consists of smooth alder, boxelder, green ash, broad-leaf cattail, jewelweed, clearweed, reed canary grass, poison hemlock, skunk cabbage, and duckweed. Soils were saturated to the surface or inundated with up to 5 cm (2 inches) of water closer to a nearby tributary streambed.

Wetland 14 is an emergent and scrub-shrub wetland located along an unnamed tributary to West Branch Codorus Creek where the proposed pipeline intersects, and again follows the same route as the proposed electrical interconnection corridor. Located on the south side of Rockery Road, this wetland receives its hydrology from the same unnamed tributary that flows through a culvert under Rockery Road to its north side where Wetland 6 begins. The proposed water pipeline route parallels the southern shoulder of

Rockery Road in this area and will unavoidably pass through it. Dominant vegetation within Wetland 14 includes hydrophytic species such a silky dogwood, black willow, arrowhead, arrow-leaf tearthumb, poison ivy, shallow sedge, and jewelweed. Soils in the area were comprised of gravel and silts, likely due to past road construction and sedimentation from the adjacent pasture. The wetland hydrology criterion observed was inundated and saturated soil conditions.

On November 21, 1994, the ACOE inspected the delineation of waters of the United States, including jurisdictional wetlands, associated with the electric interconnect route. Their inspection determined that all wetland delineations had been identified correctly and accurately (correspondence from J. Johnson to S. Van Ooteghem dated March 13, 1995; see Appendix E).

3.1.14.6 Human Health and Safety

During the public comment period on the DEIS, several comments were received regarding the possible effects of electric and magnetic fields produced by the proposed electric transmission line and switchyard facility. This section provides a discussion on electric and magnetic fields, and a summary of the information relevant to health and safety issues associated with the proposed electric transmission developments in North Codorus and West Manchester Townships.

For two decades, concern has existed about the possible health effects of electric and magnetic fields (EMFs) associated with the transmission and distribution of electrical power. All electrical power lines, electrical wiring in buildings, and electrical appliances have associated EMFs. Electric and magnetic fields are found throughout nature and in all living things. The magnetic field of the earth, which makes a compass needle point north, is made by flowing charges or currents in the earth's molten interior. The molecules in our bodies and in all other living and non-living things are held together by fields. The messages that flow in our nervous systems also involve fields (Morgan, 1989).

In the late 1970's, public concern about extra-high voltage transmission lines shifted from objections to their aesthetic and ecological impacts to possible human health effects. At that time, many scientists believed that EMFs were so low in energy that they could have no biological impact leading to human health effects such as cancer. However, more recent laboratory research has suggested that these fields may cause certain effects in biological systems. Whether these effects are related in any way to carcinogenesis (causing cancer), possibly by promoting malignant behavior in cells whose genetic

components have been altered to be susceptible to such promotion, is highly speculative (Hendee & Boteler 1994).

Electric Power in the United States

Electric power is supplied throughout the United States by a distribution system that operates at various voltage stages. Public utilities produce power with generators typically operating at voltages between 13 and 26 kilovolts (kV), where one kilovolt = 1,000 volts. This power is shifted to 69-765 kV through "step up" transformers to permit transmission of electrical power at extra-high voltage, where energy loss is reduced. High voltage transmission lines then transmit electrical power over long distances at currents up to 2,000 amperes. The transmission lines terminate in a power substation where "step down" transformers reduce the voltage to 5-35 kV for distribution to local, usually pole-mounted, transformers. These transformers provide secondary circuits that deliver 115/230 volt electrical power to residences and work sites (Hendee & Boteler 1994).

The electric power that we use in North America is AC, or alternating current. An alternating current does not flow steadily in one direction – it alternates back and forth, in contrast to DC, or direct current, that is produced by batteries. This AC power alternates back and forth 60 times each second, and is referred to as 60 hertz (Hz) power. In Europe and Asia, the frequency of electric power is 50 Hz rather than 60 Hz (Morgan, 1989). Electric and magnetic fields can be characterized either by their wavelength or their frequency, which are related. The amount of energy an electric or magnetic field can carry depends on the frequency and wavelength of the field. The wavelength describes how far it is between one peak on the wave and the next peak. The frequency, measured in Hz, describes how many wave peaks pass by in one second in time. The wavelength of a 60-Hz field is about 5,000 kilometers, compared to the wavelength produced in microwave ovens, which is about 1 centimeter. Oddly enough, people can be easily shielded from the microwave's higher frequency (3 billion Hz) magnetic fields, but not from 60-Hz magnetic fields. This is because even though the frequency is much higher, the microwave's shorter wave can be blocked by materials such as thin metal sheets, whereas the much longer 60-Hz wave cannot (EPA, 1992b). Special metal alloys (MuMetal, low-carbon steel) are effective in blocking 60 Hz magnetic fields (Gan, 1994; Perry, 1994). However, the high costs of these materials limit their use in occupational settings.

Electric Fields

Most early interest in transmission line fields was concerned with the electric rather than the magnetic field component. An electric field is basically invisible lines of force that repel or attract electrical charges. Voltage on any wire produces an electric field in the area surrounding the wire, irrespective of whether an electrical current is flowing through it. The intensity or "strength" of an electric field is expressed in units of volts/meter (v/m), and varies directly with the voltage of the source creating it. Electric fields found near high voltage transmission lines are usually measured in units of kilovolts per meter (kV/m). For example, 1 kV/m means that there is a difference of 1 kV (1,000 volts) between two points in air, 1 m (3.3 ft) vertically apart (DOE, 1989b). When conducting objects, such a vehicles or people, are in an AC electric field, weak currents and voltages are induced in them (DOE, 1989b).

The only known health hazards from electric fields are shocks. When a person or animal contacts a conducting object isolated from ground within an electric field, a perceptible current (tingling sensation) or a shock may occur. This can also happen when the person or animal is insulated and the object is grounded. For years, utilities have mitigated problems associated with electric shocks from induced currents under transmission lines. Utilities have internal standards for grounding stationary objects such as fences, metal roofs, and antennas. The National Electrical Safety Code (NESC) specifies the maximum allowable short-circuit current to ground from vehicles, trucks, and equipment near transmission lines (DOE, 1989b).

In addition to nuisance shocks, another short-term effect is direct perception of the electric field. The alternating charges induced by an electric field on the body surface may cause a detectable sensation through hair vibration. In one study, 110 men were asked to describe their perceptions of various electric field strengths (Reilly 1979). Approximately 20 percent of the men could perceive a 9 kV/m field through stimulation of head hair.

Magnetic Fields

A magnetic field is produced from current in a conductor, and exists near a voltage source only when electrical charge flows through the source. Magnetic field intensity varies directly with the amount of current flowing through the source, and is measured in terms of lines of force per unit (i.e., magnetic flux density), most commonly expressed in units of gauss (G) or tesla (T) (Hendee & Boteler, 1994). Like miles and feet, gauss and tesla are just different units for measuring the same thing. The gauss *is a fairly large unit, so magnetic field strength is often reported in thousandths of a gauss or "milli" gauss (abbreviated mG). There are 10,000 gauss in one tesla (Morgan, 1989).*

In the home, EMFs are generated by a number of sources, including nearby high voltage transmission lines, primary and secondary overhead utility distribution lines, the electrical grounding system, household wiring, and electrical appliances. Generally, electric fields in the home are two to three orders of magnitude lower in intensity than those in the vicinity of high voltage transmission lines. However, magnetic fields near some appliances in the home may be considerably more intense than those experienced from transmission lines for at least two reasons: most people spend more time in close proximity to appliances than to transmission lines, and many appliances draw relatively high currents and thus produce significant magnetic fields (Hendee & Boteler, 1994). Table 3.1-25a compares magnetic field measurements of some ordinary household sources of EMFs. These measurements were taken from tables in EPA's publication "EMF In Your Environment" (EPA, 1992b). There are three sets of numbers listed for each appliance at each distance. First is the lowest measurement EPA obtained, followed by the median, and then the highest measurement taken. Table 3.1-25b displays typical magnetic field strength at various distances from powerlines for comparison. Both annual average and peak values are given because current levels can vary throughout the year due to fluctuations in electricity use.

Humans cannot perceive the 60-Hz magnetic fields produced by transmission lines. An extensive study involving 200 people found that they could not perceive magnetic fields more than 30 times stronger than those beneath transmission lines (DOE, 1989b). Tenforde (1985) found that very strong alternating current magnetic fields of 100 Gauss or more can cause a flickering sensation in human vision. The effect, called magnetophosphenes, disappears when the field is removed and there are apparently no reported harmful effects on the visual system.

The strength of both electric and magnetic fields decreases rapidly with distance. Electric fields can be shielded by trees, buildings, the ground, or other objects. Unlike electric fields, 60-Hz magnetic fields are not easily shielded, and can pass through most objects, including buildings and people. Therefore, power lines can contribute to the magnetic field found throughout homes near the lines. Savitz et al. (1988) reported that the average magnetic field measured throughout homes near "low current" power lines in Denver, Colorado, was around 0.5 to 1 mG. There is considerable interest in magnetic fields in residential and occupational environments. This is due to recent epidemiological studies suggesting a link between these fields and cancer. Among the factors influencing magnetic

Table 3.1-25a. Comparison of electromagnetic fields for household appliances.

EMF Source	Magnetic Field Measurements (in units of milligauss [mG])	Distance from Source			
		6 inches	one foot	two feet	four feet
Hair Dryers	Lowest	1	-	-	-
	Median	300	1	-	-
	Highest	700	70	10	1
Refrigerators	Lowest	-	-	-	-
	Median	2	2	1	-
	Highest	40	20	10	10
Color TVs	Lowest		-	-	-
	Median		7	2	-
	Highest		20	8	4
Electric Clothes Dryers	Lowest	2	-	-	-
	Median	3	2	-	-
	Highest	10	3	-	-
Vaccum Cleaners	Lowest	100	20	4	-
	Median	300	60	10	1
	Highest	700	200	50	10
Digital Clocks	Lowest		-	-	-
	Median		1	-	-
	Highest		8	2	1

The dash (-) in the above table means that the magnetic field measurement at this distance from the operating appliance could not be distinguished from background measurements take before the appliance had been turned on.

Source: EPA, 1992

field levels in the human environment are the following: amount of current carried on nearby power lines, how well the current is balanced, power-line configuration, and location of return currents (DOE, 1989b). For these reasons, magnetic fields, rather than electric fields, have been the primary focus of recent health effects research in this area.

Table 3.1-25b. Magnetic field strengths at various distances from powerlines.

LINE SIZE	Annual Current Levels	Magnetic Field Measurements in units of milligauss (mG)				
		Directly Beneath Centerline	50 Feet from Centerline	100 Feet from Centerline	200 Feet from Centerline	300 Feet from Centerline
115 kV	Average	20	5	1	0.3	0.1
	Peak	40	10	2	0.6	0.3
230 kV	Average	35	15	5	1	0.5
	Peak	70	30	10	2	1

Source: DOE, 1989b.

__Research Findings -- Potential Health Effects of EMFs__

For any environmental exposure, research on possible health effects typically includes short-term exposures to relatively high levels (acute), and long-term (chronic) exposures to relatively low levels. In recent years, the issue of health effects from electric and magnetic fields has been whether long-term, low-level exposures at home or at work contribute to cancer. Long-term exposures are those that persist over several years, typically constituting a large proportion of a person's lifetime. Short-term exposures may last for a portion of a day, or even a few months. Routine short-term exposures to electric and magnetic fields occur to people who regularly use electrical devices.

In order to analyze the possibility that any environmental agent, such as 60-Hz electric and/or magnetic fields (EMF), may present a health risk to humans, the standard approach is to consider the results from epidemiologic and laboratory research studies. Epidemiology examines the relationships between disease and exposures in groups of people in their usual environment. Laboratory research investigates intact animals, isolated cells, or tissues that have been exposed to electric or magnetic fields. These two approaches have different strengths and limitations, so they are generally used together to provide balanced information about environmental exposures.

Epidemiologic Studies

Epidemiology is the systematic study of the patterns of disease within human populations and the factors that may determine the occurrence of disease. The strength of epidemiology studies is that they study people. The limitation is that they are observational; there is typically no experimental control over the EMF exposure, or over other factors that may affect the health outcome such as heredity, diet, and the general environment.

Some of the first epidemiological studies associated with EMFs suggested a relationship between proximity to electrical transmission and distribution lines and certain forms of cancer. To date, approximately 20 epidemiological (residential) studies have investigated this relationship. Cancer is a group of many different diseases, each with different causes and characteristics. Research has shown, for example, that causes of lung cancer, largely cigarette smoking and also air pollution, are very different from the likely causes of colon cancer, largely attributed to the nature of our diets. Hereditary factors are among the several factors that contribute to many common cancers, and recent biological research has begun to identify specific genes linked with certain cancer types.

Childhood cancers and adult cancers are considered distinctly different diseases, and even cancers of the same anatomical area, such as brain cancer, do not have identical medical characteristics. It cannot be assumed that adult and childhood cancers share the same causal factors.

Long-Term Residential Exposure Studies. *The first report, published in 1979 by epidemiologist Nancy Wertheimer and physicist Ed Leeper – analyzed death certificates in relation to power distribution lines in residential areas of Denver. Their results showed a weak but positive association (odds ratios of 1.6-2.2) between "high current configuration" households and cancer in children 18 years old or less, compared with a control group (Wertheimer & Leeper, 1979). "High current configuration" households were defined as: (1) homes situated less than 39.6 m (130 ft) from three-phase, large-gage primary wires; (2) homes situated less than 19.8 m (65 ft) from an array of three to five small-gage primary wires; and (3) homes situated less than 15.2 m (50 ft) from first-span secondary wires. This study has been very controversial because of its indirect assessment of exposure and the presence of several uncontrolled variables ("confounders") that could have affected the results (Hendee & Boteler 1994). The Wertheimer-Leeper study found that children who died from cancer were more likely to live within 39.6 m (130 ft) of high current lines (for example, near transformers) than other children.*

In 1982, these same researchers reported a similar correlation for adult deaths from cancer (Wertheimer & Leeper, 1982). Since then, other teams have tried to replicate the results of the Denver study by studying inhabitants of Rhode Island, Stockholm (Sweden), Washington State, and various areas in England. The results of the followup studies were these: one study confirmed the Denver findings; four studies found a correlation that failed to meet the statistical criterion of significance; one study gave ambiguous results; and one study (Rhode Island) showed no correlation. However, when the Rhode Island study was re-analyzed by Dr. Wertheimer and Mr. Leeper, they found that there was a statistically significant, though weak, association (Harvard Medical School Health Letter, 1990).

Dr. Wertheimer and Mr. Leeper published another study in 1986 that found the use of electric blankets and waterbed heaters correlated with spontaneous abortions, birth defects, and reduced birth weight of infants exposed to these devices in utero. Strong electromagnetic fields are produced at the surface of electric blankets--fields greater even than those occurring beneath a typical residential power distribution line--and the duration of exposure is relatively long. This study has not been repeated, so it awaits confirmation, and it was not designed in a way that would indicate whether sleeping at a higher temperature, rather than exposure to 60-Hz fields, was the important variable. Lower levels of magnetic fields in homes are not reported to be associated with adverse pregnancy outcomes (Savitz & Anath, 1994).

Swedish epidemiologist Anders Ahlbom, a professor of environmental medicine at the Karolinska Institute in Stockholm, published a study of childhood cancer and EMFs that had two major advantages over earlier investigators. His team knew how much electricity had actually been carried by the transmission lines they studied, and second, a detailed government registry enabled them to identify and select children properly. This investigation has reached the same conclusion as its predecessors: children with leukemia but not other cancers were about two and a half times as likely to live very near high voltage power lines than other children (Harvard Medical School Health Letter, 1993).

Long-Term Occupational Exposure Studies. *Two studies completed in the past year provide more reliable information with the use of many measurements, systematically collected, on a large number of workers. These studies are the joint Canada/France study (Thériault, 1994), and the study of five utilities in the United States (Savitz and Loomis, 1995). Canadian and French researchers based their case-control studies on over 220,000 male workers in 2 electrical utilities in Canada and 1 in France. The study includes assessment of a worker's magnetic field exposures for as long as they had worked* *at the utility, and included an estimate of chemical workplace exposures as well. Measurements were taken on workers in representative jobs by having volunteers wear a magnetic field recording meter for a full work week.*

Both of these studies are also important because they provide information about most varieties of cancer, including the more common ones in human populations, with respect to various levels of exposures to magnetic fields. In the Canada/France study, 31 different types of cancer were analyzed; for 29 of these, no association at all was seen with magnetic fields. No association was reported with combined leukemia for all of the utilities considered together, or for individual utilities. When all brain cancers were evaluated together, no convincing association was reported with any exposure group or utility. That is, workers who had these cancers did not have higher cumulative exposures to magnetic fields. For one of the three utilities, workers with one kind of leukemia did have higher estimated lifetime exposures to magnetic fields.

The 5-utility study (United States) examined almost 140,000 men who worked for 5 major United States electric companies over a 36-year period (Savitz and Loomis, 1995). Similar to the results of the Canada/France study, workers at these utilities had far fewer deaths from cancer and other diseases than men in the general population. A goal of the 5-utility study was to determine whether deaths from leukemia and brain cancer were found more frequently among men whose jobs involved higher exposures to magnetic fields. To do this, the researchers examined the cancer mortality experience among the workers according to their estimated exposure to magnetic fields during their working years.

No overall association between leukemia in electric utility workers and magnetic field exposure was found in this study. This is consistent with a smaller study of Southern California Edison Workers in 1993 (Sahl et al, 1993). However, an association between brain cancer and estimated cumulative exposure to magnetic fields was reported by Savitz and Loomis (1995), although this relationship was not reliably identified in either of these previous studies. The reported differences between the results of this study and prior studies were one of the factors that prompted these researchers to state, "Firm conclusions regarding whether magnetic fields cause cancer, based on our study alone or on the entire literature, are not yet possible."

A few other cancer types have occasionally and inconsistently been reported in other studies as associated with electrical work (male breast cancer), or hypothesized to be affected by exposure to 60-Hz fields (breast cancer, prostate cancer). Neither the Canada/France or the five-utility study reported *any association with magnetic fields for prostate cancer, or male breast cancer (Thériault et al, 1994; Savitz and Loomis, 1995). To date, the evidence for an association between magnetic fields exposures and breast cancer does not support the hypothesis that exposure affects these cancers.*

Laboratory Studies

In contrast to epidemiology studies, typically exposures and other variables in laboratory studies are strictly controlled. In laboratory experiments, the investigator determines the nature and intensity of the exposure under study, and also has control over the food intake, water, temperature, humidity, and the genetic makeup of the animals. Laboratory studies in whole animals and isolated cells and tissues have examined the effect of exposure on the various steps of cancer development. Other research has been prompted by a hypothesis that magnetic fields inhibit the nighttime increase in melatonin and that this could facilitate development of cancer. Studies of cancer and of effects on melatonin levels are summarized in this section.

Studies of cancer. Cancer development is generally believed to follow a series of steps: first, initiation, followed by the promotion and progression of initiated cells to cancer. Effects of 60-Hz electric and/or magnetic fields on tumor initiation has been investigated in whole animals and in cells in culture. The results have not shown that electric and/or magnetic fields can damage DNA - the genetic material in cells - or initiate cancer (Benz et al, 1987; McCann et al, 1993).

To study tumor promotion by magnetic fields in animal model systems, animals were first exposed to a chemical initiator and then to 60-Hz magnetic fields. In well-characterized mouse skin models in two different strains of mice and in a liver tumor model, magnetic fields were not tumor-promoters (Stuchly et al, 1991, 1992; McLean et al, 1991: Rannug et al, 1993a, 1993b, 1994). The studies in the rat mammary tumor model system are suggestive of a link at high doses, but further research is necessary to evaluate effects of exposure in this model.

Long-term animal bioassays examining the potential carcinogenicity of magnetic fields are considered important in assessing potential human health risk. Preliminary results of a study in which rats were exposed to 50 mG, 5,000 mG, or sham-field exposures for up to 2 years or until death and examined for evidence of tumors in organs throughout the body have been made public. Magnetic field exposures did not increase the incidence of cancer in any of the organs examined above that of the unexposed control animals (i.e., those animals exposed to the "sham"-field) (Yasui et al, 1993). Other *studies are currently in progress. These experiments will involve continuous exposures of specific strains of laboratory mice and rats to 60-Hz magnetic fields of 20 mG, 2,000 mG and 10,000 mG. Since the exposures are long term and involve extensive analysis of the data, results from these experiments are not expected for another 4 to 5 years.*

Another approach for determining whether exposure to electric and magnetic fields has an impact on human health is to evaluate cellular function. Biochemical responses that have been observed in isolated cells exposed to specific regimens of electric and/or magnetic field exposure include changes in levels of calcium especially in mitogen treated lymphocytes, changes in gene expression, changes in the hormone melatonin, and changes in cellular proliferation. Each of these topics is an area of active research. Because the data as a whole in these areas is inconsistent and inconclusive at present, it is unresolved whether or not any of these changes, if confirmed, results in an impact on human health.

Effects of electric and magnetic fields on melatonin. *Over the past 15 years, scientific research has been exploring the effects of both AC and DC electric and magnetic fields on melatonin, a hormone produced by the pineal gland. Although there is as yet no proven role for melatonin in human physiology, decreased melatonin has been implicated in increased cancer risk, especially for hormone-related cancers such as breast cancer.*

Scientists have exposed a number of different species, including humans, to electric or magnetic fields and have then analyzed the subjects' levels of melatonin. For example, in laboratory rats, nighttime melatonin levels in the blood were decreased after exposure to magnetic fields at 10 mG for 6 weeks. This effect was transitory, in that melatonin levels returned to normal in a week after exposure ceased, and remained at the usual level when tested 6 weeks after exposure (Kato et al, 1994). In contrast to the observations in rodents, no effects on melatonin secretion were reported in a study of lambs reared under power lines (Stormshak et al, 1991). Graham et al (1993) reported that serum melatonin levels of a group of human subjects exhibited no overall response to intermittent exposures to 10 mG or 200 mG 60-Hz magnetic fields at night for 8 hours. While some studies have reported decreases in melatonin levels in animals after exposure to electric or magnetic fields, others have not (Reiter, 1993). Within the same laboratories, it has been hard to replicate results, for reasons yet unknown. To date, there is no convincing evidence that electric or magnetic fields decrease melatonin levels in humans, and the role of decreases in melatonin levels in hormone-related cancers is presently unclear.

Short-Term Exposure Studies. *Several types of studies provide information on possible effects of short-term exposure to electric and magnetic fields. Studies of people include epidemiologic studies of electric utility workers and laboratory studies of volunteers who are exposed to specific levels under controlled conditions. Studies in laboratory animals have used exposures that are 10- to 100-fold greater than fields found in the environment (or expected to be emitted by the proposed switchyard and transmission line facilities), a standard approach to obtaining thorough information regarding potential effects of exposure. Except for some physiological responses such as changes in melatonin levels discussed in the previous section, laboratory animals show few responses to short-term exposures to electric or magnetic fields, and none are known to be adverse.*

Controlled laboratory studies have shown few biological changes in human volunteers exposed to combined electric and magnetic fields (9 kV/m and 200 mG) for 3 to 6 hours. The changes reported were a slowing of the heartbeat and modest change in the brain wave; these changes are within the normal range and do not last. Tests of alertness and mood did not differ among people exposed to magnetic fields (100, 200, or 300 mG) and electric fields together (6, 9, or 12 kV/m) for 3-hour periods (Graham et al, 1993; Graham et al, 1990). Human subjects in these studies have not reported symptoms of stress, and chemical changes indicating stress did not occur in the people exposed to fields. None of the numerous individuals in studies of perception of, or response to, electric and magnetic fields reported physical effects such as headaches, nausea, dizziness, fatigue, numbness, or any effects on mood or the senses of any sort (Graham et al, 1990).

Acute Effects on Humans - Short-Term Exposure

Neither electric nor magnetic fields are known to affect an individual's behavior or mood, or cause any physical feeling or symptoms at the levels produced by power lines, or by home and office appliances. Nor are such complaints reported by individuals who may be exposed more frequently or at higher levels as a result of working to maintain or repair electrical equipment.

Guidelines for Magnetic Field Exposures

The reviews by scientists for regulatory agencies in various states and countries have not concluded that electric or magnetic fields at environmental levels pose a hazard; consequently, exposure limits have not been set in the United States, Great Britain, Sweden, or Denmark, or any of the other countries that have reviewed the data. There are no Federal health standards in the United States for exposures *to 60-Hz electric and magnetic fields, although some counties in seven states, Florida, Minnesota, Montana, New Jersey, New York, North Dakota, and Oregon, have set limits on EMFs from high-voltage transmission lines -- but these limits are arbitrary and vary from state to state (Hendee and Boteler, 1994). A brochure about EMF prepared by the National Institute of Environmental Health Sciences and DOE states: "We do not know at this point whether EMF exposure from power frequency sources constitutes a health hazard. Therefore, we cannot determine levels of exposure which are 'safe' or 'unsafe'" (DOE, 1995).*

Voluntary guidelines for magnetic field exposure have been proposed by several professional and scientific organizations in the United States and abroad. These limits are at levels higher than those typically found near, or even under, transmission lines. For example, the International Committee on Non-Ionizing Radiation Protection has proposed magnetic field levels of 5,000 mG, and 1,000 mG as general limits for occupational and public exposure, respectively, to 50/60-Hz magnetic fields (ICNIRP, 1993).

These scientists noted that currents flow naturally in certain portions of the body (e.g., heart and brain) due to normal physiologic activity. The basis of the IRPA exposure guidelines is to limit continuous electric or magnetic field exposures to levels below those that induce currents comparable to these natural currents. This group of scientists did not find sufficient evidence to conclude that 60-Hz fields pose a cancer risk.

During the public comment period on the Draft Environmental Impact Statement, one commenter stated that he had contacted the Region 3 Office of the EPA for information about EMFs, to find out whether EPA had recommendations for safe distances from power lines. DOE contacted the EPA in followup to this and other comments made during the public hearing. An official of the EPA stated that EPA's policy regarding EMFs is to refrain from issuing guidance, making recommendations for safe distances from electric transmission lines, or setting health effect exposure levels to EMFs. The EPA official said he does advise inquiring parties that they (EPA) consider a magnetic field intensity of about 2 milligauss to be "background" for the average home. However, EPA will not recommend that any particular action be taken if background field intensity is above this value.

Without standards to guide the reduction of EMFs, researchers and public-policy experts have focused predominantly on "prudent avoidance." Prudent avoidance has been suggested by Morgan (1989) as an intermediate approach to decision-making in the face of present uncertainties about EMFs and *cancer. "Avoidance" in this context means doing things to keep people isolated from EMFs; "prudent" means undertaking only those avoidance activities that carry a modest and well-defined cost. Examples of prudent avoidance (Hendee and Boteler, 1994) include the following suggestions:*

1. *Route new transmission lines so they avoid people;*
2. *Widen transmission line rights-of-way;*
3. *Design distribution systems to minimize associated fields;*
4. *Develop new approaches to house wiring that minimize associated fields; and*
5. *Redesign appliances to minimize or eliminate fields.*

Summary

The February 1994 issue of Health Physics carried an article by Dr. William R. Hendee, Ph.D, a Senior Associate Dean for Research and Vice President of Technology at the Medical College of Wisconsin and former Vice President for Science and Technology at the American Medical Association. In his article, Dr. Hendee reviewed all the laboratory and epidemiology studies in the scientific literature on the health effects of EMFs. His summation reflects the views of the majority of EMF researchers, and governmental public health agencies.

> *Laboratory research shows that EMFs produce weak electric currents in the body. Some studies have shown that EMFs produce a variety of effects within cells, such as altering calcium channels and other structures in cell membranes and suppressing the secretion of melatonin, a hormone that may be associated with certain cancers and depression. But most of these studies have been contradictory and have not been linked to human health effects. Without a biological model to substantiate a correlation suggested by epidemiological studies, it is difficult to draw any real conclusions between EMFs and health risks, much less determine what constitutes a safe level of exposure.*

Prudent avoidance is the practice of reducing human exposure to magnetic fields when it is easy and relatively inexpensive to do so. In the case of the YCEP proposed electrical interconnection, the preferred corridor route affects the least amount of private property, in terms of proximity to residences and amount of encumbrance. It seems to be the most favorable route for avoiding local residents.

The property boundary of the closest residence to the electric interconnection corridor and switchyard would be approximately 137 m (450 ft) from the boundary of the proposed switchyard, and approximately 55 m (180 ft) from the point where lines from the switchyard would connect to existing

Met-Ed transmission lines. A description of the potential magnetic field intensities produced by the proposed electric facilities is provided in Section 4.1.14.6. Also, a discussion of potential options for minimizing effects of these facilities on private property in the Bair area is included in Section 4.1.14.9.

3.1.14.7 Noise

The noise monitoring study performed to characterize existing noise levels on and in the vicinity of the proposed site included the area for proposed utility corridors (see Section 3.1.7). There are no formal Federal, State, or local noise level criteria applicable to the proposed project area. Noise levels were found to be related to existing noise from traffic on York Road (Route 116) and current operations at the P. H. Glatfelter Company paper mill.

3.1.14.8 Transportation and Traffic

Transportation facilities in the study area consist of roadways and railways. This section provides a description of the facilities potentially affected by the development of the proposed utility and electrical interconnection corridors.

The primary roadways in the area are York Road (Route 116) and Jefferson Road (Route 516), both of which are two-lane highways with intersections controlled by traffic signals or lights. Secondary roadways in the study area are two-lane state roads (SRs) and private roads which may be paved or unpaved. The existing traffic patterns on these roads generally indicate less than 50 percent capacity during peak demand periods.

The Maryland & Pennsylvania Railroad and Yorkrail lines, each under the same ownership, both service the P. H. Glatfelter Company property. The Yorkrail line would be able to provide service to the proposed site.

3.1.14.9 Land Use

This section describes existing land use features and land use trends and controls applicable to the utility corridors associated with the proposed North Codorus Township site.

Existing Land Use

Utility Pipeline and Internal Electrical Intraconnection The electrical intraconnection between the Cogeneration Facility at the proposed site and the Met-Ed line at the P. H. Glatfelter Company plant would be elevated over company property which is cleared of vegetation. The dominant existing land uses of the area proposed for the electrical intraconnection is light industrial use and fresh water impoundment. Currently, no structures or facilities occupy this land, other than the existing electrical Met-Ed power transmission line and electrical substation. The open land has primarily served as a staging area and temporary material storage site. The mill pond, which serves as both the source of Spring Grove municipal water and industrial process water for P. H. Glatfelter Company, would be traversed by the electrical intraconnection corridor.

The internal electrical intraconnection (See Figure 2.1-10) would be approximately 228.6 m (750 ft) long, located within existing rights-of-way for roadways, railbeds, and the existing Met-Ed electrical interconnection for the P. H. Glatfelter Company. Steam and condensate lines serving the facility are depicted in Figure 2.1-12 and would be approximately 685.8 m (2,250 ft) in length. They would be sited within an existing aboveground utility raceway within the land uses of the P. H. Glatfelter parcel (a highly disturbed area).

The primary cooling line, wastewater return line, and water supply line would be constructed within a common pipeline corridor for roughly the first 213.4 m (700 ft) off-site, at which point the water supply line would continue for an additional 762 m (2,500 ft) to tie-in at Spring Grove Water Company (see Figure 2.1-13). The primary cooling water and wastewater return lines would continue east crossing to the south side of Rockery Road until these lines also separate, with the wastewater return line turning north to the P. H. Glatfelter Company equalization basin (see Figure 2.1-17). The primary cooling water line would continue along the south side of Rockery Road eventually connecting with the P. H. Glatfelter effluent discharge as depicted in Figure 2.1-16. The overall length of the primary cooling water line, excluding the common pipeline corridor, would be approximately 1,341.1 m (4,400 ft).

Electrical Interconnection Corridor The 6.1 km (3.8 mi) electrical interconnection corridor is depicted in Figure 2.1-11. The proposed electrical interconnection corridor would begin within the P. H. Glatfelter Company industrial property. The line would cross Rockery Road and then follow the road right-of-way along wooded and agricultural uses leased by the P. H. Glatfelter Company. Once the line exits the property, it would parallel riparian land adjacent to the West Branch of Codorus Creek and then enter agricultural land near Martin and Sunnyside Roads. The electrical interconnection would terminate in the Bair area of West Manchester Township in an agricultural and rural residential area.

Approximately 37 percent [17.3 acres (7.0 hectares)] of the electrical interconnection route would span flood control lands controlled by the ACOE. The flood control property controlled by the ACOE is part of the Indian Rock Dam Reservoir project which was constructed by the Corps of Engineers on the West Branch of Codorus Creek in 1939 for the protection of residents and properties in York from flood waters. The Indian Rock Dam project area is 1,759 acres (711.9 hectares). According to ACOE, this land use is expected to continue as a dry reservoir indefinitely. The floodplain property surrounding the dam is comprised of cultivated and fallow fields and narrow riparian forests along the West Branch of Codorus Creek. During the 1950's, the ACOE granted Met-Ed five easements for electrical lines along this property. In 1959, the ACOE granted a lease comprising 1,539 acres (622.8 hectares) of this land to the Pennsylvania Game Commission for the purpose of wildlife conservation.

The proposed pipeline utilities and electrical interconnection lines would cross nine soil types identified by the Soil Conservation Service in York County as prime agricultural soils. Designating these areas as prime farmland indicates that they should be used for producing food or fiber, or be available for these uses.

Land Use Trends and Controls

Utility Pipelines and Internal Electrical Intraconnection The nature of previous and current industrial uses of the P. H. Glatfelter Company property indicate similar future use for the area of the proposed utility pipelines. The mill pond is expected to remain the primary fresh water source for Spring Grove municipal uses and P. H. Glatfelter Company industry uses for the foreseeable future.

Electrical Interconnection Large portions of the proposed alignment would be within the limits of land managed by the ACOE for flood protection, and by rail and other public utilities for utility rights-of-way. A portion of the ACOE flood control lands is leased and maintained by the PGC for wildlife management and public hunting. These uses are expected to remain unchanged in the future. Future use of private land in the vicinity of the alignment is influenced by previously recorded subdivision approvals and building permits on file in the respective townships. The Indian Rock Dam flood control property controlled by the ACOE is expected to be used for flood control purposes indefinitely.

3.1.14.10 Pollution Prevention

A discussion of pollution prevention relevant to the proposed utility corridors is presented in Section 3.1.10.

3.1.14.11 Cultural Resources

Historical Resources

Historic resources, for the proposed project and along the route of the electric interconnect route to Bair, have been discussed in Section 3.1.11.1, and a synopsis of the portion of this information that relates specifically to the electrical interconnect route is reiterated here for clarity.

Utility Pipelines and Internal Electrical Intraconnection The site designated for utility pipeline construction is highly disturbed industrial land; ***and no*** historic resources ***are known to*** exist in the industrial portion of the site.

Electrical Interconnection ***In 1993, a*** general data inquiry to identify known historical and cultural resources in the vicinity of the electrical interconnection alignment was made through requests to Historic York, Inc., and the Pennsylvania Bureau ***for*** Historic Preservation. ***This inquiry, however, was*** not specific to the preferred electrical interconnection alignment and utility pipelines corridor. The most cohesive historic feature identified ***in this initial survey*** was the Spring Grove Historic District which covers approximately 48.8 acres (19.7 hectares) in a dense concentration of residential and commercial properties. This District is listed on the National Register of Historic Places as an architecturally and industrially significant mill town. The town began development in 1864. It is recorded that many of the architecturally significant structures ***in the Spring Grove Historic District*** were funded wholly or in part by the Glatfelter family.

Subsequently, Historic York, Inc. conducted a survey of the potentially affected area for the proposed project, including the electrical interconnection, which DOE submitted to the Bureau for Historic Preservation on March 17, 1995. The results of this survey are described in Section 3.1.11.1 and the location of historic resources are provided in Figure 3.1-13a. The Bureau determined that the proposed electrical interconnect route would have an adverse visual effect on one of the individual resources

(GG-44E) near the community of Bair. The effect to this National Register Eligible resource is described in Section 4.1.14.1.

Archaeological Resources

Utility Pipelines and Internal Electrical Intraconnection A Phase I archaeological investigation ***along the corridor of the utility pipelines and along the route of the internal electrical intraconnection has been conducted at the request of the Pennsylvania Bureau for Historic Preservation. The results of this investigation were submitted to the Pennsylvania Bureau for Historic Preservation for review and concurrence. The results of the Bureau's review are discussed in Section 4.1.14.11 of the FEIS.***

Electrical Interconnection ***The*** Phase I archaeological investigation ***discussed above was extended along the proposed route of the electrical interconnection to the Bair switchyard. The results of this Phase I archaeological survey were submitted to the*** State of Pennsylvania Bureau ***for*** Historic Preservation in the fourth quarter of 19***94***.

The Bureau for Historic Preservation determined that all archaeological reports for the entire project met required standards and specifications, and no further testing for archaeological resources was required. A more complete discussion of the Bureau's determination is provided in Section 4.1.14.11.

3.1.14.12 Socioeconomic Resources

Socioeconomic indicators such as population, employment, income, wages, and housing have been analyzed at the county level, and, where available, at the township level. The proposed utility pipelines would be located in North Codorus Township and the Borough of Spring Grove, and the electrical interconnection would pass through North Codorus Township, Jackson Township, and West Manchester Township.

The discussion of socioeconomic resources presented for the proposed site in Section 3.1.12 also characterizes the socioeconomic resources applicable to the proposed utility corridors.

3.1.14.13 Environmental Justice

The proposed utility corridor would be located in undeveloped areas that contain existing utility easements or floodplains, or both. The proposed location has been chosen to avoid visual and physical intrusion on existing populations. No low-income communities are located in close proximity (3 km (1.9 mi) or less) to the proposed corridor. The only minority community in close proximity to the proposed corridor is in Jackson Township (census tract 020520, block group 2), northeast of Spring Grove, near the community of Nashville. The minority population in this block group is 12.2 percent and is within 2 km (1.2 mi) of the proposed utility corridor ***(see also Section 3.1.13)***.

3.2 Alternative Site

One alternative site located in West Manchester Township, York County, PA, has been evaluated for comparison purposes. In late 1991, the Cogeneration ***Facility*** was originally proposed at this location, which is adjacent to the J.E. Baker Company's (J.E. Baker) West Manchester Township Manufacturing Facility. It should be noted, however, that YCEP has indicated that it would not construct the proposed project at this site because of timing considerations under an existing power purchase agreement with Met-Ed. (The project site was subsequently relocated in February 1993 to the current proposed site in North Codorus Township.)

3.2.1 Setting

The alternative site is located in West Manchester Township, which is characterized by areas of rural homesteads, crop and animal farming, moderately dense residential neighborhoods, open space, and mixed commercial and light and heavy industrial land uses. The regional terrain is gently rolling with various vegetation and consists of open field, crop land, and developed land. The alternative site consists of a vacant, gently graded field, ***which*** was historically and is currently used for agricultural production; it is located adjacent to the J.E. Baker Company Dolomite Surface Mining Facilities.

Four locations in the vicinity of the West Manchester alternative site were identified as potentially sensitive visual receptors. The alternative site is the primary view identified for three of the four receptors. These sensitive visual receptors are presented in Figure 3.2-1. and described in Appendix C.

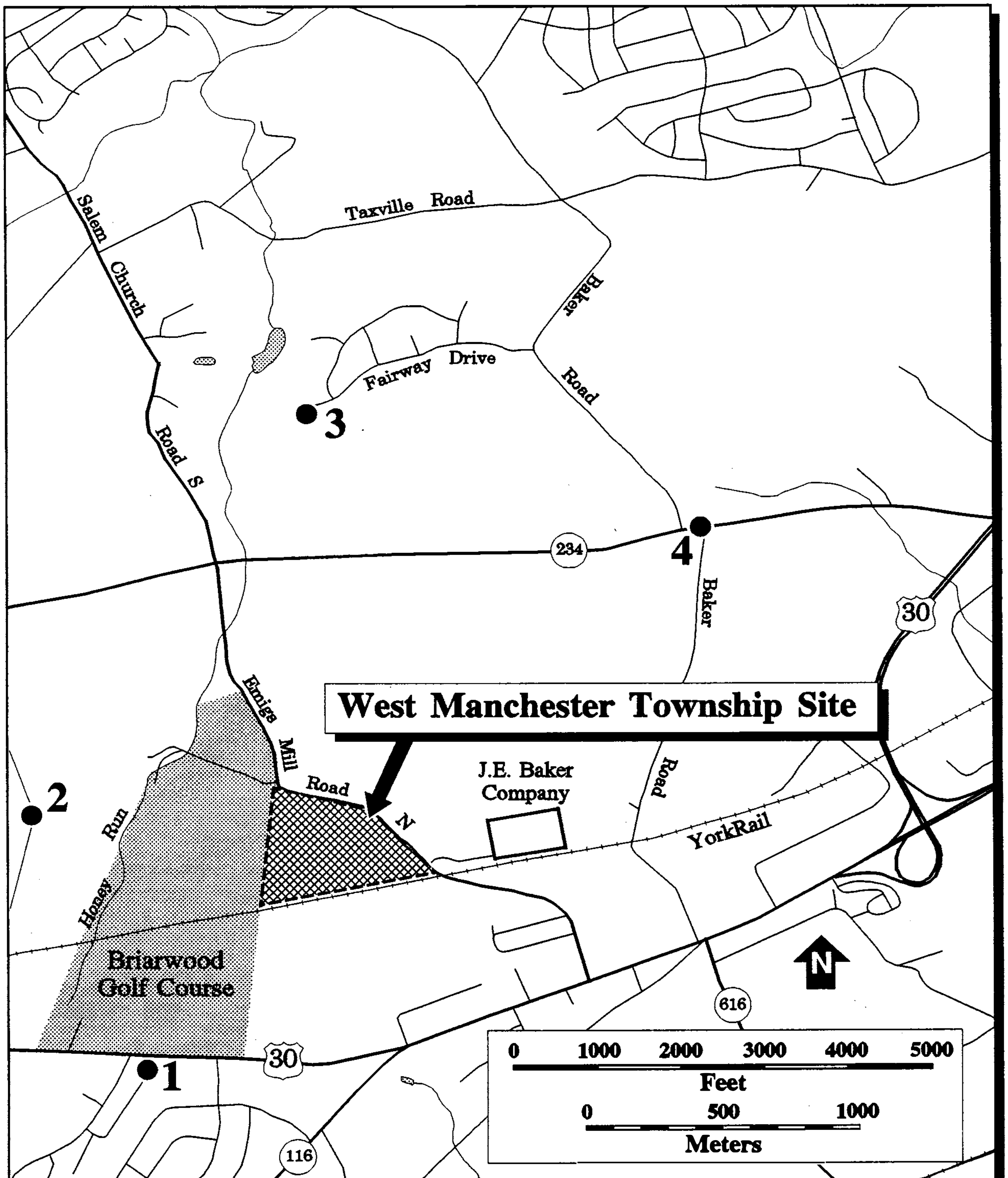

Figure 3.2-1. Locations of sensitive visual receptors in the vicinity of the alternative West Manchester Township site.

3.2.2 Air Quality

Atmospheric Conditions

The atmospheric conditions of the West Manchester alternative site are similar to those presented in Section 3.1.2 for the North Codorus Township site.

Air Quality

Existing air quality conditions for the West Manchester Township site are the same as those for the North Codorus Township site in Section 3.1.2. However, the distance and direction of the PADER air quality monitoring stations from the West Manchester site described are different than those listed for the North Codorus Township site. The York East station is 7.4 km (4.6 mi) east-northeast; the West York station is 5.8 km (1.9 mi) northeast; and the York Central station is 5.8 km (3.6 mi) east-northeast of the alternative West Manchester site.

3.2.3 Geology and Soils

The existing ground surface of the West Manchester alternative site slopes generally upward, from approximately 138.7 m (455 ft) above msl at the southeastern portion of the site to approximately 150.9 m (495 ft) above msl at the northwestern portion of the site.

3.2.3.1 Geology

The West Manchester alternative site is located within the Conestoga Valley section of the Piedmont physiographic province. Limestone and dolomitic rock underlie the site.

3.2.3.2 Soils

Soils at the West Manchester alternative site are composed of silt loams and clays of the Bedford, Duffield, Hagerstown, and Montalto soil series. These soils are predominantly fine-grained and poorly drained residual soils that derived from in-place weathering of the underlying dolomite and limestone rock. These residual soils have depths varying to 12.2 m (40 ft) below ground surface, and consist of lean to fat clays and elastic silts. Soil types are described in more detail in the following paragraphs.

Hagerstown: Hagerstown silt loam, 0 to 3 percent slope (HaA), 3 to 8 percent slopes, moderately eroded (HaB2), and Hagerstown silt clay, 8 to 15 percent slopes, severely eroded (HcC3) — These series consist of deep, well-drained reddish soils on uplands formed from materials weathered from limestone. Permeability is moderate for all three phases, and the water table is typically located greater than 1.8 m (6 ft) from the surface. This series occupies the majority of the site area and is located to the west of Bedford silt loam.

Bedford: Bedford silt loam, 0 to 3 percent slopes (BdA) — This series consists of moderately well-drained soils formed in loess and material weathered from limestone on uplands. The phase located on the site, BdA, is characterized as having slow permeability, and the water table is within 0.5 to 0.8 m (1.5 to 2.5 ft) of the surface. This soil occupies the lowest landscape position on the site.

Duffield: Duffield silt loam, 3 to 8 percent slopes, moderately eroded (DuB2) — Duffield soils are deep, well-drained soils on uplands that form from material weathered from limestone. These soils have moderate permeability and the water table is greater than 1.8 m (6 ft) below the surface. This series occupies the northeastern portion of the site.

Montalto: Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded (MnB2) and 8 to 15 percent slopes, severely eroded (MoC3) — These soils are deep and well-drained, and are formed in material weathered from basic igneous rocks. The permeability is moderate, and the water table is typically greater than 1.8 m (6 ft) below the surface. These soils are located in a thin band adjacent to Emigs Mill Road.

The potential utility routes associated with the alternative site traverse soils consisting of silt loams and silty clays of the Hagerstown, Huntington, Penn, Duffield, Readington, Montalto, Bedford, Lindside, Cardiff, Conestoga, and Rowland soil series (Table 3.2-1).

3.2.4 Water Resources and Water Quality

3.2.4.1 Surface Water

The major surface water feature in the vicinity of the alternative site in West Manchester Township is Codorus Creek, a tributary to the Susquehanna River (see Figure 3.1-5). The natural flow of this stream

Table 3.2-1. Soils traversed by the proposed utility corridors for the alternative West Manchester Township site.

Soil Name	Slope (%)	Depth to Bedrock (in.)	Permeability	Available Water Holding Capacity	Water Table (when present)	Capability Subclass[1]
Bedford silt loam (BdA)	0-3	48-84	slow	medium	1.5-2.5 ft	2W
Cardiff slaty silt loam (CaB2)	3-8	18-36	moderate	low	>6.0 ft	3E
Cardiff slaty silt loam (CaC2)	8-15	18-36	moderate	low	>6.0 ft	4E
Cardiff slaty silt loam (CaC3)	8-15	18-36	moderate	low	>6.0 ft	6E
Cardiff slaty silt loam (CaD3)	15-25	10-20	moderate	low	>6.0 ft	7E
Conestoga silt loam (CoB2)	3-8	48-72	moderate	medium	>6.0 ft	2E
Conestoga silt loam (CoC2)	8-15	48-72	moderate	medium	>6.0 ft	3E
Duffield silt loam (DuA)	0-3	36-72	moderate	high	>6.0 ft	1
Duffield silt loam (DuB2)	3-8	36-72	moderate	high	>6.0 ft	2E
Duffield silt loam (DuC2)	8-15	36-72	moderate	high	>6.0 ft	3E
Hagerstown silt loam (HaA)	0-3	48-84	moderate	high	>6.0 ft	2E
Hagerstown silt loam (HaB2)	3-8	48-84	moderate	high	>6.0 ft	2E
Hagerstown silt loam (HaC2)	8-15	48-84	moderate	high	>6.0 ft	3E
Hagerstown silty clay (HcC3)	8-15	48-84	moderate	high	>6.0 ft	4E
*Huntington silt loam (Hn)	—	>60-99	moderate	high	3.0-6.0 ft	1
*Lindside silt loam (Ls)	—	36-84	moderately slow	high	1.5-2.0 ft	2W
Montalto channery silt loam (MnB2)	3-8	36-60	moderately slow	medium	>6.0 ft	2E
Montalto channery silty clay loam (MoC3)	8-15	36-60	moderately slow	medium	>6.0 ft	3E
Penn silt loam (PgC2)	8-15	20-40	moderate	low	>6.0 ft	3E
Penn silt loam (PgC3)	8-15	20-40	moderate	low	>6.0 ft	4E
Penn silt loam (PgB2)	3-8	20-40	moderate	low	>6.0 ft	2E
Readington silt loam (RdA)	0-3	36-60	moderately slow	medium	2.0-3.0 ft	2W
Readington (RdB)	3-8	36-60	moderately slow	medium	2.0-3.0 ft	2E
Rowland silt loam (Ro)	—	48-96	moderately slow	medium	1.5-2.5 ft	2W

Table 3.2-1. Soils traversed by the proposed utility corridors for the alternative West Manchester Township site (continued).

Capability Subclass Key:
1 - Soils have slight limitations that restrict their use.
2 - Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
3 - Soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
4 - Soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.
6 - Soils have severe limitations that make them generally unsuitable for cultivation.
7 - Soils have very severe limitations that make them unsuitable for cultivation.
E - The main limitation is risk of erosion unless close-growing plant cover is maintained.
W - Water in or on the soil interferes with plant growth or cultivation.

Source: SCS, 1991.

has been altered by several impoundments. Flow data collected at the ***United States*** Geological Survey gaging station at Spring Grove, PA indicate a flow of 88 cfs (56.9 mgd) in this area of the stream. ***The Susquehanna River Basin Commission (SRBC, 1991a) measured 10 water quality parameters at 12 sample sites on Codorus Creek. Three sites were sampled twice. Water samples were analyzed in the field for temperature, dissolved oxygen, specific conductance, and pH. Laboratory analyses were performed for free cyanide, total alkalinity, total hardness, total copper, total lead, and total zinc. Water quality criteria do not exist for two of these parameters (specific conductance and total hardness). Of the eight parameters for which water quality criteria currently exist, six parameters (dissolved oxygen, pH, temperature, alkalinity, cyanide, and zinc) met applicable water quality standards at all sample sites. Exceedances were found for the other two parameters (lead and copper) at two sample sites located downstream from York. At RM 5.03, both the lead concentration and copper concentration, 10.1 µg/L and 28.5 µg/L, respectively, exceeded the applicable Pennsylvania water quality criteria for chronic exposure, 7.64 µg/L and 21.2 µg/L (calculated from local water hardness), respectively. At RM 6.60, only the lead concentration, 21.2 µg/L, exceeded the applicable Pennsylvania water quality criterion for chronic exposure, 7.64 µg/L (calculated from local water hardness). The parameters analyzed in the SRBC (1991a) study were the parameters of concern based on the results of a waste load screening by PADER (1990).*** A general discussion of Codorus Creek is presented in the discussion of existing conditions for the North Codorus Township site in Section 3.1.4.1.

Honey Run is an ephemeral tributary in the Conewago Sub-basin of Pennsylvania's Lower Susquehanna River Basin (see Figure 3.1-5). It has a drainage area of approximately 13.0 km^2 (5 square mi) and a moderate slope of approximately 5.7 m/km (30 ft/mi). Drainage originates from surrounding agricultural, forest, and recreational (*e.g.*, a golf course) land uses. Honey Run originates approximately 0.8 km (0.5 mi) southwest of the West Manchester alternative site and flows in a northerly direction to its confluence with Paradise Creek, approximately 3.2 km (2 mi) north of the site, forming Little Conewago Creek. Little Conewago Creek continues in a northerly direction to its confluence with Conewago Creek, approximately 0.8 km (0.5 mi) south of the Susquehanna River. Pennsylvania Water Quality Standards designate Little Conewago Creek as a trout-stocking water *(Pennsylvania Code, Title 25, Chap 93)*.

3.2.4.2 Groundwater

Groundwater resources in the vicinity of the alternative site are capable of satisfying domestic needs. In some locations, groundwater resources meet the water supply demands of small, low water-demand industries. Actual use of groundwater within the basin is limited. Peak groundwater withdrawal rates do not exceed 0.1 million gallons per day (mgd) from any source, and most active wells have a reported withdrawal of less than 0.01 mgd.

3.2.4.3 Floodplains

Surface water resources in the vicinity of the West Manchester Township alternative site include Codorus Creek, located 1.9 km (1.2 mi) to the south, and Honey Run (a tributary of Little Conewago Creek), located 0.4 km (0.25 mi) to the west. Both of these creeks have an associated 100-year floodplain mapped by FEMA; however, no FEMA-mapped 100-year floodplain areas extend onto the alternative site.

3.2.5 Biological Resources and Biodiversity

This section describes the aquatic and terrestrial environments in the area of the West Manchester Township alternative site.

3.2.5.1 Aquatic Ecosystems

The major surface water feature in the vicinity of the alternative site is Codorus Creek, a tributary to the Susquehanna River. Honey Run, an ephemeral tributary in the Conewago Sub-basin of Pennsylvania's Lower Susquehanna River Basin, originates approximately 0.8 km (0.5 mi) southwest of the West Manchester alternative site and flows in a northerly direction to its confluence with Paradise Creek, approximately 3.2 km (2 mi) north of the site, forming Little Conewago Creek. Little Conewago Creek continues in a northerly direction to its confluence with Conewago Creek approximately 0.8 km (0.5 mi) south of the Susquehanna River. Little Conewago Creek has been identified by Commonwealth of Pennsylvania as a trout stock water under the PADER Title 25 Chapter 93 Water Quality Standards.

Pertinent information regarding the Codorus Creek ecosystem is presented in Section 3.1.5.1.

3.2.5.2 Terrestrial Ecosystems

The West Manchester alternative site and vicinity have historically been altered by agricultural, industrial, commercial, residential, and recreational development. Ongoing agricultural cultivationoccurs at the site. Natural vegetation at the alternative site is found only in the hedgerows at the western limits of the cultivated fields. The hedgerows are composed primarily of sapling to pole-sized black cherry (*Prunus serotina*), with a shrub layer dominated by tartarian honeysuckle (*Lonicera tatarica*), multiflora rose (*Rosa multiflora*), smooth juneberry (*Amelanchier laevis*), and staghorn sumac (*Rhus typhina*). The most common ground cover within the hedgerows is sprawling poison ivy (*Toxicodendron radicans*), which also exists in this area as a climbing vine on trees. Wild onion (*Allium sp.*), a common weedy species, is found in the hedgerows and the agricultural fields.

Most of the potential electrical transmission line options would share a common route for approximately 0.6 km (0.4 mi) of the overall 1.8 km (1.1 mi) length. The routes that extend to the west along the boundary of the alternative site traverse grasslands and industrial areas, including a golf course consisting of maintained meadow grasses and isolated landscape plantings of trees and shrubs (accounting for approximately 0.6 km (0.4 mi) of the 1.8 km (1.1 mi) route). The industrial area crossed is a mixture of paved parking areas and industrial facility lawns (for the remaining 1.2 km (0.7 mi) of the route). These routes also parallel a railroad grade bordered by a narrow band of scrub/shrub vegetation dominated by tartarian honeysuckle, and cross Honey Run (at about the 0.6 km (0.35 mi) point). Other alternative routes for the electric line extend northward from the alternative site [for approximately 1.8

km (1.1 mi)] and then west along an existing transmission corridor [for an additional 1.9 km (1.2 mi)] to an existing substation near the intersection of Route 234 and Rupert Road. These routes traverse predominantly rural residential, open land consisting of agricultural and cattle pasture uses and forage grass growth. Some isolated shrubs are present; however, mature trees are scarce.

Three potential pipeline routes are under consideration for connection of the alternative site to the discharge point for non-contact wastewater. Two of these potential routes cross primarily open land consisting of agricultural fields and light industrial and commercial areas for approximately 4.8 km (3.0 mi). The other potential route closely parallels existing railroad beds or roadways for its entire length through industrial, commercial, and residential areas for about 3.4 km (2.1 mi).

The potential routes tying into the York County Wastewater Treatment Plant for the domestic/demineralizer wastewater discharge pipeline closely parallel an active Yorkrail rail grade [traversing about 2.4 km (1.5 mi)]. Very little vegetation occurs along the routes, which cross through an office complex and operating yards of ***the*** J.E. Baker Company dolomite quarry and brick kiln. They also traverse agricultural areas consisting of row crops and pastures; no forests occur along the routes, aside from narrow hedgerows.

One potential route for the natural gas pipeline traverses predominantly agricultural fields (existing on the alternative site) and developed land for a total of approximately 0.6 km (0.4 mi). No wetlands or streams ***would be*** traversed by this route. Another potential natural gas pipeline route extends about 1.4 km (0.9 mi) along Emigs Mill Road and Route 234 and ***would be*** adjacent to existing paved roadways for its entire length. It ***would*** traverse grassland (***e.g.***, a golf course and rural-residential lawns) and some active agricultural land (***e.g.***, cattle pasture and row crops). Shade trees are present along the roadways. This route ***would*** also cross Honey Run and an unnamed tributary to Honey Run.

The probable roadway interconnection route from Route 30 traverses active agricultural land for its entire 1.1 km (0.7 mi) length. Narrow strips of shrub/scrub vegetation on either side of the railroad grade are the only areas of native vegetation within this route.

3.2.5.3 Threatened and Endangered Species

Agency correspondence was submitted to the Pennsylvania Natural Diversity Inventory and Botanist, Pennsylvania Bureau of Forestry; the Pennsylvania Fish Commission; the Pennsylvania Game

Commission; and the ***United States*** Fish and Wildlife Service (USFWS) regarding the presence of threatened or endangered species on or in the vicinity of the West Manchester alternative site. The USFWS, the Pennsylvania Fish Commission, Pennsylvania Bureau of Forestry, and the Pennsylvania Game Commission reported no record of any federally-listed threatened or endangered plant or animal ***species*** and no record of any State-listed threatened or endangered animal ***species*** on or adjacent to the alternative site. An April 15, 1992, reconnaissance survey of the site and surrounding area resulted in no observations of any threatened or endangered plant or animal species. Agency correspondence letters are presented in Appendix E.

3.2.5.4 Biodiversity

The biodiversity of organisms inhabiting Codorus Creek is described in Section 3.1.5.4. The biodiversity of the terrestrial ecosystems at the West Manchester Township alternative site is limited due to previous land disturbances that have occurred at the site. Natural vegetation is limited to hedgerows.

3.2.5.5 Wetlands

No wetlands are located on the West Manchester alternative site. An April 1992 reconnaissance of the entire site revealed the absence of any wetland vegetation. Although no detailed delineations have been made and approved by the ACOE, secondary sources were reviewed including a USGS topographic map of the West York, PA 7.5-minute series quadrangle; the Soil Conservation Service Soil Survey for York County, PA; and the USFWS National Wetlands Inventory (NWI) map for West York (7.5-minute series quadrangle). Examination of these secondary sources, along with field examination of the soil, confirmed that no wetlands occur on this site.

One wetland resource exists along a potential electrical transmission line route. This wetland is a very narrow band of wet meadow associated with Honey Run, located within a golf course, and its vegetation undergoes mowing and other management. The total wetland crossing length is less than 9.2 m (30 ft).

Wetland areas exist within all of the potential routes for the 3.8 km (2.4 mi) discharge pipe to Codorus Creek associated with the alternative site. A narrow area of shrub swamp wetland at the discharge point on the banks of Codorus Creek exists within one route. Portions of two other potential routes closely parallel a stream swale [for approximately 4.8 km (3 mi)] and traverse meadow wetland areas. Although these wetlands have been disturbed by grazing use, they meet the Federal definition of a wetland.

Another wetland resource is associated with a potential natural gas route. This narrow stream-side wet meadow associated with the unnamed tributary to Honey Run extends about 1.4 km (0.9 mi) along Emigs Mill Road and is designated as PEM5A (i.e., palustrine emergent, narrow leaved, temporarily saturated) by the NWI map. This designation is consistent with the sedge and grass wet meadow observed in the field at this location.

3.2.6 Human Health and Safety

This section provides a summary of the relevant regulations and procedures regarding health and safety that would affect the proposed Cogeneration Facility at the alternative West Manchester Township site.

3.2.6.1. Health Risk Assessment

The discussion present in Section 3.1.6.1 provides a summary of health statistics in York County.

3.2.6.2 Solid Waste

There are currently no existing landfills in West Manchester Township. One operating solid waste landfill, the Modern Landfill, currently exists in York County. This landfill is located in Windsor/Lower Windsor Township, approximately 19.3 km (12 mi) northeast of the alternative site.

3.2.6.3 Hazardous and Toxic Materials and Wastes

The discussion presented in Section 3.1.6.3 describing regulations for hazardous and toxic materials and wastes also is applicable to the alternative West Manchester Township site.

3.2.7 Noise

An acoustic field survey was conducted by Air Products in January 1992 at the West Manchester alternative site in order to define the existing noise environment. The predominant noise sources in the vicinity of the alternative site include highway traffic along Emigs Mill Road and Route 30, the J.E. Baker Company quarrying and manufacturing operation, the Pfaltzgraff manufacturing facility, and occasional rail traffic. No site topographic features or vegetation sufficient to provide significant sound attenuation were noted.

Daytime monitoring of ambient noise levels was conducted at 12 locations (Figure 3.2-2). Because background noises noted during the monitoring survey were anticipated to be similar during nighttime conditions, no structured monitoring program was conducted during the nighttime period. Ten of the monitoring locations were positioned at points along the periphery of the site, and two of the monitoring stations were placed at nearby noise sensitive land uses (i.e., a trailer park to the south, and the golf course to the northwest of the site). Spot sample noise measurements for unfiltered sound levels (decibels) and A-weighted sound levels (dBA) are presented in Table 3.2-2. These values were collected in measurements of approximately five minute duration and exclude noise peaks associated with the passing of individual vehicles on the local road system. These values are considered an approximation of the L_{90} noise statistic (the noise level exceeded 90 percent of the evaluation time). The noise levels measured at the 12 monitoring stations generally correspond to the noise range characteristic of normal suburban residential areas (i.e., typical range of 41 to 45 dBA inclusive, with an average of 43 dBA).

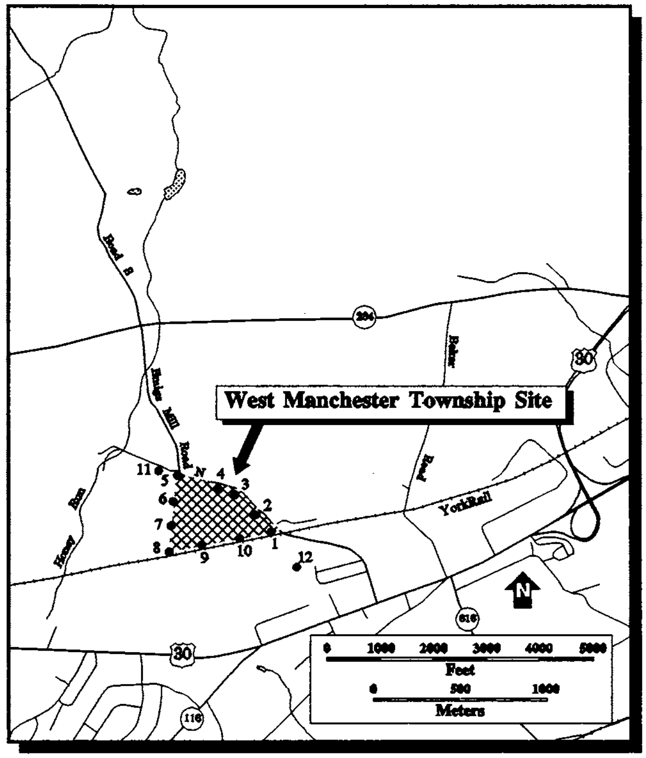

Figure 3.2-2. Locations of noise receptors for the alternative West Manchester Township site.

3.2.8 Transportation and Traffic

<u>Current Levels of Intersection Operations</u>

Highway Capacity Software (HCS) developed by the Federal Highway Administration (FHWA) was used to determine intersection capacity from 1992 traffic count data. Information regarding intersection geometry, controls, and vehicle characteristics was collected in the field, and these data were used as the input parameters to the HCS program. The results of the computer modeling analysis of the study area intersections for 1992 conditions are presented in Table 3.2-3.

Table 3.2-2. Summary of sound level measurements at the West Manchester alternative site.

Monitoring Location No.	Noise Monitoring Results		Remarks
	dB	dBA	
1	72	44	Close to J.E. Baker Company, but industrial noise not strong.
2	69	46	Close to J.E. Baker Company, but industrial noise not strong.
3	64	41	Close to J.E. Baker Company, but industrial noise not strong; passing car recorded at 65 dBA.
4	67	48	Industrial noise from J.E. Baker Company stronger than at Locations 1 through 3.
5	62	44	Industrial noise from J.E. Baker Company and Pfaltzgraff heard.
6	67	41	Deep, pulsing industrial noise heard from southwest; source unidentified.
7	66	42	Deep, pulsing industrial noise heard from southwest; Pfaltzgraff noise increasing.
8	75	42	Deep, pulsing industrial noise heard from southwest, especially at 1,000 Hz; Pfaltzgraff noise strong.
9	65	45	Deep, pulsing industrial noise heard from southwest; source unidentified.
10	73	44	Pfaltzgraff still audible; passing train recorded at 75-80 dBA at 20 ft.
11	64	46	Industrial noises from J.E. Baker Company and Pfaltzgraff faintly audible.
12	69	50	Location at which J.E. Baker Company industrial noise is strongest.

Source: ENSR, 1992.

Table 3.2-3. Existing intersection levels of service for the West Manchester alternative site.

Intersection	Approach	Existing LOS A.M.	Existing LOS P.M.
US 30 (W. Market St.) and Trinity/Baker Roads	E Bound Approach	E	D
	W Bound Approach	C	#
	N Bound Approach	E	E
	S Bound Approach	D	D
	Intersection	D	#
US 30 (W. Market St.) and Emigs Mill Road	N Bound Left-Through-Right	A	E
	S Bound Left-Through-Right	C	D
	E Bound Left	B	E
	W Bound Left	C	C
US 30 (W. Market St.) and Hanover Road	N Bound Left-Right	F	F
	W Bound Left	D	E
US 30 (W. Market St.) and Bowman Road	S Bound Left-Right	D	E
	E Bound Left	A	A
US 30 (W. Market St.) and KBS Road	N Bound Left-Right	B	D
	W Bound Left	A	A
East Berlin Road and Baker Road (SB)	S Bound Left-Right	E	E
	W Bound Left	A	B
East Berlin Road and Baker Road (NB)	N Bound Left-Right	D	E
	W Bound Left	A	A
East Berlin Road and Emigs Mill/Salem Church Roads	N Bound Left-Through-Right	C	D
	S Bound Left-Through-Right	E	E
	E Bound Left	A	A
	W Bound Left	A	A

# Denotes an over-capacity situation in which the methodology is inaccurate for the determination of LOS.

Source: ENSR, 1992.

Operational deficiencies associated with peak hour performance at the study area intersections included the following: (1) left turns from the study area roadways at intersections with Route 30 are difficult because the heavy traffic on Route 30 offers few gaps of sufficient length to allow safe entry into the flow; and (2) an insufficient green signal does not accommodate, without excessive delay, all approaches at the intersection of Route 30 with Trinity/Baker Roads. Less serious operational deficiencies were noted at three study area intersections not involving Route 30. Traffic operations are described in terms of "Level of Service" (LOS), which is defined as a "quantitative measure of the effect of a number of factors, which include speed and travel time, traffic interruption, freedom to maneuver, safety, driving comfort and convenience, and operating cost" *(TRB, 1985)*. LOS is expressed as a range of "A" through "F," whereby "A" is representative of the best conditions and "F" is representative of the worst conditions. During peak hour conditions, the intersection at US 30 and Hanover Road (northbound, left-right) is currently characterized by LOS F performance. Several intersection exhibit LOS E performance for left turns from minor approaches.

Existing Rail Conditions

Coal delivered to the West Manchester alternative site by rail from mines outside of York County would arrive via either Conrail or CSX to Yorkrail's Lincoln Yard (located near Route 30 and West Market Street). From the Lincoln Yard, the coal would be transported over the Yorkrail track to the alternative site. Three at-grade roadway crossings occur between Yorkrail's Lincoln Yard and the alternative site. The proposed realignment of Emigs Mill Road would cross the rail line in the vicinity of the southwest corner of the site. Existing delays at the rail crossings caused by the passage of trains are minimal because of the small number of trains (i.e., typically 10 trains per week) using the line.

The Conrail and CSX rail lines are currently used for coal deliveries. Both of these lines are in good condition and have available capacity for handling additional coal trains. The Yorkrail track and facilities also are in good condition and have the available capacity to handle increased levels of coal shipments.

3.2.9 Land Use

This section describes existing land use features, as well as land use trends and controls at the alternative West Manchester Township site.

3.2.9.1 Existing Land Use

The West Manchester alternative site is an undeveloped 47-acre (19 hectare) parcel of land that is currently used for agricultural purposes. Mixed land uses surround the alternative site. The proposed steam host, the J.E. Baker Company, is across Emigs Mill Road from the alternate site and represents a nearby industrial use. Recreational (*e.g.*, a golf course), agricultural, commercial, and residential uses also surround the alternative site. The alternative site has a zoning designation of I-3, which is a General Industrial Zone. This area is the most intensively industrialized district within West Manchester Township.

The potential westerly routes for the electric transmission line would traverse open space, recreational, and light industrial land uses for approximately 1.8 km (1.1 mi). The potential northerly routes would traverse the quarrying areas of the J.E. Baker Company operation and are located within an existing transmission corridor that traverses agricultural and rural residential uses for about 3.7 km (2.3 mi).

The potential routes for the process wastewater discharge pipeline to Codorus Creek would pass through agricultural, commercial, and industrial land in the area of the alternate site. Residential, open field, agricultural, and rural residential areas would be traversed near the point of discharge to Codorus Creek. The preferred process wastewater discharge route would be approximately 4.8 km (3.0 mi) in length.

Potential routes for the domestic/demineralizer wastewater discharge pipeline connecting to the existing sewer line would traverse industrial, commercial, and agricultural land uses for about 2.4 km (1.5 mi).

One potential route for the natural gas pipeline would traverse industrial and quarrying land uses. The other potential route would traverse industrial, quarry [0.6 km (0.4 mi) in length], open space recreational, agricultural, and rural residential land uses 1.4 km (0.9 mi) in length).

The potential roadway interconnection would be 1.1 km (0.7 mi) in length and traverse open space recreational and agricultural land uses along the boundary of the site, and light industrial and commercial land uses at its interconnection point with Route 30.

3.2.9.2 Land Use Trends and Controls

The West Manchester alternative site is located within the General Industrial Zone (I-3), which signifies the most intensive level of industrial zoning in West Manchester Township (Figure 2.2-2). The site is surrounded by zones that make up part of a large corridor of Industrial and Quarry Zones extending east to west through the center of West Manchester Township. Section 150-188.A of the township Zoning Ordinance permits the following uses within this zone: "industrial activities involving processing, packaging, production, repair or testing of material, goods and products, including those industries performing conversion, assembly or nontoxic chemical operations."

A conditional use provision also is provided in Section 150-9 of the ordinance, which states the following:

> Any use not specifically allowed elsewhere in this chapter shall be allowed by conditional use in the zone or zones where, and to the extent that, similar uses are permitted or allowed by special exception or allowed by conditional uses, provided that said use meets the requirements for a conditional use and does not constitute a public or private nuisance.

Sections 15-191 through 15-195 of the Zoning Ordinance identify area restrictions for development in the General Industrial Zone including restrictions on lot area, lot width, yard setbacks, residential zone setbacks, and maximum lot coverage. Section 150-194 of the ordinance contains information regarding building height limits for principal use buildings and accessory or appurtenant structures. Section 150-197 of the ordinance describes specifications for screening of outdoor storage areas. The ordinance also provides regulations and specifications regarding the use and posting of signs; the placement, number, and maintenance of access drives; landscaping; industrial operations; storage of waste materials; exterior lighting; and stormwater control.

The potential electric transmission line options that extend to the west of the alternative site would traverse General Industrial and Open Space Zones. Those options extending to the north and west of the site would pass through a Quarry Zone.

The one possible route for the process wastewater discharge pipeline to Codorus Creek would traverse Quarry, Industrial Park, Local Commercial, Commercial Office, R-3 Residential, Agricultural, and Rural Residential Zones. Other potential routes would traverse the aforementioned zones, as well as General Industrial, R-5 Residential, and Light Industrial Zones.

The domestic/demineralizer wastewater discharge pipeline to the York County Wastewater Treatment Plant would follow the Yorkrail rail bed through Quarry, Industrial Park, General Industrial, and R-5 Residential Zones.

One potential natural gas pipeline would traverse General Industrial and Quarry Zones. The other possible route would pass through General Industrial, Quarry, Open Space, and Rural Residential Zones.

The probable roadway interconnection would traverse General Industrial and Residential Zones.

3.2.10 Pollution Prevention

As described in the description of pollution prevention for the North Codorus Township site (Section 3.1.10), the proposed project would be a new facility; consequently, no pollution prevention measures currently exist.

3.2.11 Cultural Resources

This section describes historic and archaeological resources in the vicinity of the alternative West Manchester Township site.

3.2.11.1 Historical Resources

Consultations to determine the potential presence of archaeological sites or historical structures on or near the alternative site were made with the Pennsylvania Historical and Museum Commission, the Historical Society of York County, and the York County Planning Commission in accordance with Section 106 of the National Historic Preservation Act.

The West Manchester alternative site has been under agricultural production for more than 60 years. No structures currently exist on the site; however, the remains of a low stone wall and rubble pile are present at the northeast boundary, across from one of the residences on Emigs Mill Road. The Pennsylvania Historical and Museum Commission has confirmed that no known historical resources are located on the alternative West Manchester Township site (Appendix E).

Section 106 also requires the identification of properties that are included in or eligible for the National Register of Historic Places that may be affected by development of a proposed project. The York County Planning Commission provided a list of properties in West Manchester Township that meet the criteria for eligibility on the National Register of Historic Places. This list was prepared in April 1987 by Historic York, Inc., and includes five properties located along Emigs Mill Road. Historic York, Inc., completed the Pennsylvania Historical Resources Survey Form for two of these properties. The first property is the West Manchester Consolidated School Number 1, located north of the intersection with Route 30, approximately 609.6 m (2,000 ft) to the southeast of the alternative site. The second property is a farm house complex located immediately north of the alternative site on the opposite side of Emigs Mill Road. The other three structures, for which corresponding Pennsylvania Historical Resource Survey Forms have not been completed, include two log-constructed farm houses and a farmstead with a Philadelphia-style farm house.

3.2.11.2 Archaeological Resources

No Phase I archaeological investigation has been conducted for the West Manchester alternative site.

3.2.12 Socioeconomic Resources

Socioeconomic indicators such as population, employment, income, wages, and housing are described in the following sections.

3.2.12.1 Demographics

Population

West Manchester Township has exhibited a higher population growth rate over the past decade than both York County and the Commonwealth of Pennsylvania. The population of West Manchester Township increased by approximately 12.89 percent (from 12,728 in 1980 to 14,369 in 1990) ***(1.3 percent annually),*** as compared to the 8.5 percent increase for York County and the 0.14 percent increase for the Commonwealth of Pennsylvania over the same time period.

Additional York County and Commonwealth of Pennsylvania population statistics, are provided in the corresponding section (3.1.12.1) for the North Codorus Township site.

Housing

In 1990, there were a 6,022 total housing units in West Manchester Township, which is more than double the number of housing units in North Codorus Township. The vacancy rate of West Manchester

Township was 4 percent (241 units). This vacancy rate was lower than the county and Commonwealth vacancy rates (5 percent and 9 percent respectively). Most of the occupied housing (73 percent) was owned; the remainder was renter-occupied. The 73 percent owner-occupied rate was consistent with the county rate and higher than the Commonwealth rate of 64 percent. West Manchester Township experienced a 27-percent growth rate in total housing units between 1980 and 1990, which was higher than the county rate (15 percent) and the Commonwealth rate (10 percent) during the same period. The median value of an owner-occupied housing unit in West Manchester Township was $83,400, which was approximately $3,000 lower than the value for North Codorus Township. However, the West Manchester Township value was approximately $4,000 more than the county median value and approximately $14,000 more than the Commonwealth median value. The median monthly contract rent in West Manchester Township was $518, which was approximately $100 higher than the rent figures for North Codorus Township, the county, and the Commonwealth. West Manchester Township had a total of 141 new residential building permits issued in 1990 *(Pennsylvania State Data Center, 1993 as cited in ENSR, 1994)*.

3.2.12.2 Local Regional Economic Activity

Employment

The description of employment provided for the North Codorus Township site also describes employment for the West Manchester alternative site.

Unemployment

The description of unemployment provided for the North Codorus Township site also describes unemployment for the West Manchester alternative site.

Income

The description of income provided for the North Codorus Township site also describes income for the West Manchester alternative site.

3.2.12.3 Public Services

Education

Approximately 76 percent of the population over 25 years of age in West Manchester Township has completed high school, which is comparable to county and Commonwealth figures. Approximately 15 percent has completed college, which is comparable to the county figure, but lower than the Commonwealth figure of 18 percent. Similarly, 5 percent of the over-25 population has graduate or professional degrees, which is comparable to the county-wide figure, but lower than the Commonwealth figure of 7 percent.

The majority of students in West Manchester *is* enrolled in public school: 64 percent at the pre-primary level, 89 percent at the elementary/high school level, and 64 percent at the college level. These data are consistent with Commonwealth and county enrollment trends.

The West Manchester alternative site is located within the West York School District, one of 16 public school districts in York County (*York County Planning Commission, 1992*). There are six existing schools in the West York School District. The closest school to the West Manchester site is the Lincoln Way Elementary School, located approximately 4.8 km (3 mi) from the site. The Township School #1, approximately 0.6 km (0.4 mi) southwest of the site along Emigs Mill Road, has been converted to an alternate use. Table 3.2-4 lists the four elementary schools and two secondary schools located in the West York School District.

Health Care and Human Services

The description of hospitals provided for the North Codorus Township site also describes available hospitals for the West Manchester alternative site.

Emergency medical services are provided for West Manchester Township through two privately-maintained volunteer ambulance/paramedic companies: (1) the West York Ambulance Club based in West York; and (2) the Thomasville Ambulance Club located in Jackson Township. Although the Thomasville Ambulance Club is smaller, it is located closer to the West Manchester alternative site, and would therefore likely be the company providing first response to emergency service needs at the alternative site.

Table 3.2-4. Schools located near the West Manchester alternative site.

Lincoln Way Elementary School 2625 West Philadelphia Street Enrollment: 490 Total Capacity: 600-700	Charles B. Wallace Elementary School 2065 High Street Enrollment: 240 Total Capacity: 300-350
Norman A. Trimmer Elementary School 1900 Brenda Road Enrollment: 528 Total Capacity: 600-700	West York Area Junior High School 1700 Bannister Street Enrollment: 395 Total Capacity: 500
Grace E. Loucks Elementary School 1381 West Poplar Street Enrollment: 187 Total Capacity: 250-300	West York Area Senior High School 1800 Bannister Street Enrollment: 690 Total Capacity: 1,000

Source: Personal Communication with Mr. Harry Brown of the West York School District, April, 21, 1994, ENSR, 1994.

Police Protection

West Manchester Township maintains a full-time, salaried police department. This department consists of a department chief and 19 full-time officers. There are no part-time police department employees on this force.

Fire Protection

The two fire districts within West Manchester Township are served by a 30-40 member volunteer fire department. This department is divided into two companies that are each assigned responsibility for providing first response to a designated district.

Parks and Recreation

The closest recreational area to the alternative site is the Briarwood Golf Course, which abuts the site to the west. In addition, there is a golf course located approximately 1.61 km (1 mi) north of the site. A description of parks and recreation facilities located in York County is presented in Section 3.1.12.3.

Utilities

West Manchester Township is served by the West Manchester Township Authority public water utility. West Manchester Township's sewer services are provided by the York City Municipal Wastewater Treatment Plant *(York County Planning Commission, 1992)*.

Detailed information regarding utilities servicing York County is provided in the corresponding section (3.1.12.3) describing utilities for the North Codorus Township site.

3.2.13 Environmental Justice

Land use and ***United States*** Department of Housing and Urban Development data ***were*** used to identify ***low- to moderate-income*** and minority population concentrations in the vicinity of the West Manchester alternative site. Minority populations in York County comprised 4.6 percent of the total population in 1990. Three census tracts that have a 1990 minority population greater than the county average are located within a 5 km radius of the alternative site. Block groups within census tracts 0214, 0215, and 0216, have minority population of 6.1 percent, 15.5 percent, and 8.4 percent, respectively.

Concentrations of low-income individuals are located in West Manchester census tract 0016, block group 4. This area has a low-income concentration of 54.1 percent. The alternative site is also located within this census tract block group.

The 1990 Census indicated that the median family income in York County was $37,560 (compared to a national median family income of $35,939). Low- to moderate-income households are defined as households earning 0 to 95 percent of the county median family income. In York County, approximately 42 percent of the households can be defined as low- to moderate-income households.

The United States Department of Housing and Urban Development has identified those census tracts where more than 51 percent of the residents meet the low- to moderate-family income level. In West Manchester Township, three census tracts have low- to moderate-income households of more than 51 percent of the residents. These are census tracts 0016 (54 percent), 0215 (100 percent), and 0216 (66 percent). The alternative site is located in census tract 0016, while the other two census tracts are approximately 5-7 km (3-4.5 miles) from the alternative site.

4. ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the potential impacts to human and environmental resources that would be expected to result from construction and operation of the proposed York County Energy Partners, ***L.P.*** (YCEP) Cogeneration Facility at the North Codorus Township site. Analysis of the potential impacts resulting from the no-action alternative and the alternative site also are provided. A summary of proposed mitigation and related monitoring activities is included in the final section of this chapter.

4.0 Summary of Major Changes Since the DEIS

In Section 4.1.1 (Setting), two additional receptors have been included to assess visual impacts to residential areas. Section 4.1.2 has been rewritten to provide a more comprehensive presentation and comparison of permitted and actual (expected) emission levels, and more information on emission differentials (the overall increases or decreases in pollution levels due to the proposed project), as shown in the addition of Table 4.1-2a to Section 4.1.2.3 (Estimated Emission Rates). Table 4.1-2a also includes information on the expected and differential levels for carbon monoxide, volatile organic compounds (VOCs), and radionuclides. A discussion of expected emission rates of VOCs under varying load conditions has also been included in this section. Section 4.1.2.6 (Air Quality Modeling: Analysis) has been expanded to include more information regarding the appropriateness of the models and data sets chosen for use in analysis. Section 4.1.2.8 (Radionuclide Emissions) has been rewritten and expanded to show revised radionuclide emission estimates (based on analytical information from other power plants) and includes an independent and more inclusionary analysis of radionuclide emissions made by DOE (based on emission factors analysis) for both the proposed project and the P. H. Glatfelter Company's Power Boiler No. 4. A differential radionuclide table showing radionuclide emission increases and decreases for the overall proposed project is now included in this section. In Section 4.1.2.10, a discussion of the proposed project's impact on odor generation has been added, as well as an expanded discussion of the effects on soil, vegetation, and agricultural resources. In particular, the impact of VOCs on crop yield (through the formation of ozone) is presented. Section 4.1.2.11 (Health Risk Assessments) has been expanded to incorporate and provide analysis on recent epidemiological and medical research information (sent to DOE by York County medical societies and EPA, Region 3), investigating the associations between air pollution (primarily particles) and adverse health effects. Table 4.1-22 has been updated to show the revised and additional independent estimates of lifetime cancer risk from radionuclide emissions associated with the proposed project. Section 4.1.4

(Water Resources and Water Quality) has been rewritten to be more clear and precise in the presentation of water quality criteria and more explanatory in discussing how the proposed project would affect the levels of constituents in Codorus Creek and the achievement of applicable water quality criteria. The discussion of hazardous and toxic materials in Section 4.1.6.2 has been expanded to include information on the amount of hazardous and/or carcinogenic wastes to be generated by the proposed project and their disposition. Section 4.1.11.1 (Historic Resources) includes additional information related to the effect of the proposed project on historic resources (in particular, one district and one individual property). The subject of electric utility rates is now discussed in a subsection (Utilities) in Section 4.1.12.3 (Public Services). Section 4.1.14.1 has been expanded to provide contextual information on the utility corridor's (especially the intra-utility corridor between the proposed site and P. H. Glatfelter Company) relationship to setting. The impact of electromagnetic fields (EMFs) resulting from the proposed electric utility corridor and electric switchyard addition are discussed in greater and more analytical detail in Section 4.1.14.6 (Human Health and Safety). The discussion of noise impacts associated with the construction and operation of the electric switchyard addition and the electric utility interconnection have been incorporated into Section 4.1.14.7 (Noise). Section 4.1.14.9 (Land Use) has been rewritten to incorporate land use information on the electric switchyard addition to Bair substation. Section 4.1.14.11 (Cultural Resources) now includes information related to two potentially affected individual properties near the electric utility line and switchyard addition. Section 4.3 (Environmental Impacts of the No-Action Alternative) now includes a discussion of the environmental consequences of a new ramification of the no-action alternative. This alternative [for Met-Ed to purchase excess electricity from the Pennsylvania-New Jersey-Maryland (PJM) power pool] is discussed in Section 4.3.3. Section 4.4 (Mitigation and Monitoring) has been updated to include additional potential mitigation measures, such as mitigation options to compensate for loss of wildlife habitat in the lands leased by the Pennsylvania Game Commission from the Army Corps of Engineers and measures taken to lessen the impact to historic resources from the proposed project and its utility corridors. A discussion of air toxics monitoring and water quality characterization is now provided.

4.1 Environmental Impacts of the Proposed Action

This section presents the analyses of potential impacts from construction and operation of the proposed YCEP Cogeneration Facility at the proposed site in North Codorus Township. The section is organized to correspond to information presented in Section 3.1, which describes the affected environment for the proposed site.

4.1.1 Setting

Construction Impacts. Construction impacts to visual resources would be caused by the construction equipment used on site and activities associated with the conduct of initial excavation and fill activities, and subsequently, by the construction of buildings and service roads that would be components of the proposed project. This equipment would include cranes, trucks, bulldozers, and various other smaller vehicles and tools. Under applicable ***United States*** Environmental Protection Agency (EPA) and Pennsylvania Department of Environmental Resources (PADER) National Pollutant Discharge Elimination System (NPDES) regulations, all earthmoving activities that disturb approximately 5 or more acres (2.0 hectares or more) of land are required to obtain a permit. An erosion and sedimentation plan must be developed in accordance with 25 Pennsylvania Code, Section 102.5. Construction of the proposed facility would be consistent with approved guidelines for erosion and sedimentation control. Impacts would be short term, lasting the duration of the construction period, which is estimated to be 36 months. Final construction activities would consist of landscaping and would include planting trees and vegetation to provide additional appearance enhancements.

Operation Impacts. Approximately 30 percent of the 38-acre (15.4-hectare) proposed site would be developed for the proposed Cogeneration Facility footprint. The major visual elements of the proposed facility would include the circulating fluidized bed (CFB) boiler building, the coal fuel storage area, the fuel conveyor, the cooling tower, and the exhaust stack (Figure 4.1-1). The CFB boiler would be housed in a building approximately 54.9 meters (m) [180 feet (ft)] high located in the center of the proposed facility. The coal fuel storage area, approximately 54.9 m (180 ft) high, would be located to the north of the boiler building with an enclosed fuel conveyor [approximately 53.3 m (175 ft) high at its highest point] extending from the storage unit to the boiler building. The exhaust stack, approximately 120.4 m (395 ft) high, would be located in the southwest portion of the proposed facility.

Because the function of the proposed facility would be industrial, its visual character also would be industrial in nature. To minimize the visual impact on its surroundings, the buildings at the proposed facility would be consistent with the industrial style architecture of the existing structures in the vicinity of the proposed site, especially those at the P. H. Glatfelter Company (Figure 4.1-2). In addition, landscaping features to be incorporated into the final design of the proposed facility would help to blend the facility with its surroundings. Existing treelines would be preserved to visually buffer the facility from adjacent properties and existing land uses surrounding the proposed site.

The visual impacts of the facility were evaluated from the ***nine*** viewshed receptor locations described in Section 3.1 and Appendix C. The anticipated views from the ***nine*** receptors are described in the following paragraphs. Illustrations of ***seven of*** these views are presented in Section 7.10 of the Environmental Information Volume (EIV) *(ENSR, 1994)*, which is available in the public reading rooms (Appendix A).

Receptor 1 — Residence on Southern Site Boundary

The views of the proposed facility from residences along York Road (Route 116), approximately 152.4 m (500 ft) south of the site, would be unobstructed; planned plantings of mature trees along the proposed site boundary would provide some visual screening. Major facility structures on the southern part of the proposed site, such as the administration building and the boiler and turbine buildings, would be prominent in the viewscape from these residences. However, the view of the proposed site would obscure a large portion of existing views ***of the following***: the P. H. Glatfelter Company mill, the Roundwood Facility, and the conveyor. Because existing views are industrial in nature, replacing these views with the proposed facility would not result in an adverse impact.

Receptor 2 — Lions Club Pavilion on Southeast Site Boundary

Major facility structures associated with the proposed project would be present in the view to the northwest of the Lions Club Pavilion area [located approximately 213.4 to 304.8 m (700 to 1,000 ft) from the site]. These structures would include the turbine bay, the coal fuel storage area, the fuel conveyor (extending from the coal fuel storage area to the CFB boiler building), and a partial view of the facility stack beyond the turbine building. These additional facility structures would be similar to those of the P. H. Glatfelter Company facility to the north and northeast. The long-term, direct impact would be minimal because existing views are similar, and this receptor is used infrequently, on a seasonal basis. The existing treeline between the pavilion area and the proposed site would be augmented with additional plantings to improve the buffer.

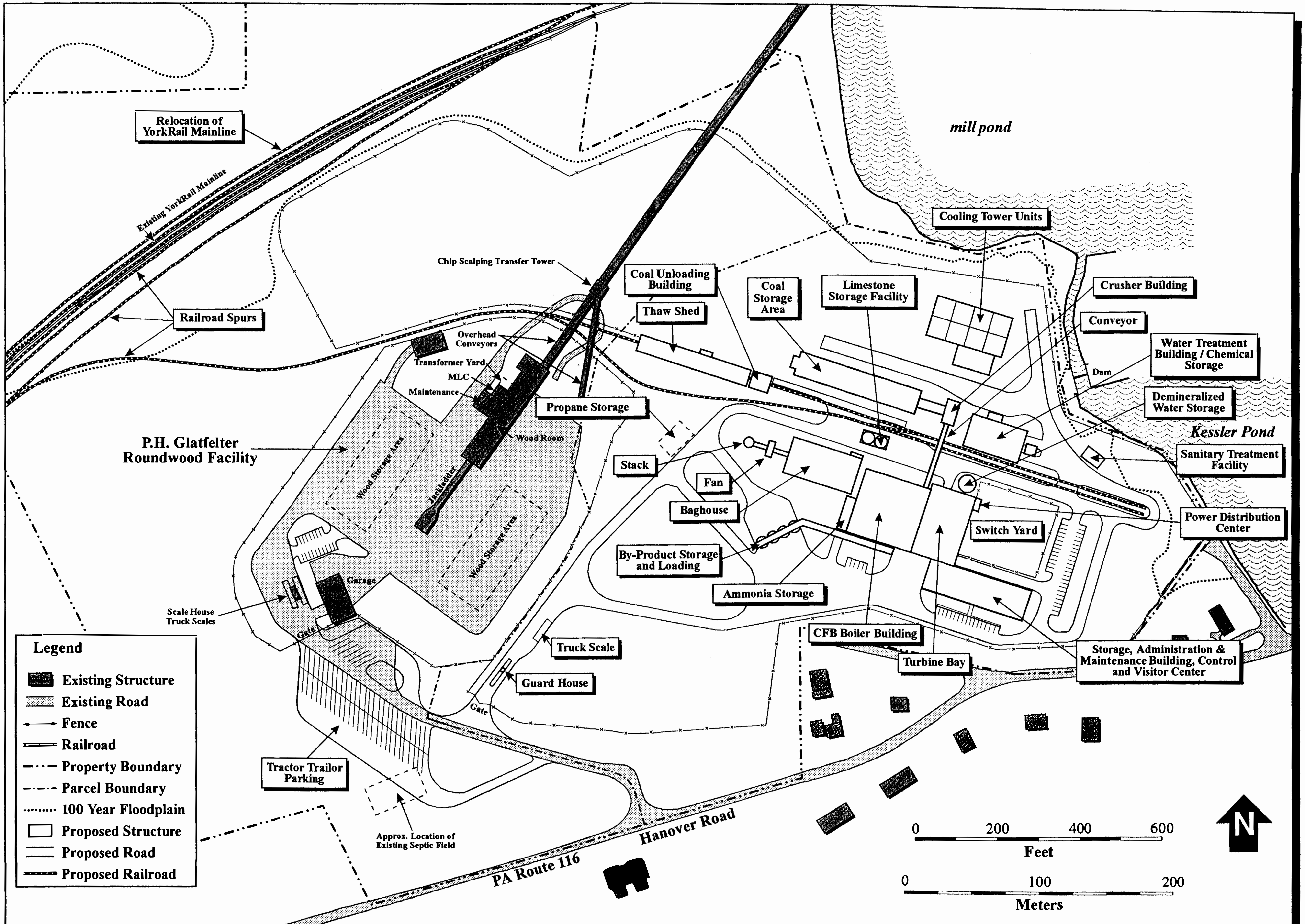

Figure 4.1-1. Proposed YCEP cogeneration facility site plan for the North Codorus Township site.

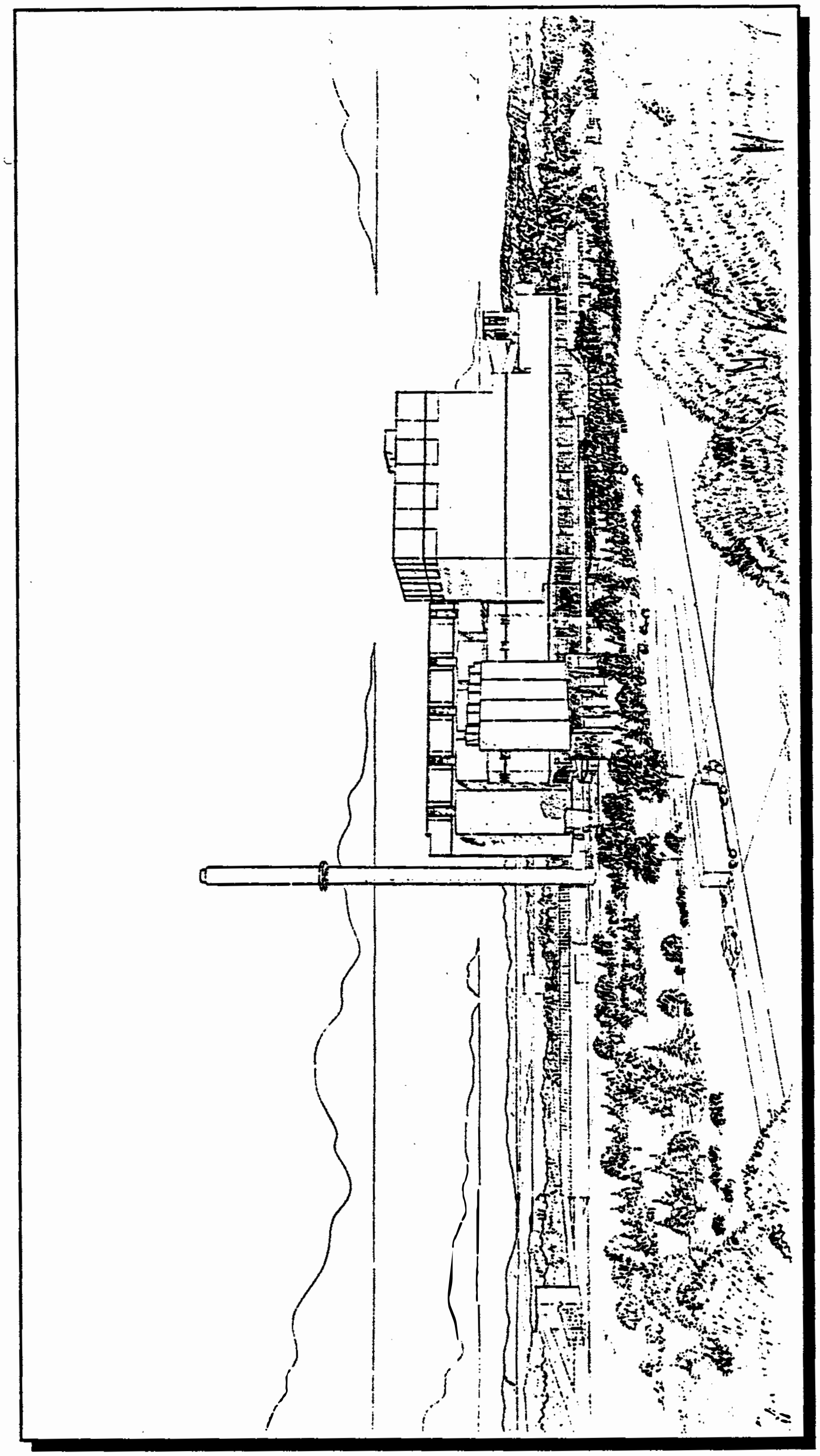

Figure 4.1-2. Artist's rendering of the proposed YCEP Cogeneration Facility.

Receptor 3 — Location on Western Edge of Residential Area by the P. H. Glatfelter Company Research Building

The view of the proposed facility from this receptor would be seen as an extension to the west of the existing northwesterly view of the P. H. Glatfelter Company buildings. Because of the distance [approximately 518.2 m (1,700 ft)] and higher elevation [approximately 12.2 m (40 ft)] of this receptor relative to the proposed site, the major structures of the proposed site would be visible when not obscured by seasonal vegetation. However, the view would be compatible with the existing view. Currently, the residences at this receptor, off Rockery Road, have plantings of deciduous trees and evergreen bushes that serve to screen the view of the existing P. H. Glatfelter Company structures; it would be expected that they also would screen the view of the proposed facility. Therefore, the impacts to this receptor are expected to be minor.

Receptor 4 — Nearest Residence on Hillside Lane Southwest of Proposed Facility

Several elements of the proposed facility, including the stack, the boiler building, and the fuel storage area would be in the view to the northeast of this receptor which includes several residences [approximately 670.6 m (2,200 ft) from the proposed site]. Although these structures would be more prominent than the existing P. H. Glatfelter Company Roundwood Facility, the impact would be similar. The existing view of the paper mill would be obscured by the proposed project's buildings, and these buildings would be more prominent in the view. Although more buildings would be visible than can be seen presently, the nature of the view would not be expected to change.

Receptor 5 — Nearest Residence on Colonial Valley Road West of the Proposed Facility

From this receptor [approximately 914.4 m (3,000 ft) from the proposed site], the P. H. Glatfelter Company mill structures and the Roundwood Facility are largely obscured by the T & J Breeder Farm, a large chicken-breeding operation managed by the owner of the residence. The proposed facility would introduce industrial structures into a previously rural open space containing some treelines. This impact, although adverse, would affect few people. The majority of the other locations along Colonial Valley Road have an unobstructed view of P. H. Glatfelter Company structures to the east (i.e., the view is not obstructed by the T & J Breeder Farm); therefore, proposed facility structures would add new industrial elements to a viewshed that is already industrial in nature.

Receptor 6 — Nearest Residence on Spring Grove Road Northwest of the Proposed Facility

To the southeast of the receptor [approximately 1,219 m (4,000 ft) from the site], the introduction of the proposed facility would add industrial elements to existing distant views of an industrial nature. The new structures would be similar in size to existing P. H. Glatfelter Company structures, as well as in their distance from the receptor. The basic visual character of the viewshed would not be altered.

Receptor 7 — Nearest Residence in Spring Grove Borough North of the Proposed Facility

The proposed facility would be located further south of the receptor [approximately 762.0 m (2,500 ft) from the proposed site] than the existing P. H. Glatfelter Company mill structures. The visual impact from these residences, on the high ground of West Constitution Avenue, is expected to be minimal because the new structures would appear as a short extension of the existing mill complex and would appear to be smaller than existing buildings. The visual character of the viewscape would not be altered.

Receptor 8 — Residential Area off Rockery Road

The view of the proposed facility from this receptor would be similar to that of Receptor 3. In the immediate foreground, the view of this receptor is of trees. In the distance to the northeast, the mill pond and the existing P. H. Glatfelter Company structures are visible. From the distance of this receptor, the proposed facility would be of a similar scale and visual character to the existing P. H. Glatfelter Company mill structures.

Receptor 9 — Residential Area on Lehman Road

The proposed facility, primarily the boiler building, would be the prominent feature in the viewshed from this receptor. In the foreground is the view of the Lions Club Pavilion, and in the distance, the existing P. H. Glatfelter Company Roundwood Facility is visible. There is some vegetative screening in the vicinity of Kessler Pond. The visual impact to this receptor associated with the development of the proposed facility would be the replacement of more distant views with an industrial setting.

4.1.2 Air Quality

This section discusses the potential impacts to ambient air quality from operation of the facility, and presents evaluations of air emission impacts on human health and the environment, including vegetation and soils, during construction and operation. Air emissions from the boiler stack and cooling tower are estimated, and their effects on human health quantified, through risk assessments.

4.1.2.1 Regulatory Requirements

This section summarizes pertinent air quality regulatory requirements. Additional information is provided in Chapter 9.

National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD)

Ambient air quality impacts are characterized and implemented under the Clean Air Act (CAA), as amended in 1990 ***(42 U.S.C. 7401 et seq as amended by Public Law 101-549)*** by means of the NAAQS ***(40 CFR 50.2)*** and the PSD increments ***(40 CFR 52.21)***. The NAAQS are fixed, absolute concentration limits, established by EPA and implemented by the state, for six "criteria" pollutants [sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulates (PM_{10}), carbon monoxide (CO), ozone (O_3), and lead (Pb)] in the ambient air. The purpose of NAAQS is to protect public health and the environment with an adequate margin of safety by establishing a ceiling for ambient pollutant concentrations resulting from the combination of new sources (e.g., the proposed YCEP project), existing sources, and natural sources of air emissions in an area. ***Areas that are in NAAQS attainment (i.e., attainment areas) for a given criteria pollutant are subject to a maximum allowable PSD increment in ambient air concentration of a criteria pollutant emitted from a source considered "significant" (i.e., above an emission-specific threshold).***

Although the CAA provided a plan for addressing emissions in areas of the country where pollution levels exceed the NAAQS, the Act did not contain explicit provisions to address the potential deterioration of ambient air quality in areas where pollutant levels were below the NAAQS. In ***the*** 1977 ***amendments to the CAA (Public Law 95-190)***, Congress established provisions that require states with areas in compliance with the NAAQS to adopt a permit program for the pre-construction review of both new stationary sources and modified existing stationary sources to prevent the significant deterioration of existing air quality levels.

The PSD program mandated by Congress is required to balance three primary goals, as specified by Section 160 of the CAA. The first of these goals is to protect public health and welfare through the protection of existing air quality in all areas where ambient pollutant concentrations required by the NAAQS are currently being achieved or have not been classified. The second goal emphasizes the protection of air quality in national parks, wilderness areas, and similar areas of special concern where the protection of air quality is considered especially important. The third goal is to assure that economic growth in clean air areas occurs only after careful deliberation of the impacts of growth on air quality by the state and local communities, and only when such growth would be consistent with the preservation of clean air resources. Under PSD regulations, each pollutant emitted from major sources in "significant" quantities must undergo a PSD review. In this context, "significant" refers to emission-specific thresholds stated in the CAA.

The required review involves the following:

- Best Available Control Technology (BACT) analysis;
- PSD increment consumption analysis (including consideration of other increment-consuming sources in the area);
- Analysis of impacts on Class I areas;
- NAAQS impact analysis;
- Nonattainment area impact analysis; and
- Additional impact analyses (e.g., impacts to visibility; impacts to soils and vegetation; impacts to commercial, residential, and industrial growth).

In January 1994, YCEP submitted its PSD Permit Application to PADER, Air Quality Control Program, for the proposed project. This PSD Permit Application was prepared to address the regulatory requirements for obtaining a PSD "Plan Approval Authority to Construct" for the proposed facility. This Permit Application includes details of the proposed facility's process description, emissions inventory, applicable air quality regulations, BACT determination, and air quality impact analysis as outlined later in this section. The specific environmental analyses for each of these areas is included in this section of the ***Final*** Environmental Impact Statement (***FEIS***).

PADER's administrative review of the PSD Permit Application for the proposed project was compiled on February 8, 1994, and included a request for additional information on 11 points. YCEP's Response Document was submitted on April 6, 1994. PADER subsequently requested more information on April 27, 1994, and YCEP's Response Document, providing details on two issues, was submitted on May 11, 1994. All documentation pertaining to YCEP's PSD Permit Application is available in the ***public*** reading rooms listed in Appendix A.

A summary of the information contained in the application follows. An analysis and discussion of information contained primarily in the air quality impact analysis section of the PSD Permit Application is largely the content of Sections 4.1.2.2 through 4.1.2.6 of this ***FEIS***. In addition, Appendix I is a compilation of the PSD Permit Applications' requirements, base conditions, and assumptions used to predict performance. This specific information is important since it forms the boundaries of operation for the proposed project. It should be noted that this compilation in Appendix I is not inclusive of all the requirements, conditions, and assumptions, but rather highlights that information most relevant for understanding and assessing the environmental impacts from the proposed project.

The Project Description chapter of the PSD Permit Application includes sections that describe the facility location, the physical facility, air pollution emission control systems, material handling and storage systems, and pollution prevention measures. Section 2.1.3 of this ***FEIS*** also provides a complete description of the proposed project.

The Emissions Inventory chapter of the PSD Permit Application describes emissions anticipated from the CFB boiler and ancillary facility operations. (Information on expected emissions also is provided in Section 4.1.2.3 of this ***FEIS***.)

The Air Quality Regulations chapter of the PSD Permit Application describes Federal regulations (PSD, NAAQS, ***New Source Performance Standards*** (NSPS), ***National Emissions Standards for Hazardous Air Pollutants*** (NESHAP), Commonwealth regulations ***[Ambient Air Quality Standards*** (AAQS), PSD, NSPS***]***, proposed regulations, and permit requirements). Additional discussions on regulatory and permit requirements are contained in Chapter 9 of this ***FEIS***.

The Determination of BACT chapter of the PSD Permit Application includes a detailed technical analysis of the proposed air pollution control equipment and a determination of whether the best available emissions control technology is being implemented for the control of oxides of nitrogen (NO_x), sulfur dioxide (SO_2), hydrogen fluoride (HF), particulate matter, trace metals, carbon monoxide (CO), and non-methane volatile organic compounds (VOCs). The BACT determination was conducted by reviewing the existing or proposed facilities which have recently received air quality permits to determine the latest air pollution control technologies being used. This BACT information is available from the EPA BACT/ Lowest Achievable Emission Rate (LAER) Clearinghouse database which is an electronic database established and maintained by EPA. A summary of the most relevant BACT determination is provided in Section 4.1.2.2 of this ***FEIS***.

A description of the modeling approach is provided in the Air Quality Impact Analysis chapter of the application as well as sections on the PSD increment analysis, NAAQS analysis, air toxics analysis, impacts on soils and vegetation, and Class I visibility impacts. This modeling analysis considers background ambient air quality, ground level impacts from the proposed source, and cumulative impacts due to the proposed source and other existing emissions sources, to determine the associated impacts to surrounding air quality. The results of these air quality modeling analyses are presented in Section 4.1.2.6 of this ***FEIS***.

Some of the more important analyses results contained within the PSD Permit Application are as follows:

- The increase in ambient concentration attributable to the proposed project for total suspended particles (TSP), ***particulate matter*** (PM_{10}), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) would not exceed the allowable PSD increment consumption. In particular, the increments consumed by the proposed project and all of the PSD facilities on a cumulative basis are 24, 85, and 85 percent of the allowable PSD increment for the annual, 3-hour and 24-hour ***sulfur dioxide*** (SO_2) averaging periods, respectively. By itself, the proposed project would consume 24, 22, and 27 percent of the allowable annual, 3-hr, and 24-hr ***sulfur dioxide*** (SO_2) increments. The proposed facility would consume 9.7 percent of the allowable annual ***oxides of nitrogen*** (NO_x) increment; the total NO_x increment consumed by all PSD sources in the area would be 24 percent.

- Emissions from the proposed project would not cause or greatly contribute to pollutant concentrations that exceed the primary or secondary NAAQS or the Commonwealth of Pennsylvania ***ambient air quality standards*** (AAQS).

New Source Performance Standards (NSPS)

New Source Performance Standards (40 CFR Part 60) apply to new, modified, and reconstructed sources of emissions. EPA has promulgated NSPS for fossil fuel-fired steam generators with a heat input greater than 250 MMBtu/hr (Subpart D). Under the EPA New Source Review (NSR) policy, the proposed YCEP project would be one of 28 specified major stationary source categories, since it is a fossil-fuel fired steam electric plant with more than 250 MMBtu/hr heat input, and because it has the potential to emit more than 100 tons per year ***(tons/yr)*** of regulated pollutants. Continuous Emissions Monitoring System (CEMS) requirements for this regulated source category are specified in 40 CFR 60.47a. Subpart Y (coal preparation) defines particulate matter and opacity standards for coal processing and thermal coal drying plants, and requires the monitoring of coal thermal dryer exhaust gas temperatures. The proposed project would be subject to the requirements of Subparts D and Y of the NSPS in addition to the above-mentioned CEMS requirement.

Conformity Determination

The CAA Amendments ***of 1990*** require Federal actions to conform with the host state's "State Implementation Plan" (SIP). The SIP provides for the implementation, maintenance, and enforcement of the NAAQS for the six criteria pollutants *[*i.e., ***sulfur dioxide*** (SO_2), ***particulate matter*** (PM_{10}), ***carbon monoxide*** (CO), ***ozone*** (O_3), ***nitrogen dioxide*** (NO_2), and ***lead*** (Pb)*]*. The SIP's purpose is to eliminate or reduce the severity and number of violations of NAAQS and to expedite the attainment of these standards. No department, agency, or instrumentality of the Federal government can engage in; support in any way; or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable implementation plan (***40 CFR Part 51 Subpart W***).

The final rule for "Determining Conformity of General Federal Actions to state or Federal Implementation Plans" was promulgated by EPA *o*n November 30, 1993 (58 FR 63214), and took effect on January 31, 1994 (40 CFR Parts 6, 51, and 93). This rule establishes the conformity criteria and procedures necessary to meet the CAA until the required conformity SIP revision by each state is approved by EPA. States ha*d* until November 30, 1994, to submit their conformity provisions (or within

12 months of an area's change in designation from "nonattainment," whichever is later) (***40 CFR 51.581***). Criteria for determining conformity are specified in some detail in the final rule, but basically are such to ensure that emissions of all criteria air pollutants and VOCs from an action are specifically identified and accounted for in the SIP's attainment or maintenance demonstration.

EPA has strived to ensure that the new conformity procedures are consistent with ***National Environmental Policy Act*** (NEPA). This way, Federal agencies can incorporate the new conformity procedures within existing NEPA procedures. EPA has recognized that for now, the CAA statute provides limited applicability of the Conformity Rule to "nonattainment" areas or those areas classified after November 15, 1990, as "maintenance" areas. An area is designated as nonattainment for a criteria pollutant if the area does not meet primary or secondary NAAQS for the pollutant (or if the area contributes to the ambient air quality of a nearby area that does not meet primary or secondary NAAQS). An area is classified as a "maintenance" area when a state redesignates it from nonattainment to attainment; accordingly, the state must also submit to EPA a plan for maintaining NAAQS as a revision to the SIP ***(40 CFR 51.852 Definitions)***.

There are circumstances in which the Conformity Rule would not apply to a Federal action in a nonattainment or maintenance area; for example, when an action requires a permit under NSR or the PSD requirements of the CAA.

As discussed in Section 3.1.2, the proposed site is located in the South Central Pennsylvania Interstate Air Quality Control Region (AQCR). This site is within an attainment area for five of the six criteria pollutants; ***sulfur dioxide*** (SO_2), ***particulate matter*** (PM_{10}), ***carbon monoxide*** (CO), ***nitrogen dioxide*** (NO_2), and ***lead*** (Pb). Therefore, in regard to these criteria pollutants, the proposed action is not affected by the provisions of this rule. However, the site is within a nonattainment area for ozone (O_3). In this case, a NSR has been performed for a permit under requirements of the CAA. By virtue of this review, no procedures related to a conformity determination for the proposed YCEP project site are required, and none has been undertaken.

<u>Acid Rain</u>

The proposed YCEP facility would be required to comply with the requirements of the CAA Amendments of 1990. In particular, the proposed facility would be required to comply with two provisions: Title IV, Section 403, Acid Rain; and Title I, Section 182, *O*zone *C*ontrol in a *N*onattainment *A*rea. Under the

Acid Rain provision (Title IV, Section 403), all new electric utility sources that operate after January 1, 2000, would be required to obtain sulfur dioxide (SO_2) allowances. These allowances represent a limited authorization to emit sulfur dioxide (SO_2) in accordance with the provisions of the Title IV program. These allowances must be obtained from an existing baseline facility and are designed to assure no net increase in sulfur dioxide (SO_2) emissions above a pre-established baseline. The proposed facility must obtain these allowances on a yearly basis as part of the on-going operating permit requirements.

Northeast Ozone Transport Region (NOTR)

Under the Nonattainment Area ***provision***, Title I, Section 182 of the CAA Amendments ***of 1990***, the Commonwealth of Pennsylvania is listed as being located in an air quality area designated as the Northeast Ozone Transport Region (NOTR). Any major stationary source located in the NOTR with the potential to emit more than 100 ***tons/yr*** of oxides of nitrogen (NO_x) or 50 ***tons/yr*** of VOCs must offset these emissions by obtaining emissions reduction credits (ERCs) from existing baseline facilities in the surrounding area. The new source emissions must be offset by a ratio of 1.15 to 1, thus ERCs equivalent to 115 percent of the potential to emit must be obtained. The proposed facility would be subjected to the oxides of nitrogen (NO_x) emissions requirements because it could potentially emit more than 100 ***tons/yr***. It would not be subjected to the VOC requirements because its potential to emit VOCs is less than 50 ***tons/yr***. YCEP would be required to obtain ERCs for oxides of nitrogen (NO_x) emissions from the proposed facility from an existing baseline source as part of its air quality permitting process.

Prior to calculating the amount of ERCs available, an existing baseline source is required to comply with the Reasonably Available Control Technology (RACT) requirements of the CAA. The purpose of the RACT requirements is to require existing sources of oxides of nitrogen (NO_x) and VOCs to lower emissions. These RACT requirements, which went into effect in May 1994, require existing oxides of nitrogen (NO_x) sources to install control technology to achieve a reasonable reduction in their existing oxides of nitrogen (NO_x) emissions. These modifications to existing sources are required prior to May 31, 1995. Before determining the amount of ERCs available to the proposed facility, existing sources must first consider their RACT reduction. ERCs must be obtained and approved by the PADER before it will issue a PSD Plan Approval Authority to Construct permit.

4.1.2.2. BACT/Air Pollution Control Equipment

As part of the PSD permit application, YCEP conducted a BACT review and a technical analysis of the proposed sulfur dioxide (SO_2), oxides of nitrogen (NO_x), particulate matter ***(PM_{10})***, carbon monoxide (CO) and VOCs control technologies to other similar, but smaller CFB boilers burning eastern bituminous coal. These other CFB boilers are currently operating or have received air quality permits to operate. A complete description of the BACT analysis is provided in Chapter 5 of the YCEP PSD Air Quality permit application package, which is available in the ***public*** reading rooms (Appendix A); a summary is provided in Appendix I.

Sulfur Dioxide Emissions

A review of BACT determinations (using data available from the BACT/LAER Clearinghouse database) showed that sulfur capture in the CFB boiler combustion chamber using limestone material as a sorbent was the BACT for all units.

Facility Name	Permitted SO_2 Emissions Level (lbs/MMBtu)
Halfmoon Cogeneration Project	0.22
Cedar Bay Cogeneration	0.24
York County Energy Partners	0.25
AES Thames, Inc.	0.32

The CFB boiler technology for the proposed YCEP facility would include the use of limestone injection in the boiler combustion chamber for control of sulfur dioxide (SO_2) emissions. The limestone consists primarily of calcium carbonate ($CaCO_3$), which would convert to calcium oxide (CaO) and carbon dioxide (CO_2) when heated in the boiler combustion chamber. The calcium oxide (CaO) would interact with the sulfur dioxide (SO_2) emitted in the coal burning process to control the sulfur dioxide (SO_2) emissions. The calcium oxide (CaO) and sulfur dioxide (SO_2) would combine to form calcium sulfate ($CaSO_4$), an inert gypsum material.

The proposed YCEP facility would have a sulfur dioxide (SO_2) emissions level of 0.25 pounds per million Btu (lbs/MMBtu) which translates to a 92-percent reduction compared to the potential uncontrolled sulfur dioxide (SO_2) emissions level (assuming 100 percent of sulfur in the coal is released to the gas in the uncontrolled situation). This emissions level was confirmed by a pilot plant test conducted by the boiler manufacturer using the coal and limestone materials expected to be used at the proposed project.

Oxides of Nitrogen

A review of BACT determinations (using data available from the BACT/LAER Clearinghouse database) showed that oxides of nitrogen (NO_x) control in the CFB boiler combustion chamber with selective non-catalytic reduction (SNCR) using ammonia or urea was the BACT for all units.

Facility Name	Permitted NO_x Emissions Level (lbs/MMBtu)
Halfmoon Cogeneration Project	0.10
York County Energy Partners	0.125
North Branch Energy Partners, L.P.	0.15
Cedar Bay Cogeneration/Seminole Kraft	0.17

The proposed YCEP CFB boiler would include the add-on SNCR control system, which uses aqueous ammonia to minimize oxides of nitrogen (NO_x) emissions. Aqueous ammonia (NH_3) would be injected into the boiler exhaust stream to interact with the oxides of nitrogen (NO_x), converting it into nitrogen and water.

This injection technology would control oxides of nitrogen (NO_x) emissions to 0.125 lbs/MMBtu and achieve a 40 percent or greater reduction compared to the potential uncontrolled oxides of nitrogen (NO_x) emissions. This control technology has been used on other CFB boilers and it has been demonstrated to be technically feasible.

Particulate Matter

A review of BACT determinations (using data available from the BACT/LAER Clearinghouse database) showed that particulate matter control using a fabric filter (i.e., baghouse) was the BACT for all units.

Facility Name	Permitted PM_{10} Emissions Level (lbs/MMBtu)
York County Energy Partners	0.011
Halfmoon Cogeneration Project	0.015
Cedar Bay Cogeneration/Seminole Kraft	0.018
AES Thames, Inc.	0.020

The proposed facility would include a fabric filter collection system (baghouse) used to control particulate matter emissions. The baghouse uses filter material to remove fine particles in the boiler exhaust stream prior to release of the exhaust gas into the atmosphere.

The baghouse system would control particulate matter emissions to 0.011 lbs/MMBtu and achieve a 99.9 percent or greater reduction compared to the potential uncontrolled particulate matter emissions. This control technology has been used on other CFB boiler applications and it has been demonstrated to be technically feasible.

Carbon Monoxide

A review of BACT determinations (using data available from the BACT/LAER Clearinghouse database) showed that carbon monoxide (CO) emissions are controlled by combustion control (i.e., efficient operation) of the CFB boiler. No add-on control equipment was used for carbon monoxide (CO) emissions control on any CFB boiler. Carbon monoxide (CO) emissions levels are guaranteed by respective boiler manufacturers and are dependent on the CFB boiler design, expected operating conditions, and the type of coal supply used as fuel.

Facility Name	Permitted CO Emissions Level (lbs/MMBtu)
Scrubgrass Power Cogeneration	0.10
AES Thames, Inc.	0.11
York County Energy Partners	0.15
Cambria Cogen Company	0.15

The proposed CFB boiler would utilize an efficient combustion process which controls carbon monoxide (CO) emissions through good combustion control practices. No add-on type equipment is needed for carbon monoxide (CO) emissions control. The proposed CFB boiler would have a carbon monoxide (CO) emissions level of 0.15 lbs/MMBtu. The combustion control technology to be used has been demonstrated to be technically feasible on other CFB boiler applications.

Volatile Organic Compounds

A review of BACT determinations (using data available from the BACT/LAER Clearinghouse database) showed that VOCs emissions are controlled by combustion control (i.e., efficient operation) of the CFB boiler. No add-on equipment was used for VOCs emissions control on any CFB boiler. VOCs emissions levels are guaranteed by respective boiler manufacturers and are dependent on the CFB boiler design, expected operating conditions, and the type of coal supply used as fuel.

Facility Name	Permitted VOC Emissions Level (lbs/MMBtu)
Halfmoon Cogeneration Project	0.0037
York County Energy Partners	0.004
Scrubgrass Power Cogeneration	0.005
North Branch Energy Partners, L.P.	0.010

The proposed CFB boiler would use an efficient combustion process which controls VOCs emissions through good combustion control practices. No add-on type equipment is needed for VOCs emissions control. The proposed CFB boiler ***at 100 percent load*** would have a VOCs emission level of 0.004 lbs/MMBtu. The combustion control technology to be used has been demonstrated to be technically feasible on other CFB boiler applications.

4.1.2.3 Estimated Emission Rates

Although the facility would be designed to operate continuously at full (100 percent) capacity, the facility power sales contract has provisions that would allow for varying facility output between 114 and 227 MW. When operating at less than full capacity, coal and limestone use would decrease and air pollution emissions would be lower. Despite the fact that current projections indicate that operation may occur at lower load levels for up to approximately 2,000 hours per year, all air quality analyses were based on the more conservative assumption that the proposed project would operate at 100 percent load, 24 hours per day, 365 days per year. The operating parameters and expected emissions rates for three operating levels — 100, 75, and 50 percent — listed in Table 4.1-1 are based on the boiler manufacturer's expected performance for the proposed facility using expected coal and limestone supplies. These three operating levels provide a range of the expected operation of the proposed project.

Volatile organic compound (VOC) emissions from the proposed YCEP facility would increase over existing conditions (see Table 4.1-2a). However, the proposed facility would not need to provide ERCs for VOCs because the expected VOCs emissions rate of 48 ***tons/yr*** is below the threshold of 50 ***tons/yr*** established for a major ***stationary*** source in the NOTR. ***The equipment vendor, Foster Wheeler Energy Corporation, guarantees that when the proposed facility operates at a unit capacity of 50 to 100 percent, the VOC emissions in the flue gas measured in the stack would not exceed 10 pounds per hour based on a 24-hour average (letter from Foster Wheeler Energy Corporation to YCEP, January 2, 1995–see Appendix E). Thus, regardless of the unit capacity conditions, 50, 75, or 100 percent under which the proposed YCEP facility would operate, the maximum annual emissions of VOCs would be 48 tons. For permitting purposes, YCEP has chosen to use a VOC emission value of 11 pounds per hour, which is reflected in the emission values for VOCs in Table 4.1-1.*** In addition, it is known that VOCs are emitted from sources such as propane, motor fuel storage, and traffic generation. These emissions, compared to the 48 ***tons/yr*** of VOCs emitted from the CFB boiler, are likely to be low, as illustrated by the estimate of 1.0 ***ton/yr*** of hydrocarbon VOCs from local traffic generation (see subsection 4.1.2.10, Table 4.1-14). Because the proposed facility's expected oxides of nitrogen (NO_x) emission rate of 1,437 ***tons/yr*** exceeds the threshold level (100 ***tons/yr***) for a major source of oxides of nitrogen (NO_x), emissions must be offset by a 1.15 to 1 ratio with ERCs.

Table 4.1-1. Operating parameters and expected emission rates for the CFB boiler at three operating levels.

	50% Load (1)	75% Load	100% Load
Firing Duty, MMBtu/hr	1,574	2,099	2,624
Fuel Flow, lbs/hr	123,969	165,291	206,580
Flue Gas Flow, lbs/hr	1,616,670	2,000,480	2,493,372
Flue Gas Flow, acfm	492,400	607,400	758,700
Flue Gas Temperature, °F	270	275	280
Flue Gas Exit Velocity, fpm (1)	3,440	4,243	5,300
Flue Gas Composition, lbs/hr			
Nitrogen	1,144,116	1,420,396	1,770,387
Oxygen	79,799	71,406	88,935
Carbon Dioxide	317,026	426,518	531,728
Water Vapor	74,622	80,909	100,900
Sulfur Dioxide (2)(3)	394	525	660
Nitrogen Dioxide (3)	328	328	328
Carbon Monoxide (3)	355	364	394
VOC, Non-Methane (3)	*11*	11	11
Particulate (PM_{10}) (3)	17	23	29
Arsenic	0.005	0.0066	0.0083
Beryllium	0.0007	0.0010	0.0012
Cadmium	0.0001	0.0001	0.0001
Total Chromium	0.0112	0.0149	0.0186
Fluoride	0.087	0.116	0.145
Lead	0.0026	0.0035	0.0044
Manganese	0.008	0.0107	0.0134
Mercury	0.0173	0.0231	0.0289
Nickel	0.008	0.0107	0.0134
Selenium	0.0009	0.0012	0.0015
Thallium	0.0002	0.0003	0.0004
Zinc	0.0093	0.0124	0.0155

Notes:
(1) The flue gas exit velocity is calculated on a 13.5 foot diameter stack.
(2) Sulfur dioxide emissions are based on a coal with a 2% sulfur level.
(3) Values based on boiler manufacturer guarantee.

Source: ENSR, 1994.

A total of 1,652 ***tons/yr*** of ERCs would be required by YCEP to provide a 1.15 to 1 offset of oxides of nitrogen (NO_x). ***Thus, a net reduction of at least 215 tons/yr (1,652 tons/yr-1,437 tons/yr) of oxides of nitrogen (NO_x) would be required.*** As a result of actions taken at York County sources, the P. H. Glatfelter Company and the Transcontinental Gas Pipe Line Corporation (TGPL), located 55 kilometers (km) [34.1 miles (mi)] from the proposed site, ERCs would be created and transferred to YCEP. Taking into account reductions for RACT, it is anticipated that up to 800 ***tons/yr*** of ERCs would be received from TGPL and up to 900 ***tons/yr*** would come from the P. H. Glatfelter Company. These ERCs would result in a net reduction ***in permitted emissions*** of oxides of nitrogen (NO_x) of ***272 tons/yr*** in the York Air Basin.

The TGPL owns and operates a natural gas pipeline compressor station near Delta, York County, Pennsylvania. This station, referred to as Station 195, includes five natural gas-fired compressor engines. YCEP and TGPL have entered into an agreement whereby modifications would be performed to certain units that would permanently reduce oxides of nitrogen (NO_x) emissions. This agreement requires TGPL to obtain all the necessary permit modifications to create and transfer ERCs to YCEP. These modifications would occur before operation of the YCEP facility.

The proposed YCEP facility would provide sufficient high pressure steam to the P. H. Glatfelter Company mill to allow it to curtail operations of its Power Boiler No. 4, thereby creating ERCs that would be transferred to YCEP. The Power Boiler No. 4, based on recent monitoring, emits approximately 1,200 ***tons/yr*** of oxides of nitrogen (NO_x). Following installation of low ***oxides of nitrogen*** (NO_x) burners to comply with the RACT requirements, actual oxides of nitrogen (NO_x) emissions would be measured to determine the exact amount of ERCs available for transfer to YCEP. It is anticipated that up to 900 ***tons/yr*** of oxides of nitrogen (NO_x) ERCs would be available.

A permit modification for Power Boiler No. 4 is required for the construction and operation of the proposed YCEP facility. The P. H. Glatfelter Company is expected to curtail operation of Power Boiler No. 4 to an equivalent of 720 hours per year at full load, and, through a permit restriction, limit operation to a maximum quantity (***tons/yr***) of oxides of nitrogen (NO_x) emissions equal to this 720 hours of operation at full (100 percent) load. An accompanying reduction in sulfur dioxide (SO_2) and particulate matter (PM_{10}) emissions also would result from the Power Boiler No. 4 curtailment. Over ***a*** 90 percent reduction in the amount of coal combusted due to the curtailment of Power Boiler No. 4 would be anticipated when compared to the current baseline of this unit. The oxides of nitrogen (NO_x)

permit restrictions that translate to coal usage/time of operation restrictions would help assure that the potential net reduction (***based on the potential to emit***) in sulfur dioxide (SO_2) and particulate matter (PM_{10}) emissions of 2,419 and 65 ***tons/yr***, respectively, would occur for ***an*** overall proposed project.

It should be noted that the existing P. H. Glatfelter ***Company*** Power Boiler No. 4 consumes approximately 105,580 tons of coal per year and emits 5,785 tons of sulfur dioxide (SO_2), while the proposed YCEP facility would consume approximately 912,500 tons of coal per year and emit 2,891 tons of ***sulfur dioxide*** (SO_2) per year. Thus, the proposed project would consume 760 percent more coal than Power Boiler No. 4, but would emit 50 percent less sulfur dioxide (SO_2), thereby supporting the Clean Coal Technology (CCT) Program's objectives. It should also be recognized that P. H. Glatfelter Company Power Boiler No. 4 is classified as an industrial boiler and, as such, would not be subject to the same CAA provisions for coal-fired utility boilers. A summary of the net ***permitted*** emissions reductions due to YCEP's operations in concert with curtailment of the P. H. Glatfelter ***Company*** Power Boiler No. 4 and the modifications of TGPL is shown in Table 4.1-2.

The actual operating scenarios for the proposed YCEP facility and the P. H. Glatfelter Company's Power Boiler No. 4 would likely result in lower emissions than the permitted emission rates shown in Table 4.1-2. Table 4.1-2a presents a summary of the expected emissions from the proposed YCEP facility in the context of curtailing Power Boiler No. 4, under expected operating conditions. These emission rates reflect reductions in emissions of sulfur dioxide (SO_2***), oxides of nitrogen (*** NO_x***), and particulate matter (*** PM_{10}***), and increases in emissions of carbon monoxide (CO) and VOCs. Table 4.1-2a also presents the expected increase in emissions of radionuclides. It should be noted that the emissions shown in Table 4.1-2a reflect the expected level of performance of the proposed project's boiler and pollution control devices. For instance, expected emissions of sulfur dioxide (*** SO_2***), oxides of nitrogen (*** NO_x***), and particulate matter (*** PM_{10}***) were estimated by YCEP as being 90 percent of permitted (maximum) emissions, and as 80 percent of permitted emissions for carbon monoxide (CO) and VOCs. These estimates are based on operational experience with other systems. These expected values do not take into account any decreases in overall emissions due to operating at reduced loads (i.e., at 50 percent load) or time of operation (i.e., 10 months out of a year). Because it would be highly speculative to assume these types of operational parameters at this time, these were not considered when the expected emissions estimates were developed. It is anticipated that the expected emissions for the proposed project as shown in Table 4.1-2a could be less than those presented in the table if parameters such as load and time of operation were factored into the analysis.***

Table 4.1-2. Emissions reduction summary based on permitted emissions (tons/yr).

	SO_2 tons/yr	NO_x tons/yr	PM_{10} tons/yr	*TOTAL tons/yr*
(1) P. H. Glatfelter Company's Power Boiler No. 4 - annual permitted emissions	5,785	990[a]	209	*6,984*
(2) P. H. Glatfelter Company's Power Boiler No. 4 - 720 hours	475	*81*	17	*573*
(3) P. H. Glatfelter Company's Power Boiler No. 4 - after curtailment reduction (line 1 minus line 2)	5,310	*909*	192	*6,411*
(4) TGPL modification reductions for ERCs		800		*800*
(5) Available emissions reductions (line 3 plus line 4)	5,310	*1,709*	192	*7,211*
(6) YCEP permitted (maximum) emissions	2,891	1,437	127	*4,455*
(Reduction) of permitted emissions (line 6 minus line 5)	(2,419)	*(272)*	(65)	*(2,756)*

[a] *After RACT Modifications*

Currently, the P. H. Glatfelter Company operates three coal-fired Power Boilers, No. 1, No. 4, and No. 5. A fourth boiler, Power Boiler No. 3, currently serves as a back-up steam source in the event one of the three power boilers is out of service. The 720 hours per year permit limitation would allow P. H. Glatfelter Company the flexibility to operate Power Boiler No. 4 as a back-up steam source. After start-up of the proposed YCEP facility, Power Boiler No. 3 would be expected to be used only as an emergency back-up unit in the unlikely event that several boilers were out of service at the same time. The P. H. Glatfelter Company would be expected to operate only two of the three currently operating coal-fired power boilers. Expected operating scenarios may include the following:

Table 4.1-2a. Emissions increase (reduction) summary based on actual or expected emissions.

	SO_2 tons/yr	NO_x tons/yr	PM_{10} tons/yr	CO	VOCs	TOTAL tons/yr	Radio-nuclides mCi/yr
(1) P. H. Glatfelter Company's Power Boiler No. 4 - annual emissions[a]	3,588	990[b]	132	35.0	3.70	4,684	58.6
(2) P. H. Glatfelter Company's Power Boiler No. 4 - 720 hours	336[c]	81	11	2.9	0.3	431	4.8
(3) P. H. Glatfelter Company's Power Boiler No. 4 - after curtailment reduction (lines 1-2)	3,252	909	121	32.1	3.4	4,253	53.8
(4) TGPL modification reductions for ERCs		800					
(5) Available emissions reductions (lines 3+4)	3,252	1,709	121	32	3.4	5,053	53.8
(6) YCEP estimated emissions[d]	2,602	1,293	114	1,381[e]	38.4[e]	5,429	278.9
Increase (reduction) of expected emissions (lines 6-5)	(650)	(415)	(7)	1,349	35	312	225.2

[a] Estimates of annual *(actual)* emissions of SO_2, NO_x, CO, and VOCs from the P. H.G. Boiler No. 4 are based on 1993 data provided to YCEP by P. H. Glatfelter Incorporated. Radionuclide emissions from Boiler No. 4 were estimated by DOE (see Table 4.11-2b)

[b] Maximum permitted level after RACT modifications.

[c] Value for 720 hours includes an additional allowance for monthly variation in the sulfur content in coal.

[d] Expected emissions of SO_2, NO_x, and PM_{10}, were estimated by YCEP as 90 percent of permitted (maximum) emissions, and as 80 percent of permitted emissions for CO and VOCs. Radionuclide emissions from the proposed YCEP facility were estimated by DOE (see Table 4.1-12a). Actual emissions would likely be lower than amounts shown because the YCEP boiler would not be on line at as high a capacity or for as long a duration as reflected in this table.

[e] The maximum allowable (permitted) emissions for CO and VOC are 1,726 tons/yr and 48 tons/yr respectively.

- Power Boiler No. 4 would be on hot-standby (boiler kept hot with steam injected into the steam drum) and the P. H. Glatfelter Company would receive high pressure steam from the proposed YCEP facility. The P. H. Glatfelter Company would also continue to generate steam from the two other existing coal-fired boilers, Power Boilers No. 1 and No. 5. This scenario is the expected long-term operating situation.

- In the event that one of the P. H. Glatfelter Company operating coal-fired boilers (No. 1 or No. 5) becomes temporarily out of service, the P. H. Glatfelter Company would have the flexibility to run Power Boiler No. 4 to make up for the lost industrial steam. This is expected ***to*** be a short-term operating scenario and represents a situation when the 720 hours per year of Power Boiler No. 4 operation would allow for back-up flexibility.

- The P. H. Glatfelter Company would operate Power Boiler No. 4 when the proposed YCEP boiler is shut down for maintenance to compensate for industrial steam loss. Power Boilers No. 1 and No. 5 would also continue to operate to provide industrial steam to the paper making operation. This scenario reflects current operations at the P. H. Glatfelter Company facility.

The P. H. Glatfelter Company is currently preparing a permit modification application for the existing Power Boiler No. 4 permit to allow for limited operation up to 720 hours per year after start-up of the proposed YCEP facility. This permit modification application should be submitted in 1995. YCEP submitted its PSD "Plan Approval Authority to Construct" permit application in January 1994, which is currently under review by PADER. ***A public hearing was conducted by PADER on YCEP's permit application on April 18, 1995, and a decision on this permit application should be rendered in spring/summer 1995.*** The regulatory requirements state that both the YCEP permit application and the Power Boiler No. 4 permit modification must be approved prior to release of the YCEP PSD "Plan Approval Authority to Construct." It is expected that PADER would include special conditions in both of these air permit approvals to link the two operating units and assure that the ***oxides of nitrogen*** (NO_x) ERCs would be permanent and federally enforceable. The subsequent reduction in sulfur dioxide (SO_2) and particulate matter (PM_{10}) emissions from Power Boiler No. 4, therefore, would also be permanent.

Under the provision of Phase II of Title IV of the CAA, YCEP would be obligated to purchase or obtain ***sulfur dioxide*** (SO_2) "allowances" to emit ***sulfur dioxide*** (SO_2) from the proposed facility after January 1, 2000. Under an opt-in provision, it is thought that some portion of these "allowances" could be generated by the curtailment of Power Boiler No. 4. ***Within the provisions of Title IV (the so-called "opt-in" provisions) certain industrial boilers may optionally comply with sulfur dioxide (SO_2) emission reductions and hence create allowances that can be sold on an open market for use by electric utilities.*** If this option becomes available, the P. H. Glatfelter Company has committed to transferring ***sulfur dioxide*** (SO_2) "allowances" to YCEP. In the event that the allowances are not obtained through the P. H. Glatfelter Company, YCEP would be required to purchase these allowances on the open market. Since there is a legislative cap on these allowances, this proposed action would not promote the creation of more allowances.

4.1.2.4 Significant Emission Rates

To evaluate the proposed project emissions that would have the greatest potential to impact air quality, air emissions were compared with the PSD significant emission rates [threshold values for ambient air quality monitoring requirements contained in 40 CFR 52.21(b)(23)]. The proposed facility is an electric generating facility with a heat input greater than 250 million Btu (MMBtu) and is thus classified as one of the 28 named source categories in Section 169 of the CAA that emits or has the potential to emit 100 ***tons/yr*** or more of pollutant regulated by the CAA, and is subject to PSD review for any of the pollutants ***deemed*** "significant." Table 4.1-3 presents a comparison of PSD emission rates and expected project emissions. Maximum air emissions expected during operation of the proposed YCEP project include 2,891 ***tons/yr*** of sulfur dioxide (SO_2), 127 ***tons/yr*** of particulate matter (PM_{10}), 1,437 ***tons/yr*** of oxides of nitrogen (NO_x), 1,726 ***tons/yr*** of carbon monoxide (CO), and 48 ***tons/yr*** of VOCs. Expected emission levels for carbon monoxide (CO), oxides of nitrogen (NO_x), sulfur dioxide (SO_2), particulate matter (TSP/PM_{10}), VOCs, beryllium, and mercury are shown to be higher than the corresponding significant emissions rate. Each of these pollutant emission levels were further evaluated through modeling and technical analyses to assure that AAQS would not be exceeded. Expected emissions levels for fluorides, sulfuric acid mist, and lead are not higher than the significant emissions rates, and thus, no further evaluation was required.

4.1.2.5 Air Quality Modeling: Good Engineering Practice (GEP) Height

A key parameter used in the air quality modeling is the facility's stack height. Under Section 123 of the CAA, the EPA has established regulations (40 CFR Part 51) called Good Engineering Practice (GEP) stack height to ***en***sure that excess stack heights are not used as air dispersion techniques, ***which would*** allow high levels of emissions. The purpose of Section 123 is to allow EPA to regulate only stack height credit rather than actual height. A GEP stack height is defined in Section 123 of the CAA as the "height necessary to ensure that emissions from the stack do not result in excessive concentrations of any pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles." Even if a proposed project includes construction of a stack higher than GEP, only the stack height equal to GEP can be used in air quality dispersion model analyses. If a proposed project includes construction of a

Table 4.1-3. PSD emission rates vs. estimated proposed facility emission rates.

Pollutants	PSD Significant Emission Rate (tons/yr)	Estimated Project Emission Rate[1] (tons/yr)
Carbon Monoxide	100	1,726
Oxides of Nitrogen	40	1,437
Sulfur Dioxide	40	2,891
Particulate Matter (TSP/PM_{10})	25/15	127[2]
Ozone (VOC)	40 (of VOCs)	48
Fluorides	3	0.635
Sulfuric Acid Mist	7	NA[3]
Lead	0.6	0.02
Beryllium	0.0004	0.0053
Mercury	0.1	0.127

[1] Based on 100 percent operating load 8,760 hours per year.
[2] PM_{10} emissions are included in the total suspended particulate matter emissions.
[3] Emissions are expected to be negligible due to operating conditions of the proposed facility.

Source: Weston, 1994d.

stack less than GEP, air dispersion modeling analyses must incorporate potential building downwash effects to ensure that excessive pollutant ground-level concentrations would not occur.

A GEP stack height analysis based on EPA's Guideline for Determination of Good Engineering Practice Stack Height *(EPA, 1985b)* was completed for the proposed project using the building design and facility layout information. Table 4.1-4 provides the information for the facility boiler building, which is the controlling parameter for the GEP stack height calculation. The maximum GEP height for the main stack based on this building was determined to be 137.2 m (450 ft).

YCEP proposes to build a stack with a height of 120 m (395 ft). Because the proposed stack height is less than the calculated GEP formula height, additional air quality modeling analysis is required to

Table 4.1-4. Boiler building assumptions for GEP analysis.

Ground level elevation:	144.8 m (475 ft)
Building height:	54.9 m (180 ft)
Building width:	50.3 m (165 ft)
Maximum projected width:	50.3 m (165 ft)
H^1:	71.0 m (233 ft)

H^1 = height of nearby structure(s) measured from the ground level elevation at the base of the stack.

Source: Weston, 1994a.

incorporate potential building downwash effects and to determine ***whether*** excessive ground-level concentrations would occur. Ground-level impacts would be considered excessive if the facility's modeled ground-level concentrations plus existing background air quality exceeds NAAQS. The final stack height of 120 m (395 ft) was selected after a detailed air quality modeling analysis. This stack height was shown to provide a balance between ground-level impacts and the visual aesthetics of the stack.

4.1.2.6 Air Quality Modeling: Analysis

Air quality impacts from the proposed project were evaluated using EPA-approved atmospheric dispersion models. A dispersion model is a computer program that incorporates a series of mathematical equations for predicting ground-level concentrations resulting from emissions of a pollutant. Inputs to a dispersion model include the emission rate; characteristics of the emissions release such as stack height, exhaust temperature, and flow rate; and atmospheric dispersion parameters such as wind speed and direction, air temperature, atmospheric stability, and mixing height. The modeling approach used incorporated procedures and methods described in U.S. EPA's "Guideline on Air Quality Methods (Revised)" *(1986, 1987b, 1990d, 1993)* and PADER's "Guidelines on Air Quality Modeling" *(1983)*. Three different models were used to determine the ground-level concentrations:

(1) The Industrial Source Complex (ISC2) short-term and long-term dispersion model was used to estimate ambient concentrations in simple rural terrain, which is defined as surrounding terrain up to stack top elevation;

(2) The Bowman's intermediate terrain model was used in situations where terrain is both above and below stack top to determine ***whether*** simple or complex terrain is the controlling factor in the calculation of ambient ground-level concentrations; and

(3) The CTSCREEN complex terrain model was used to estimate short- and long-term ambient air concentrations for complex terrain situations, defined as terrain which exceeds stack top.

Additional information on the models used and the input data are provided in the EIV, available in the public reading rooms (Appendix A)***, and are summarized below***.

The air quality modeling analysis assumed very conservative operating parameters. The analysis did not take into account the reductions that would be realized as a result of Power Boiler No. 4 being put on hot stand-by status. In addition, it was assumed, for worst-case analysis, that the maximum modeled concentration from the proposed plant would occur at the same time and location as the maximum background for a given pollutant. Nonetheless, it was believed that this conservatism was warranted due to the possibility that for 720 hours each year, the proposed YCEP plant and the P. H. Glatfelter Company Power Boiler No. 4 could be operating in parallel.

The impact on air quality associated with the proposed YCEP project was modeled for purposes of New Source Review and Prevention of Significant Deterioration (PSD) for all appropriate criteria pollutants (PM_{10}, SO_2, NO_x, CO, and Pb). The topography around the proposed YCEP facility encompasses hills, a creek valley, and several significant terrain features such as the nearby Pigeon Hill. Therefore, in order to emulate the features of this topography, air quality dispersion models were used that predicted ambient concentrations for complex, intermediate, and simple terrain. A simple terrain model, the Industrial Source Complex (ISC2) model, was used to model building downwash, and simple point source emissions from stacks and other point sources. The BOWMAN's BEE-X model was used for intermediate terrain modeling analysis. The hourly meteorological data used for the ISC2 and BEE-X models consisted of surface data collected at West Manchester for the 1-year period, January - December 1992. Selection of these data sets is consistent with EPA recommendations, and was

approved for use in the air quality modeling by PADER in November 1993. In addition, the CTSCREEN model was used as a screening model for unstable conditions in complex terrain. The CTSCREEN model uses an extensive array of predetermined meteorological conditions, and is designed to predict "worst case" or upper bound ambient concentrations. The predicted concentrations in the Spring Grove area were derived using the BEE-X or CTSCREEN models that incorporated the features of hilled terrain. The air models SACTI, CTSCREEN, BEE-X, and ISC2 were used conservatively to predict the impacts of the proposed YCEP project on ambient air quality. These models are approved by EPA and PADER. The rationale behind such "conservatism" is that any derived impacts portray the "upper bound" or the largest reasonably expected impacts, and can be assessed as such, rather than on the uncertainty that any impact might have been significantly greater.

The air quality modeling analysis for the proposed facility was completed using the operating parameters and expected emissions rates at 100 percent load, as shown in Table 4.1-1 along with site-specific meteorological, topography (terrain elevations and nearby structures) and ambient air data. The air modeling analysis is conducted by comparing the facility's modeled ground level concentrations to the air quality "significance" levels, "PSD increment consumption" levels, and NAAQS values. The "significance" level is defined by EPA as the level at which modeled ground level impacts may have a measurable impact and would contribute to background ambient air quality levels. The "PSD increment consumption" levels are defined by EPA as levels below which new sources are allowed to impact ambient air quality and do not degrade existing background levels below NAAQS values. The NAAQS value is defined by EPA as the ambient air quality level at which air quality would not have a health effect on the public.

4.1.2.6.1 Significance Levels

Significance levels are established by EPA for various averaging periods. The significance level is the ambient concentration below which a source impact is deemed to be at a level that it cannot cause or "significantly" contribute to an exceedance of either the NAAQS or PSD standard or increment. A comparison between the air quality modeling results ***and*** regulatory "significance" levels is presented in Table 4.1-5. These analyses, conducted for those major pollutants whose rates of emission exceeded significant emission rates (see Section 4.1.2.4), show that:

- For carbon monoxide (CO) and particulate matter (PM_{10}), the worst-case ground level concentrations would be below EPA and PADER significance levels; and

- For worst-case ground level sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) ambient concentrations, the ground level impacts would be above the significance level (and, thus, require PSD increment consumption analysis for these two pollutants).

4.1.2.6.2 PSD Class II Increment Consumption

The principal air quality protection mechanism under the PSD program involves a system of increments and area classifications that effectively define "significant deterioration" for individual pollutants. The CAA establishes three area classes and applies PSD increments of different stringencies to each class. Class I areas include international parks, national wilderness areas, memorial parks larger than 5,000 acres (2,023 hectares), and national parks larger than 6,000 acres (2,428 hectares). Less restrictive increments apply in areas identified as Class II. Class II areas are designated for moderate well-controlled industrial growth. The Class III area designation allows states to permit increased deterioration to air quality in specific areas that may be targeted for higher levels of industrial development and consequent growth in pollution (to date, no state has established a Class III area). The proposed facility would be located in a Class II area. Table 4.1-6 presents the PSD increments for Class II areas and the percentage that would be consumed as a result of the proposed facility's emissions. As shown in this table, the percent of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) increment ***to be*** consumed by the proposed project would range from 10 to 27 percent, which would be well below the allowable consumptions. When emissions are added from other PSD sources into the analysis, the cumulative PSD incremental consumption would range from 22 percent [annual oxides of nitrogen (NO_x) standard] to 85 percent [3-hr and 24-hr sulfur dioxide (SO_2) standard]. In addition, for illustrative purposes, particulate emissions from the proposed facility [either as total suspended particles or ***particulate matter*** (PM_{10})] were analyzed and also showed low percent increment consumption (***1.2*** to ***3.7*** percent), although it should be noted that these pollutants would not be emitted above regulatory significance levels and thus would not have to undergo cumulative PSD increment analysis.

4.1.2.6.3 PSD Class I Areas and Other National Park Areas

As part of the air quality modeling for the proposed project, analyses were completed to address potential air quality impacts to Class I areas and other areas under the jurisdiction of the National Park Service. The impacts of the proposed facility on visibility in the five closest Class I areas (Shenandoah National Park, Brigantine National Wilderness Area, Dolly Sods National Wilderness Area, Otter Creek National Wilderness Area, and James River Face National Wilderness Area) were evaluated utilizing the

Table 4.1-5. Modeling results of ground level impacts highest concentrations ($\mu g/m^3$).

Pollutant	Significance Level	Highest Modeled YCEP Concentration
Sulfur Dioxide		
3-hour average	25.0	113.5
24-hour average	5.0	24.3
Annual average	1.0	4.9
Nitrogen Dioxide		
Annual average	1.0	2.4
Carbon Monoxide		
1 hour average	2,000	96.8
8 hour average	500	50.0
Particulate (PM_{10})		
24 hour average	5	1.1
Annual average	1	0.2

Note:
Highest ground level concentration being used since 1 year of background meteorological data from the West Manchester Township monitoring station is being used.
Results shown are from the CTSCREEN model output since the maximum ground level impacts occur in complex terrain.
Source: Environ, 1994b.

VIZSCREEN model (*EPA, 1988d*), which is used to assess impacts to visibility due to atmospheric pollutants. The nearest PSD Class I area, the Shenandoah National Park, is approximately 164 km (101.9 mi) south-southwest of the proposed project. The results of the visibility analysis are presented in Table 4.1-7. "Contrast" and "Delta E" are terms that refer to key measures used to predict the visual impact of a plume. Contrast is the relative difference in light intensity of two viewed objects, and Delta E is used to characterize the perceptibility of a plume on the basis of the color difference between the plume and the viewing background. As seen from this table, the predicted Delta E values would be less than 2.0 and the predicted contrast values would be less than 0.05 for all Class I areas. As a result, the facility would not be expected to have an adverse impact on visibility in Class I areas.

Table 4.1-6. PSD Class II increment consumption (μg/m³).

Pollutant	Allowable PSD Increment	Proposed YCEP Facility Alone[1]	Percent of Increment	Cumulative PSD Increment for All Sources[2]	Percent of Increment
Sulfur Dioxide					
Annual	20	4.9	24	4.8[3]	24
24-Hour	91	24.3	22	77.0	85
3-Hour	512	113.5	27	435.0	85
Nitrogen Dioxide					
Annual	25	2.4	10	5.6	22
TSP					
Annual	19	1.1	5.6		
24-Hour	37	0.2	0.5		
PM_{10}[4]					
Annual	17	*0.2*	*1.2*		
24-Hour	30	*1.1*	*3.7*		

1 The proposed YCEP facility alone ground level impacts are based on the model results from the complex terrain (CTSCREEN) model

2 The cumulative PSD increment for all PSD sources including the proposed YCEP source are based on the model results from the intermediate terrain (Bowman's BEE-X) model.

3 The lower value for cumulative increment (4.8) when compared to YCEP alone (4.9) is due to the use of two different models, CTSCREEN and Bowman's BEE-X.

4 The highest levels of particulate matter concentrations (TSP/PM_{10}) were below significance levels and thus below levels that could significantly contribute to increments. Hence, particulate matter increment values were not derived.

Source: Weston, 1994a.

The National Park Service within the ***United States*** Department of the Interior is the Federal agency with jurisdiction over the nearest Class I area, the Shenandoah National Park, as well as the nearby Gettysburg National Military Park (a Class II area). The Department of Energy (DOE) has communicated with headquarters representatives from the ***United States*** Department of the Interior and with the environmental and air quality divisions of the National Park Service in Pennsylvania and Colorado, respectively, for their input in reviewing the potential impacts of the proposed project on Class I and Class II National Park areas. Their review has been incorporated into the analysis of air quality impacts on National Parks from the proposed project. National Park Service correspondence indicates their overall acceptance of DOE's conclusions that there would be no adverse impacts to National Park resources from the proposed project. In addition, the DOE has communicated extensively with agencies having jurisdiction over both

Table 4.1-7. Predicted Class I visibility impact analysis.

Class I Area	Background Visual Range (km)	Theta	Delta E Sky	Delta E Terrain	Delta E Criteria	Contrast Sky	Contrast Terrain	Contrast Criteria
Shenandoah National Park	40	10	0.25	0.02	2.00	0.0	0.0	0.05
		140	0.008	0.01	2.00	0.0	0.0	0.05
Brigantine National Wilderness Area	40	10	0.004	0.0	2.00	0.0	0.0	0.05
		140	0.002	0.0	2.00	0.0	0.0	0.05
Dolly Sods National Wilderness Area	25	10	0.0	0.0	2.00	0.0	0.0	0.05
		140	0.0	0.0	2.00	0.0	0.0	0.05
Otter Creek National Wilderness Area	25	10	0.0	0.0	2.00	0.0	0.0	0.05
		140	0.0	0.0	2.00	0.0	0.0	0.05
James River Face National Wilderness Area	40	10	0.0	0.0	2.00	0.0	0.0	0.05
		140	0.0	0.0	2.00	0.0	0.0	0.05

Background ozone: 0.04 ppm
Emissions: PM_{10} 127 tons/yr
NO_x 1,437 tons/yr

Source: Weston, 1994d.

Federal and state forests in the area. The Commonwealth of Pennsylvania's Bureaus of State Parks and Forestry and the ***United States*** Department of Agriculture's Forest Service have been contacted with respect to potential impacts of the proposed project on forest resources (such as Codorus State Park, Michaux State Forest, Gifford Pinchot State Park, George Washington National Forest, and Allegheny National Forest).

A Class II area, the Gettysburg National Military Park (NMP), Gettysburg, PA, is located 32 km (19.9 mi) west-southwest of the proposed project site. An analysis was conducted to determine the potential change in ambient air quality in the Gettysburg NMP from the construction and operation of the proposed project. Meteorological data from the West Manchester site (January to December 1992) was used as the database. Receptors within the Gettysburg NMP were established every 500 m (1,640 ft), using a Cartesian coordinate system. EPA-approved models were used to estimate the annual concentrations of ***sulfur dioxide*** (SO_2). The net analysis took into account the curtailment in operation of the P. H. Glatfelter Company Power Boiler No. 4. Only the highest modeled ***sulfur dioxide*** (SO_2) concentration predicted was positive, the other nine values were negative, meaning a net reduction in impact. The estimated maximum "net" annual average ***sulfur dioxide*** (SO_2) concentration was 0.105 micrograms per cubic meter ($\mu g/m^3$), which occurred at one coordinate location. This single highest modeled concentration is well below the Class II annual average significance level of 1 $\mu g/m^3$ which EPA has determined to be the trigger for further air quality analysis. No significant impact on air quality at Gettysburg NMP would result from the proposed action.

4.1.2.6.4 NAAQS

The NAAQS compliance analysis was conducted for receptors (modeled reference points representing potential exposure) within the proposed facility's predicted significant impact areas for only sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) because no significant concentrations of other criteria pollutants were predicted (Table 4.1-8). In this context, "significant" refers to pollutant concentrations that exceed the NAAQS values (3-hour, 24-hour, and/or annual) as presented in Table 4.1-8. For presentation purposes, NAAQS comparison information was also reviewed for carbon monoxide (CO) and particulate matter (PM_{10}) since local monitoring data were available. The air quality impact analysis indicated that emissions from the proposed facility would not cause or significantly contribute to predicted pollutant concentrations that exceed the primary or secondary NAAQS or the Commonwealth of Pennsylvania AAQS. When pollutant concentrations due to the emissions from all inventoried sources within a 55 km (34.4 mi) radius of the proposed project were modeled and background level added, some NAAQS exceedances were indicated at distant receptors. The maximum exceedance of ***sulfur dioxide*** (SO_2) was modeled at a receptor some 30 km (18.8 mi) from the proposed site, and the maximum exceedance for oxides of nitrogen (NO_x) was modeled at a receptor some 15 km (9.4 mi) from the proposed site. Evaluation on a receptor-by-receptor basis indicated that the proposed project did not contribute to these modeled exceedances.

Table 4.1-8. Comparison to NAAQS ($\mu g/m^3$).

Pollutant	Highest Modeled Concentration[1, 2]	Highest Measured Background Level	Cumulative Ground Level Concentration	NAAQS Values
Sulfur Dioxide[3]				
3-Hour	113.51	236	349.51	1,300
24-Hour	24.32	113	137.32	365
Annual	4.86	26	30.86	80
Nitrogen Dioxide[4]				
Annual	2.42	41	43.42	100
Carbon Monoxide[5]				
1-Hour	96.81	13,000	13,097	40,000
8-hour	50.0	6,000	6,050	10,000
Particulate Matter[6]				
24-Hour	1.07	91	92.07	150
Annual	0.21	32	32.21	50

1 In accordance with EPA guidance documents, highest ground level concentration is being used since only one year of background meteorological data from the West Manchester Township monitoring station are available.

2 Results shown are from the CTSCREEN model output since the maximum ground level impacts occur in complex terrain.

3 Sulfur Dioxide background level is based on maximum recorded level at the YCEP West Manchester Township Monitoring Station (Table 3.1-4).

4 Nitrogen Dioxide background level is based on Maximum Recorded Level at York East PADER monitoring station (Table 3.1-3).

5 Carbon Monoxide background level is based on Maximum Recorded Level at York East PADER monitoring station (Table 3.1-3).

6 Particulate matter background level is based on Maximum Recorded Level at West York PADER monitoring station (Table 3.1-3).

Source: YCEP, 1994b.

A complete description of the NAAQS analysis is provided in Section 6.7 of the YCEP PSD Air Quality permit application package, which is available in the public reading rooms (Appendix A).

4.1.2.6.5 Additional Analyses

Additional air quality analyses for the other "significant" pollutants identified in Table 4.1-3 were also completed. Table 4.1-9 provides the air quality impacts results for lead ***(Pb)***, fluorides, and beryllium ***(Be)*** in accordance with the applicable EPA or PADER AAQS. Highest modeled values for these three pollutants were well below EPA or PADER AAQS. The air quality analysis for mercury is included under the air toxic analysis, Section 4.1.2.7.

As discussed in Section 4.1.2.1, VOCs are considered to be contributors to ozone ***(O_3)*** formation, although no AAQS have been established for this pollutant. VOC emissions (48 ***tons/yr***) would be higher than the 40 tons/yr PSD "major" source limit. ***However,*** the VOC emissions level would be considered a "minor" source under the Nonattainment Area of Title I, Section 182 of the ***CAA Amendments of 1990***. The regulations require that VOC emissions be addressed as part of the New Source Review (NSR) requirements rather than PSD review requirements. Under the NSR requirements, no additional review of VOC emissions is required with respect to ozone because the proposed facility would be a minor source (less than 50 ***tons/yr***) of VOCs. Technical information for the air quality modeling performed in compliance with PSD regulations is included in the YCEP PSD Air Quality permit application package which is available in the public reading rooms (Appendix A). ***The impacts of the VOC emissions (48 tons/yr) are discussed in Sections 4.1.2.10 and 4.1.2.11 of this FEIS.***

4.1.2.7 Air Toxics and Trace Elements

Under the requirements of the CAA Amendments of 1990, the proposed YCEP facility is not currently required to address hazardous air pollutants listed in Section 112(b) of the CAA. According to Section 112(n), Other Provisions, (1) Electric Utility Steam Generating Units, the EPA must complete additional studies before deciding if Section 112(b) is applicable to electric utility steam generating units. In lieu of EPA guidance, YCEP addressed the Section 112 requirements based on those trace element pollutants on the Section 112 list that are expected to be present in the coal and the result of coal combustion. Table 4.1-10 provides a list of these air toxics that could be present in coal combustion emissions. ***It is noted that the environmental monitoring plan for the proposed project would contain a requirement for monitoring selected air toxics (as outlined in Table 4.4-1).***

Table 4.1-9. Comparison to applicable Ambient Air Quality Standard ($\mu g/m^3$).

Pollutant Averaging Period	Applicable Ambient Air Quality Standard	Highest Modeled YCEP Concentration
Lead Quarterly	1.5 (EPA NAAQS)	0.000161[1]
Fluorides 24-hour	5.0 (PADER AAQS)	0.00529
Beryllium 30 days	0.01 (PADER AAQS)	0.00004[2]

[1] Maximum modeled 24-hour concentrations used as a conservative estimate for the quarterly air quality standard.

[2] Maximum modeled 24-hour concentrations used as a conservative estimate for the 30-day air quality standard.

Source: YCEP, 1994b.

Table 4.1-11 provides the emissions rate and annual ground level concentrations predicted by air quality modeling. These expected emission rate calculations were based on the expected quantity of each trace element in the coal supply, and assumed a credit for emission reductions from proposed pollution control devices ***(except for mercury, which was assumed to be volatilized)***. The maximum annual ground level concentrations were based on these emission rates, and generated using the modeled annual ground level impact value determined in the air modeling analysis for the proposed facility's PSD air quality permit application. The impacts of these emissions are discussed in Section 4.1.2.11, Health Risk Assessments, of the ***FEIS***.

4.1.2.8 Radionuclide Emissions

Coal is comprised of mineral matter which includes trace quantities of naturally-occurring radionuclides, primarily uranium-238 and thorium-232. During the coal-burning process, inert material either falls to the bottom of the boiler or becomes entrained in the gaseous combustion products as fly ash. This ash contains radionuclides originally present in the coal. Fly ash not captured by pollution control equipment is emitted into the atmosphere as particulate matter. ***Radon would be discharged from the boiler as a gas.*** In general, the following factors affect radionuclide emissions from coal-fired boilers:

Table 4.1-10. Constituents expected to be present in coal combustion gas.

Section 112(b) Polycyclic Aromatic Hydrocarbons	*Section 112(b)* Volatiles	*Section 112(b)* Metals	Acid Gas Constituents
Benzo[a]pyrene[a]	Benzene	Arsenic	Sulfur dioxide
Naphthalene[b]	Ethylbenezene	Beryllium	Oxides of Nitrogen
	Toluene	Cadmium	
	Xylenes	Chromium (total)	
	Formaldehyde	Chromium (hexavalent)	
		Fluoride	
		Lead	
		Manganese	
		Mercury	
		Nickel	
		Selenium	
		Thallium	
		Zinc	

[a] Represents the PAHs with potential carcinogenic health effects.
[b] Represents the PAHs with potential noncarcinogenic health effects.

Source: Environ, 1994b.

- coal properties;
- boiler heat rate;
- boiler annual capacity factor;
- ash partitioning between bottom ash and fly ash;
- enrichment of radionuclides in fly ash;
- type and efficiency of air pollution control devices for particulate removal; and
- stack height and plume characteristics.

Two technical analyses for radionuclide emissions from the proposed YCEP project were performed. The first analysis employed a data measurement approach based on actual measurements from existing facilities. In that analysis, radionuclide emissions from the proposed facility utilized available emissions information from two coal-fired electric utility plants that were recently tested as part of the on-going EPA study on air toxic emissions from coal-fired electric utility facilities (Section 112 of the CAA

Table 4.1-11. Expected emissions rate and maximum modeled annual average ground-level air concentration.

Parameter	YCEP Expected Emissions Rate g/sec	Maximum Annual Average Ground-Level Air Concentration[a] ($\mu g/m^3$)
	Section 112(b) Metals	
Arsenic	1.04×10^{-3}	6.1×10^{-5}
Beryllium	1.56×10^{-4}	9.1×10^{-6}
Cadmium	1.56×10^{-5}	9.1×10^{-7}
Chromium (total)	2.34×10^{-3}	1.4×10^{-4}
Chromium (hexavalent)	2.34×10^{-5}	1.4×10^{-6}
Fluoride	1.11×10^{-2}	6.5×10^{-4}
Lead	5.60×10^{-4}	3.3×10^{-5}
Manganese	1.69×10^{-3}	9.9×10^{-5}
Mercury	3.64×10^{-3}	2.1×10^{-4}
Nickel	1.69×10^{-3}	9.9×10^{-5}
Selenium	1.95×10^{-4}	1.1×10^{-5}
Thallium	5.21×10^{-5}	3.0×10^{-6}
Zinc	1.95×10^{-3}	1.1×10^{-4}
	Section 112(b) Volatile Organic Compounds	
Benzene[C]	2.6×10^{-2}	1.5×10^{-3}
Ethylbenzene[N]	1.5×10^{-1}	9.0×10^{-3}
Toluene[N]	7.7×10^{-2}	4.5×10^{-3}
Xylenes[N]	6.6×10^{-1}	3.8×10^{-2}
Formaldehyde[C]	5.6×10^{-2}	3.3×10^{-3}
	Section 112(b) Polycyclic Aromatic Hydrocarbons	
Benzo[a]pyrene[C]	1.8×10^{-6}	1×10^{-7}
Naphthalene[N]	2.6×10^{-4}	1.5×10^{-5}
	Other VOCs	
Acetylene[N], propane[N], propene[N], butene[N], isobutane[N], pentene[N], hexane[N], hexene(s)[N], heptane[N] and heptene(s)[N]	4.12×10^{-1}	2.40×10^{-2}
	Acid Gases	
Oxides of Nitrogen	41.3	2.42
Sulfur dioxide	83.2	4.86

[C] VOC carcinogen
[N] VOC non-carcinogen
Source: Environ, 1994b.

Table 4.1-12. Estimated radionuclide emission rates from the YCEP facility.

Radionuclide	half-life years	Emission Rate		
		mCi/yr	g/s	lb/hr
Lead-210	2.10×10^{1}	50.03	1.97×10^{-11}	1.56×10^{-10}
Polonium-210	3.79×10^{-1}	2.36	1.66×10^{-14}	1.32×10^{-13}
Radium-226	1.60×10^{3}	2.28	7.32×10^{-11}	5.80×10^{-9}
Radium-228	6.70	16.3	2.20×10^{-12}	1.75×10^{-11}
Thorium-228	1.91	0.61	2.34×10^{-14}	1.86×10^{-13}
Thorium-230	8.00×10^{4}	2.75	4.49×10^{-9}	3.56×10^{-8}
Thorium-232	1.41×10^{10}	0.45	1.31×10^{-4}	1.04×10^{-3}
Uranium-234	2.47×10^{5}	0.95	4.86×10^{-9}	3.86×10^{-8}
Uranium-235	27.10×10^{8}	0.47	6.95×10^{-6}	5.51×10^{-5}
Uranium-238	4.51×10^{9}	0.79	7.50×10^{-5}	5.94×10^{-4}
TOTALS		77.26	1.97×10^{-1} 6.72 kg/yr	1.69×10^{-3} 14.8 lb/yr

Source: Weston, 1995.

Amendments of 1990). Table 4.1-12 provides the expected emissions rates for the radionuclide trace elements from the proposed YCEP facility. These expected emissions rates were used in the CAA ***Assessment*** Package - 1988 (CAP-88) air quality model to estimate the dose and potential risk posed to the general population due to the radionuclide emissions. The CAP-88 model uses approved air quality modeling techniques to compute radionuclide concentration of the air, rates of decomposition on ground surfaces, concentrations in food, and intake rates to people from ingestion of food produced in the assessment area. The dose and risk assessment is based on combining inhalation and ingestion intake rates. The radionuclide emissions report, ***(Weston, 1995) which was revised since issuance of the DEIS,*** is available in the public reading rooms (Appendix A), ***and*** provides the details for the radionuclide analysis. The conclusions of the human health effects for the radionuclide emissions are summarized in Section 4.1.2.11.

The second analysis of radionuclide emissions (performed for independent validation of the modeling used as the basis of the human health risk analysis) employed an emission factor approach, which calculated radionuclide emissions from expected air emissions data, and extrapolated the data to assess total radionuclide emissions, including emissions of radon (Radon 220 and 222). The differences in analytical approach account for differences in the outcome of the analyses. Estimates of radionuclide emission rates from the proposed YCEP project that are based on the emission factor approach are shown in Table 4.1-12a. Estimates of radionuclide emission rates from the P. H. Glatfelter Company's Power Boiler No. 4 that are based on the emission factor approach are shown in Table 4.1-12b. Expected emission factor-based estimates of the increases and decreases of radionuclide emissions that would occur from implementation of the proposed YCEP facility adjusted for curtailment of P. H. Glatfelter Company's Power Boiler No. 4 are presented in Table 4.1-12c. The emission factor-based analysis verifies that the radionuclide emissions from the proposed YCEP project represent a small portion of the total human exposure experienced from normal background sources. A summary of the methodology and assumptions used by DOE in estimating radionuclide emissions from the proposed YCEP facility is found in Appendix L of the FEIS.

4.1.2.9 Cooling Tower Effects and Emissions

Combustion of coal at the proposed facility would produce steam which would in turn be used to generate electricity in steam turbines. Steam leaving the turbines would be subsequently cooled in a heat exchanger for reuse in the turbines. Circulating water would be used to cool steam in the heat exchanger, and ***would*** become heated in the process. The heated circulating water would be passed through a cooling tower to lower the temperature of the water through evaporation. The resulting vapor plume could then potentially affect the surrounding area through the formation of fog and ice under certain conditions.

To avoid excess build-up of dissolved solids in the recirculating cooling water and to replace water lost through evaporation, make-up water from the secondary clarifiers of the P. H. Glatfelter Company wastewater treatment plant would be added to the recirculating water. This wastewater would contain measurable levels of dissolved solids, salts, and chemical compounds which could be released from the cooling tower in the form of drift. In addition, it is anticipated that VOCs in the recirculating water could potentially volatilize directly to the atmosphere from the water passed through the cooling tower. The concentrations of these substances ***[***inorganics in drift ***(water droplets emitted from the cooling tower)*** and vapor phase volatile organic compounds from the recirculation water***]*** in the ambient air and the amount deposited on the ground surface in the vicinity of the facility would depend on the concentrations

Table 4.1-12a. DOE estimates of radionuclide emission rates from the proposed YCEP facility.

Radionuclide	half-life years	Emission Rate mCi/yr	g/s	tons/yr
Actinium-228	7.00×10^{-4}	0.28	3.96×10^{-18}	1.38×10^{-16}
Bismuth-210	1.37×10^{-2}	4.09	1.05×10^{-15}	3.63×10^{-14}
Bismuth-212	1.15×10^{-4}	1.84	3.98×10^{-18}	1.38×10^{-16}
Bismuth-214	3.79×10^{-5}	4.09	2.94×10^{-18}	1.02×10^{-16}
Lead-210	2.23×10^{1}	4.09	1.70×10^{-12}	5.90×10^{-11}
Lead-212	1.21×10^{-3}	1.84	4.20×10^{-17}	1.46×10^{-15}
Lead-214	5.10×10^{-5}	4.09	3.96×10^{-18}	1.38×10^{-16}
Polonium-210	3.79×10^{-1}	4.09	2.89×10^{-14}	1.00×10^{-12}
Polonium-214	5.21×10^{-12}	4.09	4.04×10^{-25}	1.40×10^{-23}
Polonium-216	4.76×10^{-9}	1.84	1.68×10^{-22}	5.82×10^{-21}
Polonium-218	5.80×10^{-6}	4.09	4.59×10^{-19}	1.59×10^{-17}
Protactinium-234	7.65×10^{-4}	0.63	1.00×10^{-17}	3.47×10^{-16}
Radium-224	1.00×10^{-2}	0.48	9.56×10^{-17}	3.32×10^{-15}
Radium-226	1.60×10^{3}	1.06	3.40×10^{-11}	1.18×10^{-9}
Radium-228	5.75	0.48	5.58×10^{-14}	1.94×10^{-12}
Radon-220	1.76×10^{-6}	58.60	2.01×10^{-18}	7.00×10^{-17}
Radon-222	1.05×10^{-2}	176.63	3.64×10^{-14}	1.27×10^{-12}
Thallium-208	5.84×10^{-6}	1.84	1.98×10^{-19}	6.89×10^{-18}
Thorium-228	1.91	0.28	1.08×10^{-14}	3.76×10^{-13}
Thorium-230	7.70×10^{4}	0.63	9.89×10^{-10}	3.44×10^{-8}
Thorium-232	1.41×10^{10}	0.28	8.09×10^{-5}	2.81×10^{-3}
Thorium-234	6.60×10^{-2}	0.63	8.63×10^{-16}	3.00×10^{-14}
Uranium-234	2.45×10^{5}	1.47	7.46×10^{-9}	2.59×10^{-7}
Uranium-238	4.47×10^{9}	1.47	1.39×10^{-4}	4.82×10^{-3}
TOTALS		278.91	2.19×10^{-4} 6.92 kg/yr	7.63×10^{-3} 15.26 lb/yr

$$\text{g/s} = \frac{\text{Atomic Weight} \times T_{1/2} \times \text{mCi/yr} \times 3.7 \times 10^{7}}{A^{0} \times \ln 2}$$

$$\text{tons/yr} = \text{g/s} \times 1.102 \times 10^{-6} \times 60 \times 60 \times 24 \times 365$$

where: $T_{1/2}$ = half life in years
A^{0} = Avogadro's number (6.022×10^{23})
ln2 = 0.6931

Table 4.1-12b. DOE estimates of radionuclide emission rates from the P. H. Glatfelter Company's Power Boiler No. 4.

Radionuclide	half-life years	Emission Rate mCi/yr	g/s	tons/yr
Actinium-228	7.00×10^{-4}	0.31	4.38×10^{-18}	1.52×10^{-16}
Bismuth-210	1.37×10^{-2}	3.21	8.20×10^{-16}	2.85×10^{-14}
Bismuth-212	1.15×10^{-4}	1.53	3.31×10^{-18}	1.15×10^{-16}
Bismuth-214	3.79×10^{-5}	3.21	2.31×10^{-18}	8.01×10^{-17}
Lead-210	2.23×10^{1}	3.21	1.33×10^{-12}	4.63×10^{-11}
Lead-212	1.21×10^{-3}	1.53	3.49×10^{-17}	1.21×10^{-15}
Lead-214	5.10×10^{-5}	3.21	3.10×10^{-18}	1.08×10^{-16}
Polonium-210	3.79×10^{-1}	3.21	2.26×10^{-14}	7.87×10^{-13}
Polonium-214	5.21×10^{-12}	3.21	3.17×10^{-25}	1.10×10^{-23}
Polonium-216	4.76×10^{-9}	1.53	1.39×10^{-22}	4.84×10^{-21}
Polonium-218	5.80×10^{-6}	3.21	3.60×10^{-19}	1.25×10^{-17}
Protactinium-234	7.65×10^{-4}	0.64	1.02×10^{-17}	3.53×10^{-16}
Radium-224	1.00×10^{-2}	0.46	9.16×10^{-17}	3.18×10^{-15}
Radium-226	1.60×10^{3}	0.96	3.08×10^{-11}	1.07×10^{-9}
Radium-228	5.75	0.46	5.35×10^{-14}	1.86×10^{-12}
Radon-220	1.76×10^{-6}	5.97	2.05×10^{-19}	7.14×10^{-18}
Radon-222	1.05×10^{-2}	16.72	3.45×10^{-15}	1.20×10^{-13}
Thallium-208	5.84×10^{-6}	1.53	1.65×10^{-19}	5.73×10^{-18}
Thorium-228	1.91	0.31	1.20×10^{-14}	4.17×10^{-13}
Thorium-230	7.70×10^{4}	0.64	1.00×10^{-9}	3.49×10^{-8}
Thorium-232	1.41×10^{10}	0.31	8.96×10^{-5}	3.11×10^{-3}
Thorium-234	6.60×10^{-2}	0.64	8.77×10^{-16}	3.05×10^{-14}
Uranium-234	2.45×10^{5}	1.28	6.49×10^{-9}	2.26×10^{-7}
Uranium-238	4.47×10^{9}	1.28	1.21×10^{-4}	4.19×10^{-3}
TOTALS		58.57	2.10×10^{-4} 6.63 kg/yr	7.31×10^{-3} 14.62 lb/yr

$$g/s = \frac{\text{Atomic Weight} \times T_{1/2} \times mCi/yr \times 3.7 \times 10^{7}}{A^{o} \times \ln 2}$$

$$tons/yr = g/s \times 1.102 \times 10^{-6} \times 60 \times 60 \times 24 \times 365$$

where: $T_{1/2}$ = *half life in years*
A^{o} = *Avogadro's number* (6.022×10^{23})
$\ln 2$ = *0.6931*

*Table 4.1-12c. DOE estimates of increase (reduction) of radionuclide emission rates from the proposed YCEP facility.**

Radionuclide	half-life years	Emission Rate mCi/yr	g/s	tons/yr
Actinium-228	7.00×10^{-4}	0.005	(6.39×10^{-20})	(2.22×10^{-18})
Bismuth-210	1.37×10^{-2}	1.14	2.92×10^{-16}	1.02×10^{-14}
Bismuth-212	1.15×10^{-4}	0.44	9.43×10^{-19}	3.28×10^{-17}
Bismuth-214	3.79×10^{-5}	1.14	8.21×10^{-19}	2.86×10^{-17}
Lead-210	2.23×10^{1}	1.14	4.75×10^{-13}	1.65×10^{-11}
Lead-212	1.21×10^{-3}	0.44	9.95×10^{-18}	3.46×10^{-16}
Lead-214	5.10×10^{-5}	1.14	1.11×10^{-18}	3.85×10^{-17}
Polonium-210	3.79×10^{-1}	1.14	8.07×10^{-15}	2.81×10^{-13}
Polonium-214	5.21×10^{-12}	1.14	1.13×10^{-25}	3.93×10^{-24}
Polonium-216	4.76×10^{-9}	0.44	3.97×10^{-23}	1.38×10^{-21}
Polonium-218	5.80×10^{-6}	1.14	1.28×10^{-19}	4.46×10^{-18}
Protactinium-234	7.65×10^{-4}	0.04	6.76×10^{-19}	2.35×10^{-17}
Radium-224	1.00×10^{-2}	0.06	1.15×10^{-17}	4.00×10^{-16}
Radium-226	1.60×10^{3}	0.18	5.73×10^{-12}	1.99×10^{-10}
Radium-228	5.75	0.06	6.72×10^{-15}	2.34×10^{-13}
Radon-220	1.76×10^{-6}	53.12	1.83×10^{-18}	6.35×10^{-17}
Radon-222	1.05×10^{-2}	161.28	3.32×10^{-14}	1.16×10^{-12}
Thallium-208	5.84×10^{-6}	0.44	4.69×10^{-20}	1.63×10^{-18}
Thorium-228	1.91	0.005	(1.75×10^{-16})	(6.08×10^{-15})
Thorium-230	7.70×10^{4}	0.04	6.69×10^{-11}	2.33×10^{-9}
Thorium-232	1.41×10^{10}	0.005	(1.31×10^{-6})	(4.54×10^{-5})
Thorium-234	6.60×10^{-2}	0.04	5.84×10^{-17}	2.03×10^{-15}
Uranium-234	2.45×10^{5}	0.30	1.50×10^{-9}	5.20×10^{-8}
Uranium-238	4.47×10^{9}	0.30	2.78×10^{-5}	9.67×10^{-4}
TOTALS		225.15	2.65×10^{-5} 0.84 kg/yr	9.22×10^{-4} 1.84 lb/yr

* Includes curtailment of the P. H. Glatfelter Company's Power Boiler No. 4 to 720 hours/yr.

in the wastewater, dispersion of the cooling tower drift plume, and local atmospheric conditions. From this plume dispersal, residents located in the surrounding area could be potentially exposed to cooling tower emissions. The following section addresses these issues.

Fogging

An 8-cell cluster mechanical draft cooling tower is planned for the proposed facility. A modeling analysis of the proposed cooling tower was performed to assess the potential for fogging and/or icing on nearby roadways as a result of its operation. The results of the Seasonal Annual Cooling Tower Impacts (SACTI) *(EPRI, 1984; Engineering and Environmental Science, 1987)* modeling indicate that operation of the proposed cooling tower would result in no predicted occurrences of cooling tower fogging and icing on railroads in the surrounding area. The only areas where cooling tower-induced fogging and/or icing are expected to occur would be within a 200-m (656-ft) radius of the cooling tower, southeast and south-southeast of the cooling tower within the site boundaries, and only up to 5.2 hours per year. There are no incidents of cooling tower-induced icing expected due to the proposed facility. The model indicated that along York Road (Route 116), located 300 m (984.2 ft) southeast of the proposed cooling tower, there would be no hours of plume fogging and no hours of road icing *(Weston, 1994c).*

It was estimated that plume shadowing due to the cooling tower would occur a maximum of 210 hours, or 2 percent of the time, annually. Plume shadowing refers to the hours with shadows on the ground at a given point due to the presence of the cooling tower plume. Plume shadowing is expected to occur entirely within the fenceline of the YCEP property. No adverse impacts associated with fogging, icing, or plume shadowing would occur as a result of the proposed project *(Weston, 1994c)*.

Drift

It has been conservatively estimated that the maximum drift from the proposed project's cooling tower would be 0.005 percent of its cooling water recirculation rate of 105,000 ***gallons per minute*** (gpm). This translates to 5.25 gpm (or 2.76 million gallons per year). This drift could contain trace elements and organic compounds, which require analysis with respect to loadings and effects.

Trace Inorganic and Volatile Organic Emissions

The water source for use in the proposed cooling tower is the P. H. Glatfelter Company wastewater treatment plant effluent stream. To estimate the potential cooling tower air emissions from trace elements that may be present in this water source, the water quality results obtained from the pilot study conducted by YCEP were used. The inorganic trace elements which were detected (phosphate, manganese, total cyanide, and selenium) would be expected to behave as solid materials, travel with the cooling tower drift (water droplets), and impact the ground as water deposition. The YCEP PSD air permit application provides additional information on how the expected emission rates from cooling tower operation were determined, and is available in the ***public*** reading rooms (Appendix A).

Table 4.1-13 provides the inorganic trace element water quality data used to estimate the expected emissions rates and modeled ground level concentrations. Phosphate was eliminated from further analysis due to the absence of health effects associated with it. The water deposition results from the SACTI cooling tower modeling then were used to evaluate the potential impacts to surrounding receptor media (soil, food, inhalation) due to these inorganic constituents. The Cooling Tower Assessment Report available in the public reading rooms (Appendix A) provides the basis for the SACTI modeling. The conclusion of the human health effects for the cooling tower emissions are summarized in Section 4.1.2.11.

Chloroform ($CHCl_3$) was the only VOC identified in make-up water during the pilot plant study conducted by YCEP. All other volatile and semivolatile organic compounds, if present in either the make-up or blowdown streams, were below laboratory detection limits. The pilot plant included a trailer-mounted cooling tower ***simulator*** which used actual wastewater (P. H. Glatfelter Company secondary effluent stream) in a cooling tower ***simulation*** that operated at an average of 2.5 cycles of concentration to assess the performance of the proposed cooling tower.

For the most conservative air emissions calculations, it is assumed that all VOCs enter***ing*** the cooling tower with the make-up water would behave as vapor, be released in the air leaving the cooling tower, and impact ground level as an ambient ground level concentration. The organic compound, chloroform, would be present in the make-up water at a concentration of 0.081 mg/L. Since (under worst-case conditions) the organic material would vaporize in the cooling tower, the expected emission rate was calculated based on the assumption that the total amount of chloroform entering the cooling tower through water make-up (4.67 mgd) would be released into the air stream. This translates to a chloroform

Table 4.1-13. YCEP cooling tower expected emissions rate and ground level concentrations for trace elements and chloroform.

Constituent	Water Quality Level (mg/L)	Emissions Rate (milligrams/second) (tons/yr)	Maximum Ground Level Concentration ($\mu g/m^3$)
Manganese	0.45	2.5×10^{-3} (8.58×10^{-5})	1.6×10^{-5}
Total Cyanide	0.006	3.3×10^{-5} (1.15×10^{-6})	2.2×10^{-7}
Selenium	0.021	1.2×10^{-4} (4.00×10^{-6})	7.6×10^{-6}
Chloroform	0.081	16.4 (0.57)	3.05×10^{-3}

Source: ***Environ, 1994c.***

emissions rate of 16.4 mg/s (0.57 tons/yr). ***This estimated emission rate of chloroform from the proposed facility may be viewed in relation to the 1994 emission rate of 115.5 tons/yr from the P. H. Glatfelter Company paper plant that is adjacent to the site of the proposed YCEP cooling tower (see Section 2.3). The chloroform emissions from the proposed plant would be 0.5 percent of the amounts released by nearby sources. The incremental health risks associated with chloroform released from the proposed facility are discussed in Section 4.1.2.11.*** Based on air quality modeling of the cooling tower as a point source using similar air modeling protocols as the boiler stack analysis, the expected maximum ground level concentration of chloroform resulting from the cooling tower would be 3.05×10^{-3} $\mu g/m^3$ (Table 4.1.2.13). The impacts from this ground level concentration are analyzed in Section 4.1.2.11.

4.1.2.10 Additional Air Quality Effects Associated with the Proposed Project

Construction Impacts

The primary sources of air emissions during the construction phase of the proposed project are anticipated to be fugitive particulate matter ***(dust)*** and vehicular exhaust from construction vehicles and construction equipment. Fugitive emissions are generated when turbulent forces cause particulate matter to become airborne. Site excavation and grading activities would disturb soils and produce loose dirt and silt particles that would become airborne in moderate or strong winds. These small airborne particles could potentially move to the facility fenceline or beyond. Airborne particles also may be deposited on access roadways within the proposed area. These particles could become airborne again as a result of construction vehicles using the access roadways.

Fugitive emissions created by construction-associated vehicular traffic and by construction activities would not be expected to result in a major impact to the off-site community. Emissions are expected to be temporary, and would vary, depending on the levels of activity, specified operations, and prevailing weather. Additionally, impacts from fugitive dust emissions would be minimized by the fact that these types of emissions are typically emitted at or near ground level. Impacts, therefore, would be anticipated to occur primarily within the proposed property area; impacts would be expected to decrease as the distance from the property boundary increased.

Fugitive air emissions on site would be mitigated during construction through the application of proper construction practices, including periodic wetting and mulching of the construction area to minimize fugitive emissions associated with vehicles on site. This would also help reduce emissions associated with the wind erosion of disturbed soils. Disturbed land would be stabilized to the greatest extent practical.

The exact number of construction workers scheduled to be on site at any one time would be determined later. Heavy construction vehicles would also be present on site during construction; however, the specific number, type, and operating times of construction vehicles on site would vary greatly during construction. Therefore, the expected vehicular emissions from construction cannot be determined with confidence at this time.

Additional Operational Impacts

Additional vehicular emissions would result from privately-owned vehicles, trucks hauling limestone to the site, and trucks hauling ash byproduct to the Harriman Coal Corporation mine reclamation site.

Vehicle Emissions An analysis was performed to estimate the local air emissions *[*defined to be those generated from vehicles within 8 km (5 mi) of the proposed site*]* that would result from increased truck and automobile traffic during plant operation. Air emissions from automobiles were estimated using EPA MOBILE4 emissions model *(EPA, 1989)*. MOBILE4 is a computer program that calculates emission rates of hydrocarbons, carbon monoxide (CO), and oxides of nitrogen (NO_x) from gasoline- and diesel-fueled highway vehicles. MOBILE4 estimates emission rates based on a typical mixture of highway vehicles and emission factors using EPA guidance *(EPA, 1985c)*. The estimate depends on various conditions such as ambient temperature, travel speed, and mileage accrual rates. For this portion of the analysis, it was assumed that there would be 55 roundtrips per weekday and 45 roundtrips per weekend day for 52 weeks per year (no carpooling has been assumed). It was also assumed that these automobiles would travel at an average speed of 35 miles per hour.

Emission factors *(EPA, 1985c)* for oxides of nitrogen (NO_x), carbon monoxide (CO), and hydrocarbons were used to estimate air emissions from truck traffic at or near the site. The primary assumptions are ***as follows***: (1) 70 truck roundtrips per day, 5 days per week for 52 weeks per year, (2) average road speed of 35 miles per hour, (3) ash loading/limestone unloading times of 30 minutes each trip, (4) an average truck age of 5 years, and (5) an average horsepower of 425 brake horsepower (BHP).

The predicted increases in local air emissions from automobile and truck traffic near the proposed facility are 2.1 tons/yr of oxides of nitrogen (NO_x), 5.4 tons/yr ***of*** carbon monoxide (CO), and 1.0 tons/year ***of*** hydrocarbons. These values are presented in Table 4.1-14.

Global Climate Change A worldwide environmental issue is the possibility of major changes in the global climate (i.e., global warming) as a consequence of increased concentrations of "greenhouse" gases, especially carbon dioxide (CO_2) *(Mitchell, 1989)*. It is generally agreed that fossil fuel burning is the primary contributor to increased concentrations of ***carbon dioxide*** (CO_2). Because ***carbon dioxide*** (CO_2) is stable in the atmosphere and essentially uniformly mixed throughout the troposphere and stratosphere, the potential impacts to the climate do not depend on the geographic location of ***carbon dioxide*** (CO_2) sources. Therefore, an increase of ***carbon dioxide*** (CO_2) emissions at a specific coal-burning source would effectively alter atmospheric ***carbon dioxide*** (CO_2) concentrations only to the extent that they contribute to the total fossil fuel burning that increases global ***carbon dioxide*** (CO_2) concentrations.

The proposed project would be expected to emit no more than 2,328,968 tons/yr of ***carbon dioxide*** (CO_2). This amount is compared with current estimates of ***carbon dioxide*** (CO_2) emissions generated by ***United States*** and global fossil fuel and coal combustion in Table 4.1-15. The percentage increases in ***carbon dioxide*** (CO_2) emissions contributed from the proposed project compared to the ***United States*** fossil fuel combustion would be about 0.05 percent and compared to global fossil fuel combustion, about 0.011 percent.

Table 4.1-14. Estimated emissions from YCEP vehicles in the local vicinity of the proposed site (on-site and while operating within 5 miles of the proposed facility).

Pollutant	Automobile Emissions (tpy)[(1)]	Truck Emissions (tpy)[(2)]	Total Combined Annual Vehicle Emissions (tpy)
Oxides of Nitrogen (NO_x)	0.3	1.8	2.1
Carbon Monoxide (CO)	3.8	1.6	5.4
Hydrocarbons (HC)	0.5	0.5	1.0

(1) Assumptions: 18,980 annual roundtrips [55 roundtrips/weekday, 45 roundtrips/weekend day; 52 weeks/year (no carpooling)]; roundtrip duration is 20 minutes (to estimate trips within 5 miles of proposed facility); emissions factors were 0.09 lbs/hr NO_x, 1.20 lbs/hr CO, 0.15 lbs/hr HC.

(2) Assumptions: 18,200 annual roundtrips (70 trucks per weekday); each roundtrip consists of 10 miles (to estimate trips within 5 miles of proposed facility); roundtrip average speed (no idle) was 35 mph to approximate local traffic conditions; average load/unload time (idle) was 30 min (twice the anticipated ash charge time); average truck age was 5 yrs; average ambient temperature was 53°F.

Acid Rain Acidic deposition, more commonly known as "acid rain," has become a subject of much study in recent years. Acidic deposition starts with emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) that are transformed in the atmosphere into acidic compounds known as "nitrates" and "sulfates." When pollutants such as sulfates or nitrates are dissolved in rain, snow, clouds, or fog, and impact the ground or any surface on the ground, the process is termed "wet deposition." When pollutants in the form of gases or particulates can be transported to ground level and be absorbed or adsorbed by materials without first being dissolved in atmospheric water droplets, the process is termed "dry deposition." Deposition of either type may occur close to the source of the initial emissions, or the acidic compounds may be transported over long distances before being deposited.

Concentrations of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) from the proposed facility are predicted to be lower than NAAQS. The incorporation of limestone in the proposed facility's CFB boiler would also result in a reduction of acid aerosol emissions. In addition, for the overall project, there

Table 4.1-15. Comparison of estimated annual carbon dioxide (CO_2) emissions[1].

Proposed CO_2 emissions[2] (metric tons/year)	Percentage of *United States* coal combustion[3]	Percentage of *United States* fossil fuel combustion[4]	Percentage of global fossil fuel combustion[5]
2,567,205	0.14	0.05	0.011

[1]*Source: CDIAC at Oak Ridge National Laboratory, personal communication, April 5, 1993.*

[2]Includes all point sources emissions of CO_2.

[3]***United States*** coal combustion produces 1,807 million metric tons of CO_2 per year.

[4]***United States*** fossil fuel combustion produces 4,940 million metric tons of CO_2 per year.

[5]Global fossil fuel combustion produces 22,710 million metric tons of CO_2 per year.

would be net decreases in both sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) which suggest that the contribution of the proposed project to increases in acid rain levels should be very low.

Boiler Stack Visibility Impacts Regional haze is a reduction in visibility associated with air masses containing pollutants from emitting sources that have mixed in the atmosphere so that these emissions are not visible as distinct plumes. When emissions from a coal-fired power plant contribute to regional haze, the greatest contribution is believed to be caused by sulfate particles ($SO_4^=$) which are formed by the oxidation of ***sulfur dioxide*** (SO_2) emissions (*DOE, 1993a*). Sulfate particles ($SO_4^=$) impact visibility by promoting the formation and growth of hygroscopic aerosols. Hygroscopic nuclei, such as sulfate particles ($SO_4^=$), form droplets with water in the atmosphere. These droplets, which remain suspended in the atmosphere because of their small size, scatter light in the visible spectrum. Hygroscopic aerosols continue to grow in size until they break up or settle out of the atmosphere.

The reactions that form sulfate particles ($SO_4^=$) require sunlight and water vapor, or they require liquid, which is present in clouds, and hydrogen peroxide (H_2O_2), which is formed by the same reactions that form photochemical smog (*DOE, 1993a*). Both formation pathways are present in the vicinity of the proposed site. However, as stated previously (Section 4.1.2.3), the total amount of ***sulfur dioxide*** (SO_2) emitted to the regional air as a result of the proposed project is expected to decrease by over 2,400 ***tons/yr, based on permitted emissions (650 tons/yr based on expected emissions)***. This reduction in ***sulfur dioxide*** (SO_2) emissions should likewise result in a reduction in the formation of hygroscopic aerosols from sulfate particles. This, in turn, should reduce the adverse impacts to visibility due to regional haze resulting from light scattering.

Oxides of nitrogen (NO_x) also reduce visibility through the formation of hygroscopic aerosols. In addition, oxides of nitrogen (NO_x) emitted from coal-fired power plants — specifically, nitrogen dioxide (NO_2) — absorb light energy over the entire visible spectrum (although primarily in the shorter, blue wave length region). As stated in Section 4.1.2.3, the proposed project should result in at least a net reduction in oxides of nitrogen (NO_x) emissions of 215 tons/yr to the regional air because of federally enforceable emissions reductions. This reduction should likewise result in a reduction of hygroscopic aerosols from oxides of nitrogen (NO_x) and a reduction in nitrogen dioxide (NO_2) in the region's air. This, in turn, should reduce the adverse impacts to visibility due to oxides of nitrogen (NO_x).

The proposed project should result in a net reduction in emissions which are believed to be the major mechanisms for reductions in visibility due to regional haze. Because of this reduction, the proposed project should not have any noticeable impact to atmospheric visibility in the area.

Soil and Vegetative Effects Impacts on soils from proposed facility emissions were evaluated in terms of the following:

- dry deposition of emitted particulates;
- washout deposition of particulates and water soluble gases;
- dry reaction of gaseous components with surface soils;
- transfer of gaseous compounds to the soil via metabolic incorporation into plant root systems; and
- deposition of combustion particulates.

Dry deposition acts continuously to reduce atmospheric concentrations of sulfur dioxide (SO_2) by chemical reaction and adsorption by vegetation. Rainfall is much more efficient at removing sulfur dioxide (SO_2). Dry deposition and reaction are thought to account for a small fraction (up to one-third) of total acid deposition *(Saxena et al., 1986)*. The small amount of sulfur dioxide (SO_2) from the proposed facility available for reaction would not result in a noticeable chemical alteration of the regional soils, and some non-reacting sulfur dioxide (SO_2) would be removed by subsequent rainfall. Nitrogen dioxide (NO_2) is dry-deposited to a significant degree only after further atmospheric oxidation; therefore, its atmospheric life is longer than that of sulfur dioxide (SO_2), and longer life means greater dispersion. When deposited, nitrogen dioxide (NO_2) is rapidly consumed by vegetation, which increases the likelihood of it eventually reacting with soils *(Barnes, 1979)*. The chemical impact on soils, however, would be even less than that for sulfur dioxide (SO_2) because emissions would be dispersed to greater distances.

Atmospheric washout would remove some particulates (PM_{10}), sulfur dioxide (SO_2), and oxides of nitrogen (NO_x). The amounts removed and initially deposited on the soil would be small compared to deposition from emission sources in highly industrialized areas. It is not expected that the pH of rainfall would be measurably lowered in the region by projected emissions from the proposed facility. Field experiments using simulated rainfall with a pH of 4 have shown only minor effects on soil chemical properties. These same studies have shown that forested areas absorbed much of the deposited nitrogen (N) and received some benefit therefrom *(Barnes, 1979)*.

Emissions of common atmospheric pollutants such as particulates (PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide (CO) also have the potential to cause damage to vegetation *(Hepting, 1974)*. The sensitivity of vegetation to air pollution injury varies greatly depending on factors such as plant species and variety, climatic and seasonal conditions, soil composition, and the nature or combinations of pollutants *(Heggestad, 1974)*. In general, plants tend to be more susceptible to damage during spring and summer growing seasons and when exposed to short-term high concentrations, as opposed to continuous lower levels, of pollution *(Wisconsin Public Service Corp., 1975)*.

Research on air pollution effects on vegetation has divided air pollution injuries to plants into three general categories: acute, chronic, and subtle *(Wisconsin Public Service Corp., 1975)*. Acute injury is caused by exposure to a high concentration of a deleterious substance resulting in rapid visible death of some tissue. Chronic injury is caused by long-term exposure to low pollutant levels that gradually disrupts physiological processes and retards growth or yield. Long-term subtle effects on vegetation are difficult to define and little is known to date as to the threshold concentrations and exposure times which may cause damage.

Sulfur dioxide (SO_2) is the air pollutant associated with a coal-fired ***Cogeneration*** *F*acility ***that is*** most likely to cause damage to vegetation. According to the dose-injury curve for sulphur dioxide (SO_2)-sensitive plant species provided by the ***United States*** Fish & Wildlife Service (USFWS) *(USFWS, 1978)*, impacts are applicable only when plants are growing under both the most sensitive environmental conditions and stage ***of*** maturity. Low doses of sulfur dioxide (SO_2) normally cause no injuries since the sulfur dioxide (SO_2) can be metabolized into sulfates and transported toward the roots. Long-term low-level exposures, however, may cause chronic injuries to leaf tissues *(Jacobson and Hill, 1970)*. Thresholds for chronic plant injury by sulfur dioxide (SO_2) have been estimated at about 130 $\mu g/m^3$ on an annual average *(USFWS, 1978)*. The maximum average annual air concentration for the proposed project (4.86 $\mu g/m^3$, see Table 4.1-8) are well below the USFWS thresholds for chronic exposure. In addition, the maximum concentrations are not expected to extend beyond a 3,672-m (12,047-ft) radius. No subtle physiological effects ***not associated with*** visible tissue damage have been found *(Wisconsin Public Service Corp., 1975)*. Sulfur dioxide (SO_2) sensitivities of some common plant species are shown in Table 4.1-16.

The CFB of the proposed YCEP facility would be designed to minimize sulfur dioxide (SO_2) emissions loading to the atmosphere. Furthermore, when projected sulfur dioxide (SO_2) emissions from the proposed facility are added to the baseline, the total would be below the levels at which damage would be expected to be found. Based on these studies, emissions of sulfur dioxide (SO_2) from the proposed facility are not believed to present a potential ***for*** adversely impac***ting*** vegetation.

Particulates (PM_{10}) are even less likely than sulfur dioxide (SO_2) to cause adverse effects on vegetation. Investigation of particulate (PM_{10}) effects on plants has generally shown no damage, although some interference with respiration and photosynthesis might occur if heavy crusts of dust accumulate on moist plant tissues *(Joosting and ten Houten, 1972)*. This level of accumulation is more likely to be associated with heavy agricultural or construction activities than with the level of particulate (PM_{10}) emissions expected from the proposed project. Prior to discharge to the atmosphere, particulates (PM_{10}) would be removed through the use of highly efficient fabric filters. Those particles entering the atmosphere would be slow to settle (because of their size). Furthermore, natural weather conditions tend to remove dust and particulates from plant surfaces before heavy accumulations can build up. Consequently, adverse effects on vegetation from particulate (PM_{10}) are not likely to result from the operation of the proposed YCEP facility.

Table 4.1-16. SO_2 sensitivity of vegetation.

SPECIES	SENSITIVITY[a]
CROPS	
Corn	Resistant
Soybeans	Sensitive
Wheat	Sensitive
Hay	Sensitive to Intermediate[b]
Assorted Vegetables	Mostly Sensitive[b]
OTHER VEGETATION	
Pine	Sensitive to Intermediate
Oak	Resistant
Maple	Intermediate to Resistant
Hickory	Resistant
Poplar	Intermediate to Resistant[b]
Sycamore	Intermediate to Resistant[b]

[a] **Sensitive** -- Threshold injury (visible) caused by a peak concentration of 2,620-3,930 $\mu g/m^3$ or 3-hour average of 785-1,580 $\mu g/m^3$.

Intermediate -- Threshold injury (visible) caused by a peak concentration of 3,925-5,235 $\mu g/m^3$ or 3-hour average of 1,570-2,095 $\mu g/m^3$.

Resistant -- Threshold injury (visible) caused by a peak concentration greater than 5,235 $\mu g/m^3$ or 3-hour average greater than 2,095 $\mu g/m^3$.

Ratings and threshold levels are based on information from the following sources: *Wisconsin Public Service (1975); Jacobson et al. (1970); "Effects of Sulfur Dioxides in the Atmosphere on Vegetation" (EPA, NTIS publication #PB-226-314, 1973); and "Economic Impact of Air Pollution on Plants in the United States" (Stanford Research Institute, NTIS Publication #PB-209-235, 1969).*

[b] Rating based on known sensitivity of similar species in the absence of species-specific data.

Source: Weston, 1994d.

Potential nitrogen dioxide (NO_2) damage to vegetation in the area would also be unlikely. In general, acute nitrogen dioxide (NO_2) damage to vegetation does not usually occur at levels found outdoors, although some reduction in growth might occur at continuous levels of 200-500 $\mu g/m^3$ (*Joosting and ten Houten, 1972*). Sensitive species may be damaged by 4-hour concentrations of 3,800-13,300 $\mu g/m^3$ *(EPA, 1971a)*. Soybeans are considered to have intermediate sensitivity (4-hour injury threshold of 9,400 -18,800 $\mu g/m^3$), while corn is rated as resistant (4-hour injury threshold of 16,900 $\mu g/m^3$). Based on the relatively low background nitrogen dioxide (NO_2) levels in the area, and the 1.15 to 1 oxides of nitrogen (NO_x) emissions offsets that YCEP would obtain locally, adverse effects on vegetation are not expected. Since there would be at least a 15-percent decrease in oxides of nitrogen (NO_x) loadings to the atmosphere and given that this pollutant is a princip***al*** precursor to ozone (O_3) formation, then one could extrapolate that an increase in ozone (O_3) levels due to the proposed project would be very unlikely. Consequently, it is not anticipated that increased adverse vegetative effects due to increases in ozone ***(O_3)*** levels would occur as a result of the proposed project.

An increase of up to 48 tons/yr of VOC emissions could result from the proposed YCEP facility (Table 4.1-3). As a result of the curtailment of the P. H. Glatfelter Company's Power Boiler No. 4, reductions of 3.4 tons/yr of VOC emissions would occur (Table 4.1-2a). Up to 1.0 ton/yr of VOC emissions could be expected from additional traffic (Table 4.1-14), and up to 0.57 tons/yr of chloroform would be emitted from the proposed cooling tower (Section 4.1.2.9). Thus, a maximum increase of about 46.2 tons/yr of VOCs may be expected from all sources. A regional NO_x reduction due to ERCs was not added to or included in this O_3 estimation. It has been estimated that an increase of 50 tons/yr of VOC emissions could result in a maximum formation of 0.4 ppb O_3 (approximately 0.8 $\mu g/m^3$ O_3 at standard conditions) (NAPAP, 1989), a relatively low number compared to an annual average of approximately 53 ppb, in the York air basin (which is a typical annual average over much of the United States). It has been estimated that at concentrations of around 53 ppb O_3 there is a theoretical loss of 5 to 10 percent of crop production compared to growing the same crops exposed to charcoal-filtered air (NAPAP, 1988). A reduction of about 10 ppb O_3 corresponds to about a 2-percent average gain in crop production. An increase of 0.4 ppb O_3 could correspond to an average 0.08-percent loss in crop production. Such a loss and its effect are unmeasurable, and it may be concluded that no meaningful reduction in crop production would be attributable to the proposed YCEP project.

Carbon monoxide (CO) would be unlikely to affect vegetation. Carbon monoxide (CO) is considered to have only secondary importance as a threat to vegetation. Although little is known concerning carbon monoxide (CO)-related plant damage, concentration levels associated with known injury in research settings are well above any encountered in ambient air *(Jacobson and Hill, 1970)*.

Hydrogen fluoride (HF) is considered to be one of the most phytotoxic trace pollutants. The phytotoxicity of airborne hydrogen fluoride (HF) is influenced by ecological and biological factors, as well as by its physical and chemical nature. Hydrogen fluoride (HF) air emissions can occur in either a gaseous form or a particulate form. Both forms have been shown to cause injury to plant tissues.

Plants vary in their sensitivity to hydrogen fluoride (HF) exposure. Hydrogen fluoride (HF) concentrations causing damage range from 19 to 44 ppb in short-term fumigations, to 1.4 ppb in longer studies (27 days). Other studies suggest that when individual plant sensitivities are taken into consideration, exposure concentrations are much higher (e.g., 20 to 150 ppm for sensitive species, approximately 200 ppm for plants of intermediate sensitivity, and up to 500 ppm for highly tolerant species). Individual, as well as species-specific, sensitivity to hydrogen fluoride (HF) exposure is dependent upon a number of factors, including plant development stage, environmental conditions, and ***the*** pollutant***'s exposure*** characteristics ***[such as the*** physical and chemical forms of hydrogen fluoride (HF), duration and concentration of exposure, and frequency of exposure periods***]*** *(YCEP, 1994c)*.

In 1994, PADER inquired about the possible effects to vegetation resulting from hydrogen fluoride (HF) emissions from the proposed facility. YCEP's response to PADER provided the following information with respect to ***hydrogen fluoride (***HF***)*** emissions. The potential ambient impact of hydrogen fluoride (HF) emissions from the proposed facility on the surrounding vegetation and plants was determined using the results of air quality modeling. The expected hydrogen fluoride (HF) emission rate from the main stack would be 0.145 lb/hr. This emission rate, when combined with air quality modeling results, would translate into a maximum annual average hydrogen fluoride (HF) concentration of 0.000221 $\mu g/m^3$ (0.000270 ppb) in simple terrain locations (terrain locations below the stack top) as modeled using the ISC2 model and 0.00107 $\mu g/m^3$ (0.00131 ppb) in complex terrain locations (terrain locations above the stack top) as modeled using the CTSCREEN model. Both of these concentrations would be well below the lower threshold concentration of 1.4 ppb, the level at which studies have associated damage to plants/vegetation. Therefore, the potential emissions of hydrogen fluoride (HF) from the proposed facility's main stack would not be expected to cause plant or vegetation damage.

Concern has been expressed about the effect that emissions from the proposed facility may have on crop production. Because the Commonwealth of Pennsylvania is included in the Northeast Ozone Transport Region (NOTR), any new major stationary source with the potential to emit more than 100 tons/yr of oxides of nitrogen (NO_x) must offset their emissions by obtaining emissions reduction credits (ERCs) from existing facilities in the surrounding area. Since the proposed facility has the potential

to emit greater than 100 tons/yr, it has been arranged that ERCs would be acquired from the P. H. Glatfelter Company, which would curtail operation of Power Boiler No. 4, and the Transcontinental Gas Pipe Line Corporation, which would make modifications to its natural gas pipeline compressor station. The net result of these permanent changes would be that the permitted oxides of nitrogen (NO_x) emissions would be reduced by 272 tons/yr in the York air basin. Additionally, because YCEP would obtain part of the ERCs for oxides of nitrogen (NO_x) from the P. H. Glatfelter Company through federally-enforceable limits on the operation of its Power Boiler No. 4, permitted emissions of sulfur dioxide (SO_2) would be reduced by 2,419 tons/yr, and permitted emissions of particulate matter (PM_{10}) would be reduced by 65 tons/yr; expected actual emissions would be reduced by 415, 650, and 7 tons/yr, respectively (see Tables 4.1-2 and 4.1-2a). The effective particle emission control in the proposed facility coupled with curtailment of P. H. Glatfelter Company's Power Boiler No. 4 should also reduce region-wide emissions of semi-volatile and non-volatile trace elements that may be adsorbed by the emitted particles.

Trace elements emitted from the proposed facility would potentially affect soils by dry deposition and by washout from the atmosphere. Vegetation would potentially be affected by direct deposition onto foliage (both dry deposition and washout) and by uptake from the air and soil. The accumulation of trace metals in soils due to the proposed project was calculated using the maximum modeled air concentration (Table 4.1-11) and was conservative, assuming continuous deposition for 35 years with no depletion or attenuation. Moreover, for purposes of modeling the effects of trace elements, a capture efficiency of 99.5 percent was used (except for mercury which was assumed to have a zero percent capture efficiency). DOE notes that the equipment manufacturer has guaranteed particle emissions to be no more than 0.11 lbs/MMBtu, which translates to a 99.9 percent particle capture efficiency. The resulting maximum soil concentrations attributable to the proposed facility would be approximately 100 times lower than existing soil concentrations with the exception of mercury, which would be approximately equal to existing soil concentrations.

Kabata-Pendias and Pendias (1984) tabulated phytotoxic levels for trace metals from various research studies. Using the most conservative concentration given for each element tabulated, none of the potential trace metal soil concentrations attributable to the proposed project would be expected to result in toxic levels to plants except for mercury, which one researcher lists as phytotoxic at levels close to existing soil concentrations. Other researchers lists phytotoxic levels for mercury at concentrations that are approximately 10 times higher than the concentrations expected to result from the proposed project under the worst-case conditions modeled.

The uptake and actions of metals in plants depends on several factors other than just the concentration of the metal in the air or soil. Some plant species act as "accumulators;" others act as "rejectors" (Markert, 1992). Additionally, soil properties — particularly soil pH and E_h — are more critical in determining the availability of trace metals to plants than the actual soil concentrations (Fergusson, 1990). Moreover, the presence of elements in plants can interact with other elements in either antagonistic or synergistic mechanisms (Fergusson, 1990). For these reasons, it is not possible to specifically assess all possible effects on crops and trees from emissions from the proposed project. However, Environ (1994b) estimated the concentrations of trace metals for the types of plants grown in the local area. In all cases, concentrations attributable to the proposed project were at least 10 times lower than the average concentrations in plants as reported by Markert (1992). For these reasons, trace elements emissions from the proposed facility would not be expected to adversely impact plants used for food and feed, and thus, trace elements would not adversely impact agricultural resources.

Odors

As noted in Section 3.1.2, ambient, industrial odors are noticeable in the Spring Grove area. In its proposed guidelines for pulp and paper mills (58 FR 66077), the EPA has identified process wastewater as a potential emission source of odor-producing compounds. Because the proposed project would use treated wastewater from the P. H. Glatfelter Company in the cooling tower, the potential for increased odors was evaluated.

A literature search was conducted by DOE to identify potential odor-producing compounds associated with pulp and paper mills. Four sulfur compounds were identified as potentially contributing to malodors frequently associated with pulp and paper mills: hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH), methyl sulfide (CH_3SCH_3), and methyl disulfide (CH_3SSCH_3). Two of the compounds (CH_3SCH_3 and CH_3SSCH_3) are insoluble in water and should not be present in P. H. Glatfelter Company wastewater. In addition, all of these compounds, including the two remaining compounds [hydrogen sulfide (H_2S) and methyl mercaptan (CH_3SH)], are easily removed from wastewater via treatment processes such as aeration. Wastewater from the P. H. Glatfelter Company's pulping process is subjected to both primary and secondary treatment prior to delivery to the wastewater settling pond. Much of the odor-producing sulfur compounds are released during aeration in the primary treatment stage. During secondary treatment, the wastewater passes through a two-stage clarifier and undergoes three additional stages of aeration. The mechanism that releases odor-producing compounds from the P. H. Glatfelter Company wastewater during treatment (low temperature volatilization) is the same mechanism which could release these compounds from the proposed project's cooling tower. Any odor-

producing compounds that could potentially be released from the cooling tower would already be expected to have been released during primary and secondary treatment of the wastewater prior to its utilization by the proposed facility. Therefore, use of process wastewater from the P. H. Glatfelter Company would not be expected to aggravate existing ambient odors.

In addition, the temperature of P. H. Glatfelter Company's effluent at the first stage of treatment is approximately 41 to 43°C (106 to 109°F). Methyl mercaptan (CH_3SH) boils at 6°C (43°F). Thus, the elevated temperatures of the raw wastewater should be an effective mechanism for stripping this component from the wastewater prior to use in the cooling tower. Also, if any residual sulfides are present in the wastewater, they should remain ionized ($S^{=}$) in the cooling tower water and not evolve as hydrogen sulfide (H_2S) gas (which would cause odor problems). This is due to the maintenance of the cooling tower water at slightly basic conditions (~pH 8).

Thus, given (1) the insolubility in water and low boiling points of several of the chemical species responsible for odor, (2) the P. H. Glatfelter Company's aeration processes that would strip off the volatile and insoluble species, and (3) the operation of the cooling tower at basic conditions that would tend to retain anions, the proposed project would not appear to contribute to the release of malodors.

4.1.2.11 Health Risk Assessments

Air quality is a concern in the region due to historic industrial activity, and although the purpose of the proposed project is to demonstrate a cleaner combustion technology, coal-fired power plants have the potential to adversely affect air quality. Moreover, air emissions from the combustion of coal can potentially impact other environmental media through air dispersion and wet and dry deposition onto soil, water, and vegetation. During the public scoping ***and hearing processes***, the DOE received many expressions of concern over possible adverse health effects - mainly due to potential air emissions from the proposed project - to persons in the affected communities. In addition, some ***members of the*** medical community in York County expressed concern ***as*** to the location of a coal-fired power plant in York County due to issues related to the quality of air in the York air basin. For these reasons, the DOE directed YCEP to conduct health risk assessments in order to determine the effects of the proposed project on human health.

The direct health effects of emissions from the proposed facility were evaluated, in part, within the context of the overall proposed project, which includes emissions offsets due to the cogeneration of steam for industrial use. The proposed project would result in a decrease in sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}), because of ***a*** federally enforceable oxides of nitrogen (NO_x) emission reduction ***requirement which would*** result ***in*** the curtailment of P. H. Glatfelter Company's Power Boiler No. 4 operations. ***These three air pollutants [sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10})], have been associated with most of the reported health effects due to air pollution as reported in the scientific literature (see Table 4.1-17).***

Curtailment of P. H. Glatfelter Company's Power Boiler No. 4 should also reduce emissions of ***semi-volatile and non-volatile*** trace elements to the region's inventory of air pollutants because of the improved combustion efficiency and more effective ***particulate*** emissions controls on the proposed project. ***Since there would be a net decrease in particle loadings (272 tons/yr based on permitted emissions; 7 tons/yr based on expected emissions) to the air basin as a result of the proposed project, it is reasonable to assume that the emissions loadings of the less volatile trace elements (i.e., beryllium, chromium, cadmium, nickel, zinc) that tend to adsorb on particles at baghouse temperatures would also be reduced.***

The net effect from the proposed project ***would*** be a reduction in total emissions ***of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10}), and potentially hazardous semi-volatile or non-volatile trace elements*** and an overall improvement in regional air quality ***(for these pollutants)***. To the extent that ***these key pollutants are*** curren***tly*** adversely impacting human health, ***there could be an improvement to this adverse impact*** over time with the addition of the proposed project based solely on the overall reduction of ***these key air*** pollutants in the York air basin.

However, it is also recognized that there would be increases in pollutant emissions for some species. In particular, carbon monoxide (CO) and VOCs would increase by ~1,700 tons/yr (maximum) and 45 tons/yr (maximum), respectively. These pollutants have not been as "traditionally" implicated as sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) with adverse health effects arising from power plants. In addition, as described later in this section, certain compounds are expected to be released in the drift in the cooling tower (cyanide, manganese, selenium, and chloroform) and from the boiler stack [polycyclic aromatic hydrocarbons (PAHs), radionuclides, lead (Pb), and mercury (Hg)]. The analysis of the health effects of these emissions are contained later in this section.

Overall, DOE took a view that would tend to overestimate adverse health effects. In most cases, the predicted overall reduction of air emissions in the York area due to the curtailment of P. H. Glatfelter Company's Power Boiler No. 4 was not factored into the health risk analysis. One of the primary reasons for this conservative approach is the possibility that the proposed project could be operating in parallel with the P. H. Glatfelter Company Power Boiler No. 4 for up to 720 hours per year. Thus, in most instances, in order to generate a worst-case scenario, emissions from the proposed project were not offset by the reduction in air emissions due to curtailment or modification of either the P. H. Glatfelter Company Power Boiler No. 4 or the TGPL facility near Delta, York County, PA.

Five separate approaches were used to specifically assess the effects of the proposed project on human health. A formal human health risk assessment, consistent with established chemical risk assessment principles and procedures developed for the regulation of environmental contaminants, was conducted for evaluating the health risks of stack emissions from the proposed project (*Environ, 1994b*). Two separate studies were subsequently conducted to assess the human health effects of radionuclides emissions (***Weston, 1995***) and cooling tower drift (*Environ, 1994c*). These studies complement a health assessment conducted when the project was initially proposed to be located in West Manchester Township (*Ducatman, 1992*). Though less formal than the risk assessment conducted for the North Codorus Township site (where the project is currently being proposed), the Ducatman study provides a ***limited*** discussion of the potential ***physiologic*** effects to human health of expected emissions, including particulate matter (PM_{10}), based on a review of scientific literature ***prior to 1992. In addition, scientific reports and news articles (available to the general public) that were received by DOE from York County medical and osteopathic societies and EPA, Region 3, were reviewed for their applicability in analyzing the health effects from the proposed project. These reports complemented and expanded the findings of the Ducatman report by being generally more recent and epidemiologic in nature. The first*** four studies are available in the public reading rooms (Appendix A). ***The compendium of reports obtained from the EPA and York County medical societies are publicly available through open literature searches.***

The Human Health Risk Assessment ***conducted*** for the proposed project (*Environ, 1994b*) was consistent with methods prescribed by EPA in its guidance documents. This assessment was based on the emissions data contained in the proposed project's PSD Permit Application (*Weston, 1994d*). This risk assessment primarily looked at the effect of trace elements and metals from the proposed project, because the level of reduction of these emissions due to curtailment of P. H. Glatfelter Company's Power Boiler No. 4 (when compared to current baseline) had not been as accurately quantified as other emissions [such as sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10})] ***that would be associated with net decreases in emissions in the York County air basin***. The study presents a bounding analysis, which provides an upper bound on potential human health risks posed by the proposed facility.

The assessment was conservative by design to provide a wide margin of safety. For example, in estimating exposure to potentially hazardous substances, the maximum air concentrations predicted by modeling studies were used. In estimating the deposition and accumulation of potentially hazardous substances in soil, the maximum air concentrations were assumed to exist over the total operational life of the project. Additionally, several of the exposure pathways considered in the risk assessment may provide a greater potential exposure for children than for adults because of various behavior and activity patterns peculiar to children (e.g., greater hand-to-mouth activity) and because of their lower average body weight. Therefore, in estimating environmental exposures, the risk assessment used exposure factors recommended by the EPA (*EPA, 1990b, c; 1992a*), and the method assumed an average childhood body weight of 17 kg (37 lbs), based on EPA guidance for children of 3 to 6 years of age and an adult body weight of 70 kg (154 lbs) (*EPA, 1990c*). These differences between childhood exposures and adult exposures are summarized later in this section. Finally, emissions values which were used as inputs to the risk assessment do not consider expected reductions from other offsets. Therefore, the risk assessment may overstate risks to human health.

The risk assessment proceeded in four distinct steps. The first step, Hazard Identification, identified emissions from the proposed facility that may be of potential concern to human health. Step Two, Toxicological Assessment, evaluated the response (potential human health effects) to a specific exposure (dose) to a substance identified in Step One. Step Three, Exposure Assessment, characterized the amount, frequency, and duration of human exposure based on estimated concentrations of the potentially harmful substances in various environmental media (air, soil, water) and food, and on the behavior and activity patterns of individuals. The final step, Risk Characterization, was a quantitative estimate of the potential for adverse health effects due to exposure to emissions from the proposed project.

The outcome of a quantitative risk assessment is an expression of risk to individuals potentially exposed to hazardous substances released to the environment. For known or suspected carcinogens (cancer-causing materials), this risk is expressed as the lifetime excess cancer risk, and is a measure of the likelihood that an individual will develop cancer as a result of exposure to substances released by the proposed facility. For interpreting cancer risk estimates, EPA has adopted a risk range for evaluating insignificant risks and has determined that "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response" *(National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300.430).*

For noncarcinogenic substances, the potential for adverse health effects is expressed as the hazard quotient (HQ), which is a measure of the potential to experience noncarcinogenic effects from the expected exposure. For a given substance, if an ***HQ*** is less than or equal to 1, it is assumed that the exposed population would not be affected. An ***HQ*** greater than 1 signifies a potential for adverse effects. Exposure to multiple substances, as would be expected with the proposed project, is quantified by a Hazard Index (HI), which is the sum of the HQs for the individual substances sharing common characteristics (typically those affecting the same target organ, biochemical pathway, or exposure pathway). ***The HI is a ratio of an individual's actual exposure to the federally defined maximum level of exposure considered safe.*** An HI less than or equal to 1 ***is generally <u>not</u> considered hazardous***. An HI greater than 1 ***indicates a level of potential concern requiring a more detailed assessment.***

The potential emissions from the proposed project were discussed in Sections 4.1.2.3 through 4.1.2.10, and includ***ed*** acid gases, fine particles, toxic metals [including lead (Pb) and mercury (Hg)], radionuclides, ***VOCs***, semi-volatile PAHs, chloroform, and cyanide. The specific sources for these air emissions are the boiler stack, through which the flue gases exit after leaving the baghouse, and the cooling tower, from which the evaporation plume is released. These substances would be dispersed over a wide area by normal air circulation, and some would eventually enter other media (water, soil, food) by settling, outwashing, and uptake into the human food chain.

DOE also received comments from the public and from the York County medical communities on the potential release of radionuclides from the coal combustion process being proposed. Radionuclides occur in trace amounts in all organic materials - including coal - and could be released to the atmosphere with fine particulate material and, rarely, as gases. The EPA has promulgated rules on the emission of radionuclides; however, coal-fired power plants are excluded from these emission standards. EPA is currently studying radionuclide emissions from coal-fired power plants, and a final report should be issued in late 1995. Nevertheless, to address concerns over such emissions from the proposed project, a study on the potential effects of radionuclides from the proposed project ***was performed***. This report ***(Weston, 1995)*** is available in the public reading rooms ***(Appendix A)***.

As shown in Section 4.1.2.9, YCEP identified the potential emission of chloroform from the proposed project's cooling towers. Chloroform is identified as a hazardous air pollutant under the CAA Amendments of 1990. Additionally, chloroform is a human carcinogen. To assess the potential effects that the release of chloroform would pose to human health, the DOE requested YCEP to conduct a supplemental risk assessment of the cooling tower drift. This report (*Environ, 1994c*) is available in the public reading rooms ***(Appendix A)***.

DOE received reports from members of the York County medical and osteopathic communities and EPA, Region 3, to assist in the assessment of human health effects due to emissions from the proposed project. A listing of the relevant reports and a synopsis of the pertinent substantiated findings for these reports are listed primarily in two tables contained in this section (Tables 4.1-17 and 4.1-18). DOE reviewed these reports for two types of information specifically applicable for the health effects analysis of air pollution from the proposed plant: the existence of dose-response curves and the lowest reported concentrations for which an adverse effect was observed for a given pollutant or mix of pollutants.

Upon reviewing these reports, DOE faced a challenge in applying most of these findings to the proposed project in that the studies were typically conducted for concentrations of pollutants that were much higher than those estimated to be resulting from the proposed project. Since there are no accurate quantitative methods of extrapolating the human health effects from the amounts cited in the studies down to the smaller amounts estimated to be emitted from the proposed project, it was not possible to quantitatively predict the human health effects. Linear extrapolation would probably overestimate any effects, since many dose response curves are sigmoidal ("S"-shaped) in nature. However, general associations between specific pollution emissions and general health effects have been provided for the benefit of the reader, as well as a very generalized application of these associations to the proposed project.

Collectively, ***the five separate approaches (i.e., boiler stack emissions risk assessment, cooling tower emissions risk assessment, radionuclide risk assessment, analysis of physiologic and controlled human physiology studies by Ducatman, and analysis of primarily epidemiologic information contained in reports received from York County medical societies and the EPA)*** mentioned above provide a basis to assess the potential effects that the proposed project could pose to human health. The possible effects of potentially harmful substances emitted from the proposed project (i.e., acid gases, particulate matter, toxic metals, radionuclides, VOCs, ***PAHs***, chloroform, and cyanide) are discussed in the following subsections.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions.

Reference	Pollutant	Finding
Cotton, P. 1993. "'Best Data Yet' Say Air Pollution Kills Below Levels Currently Considered Safe." JAMA 269: 3087-3088.	Particulate matter (PM)	Visits to hospital emergency department for asthma increase with particulate matter even at levels below 60 ppb (60 percent less than current regulation allows).
Fairley, D. 1990. "The Relationship of Daily Mortality to Suspended Particulates in Santa Clara County, 1980-1986." Environmental Health Perspectives 89: 159-168.	Particulate matter (PM)	An association was found between high particulate concentrations and increased mortality. Persistence of an effect at lower concentrations suggest that the particulate variable may be acting as a surrogate for some constituent particles, such as acid aerosols.
Bobak, M. and D. Leon. 1992. "Air Pollution and Infant Mortality in the Czech Republic, 1986-88." The Lancet 340: 1010-1014.	Total suspended particulates less than 10 microns (TSP-10)	The estimated effect of a 25 $\mu g/m^3$ increase in TSP-10 concentration would be to increase postneonatal respiratory mortality by a factor of 1.58.
Schwartz, J. and A. Marcus. 1990. "Mortality and Air Pollution in London: A Time Series Analysis." American Journal of Epidemiology 131: 185-194.	Particulate matter (PM)	Starting at 20 $\mu g/m^3$, there is a relation between British Smoke level and mortality. Analysis suggest that a 10 percent reduction in particulate matter in London would result in several hundred fewer early deaths per year.
Pope III, C. A., J. Schwartz, and M. Ransom. 1992. "Daily Mortality and PM_{10} Pollution in Utah Valley." Archives of Environmental Health 47: 211-217.	Particulate matter less than 10 microns in aeroequival-ent diameter (PM_{10})	A 5-day moving average increase in PM_{10} of 100 $\mu g/m^3$ was associated with an increase in deaths per day equal to 16 percent. The association with mortality and PM_{10} was largest for respiratory disease deaths, next largest for cardiovascular deaths, and smallest for all other deaths. Mean PM_{10} concentrations during the study period equaled 47 $\mu g/m^3$. The maximum 24-h and 5-d moving PM_{10} levels equaled 365 and 297 $\mu g/m^3$, respectively. The relative risk of death increased monotonically with PM_{10}, and the relationship was observed at PM_{10} levels that were below the current National Ambient Air Quality Standard of 150 $\mu g/m^3$.
Schwartz, J. and D. Dockery. 1992a. "Particulate Air Pollution and Daily Mortality in Steubenville, Ohio." American Journal of Epidemiology 135: 12-19.	Total suspended particulates (TSP)	An increase in particulates of 100 $\mu g/m^3$ was associated with a 4 percent increase in mortality on the succeeding day. Authors suggest that the study results provide evidence for a significant health effect even at concentrations at or below the National Ambient Air Quality Standard for particulate matter.
Dockery, D., J. Schwartz, and J. Spengler. 1992. "Air Pollution and Daily Mortality: Associations with Particulates and Acid Aerosols." Environmental Research 59: 362-373.	PM_{10}	For each increase of 100 $\mu g/m^3$ of PM_{10}, there was a 16 percent increase in total mortality in St. Louis and a 17 percent increase in eastern Tennessee.
Ransom, M. and C. A. Pope III. 1992. "Elementary School Absences and PM_{10} Pollution in Utah Valley." Environmental Research 58: 204-219.	PM_{10}	A 28-day moving average increase in PM_{10} equal to 100 $\mu g/m^3$ was associated with an increase in overall school absences equal to approximately 40%.
Pope III, C. A. and D. Dockery. 1992. "Acute Health Effects of PM_{10} Pollution on Symptomatic and Asymptomatic Children." American Review of Respiratory Diseases 145: 1123-1128.	PM_{10}	Elevated PM_{10} levels of 150 $\mu g/m^3$ would result in an estimated average reduction in peak expiratory flow of 5.4 and 3.8 L/min for the symptomatic and asymptomatic samples.
Ware, J., et al. 1986. "Effects of Ambient Sulfur Oxides and Suspended Particles on Respiratory Health of Preadolescent Children." American Review of Respiratory Diseases 133: 834-842.	Total suspended particulates (TSP)	The odds ratio for illness rates associated with a 10 $\mu g/m^3$ difference in total suspended particulates were: for cough, 1.11; for bronchitis, 1.11; for lower respiratory illness index, 1.08.
Schwartz, J., et al. 1993. "Particulate Air Pollution and Hospital Emergency Room Visits for Asthma in Seattle." American Review of Respiratory Diseases 147: 826-831.	PM_{10}	The relative risk (for asthma emergency room visits) for a 30 $\mu g/m^3$ increase in PM_{10} was 1.12. Daily PM_{10} concentration never exceeded 70 percent of the current ambient air quality standards during the period.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions. (continued)

Reference	Pollutant	Finding
Pope III, C. A. 1989. "Respiratory Disease Associated with Community Air Pollution and a Steel Mill, Utah Valley." American Journal of Public Health (May): 623-628.	PM_{10}	When 24-hr PM_{10} levels exceed 50 $\mu g/m^3$, hospital admissions increased by 300 percent and 44 percent for children and adults, respectively. During months when mean PM_{10} levels exceed 50 $\mu g/m^3$, admissions increased by 89 percent and 47 percent for children and adults, respectively.
Chestnut, L. G., et al. 1991. "Pulmonary Function and Ambient Particulate Matter: Epidemiological Evidence from NHANES I." Archives of Environmental Health 46: 135-144.	Total suspended particulates (TSP)	An increase of 34 $\mu g/m^3$ of total suspended particulates was associated with a decrease in forced vital capacity of 2.25 percent. A threshold level of 60 $\mu g/m^3$ (quarterly average) of total suspended particulates seems to exist below which a relationship with pulmonary function ceases to exist.
Pope III, C. A., et al. 1991. "Respiratory Health and PM_{10} Pollution: A Daily Time Series Analysis." American Review of Respiratory Diseases 144: 668-674.	PM_{10}	At 150 $\mu g/m^3$ of PM_{10}, a 3 to 6 percent decline in lung function as measured by peak expiratory flow was observed. Three consecutive days with PM_{10} levels elevated by 150 $\mu g/m^3$ would result in an estimated average reduction of peak expiratory flow of approximately 6 percent.
Pope III, C. A. and R. E. Kanner. 1993. "Acute Effects of PM_{10} Pollution on Pulmonary Function of Smokers with Mild to moderate Chronic Obstructive Pulmonary Disease." American Review of Respiratory Diseases 147: 1336-1340.	PM_{10}	An increase in PM_{10} of 100 $\mu g/m^3$ was associated with a marginal decline in forced expiratory flow, equal to approximately 2 percent.
---. 1991. "Dust to Dust: A Particularly Lethal Legacy." Science News (April): 212.	Total suspended particulates (TSP); PM_{10}	Particulate data analyzed for three *United States* cities. Daily particulate pollution correlated with mortality rates, while SO_2 showed no effect. The magnitude of the particulates' effect on mortality proved nearly identical in each *United States* city: an approximately 6 percent increase in deaths for every 100 $\mu g/m^3$ of total particulates (or approximately 50 $\mu g/m^3$ of PM_{10}).
Schwartz, J. 1991. "Particulate Air Pollution and Daily Mortality in Detroit." Environmental Research 56: 204-213.	Total suspended particulates (TSP)	Predicted daily TSP concentrations were correlated with daily mortality counts in Detroit, MI. A significant correlation was found between predicted TSP and mortality. The magnitude of the effects was similar to results reported from Steubenville, Ohio (using actual TSP measurements), with each 100 $\mu g/m^3$ increase in TSP resulting in a 6 percent increase in mortality.
Dockery, D., et al. 1993. "An Association between Air Pollution and Mortality in Six *United States* Cities." The New England Journal of Medicine 329: 1754-1759.	Fine particulates	In a prospective cohort study, effects of air pollution on mortality were estimated, while controlling for individual risk factors. Mortality rates were most strongly associated with cigarette smoking. After adjusting for smoking and other risk factors, statistically significant and robust associations between air pollution and mortality were observed. The adjusted mortality-rate ratio for the most polluted of the cities as compared with the least polluted was 1.26. Mortality was most strongly associated with air pollution with fine particulates, including sulfates.
Schwartz, J. 1994a. "Air Pollution and Daily Mortality: A Review and Meta Analysis." Environmental Research 64: 36-52.	Total suspended particulates (TSP)	In the primary meta-analysis conducted, airborne particle concentration was a significant risk factor for elevated mortality. The relative risk of 1.06 that was observed was for a 100 $\mu g/m^3$ increase in TSP concentration.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions. (continued)

Reference	Pollutant	Finding
Hilts, P. 1993. "Studies Say Soot Kills Up to 60,000 in *United States* Each Year." The New York Times, July 19, A1.	Total suspended particulates (TSP)	Summary newspaper article. In Steubenville, OH, from 1974 to 1984, researchers found a steady rise in deaths of 4 percent for every 100 micrograms of particle pollution, at the same time no association was found with ozone pollution. In St. Louis, MO, deaths increased 16 percent for each 100 $\mu g/m^3$, and in a study in East Tennessee, deaths increased 17 percent for each 100 $\mu g/m^3$. One of the largest studies, looking at particle pollution and deaths between 1973 and 1980 in Philadelphia, found that deaths increased about 7 percent for each 100 $\mu g/m^3$ of particles and 5 percent with each 100 $\mu g/m^3$ of SO_2.
Seaton, A., et al. 1995. "Particulate Air Pollution and Acute Health Effects." The Lancet 345: 176-178.	PM_{10}	A hypothesis was presented to explain the association between particulate air pollution and exacerbations of illness in people with respiratory disease and with the rises in the numbers of deaths from cardiovascular and respiratory disease among older people. It was suggested that ultra-fine, acidic particles are able to provoke alveolar inflammation, with the subsequent release of mediators capable, in susceptible individuals, of causing exacerbations of lung disease and of increasing blood coagulability.
Bown, W. 1994. "Dying from Too Much Dust." New Scientist, March 12, 12-13.	PM_{10}	American studies suggest that there are no safe levels of PM_{10}, and that when the concentration in a city increases by 10 $\mu g/m^3$, the death rate rises by 1 percent.
Schwartz, J. and D. Dockery. 1992a. "Increased Mortality in Philadelphia Associated with Daily Air Pollution Concentrations." American Review of Respiratory Disease, 145: 600-604.	Total suspended particulates (TSP); Sulfur dioxide (SO_2)	For every 100 $\mu g/m^3$ increase of total suspended particulates, death rates in Philadelphia rose by 10 percent among residents over age 65 and 3 percent in younger residents. Every 100 $\mu g/m^3$ jump in total suspended particulates brought a 19 percent increase in deaths from chronic obstructive pulmonary disease and 11 percent increase in pneumonia deaths and a 10 percent increase in heart disease deaths. Total mortality increased in Philadelphia during the 1970's by 7 percent with each 100 $\mu g/m^3$ increase in total suspended particulates and by 5 percent with each 100 $\mu g/m^3$ increase in SO_2.
Xu, X., et al. 1994. "Air Pollution and Daily Mortality in Residential Areas in Beijing, China." Archives of Environmental Health 49: 216-222.	Total suspended particulates (TSP); Sulfur dioxide (SO_2)	Relationship between air pollution and daily mortality in 1989 was examined in two residential areas in Beijing, China. Very high concentrations of SO_2 (mean = 102 $\mu g/m^3$) and TSP (mean = 375 $\mu g/m^3$) were observed. The risk of total mortality was estimated to increase by 11 percent with each doubling in SO_2 concentration. The association of ln(TSP) with total daily mortality was positive but not significant (4 percent increase in mortality with each doubling in TSP). When mortality was analyzed separately by cause, the association with a doubling in SO_2 was significant for chronic obstructive pulmonary disease (29 percent), pulmonary heart disease (19 percent), and cardiovascular disease (11 percent). A similar association was noted for a doubling in TSP, but the result was only statistically significant for chronic obstructive pulmonary disease. This study showed increased mortality associated with air pollution at SO_2 pollution levels below the current World Health Organization recommendations.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions. (continued)

Reference	Pollutant	Finding
Patel, T. 1994. "Killer Smog Stalks the Boulevards." New Scientist, October 15, 8.	Particles, Nitrogen dioxide (NO_2), Sulfur dioxide (SO_2), and Ozone (O_3).	Using Paris' clearest days as baseline, researchers calculated the toll of disease when pollutant concentrations reached 100 $\mu g/m^3$ above the baseline. For black smoke, the number of deaths from heart attacks and admissions to hospital for heart problems increased by 6 percent. The number of asthma attacks rose by 30 percent. The study linked a 100 $\mu g/m^3$ increase in NO_2 to a 63 percent rise in the number of people calling their doctors with asthma attacks, and a 17 percent rise in people going to the hospital for the same reason. An equivalent increase in SO_2 was linked to a 10 percent rise in deaths from heart attacks. When ozone concentration increased by 100 $\mu g/m^3$, admissions of elderly people with chronic breathing problems rose by 20 percent and lower respiratory tract infections in children rose by 24 percent.
Schwartz, J. 1994b. "Air Pollution and Hospital Admissions for the Elderly in Birmingham, Alabama." American Journal of Epidemiology 139: 589-598.	PM_{10}; ozone (O_3)	This study examined the association between airborne particles and/or ozone and hospital admissions for respiratory disease in Birmingham, Alabama, one of the few cities in the ***United States*** with daily monitoring of inhalable particles. Inhalable particles were a risk factor for admission for pneumonia (for an increase of 100 $\mu g/m^3$ in daily concentration, relative risk [RR] equalled 1.19) and chronic obstructive pulmonary disease (RR = 1.27). Ozone was more weakly associated with admissions for pneumonia with a 2-day lag (RR = 1.14) and for chronic obstructive pulmonary disease, with a 1-day lag (RR = 1.17). The risks are for an increase in O_3 exposure of 50 ppb.
Schwartz, J. 1994c. "PM_{10}, Ozone, and Hospital Admissions for the Elderly in Minneapolis-St. Paul, Minnesota." Archives of Environmental Health 49: 366-374.	PM_{10}; Ozone (O_3)	This study examined the association between airborne particles and/or ozone and hospital admissions for respiratory disease for the elderly in Minneapolis-St. Paul, Minnesota, one of the few cities in the ***United States*** with daily monitoring of inhalable particles. PM_{10} was a risk factor for pneumonia admissions (RR = 1.17) and COPD admissions (RR = 1.57). O_3 was associated with pneumonia admissions (RR = 1.15). These relative risks are for an increase of 100 $\mu g/m^3$ in daily PM_{10} and 50 ppb in daily ozone concentration.
Spektor, D., et al. 1985. "Effects of Submicrometer Sulfuric Acid Aerosols on Mucociliary Transport and Respiratory Mechanics in Asymptomatic Asthmatics." Environmental Research 37: 174-191.	Sulfuric acid aerosols (H_2SO_4)	After exposure to 1 hour of 1,000 $\mu g/m^3$ of H_2SO_4, the asymptomatic asthmatics not on routine medication exhibited a transient slowing of mucociliary clearance and also decrements in various indices of respiratory function, such as forced expiratory volume in one second over forced vital capacity (FEV_1/FVC).
Frampton, M., et al. 1991. "Effects of Nitrogen Dioxide Exposure on Pulmonary Function and Airway Reactivity in Normal Humans." American Review of Respiratory Diseases 143: 522-527.	Nitrogen dioxide (NO_2)	For subjects without airway hyperactivity, exposure to 1.5 ppm NO_2 for 3 hours increased airway reactivity, whereas repeated 15 minute exposures to 2 ppm NO_2 did not alter airway reactivity.
Ducatman, A. et. al. *Health Assessment for the York County Energy Partners Proposed Cogeneration Facility (West Manchester Site)*, summary report. West Virginia University, Health Sciences Center, 1992.	Nitrogen dioxide (NO_2)	Human Epidemiology: An indoor air quality study related to gas stove use indicated an excess of infection at NO_x levels of 31 - 216 $\mu g/m^3$; however, many other studies did not correlate increased respiratory symptoms with gas stove use. Others believe that results from indoor exposure to NO_x levels from gas stoves is difficult to extrapolate to outdoor environments. Controlled Human Physiology Studies: Normal subjects have not experienced airway decrements after exposures to concentrations exceeding 2000 $\mu g/m^3$. Asthmatics and emphysematous patients may respond to lower levels, possibly as low as 590 $\mu g/m^3$ (lower boundary). Biochemical markers of inflammation and immune response (i.e., mast cells in bronchoalveolar fluid) have been seen in animals and humans (inconsistently) after exposures to 490 - 1178 $\mu g/m^3$.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions. (continued)

Reference	Pollutant	Finding
Hasselblad, V.; Eddy, D. M.; Kotchmar, D. J. 1992. "Synthesis of Environmental Evidence: Nitrogen Dioxide Epidemiology Studies." Journal of Air Waste Management 42: 662-671.	Nitrogen dioxide (NO_2)	The minimum extrapolated concentration associated with hypothesized increases in childhood respiratory infection is extended exposure to increments of ~30 $\mu g/m^3$.
Vedul S, Schenker, MD; Munoz, A., et. al., 1987 "Daily air pollution effects on children's respiratory symptoms and peak expiratory flow", American Journal of Public Health 77: 694-698.	Nitrogen dioxide (NO_2)	Respiratory symptoms were not observed with outdoor exposures of 12-80 $\mu g/m^3$ in a Pennsylvania study.
Morrow, P., et al. 1992. "Pulmonary Performance of Elderly Normal Subjects and Subjects with Chronic Obstructive Pulmonary Disease Exposed to 0.3 ppm Nitrogen Dioxide." American Review of Respiratory Diseases 145: 291-300.	Nitrogen dioxide (NO_2)	A mean NO_2 dose of 1,215 micrograms was delivered to subjects with chronic obstructive pulmonary disease (COPD) - all with a history of smoking and a mean age of 60 year - at a mean rate of 4.3 μg/min during rest and 17 μg/min during exercise. This group showed significant reductions in FVC and FEV_1 during NO_2 exposure, but not in air. A mean NO_2 dose of 1,096 μg delivered to elderly (mean age 61.1 year) normal subjects at a mean rate of 3.7 μg/min during rest and 16.8 μg/min during exercise showed no difference from baseline. Smokers showed significantly lower mean FEV_1 values during NO_2 exposure versus never-smokers in the same elderly normal group.
Kehrl, H., et al. 1987. "Ozone Exposure Increases Respiratory Epithelial Permeability in Humans." American Review of Respiratory Diseases 135: 1124-1128.	Ozone (O_3)	Healthy, non-smoking young men were exposed for 2 hours to purified air and 0.4 ppm ozone while performing intermittent high intensity treadmill exercise. Ozone exposure caused respiratory symptoms and was associated with a mean 14 percent decrement in FVC.
Bascon, R. 1993. "Lung Association Tells Congress that Current Ozone Standard Does Not Protect Public Health." (August) Statement from Dr. Rebecca Bascon to ***United States*** Congress regarding current ozone standards.	Ozone (O_3)	Acute respiratory problems were observed in healthy, exercising individuals at an ozone level of 0.08 ppm when exposure duration is 7 hours (current federal standard is 0.12 ppm for 1 hour).
National Center for Health Statistics, ***United States*** EPA. 1990e. "National Interview Survey 1989."	Ozone (O_3)	Prolonged exposures to ozone levels as low as 0.08 ppm can damage lung tissue.
---. 1992. "Safe Ozone Levels Worsen Asthma Attacks." Asthma Update 8 (Summer).	Ozone (O_3)	When patients inhaled air with 0.12 ppm of ozone, they became twice as sensitive to ragweed and grass as when breathing clean air.
Schwartz, J. 1989. "Lung Function and Chronic Exposure to Air Pollution: A Cross-Sectional Analysis of NHANES II." Environmental Research 50: 309-321.	Ozone (O_3)	Highly statistically significant relationships exist between chronic pollution measures and lung function. For acute ozone exposures, levels as low as half the current ambient standard produce decreases in lung function.
Spektor, M., et al. 1988. "Effects of Ambient Ozone on Respiratory Function in Healthy Adults Exercising Outdoors." American Review of Respiratory Diseases 138: 821-828.	Ozone (O_3)	Ozone concentrations during exercise ranged from 21 to 124 ppb. All measured functional indexes showed significant ozone associated mean decrements with FVC at -2.1 ml/ppb and FEV_1 at -1.4 ml/ppb.
Burnett, R. et al. 1994. "Effects of Low Ambient Levels of Ozone and Sulfates on the Frequency of Respiratory Admissions to Ontario Hospitals." Environmental Research 65: 172-194.	Ozone (O_3); Sulfates ($SO_4^=$)	Positive and statistically significant associations were found between hospital emissions and both ozone and sulfates on the day of admission and up to 3 days prior to the date of admission. Five percent of daily respiratory admissions in the months of May to August were associated with ozone, with sulfates accounting for an additional 1 percent of these admissions. Ozone was a stronger predictor than sulfates.

Table 4.1-17. Health effects information related to pollutants typically associated with power plant emissions. (continued)

Reference	Pollutant	Finding
Nadel, J. A.; Salem, H.; Tamplin, B.; Tokomo, G. 1965. "Mechanism of Bronchoconstriction during Inhalation of Sulfur Dioxide." Journal of Applied Physiology 20: 164 - 167.	Sulfur dioxide (SO_2)	Normal human subjects tolerate exposures up to ~13,000 μg/m³ without difficulty.
Ducatman, A. et. al. *Health Assessment for the York County Energy Partners Proposed Cogeneration Facility (West Manchester Site)*, summary report. West Virginia University, Health Sciences Center, 1992.	Sulfur dioxide (SO_2)	Human Epidemiology: Communities with mean (annual) aerosol concentrations of 105 - 325 μg/m³ usually experience more asthma, bronchitis, and upper respiratory infections than communities with 18 - 21 μg/m³ exposures. In a study conducted in Chestnut Ridge, Pennsylvania, community increases in respiratory disease were not detected at mean annual exposures of 92 μg/m³. Controlled Human Physiology Studies: Studies of asthmatics consistently show that a portion of the population typically begins to show response after exposures of 1,050 - 2,600 μg/m³, with lowest recorded responses at 260 μg/m³.
Chapman, R., et al. 1985. "Prevalence of Persistent Cough and Phlegm in Young Adults in Relation of Long-term Ambient Sulfur Oxide Exposure." American Review of Respiratory Diseases 132: 261-267.	Sulfur dioxide (SO_2)	In early 1976, a survey of persistent cough and phlegm (PCP) prevalence was conducted in young adults in four Utah communities. Five-year means of SO_2 for the four communities were 11, 18, 36, and 115 μg/m³. Corresponding mean suspended sulfate levels had been 5, 7, 8, and 14 μg/m³. In non-smoking mothers, PCP prevalence was 4.2 percent in the high exposure community and approximately 2 percent in all other communities. In smoking mothers, PCP prevalence was 21.8 percent in the high exposure community and approximately 15 percent elsewhere. In non-smoking fathers, PCP prevalence was 8 percent in the high exposure community and an average of 3 percent elsewhere. In smoking fathers, PCP prevalence was less strongly associated with ambient SO_2 exposure.
Kurt, T., et al. 1978. "Association of the Frequency of Acute Cardiorespiratory Complaints with Ambient Levels of Carbon Monoxide." Chest 74: 10-14.	Carbon monoxide (CO)	On "high CO days" and "high CO days plus one", there were higher frequencies of cardiorespiratory complaints (f=7.9) than on "low CO days" (f=6.4) in Denver. On "high CO days plus one", the mean value for the one hour maximum ambient level of CO was 27.2 ppm; the 24-hr mean level of CO was 9.3 ppm. On "low CO days plus one", the mean value for the one hour maximum ambient level of CO was 12.1 ppm; the 24-hr mean level of CO was 5.9 ppm.
Stevens, A., et al. 1990. "Toxic Metals, Emissions, Deposition, Health Effects, Controls and the Relation of Incinerators, Coal Plants, and Acid Rain." Environmental Monitoring and Wet Environments Research Program, Center for Biomedical and Toxicological Research and Waste Management, Florida State University, (June).	Toxic metals	Some highlights in the summary paper: • 6.3 μg of lead per deciliter (dL) of blood are associated with an 87 percent increase in birth defects; blood levels of lead of 15 μg/dL had an 137 percent higher incidence of birth defects compared to the control of less than 0.7 μg/dL. • Blood pressure increases significantly with lead exposure of 20 μg/dL compared to 10 μg/dL. A linear relationship exists between elevated levels of lead in blood and blood pressure down to 7 μg/dL. • Children with blood levels of 50 ppm or more of lead were consistently in the low achiever group. • Blood levels of lead of 6.5 μg/dL have significant effects on mental development and learning ability while blood levels of lead of 14.6 μg/dL had serious impacts. • Blood levels of lead as low as 8 μg/dL contributed to low birth weight. • Blood levels of lead as low as 10 μg/dL had a significant effect on the hearing threshold of children.

Table 4.1-18. Increased mortality associated with increases in particle concentrations in six United States cities.

Site	Period (years)	Total Days	Daily Mortality Range (deaths/ day)	Gravi-metric Data[a]	Range ($\mu g/m^3$)	Mean ($\mu g/m^3$)	Increased Mortality per 100 $\mu g/m^3$ increase
Philadelphia, PA	1973-1980	2,922	35 - 64	TSP	37 - 132	77.2	7 %
Detroit, MI	1973-1982	3,650	39 - 68	TSP[b]	46 - 137	87	6 %
Steubenville, OH[c]	1974-1984	4,018	1 - 5	TSP	36 - 209	111	4 %
St. Louis, MO	1985-1986	365	31 - 81	PM_{10}	1 - 97	27.6	16 %
Kingston, TN	1985-1986	365	5 - 29	PM_{10}	4 - 67	30.0	17 %
Utah County, UT	1985-1989	1,736	0 - 12	PM_{10}	1 - 365	50	16 %

[a] PM_{10} in American cities is approximately 50-60 percent of TSP.

[b] Daily TSP predicted from concurrent measurements of TSP and airport visibility from every 6th day sampling for 10 years to fit a predictive model for TSP.

[c] Steubenville Standards Metropolitan Statistical Area includes Steubenville, the remainder of Jefferson Co., OH, and Brooks & Hancock Co's., WV.

Source: Schwartz and Dockery 1992a; Schwartz 1991; Schwartz and Dockery 1992; Dockery, Schwartz and Spengler 1992; and Pope, Schwartz and Ransom 1992.

Boiler Stack Emissions

Sulfur Dioxide (SO_2). Sulfur dioxide (SO_2) emissions (permitted maximum) from the proposed facility are estimated to be 660 lbs/hr (2,891 ***tons/yr***). As with other stack emissions, ***sulfur dioxide (SO_2)*** gases would be dispersed and diluted by normal air movement. Based on this rate of emission, the maximum annual average ground-level air concentration of sulfur dioxide (SO_2) is predicted by models to be 4.9 $\mu g/m^3$. Chronic human health risks ***from sulfur dioxide (SO_2)*** were evaluated, in part, by comparison against the NAAQS annual average of 80 $\mu g/m^3$. The maximum ground-level concentration of sulfur dioxide (SO_2) was ***6 percent*** of the NAAQS annual average. ***This*** low percentage of the NAAQS ***could*** reflect minimal environmental or ***chronic*** human health impacts ***from this "incremental" effect.*** If one superimposes the highest measured annual background levels recorded in the York vicinity for sulfur dioxide (SO_2) (26 $\mu g/m^3$) on the highest modeled ***annual*** concentration, the cumulative ground-level concentration for sulfur dioxide (SO_2) ***would be*** 31 $\mu g/m^3$. ***This*** value ***is*** substantially lower than the NAAQS (which is based, in part, on health effects considerations) and represents 39 percent of the annual NAAQS for sulfur dioxide (SO_2). Thus, under worst-case conditions, compliance with the NAAQS would be easily achieved, ***and chronic effects should not be observed. This argument assumes that concentration levels in the NAAQS are set to protect human health.***

For a more acute (i.e., short-term) analysis, worst-case scenario results indicate that the highest daily modeled concentration of sulfur dioxide (SO_2) released from the proposed facility (based on maximum permitted amounts) would be 24 $\mu g/m^3$ in a 24-hr period. This maximum is well below the 24-hour NAAQS value of 365 $\mu g/m^3$. The maximum 24 $\mu g/m^3$ increase from baseline would occur only during the maximum 720 hour-equivalent overlap time in which the proposed facility would be operating concurrently with the P. H. Glatfelter Company Power Boiler No. 4. If the maximum 24-hour sulfur dioxide (SO_2) increase attributable to the proposed project (24 $\mu g/m^3$) is added to the maximum 24-hour baseline recorded (113 $\mu g/m^3$), a maximum cumulative ground level concentration of approximately 137 $\mu g/m^3$ would result. This maximum worst-case concentration is only 37 percent of the 24-hour sulfur dioxide (SO_2) standard of 365 $\mu g/m^3$. Thus, it would seem that through regulatory compliance analysis, acute effects would also not result from ambient sulfur dioxide (SO_2) concentrations resulting from the proposed project.

In order to provide a more comprehensive review of any additional potential effects resulting from sulfur dioxide (SO_2) exposure, DOE reviewed information contained in the literature regarding human health effects due to sulfur dioxide (SO_2) exposure. Table 4.1-17 contains a compilation of epidemiologic information and animal and human/animal responses to sulfur dioxide (SO_2) exposure at various concentrations. It should be noted that this table is a summary of numerous research studies, and is meant to be viewed as a distillation of relevant information and not inclusive of all relevant studies. There have been a variety of epidemiologic reports assessing mortality and morbidity effects associated with sulfur dioxide (SO_2) exposure. A review of the submitted medical reports on human health effects through epidemiologic analysis indicate that in Philadelphia, Pennsylvania (Schwartz and Dockery, 1992a), there was a 5-percent increase in mortality for each 100 $\mu g/m^3$ increase in sulfur dioxide (SO_2), and in Paris, France (Patel, 1994), there was a 10-percent rise in deaths from heart attacks for each 100 $\mu g/m^3$ increase in sulfur dioxide (SO_2). A Beijing, China, study (Xu et al., 1994) indicated that there was an 11-percent increase in risk of total mortality with each doubling (approximately 102 $\mu g/m^3$) in sulfur dioxide (SO_2). Extrapolating on these epidemiologic studies, the possibility exists of adverse health effects resulting during the 30 days (maximum) out of

the year in which the proposed project could be operating in tandem with the P. H. Glatfelter Company's Power Boiler No. 4. However, it should be noted that these 30 days would probably be distributed throughout the year, and, thus, these epidemiologic results cited above may be inappropriate to apply to non-continuous, small increases in sulfur dioxide (SO_2) exposure. The actual daily increases in sulfur dioxide (SO_2) exposure to the human population during this 1-month "overlap," should be lower than 24 $\mu g/m^3$ sulfur dioxide (SO_2) and limited in effect due to the fact that expected emissions (on average) should only be approximately two-thirds of the maximum emissions and that only one "isopleth" surrounding the plant would experience the maximum concentration of 24 $\mu g/m^3$ (YCEP, 1994b) based on modeling results. (An isopleth is a line drawn on a map through all points having the same numerical value – for this case, a maximum ground-level concentration). Furthermore, maximum annual exposure levels would be on the order of only 5 $\mu g/m^3$ (see Table 4.1-8), which may be "invisible" with respect to adverse health impacts had the epidemiologic studies been based on this lower, as opposed to much higher, levels of exposure.

As evidence of the effects of this small increment in terms of chronic effects, the worst-case annual sulfur dioxide (SO_2) cumulative ground level concentration (highest measured background plus highest modeled concentration due to the proposed project) would be approximately 31 $\mu g/m^3$ (5 $\mu g/m^3$ attributed to YCEP; 26 $\mu g/m^3$ attributed to background). This level is slightly above the concentrations for many "control" cities used for comparison with more polluted cities in population epidemiologic studies.

Three-hour sulfur dioxide (SO_2) concentrations ***may be*** a more appropriate basis to assess ***short-term morbidity (i.e., onset of respiratory problems) impacts, since these measurements yield the highest modeled concentrations***. The predicted worst-case cumulative 3-hour sulfur dioxide (SO_2) concentration would be approximately 350 $\mu g/m^3$ (113 $\mu g/m^3$ due to YCEP emissions; 236 $\mu g/m^3$ due to background). This level is approximately one-third that of the lowest level that asthmatics would typically begin to show a response (approximately 1,050 $\mu g/m^3$). It should be noted, however, that the lowest recorded acute response to sulfur dioxide (SO_2) has been detected at 260 $\mu g/m^3$, which indicates that under rare circumstances, the most sensitive asthmatics could be adversely affected by cumulative sulfur dioxide (SO_2) (background and proposed project) concentrations, although either source would be below the 260 $\mu g/m^3$ threshold. The modeling results are worst-case scenarios [highest predicted modeled sulfur dioxide (SO_2) concentration at a precise location superimposed on highest background] and have not included sulfur dioxide (SO_2) emission reductions from the curtailment of P. H. Glatfelter Company's Power Boiler No. 4.

For at least 7,920 hours of the year, the proposed facility and the P. H. Glatfelter Company's Power Boiler No. 4 would not be operating concurrently. Based on permitted amounts, over most of the year, the quantity of sulfur dioxide (SO_2) emissions would decrease in the York air basin by approximately 7.9 tons of sulfur dioxide (SO_2) per day (for at least 11 months out of the year). There would probably be a health benefit gained by this sulfur dioxide (SO_2) reduction in the York area. But it is acknowledged that it would be as hard to quantify this benefit as it would be to quantify any adverse effects resulting from the maximum 720 hours of equivalent operation when the proposed facility and the P. H. Glatfelter Company's Power Boiler No. 4 would be running concurrently. From an overall health perspective, the proposed project would reduce sulfur dioxide (SO_2) levels by approximately 2,400 tons/yr (based on permitted levels), which is viewed as a positive, but non-quantifiable impact.

Also, additional air dispersion modeling for sulfur dioxide (SO_2) emissions was conducted to determine the potential impact of the proposed YCEP facility at sensitive "flagpole" receptors within 15 km (9 mi) of the proposed facility. Flagpole receptors were used to predict the concentrations at breathing level. Of specific concern in this study were the predicted levels of sulfur dioxide (SO_2) in comparison with the NAAQS. The 153 sensitive receptors that were used in the air dispersion modeling analysis included hospitals, schools, and churches. Table 4.1-19 lists the peak modeled sulfur dioxide (SO_2) concentrations for the sensitive receptors.

The peak 3-hr, 24-hr, and annual concentrations occurred at the abandoned Beard School, Saint Peters Church, and the abandoned Stauffer School, respectively. The peak modeled concentrations from the YCEP proposed project at sensitive receptors are much lower than the maximum predicted concentrations for all (i.e., the worst-case) locations (38.3 versus 114 $\mu g/m^3$; 8.7 versus 24.3 $\mu g/m^3$; 0.7 versus 4.9 $\mu g/m^3$). Taking into account the maximum background concentrations observed in the area, the worst-case percentages of NAAQS at the sensitive receptor locations would be 21, 33, and 40 ***$\mu g/m^3$*** (for 3-hour, 24-hour, and annual sulfur dioxide (SO_2) NAAQS, respectively). Thus, there is evidence to suggest that sensitive receptors would not be the locations disproportionately impacted due to sulfur dioxide (SO_2) emissions from the proposed project, and that any impact that would result would be minor as inferred by easily achievable compliance with NAAQS.

The sulfur dioxide (SO_2) increases due to the proposed project above current baseline would be small and intermittent in nature. Based on NAAQS standards comparisons, effects noted in epidemiologic and scientific research studies, and sensitive receptor locations analysis, ***there is little direct evidence that "measurable" adverse health impacts would result from these small, intermittent sulfur dioxide (SO_2) increases due to the proposed plant.***

Table 4.1-19. Peak modeled sulfur dioxide (SO_2) concentrations for sensitive receptors ($\mu g/m^3$).

Averaging Period	Peak Modeled Concentration at Sensitive Receptor	Maximum Background Concentration	Cumulative Ground Level Concentration	NAAQS
3-Hr	38.3	236	274	1,300
24-Hr	8.7	113	121	365
Annual	0.7	31	32	80

Source: YCEP, 1992.

Oxides of Nitrogen (NO_x). ***Oxides of nitrogen (NO_x) emissions (permitted maximums) from the proposed facility are estimated to be 328 lbs/hr (1,437 tons/yr).*** Based on this rate of emission, the maximum annual average ground-level air concentration of oxides of nitrogen (NO_x) is predicted by models to be 2.4 $\mu g/m^3$. Chronic human health risks from oxides of nitrogen (NO_x) were evaluated, in part, by comparison against the NAAQS annual average of 100 $\mu g/m^3$. The maximum ground-level concentration of oxides of nitrogen (NO_x) was 2.4 percent of the NAAQS annual average. This low percentage of NAAQS could reflect minimal environmental or chronic human health impacts from this "incremental" effect. If one superimposes the highest measured annual background levels recorded in the York vicinity for oxides of nitrogen (NO_x) (41 $\mu g/m^3$) on the highest modeled annual concentration, the cumulative ground-level concentration for oxides of nitrogen (NO_x) would be 43 $\mu g/m^3$. This value is substantially lower than the NAAQS (which is based, in part, on health effects considerations) and represents 43 percent of the annual NAAQS for nitrogen dioxide (NO_2). Thus, under worst-case conditions, compliance with the NAAQS would be easily achieved, and chronic effects should not be observed. This argument is based on the premise that concentration levels in the NAAQS are set to protect human health.

As stated above, the highest modeled oxides of nitrogen (NO_x) concentration due to the proposed project would be 2.4 $\mu g/m^3$ (0.0013 ppm). This concentration, by itself, does not have major importance based on either epidemiologic and physiologic information. However, the existing oxides of nitrogen (NO_x) background in the York air basin needs to be considered. Maximum measured oxides of nitrogen (NO_x) levels are 41 $\mu g/m^3$, which suggest that ambient oxides of nitrogen (NO_x) concentrations under worst-case conditions may already pose some limited health impact (i.e., increased childhood respiratory infection rates). This conclusion is based on extrapolation of research studies, ***as described in Table 4.1-17***. The oxides of nitrogen (NO_x) increment due to the proposed project would increase levels under worst-case conditions by 6 percent.

Total human population exposure to nitrogen dioxide (NO_2) is largely a matter of indoor sources, except in the Los Angeles area. It should be noted that the hypothesized association of nitrogen dioxide (NO_2) exposure to adverse human health outcomes relates to indoor fossil fuel combustion sources, including gas stoves and heaters, kerosene heaters, and wood fireplaces. This hypothesis has not been robust for outdoor studies. The extrapolation of the effects of background oxides of nitrogen (NO_x) levels to infection rates is tenuous.

A review of the submitted medical reports for acute human health effects indicate that in Paris (Patel, 1994), for each 100 $\mu g/m^3$ increase in nitrogen dioxide (NO_2), there was a 63-percent rise in the number of people calling their doctors with asthma attacks and a 17-percent rise in people going to the hospital for asthma attacks. However, a 100 $\mu g/m^3$ increase in nitrogen dioxide (NO_2) is 40 times the increase which would result from the proposed facility (2.4 $\mu g/m^3$). Thus, exposure to nitrogen dioxide (NO_2) emissions attributable to the proposed facility is not expected to impact human health significantly, based on most physiological and epidemiological evidence.

One should consider that the above analysis did not consider the offsets for oxides of nitrogen (NO_x). A total of 1,700 ***tons/yr*** of oxides of nitrogen (NO_x) offsets would be available to YCEP [1,652 ***tons/yr*** of ERCs would be required by YCEP to provide a 1.15 to 1 offset of oxides of nitrogen (NO_x) emissions.] The above modeling results and discussion were based on a 1,437 ***tons/yr*** increase in oxides of nitrogen (NO_x) due to the proposed project, rather than the more realistic net decrease of 272 ***tons/yr*** of oxides of nitrogen (NO_x), due to available offsets.

Particulate Matter (PM_{10}) ***Particulate matter (PM_{10}), as a class of pollutant, has not been classified with respect to toxicity characteristics, primarily because the chemical characteristics of airborne particles, which contribute to toxicity, are quite variable.*** Therefore, the EPA has not published any chronic toxicity values for particulate matter ***as a class of pollutant***. There is uncertainty concerning the physiologically active component of particulate emissions. Acid aerosols ***[***measured as hydrogen ion concentration ***(***H^+***)***, sulfuric acid (H_2SO_4), or sulfate (SO_4)***]*** may be the most important. Most of the research studies conducted on ***the etiology of*** health effects due to particle exposure have dealt primarily with sulfuric acid (H_2SO_4) exposures.

The rate of release of particulate matter from the proposed plant is predicted to be 127 ***tons/yr***. All of the particulate matter is conservatively assumed to be particulate matter (PM_{10}), which refers to those particles that have an aerodynamic equivalent diameter (AED) of 10 microns or less. ***In American cities, approximately 50 to 60 percent of total suspended particulates (TSP) is accounted for by particulate matter (PM_{10}) (Browne, 1994).*** The percentage of particles that would be accounted for by sulfuric acid mist is unknown. The sulfuric acid mist emission rates are expected to be negligible due to the operating conditions of the proposed facility. In any event, loadings would need to be lower than the PSD emission rate of 7 ***tons/yr***. In addition, emissions from the proposed facility would need to comply with Pennsylvania Ambient Air Quality Standards for sulfates (as H_2SO_4). These standards are 10 $\mu g/m^3$ for a 30-day averaging period and 30 $\mu g/m^3$ for a 24-hour averaging period.

The highest modeled 24-hour and annual particulate matter (PM_{10}) concentrations due to the proposed project would be 1.*1* $\mu g/m^3$ and 0.2 $\mu g/m^3$, respectively, ***which are 0.7 percent and 0.4 percent of the 24-hour and annual NAAQS***. These levels would contribute approximately 1 percent and 0.6 percent of the maximum cumulative particulate matter (PM_{10}) levels projected in the area (93 $\mu g/m^3$ and 32 $\mu g/m^3$). These latter cumulative values represent 62 and 64 percent of the 24-hour and annual NAAQS, respectively. ***Thus, the impact analysis based on regulatory compliance criteria indicates that the maximum modeled particulate matter (PM_{10}) emissions from the proposed project are not expected to contribute greatly to ambient levels.*** These ambient levels under worst-case conditions are still well within the NAAQS. As such, the particulate matter (PM_{10}) from the proposed facility would not be expected to adversely affect health ***within this regulatory context***. In addition, it is important to note that this analysis did not take credit for the 192 ***tons/yr*** of particle reductions due to the curtailment of the P. H. Glatfelter Company Power Boiler No. 4, ***which would result in an overall reduction in particulate matter (PM_{10}) of 65 tons/yr*** in the York vicinity, based on maximum permitted emissions.

However, it should be noted that even if there is compliance with particle standards under NAAQS, Dr. Joel Schwartz, EPA Headquarters-Washington, DC, has estimated that as many as 60,000 United States residents per year die from breathing particulates at or below legally allowed levels (Science News, 1991). In addition, a downward revision in the particulate ambient air quality standard is under consideration (Friedlander and Lippmann, 1994). Thus, additional analyses, such as reviewing epidemiologic reports, was conducted to better assess the effects of particles on human health populations in light of anticipated change to the NAAQS for particulate matter (PM_{10}).

Much information (especially in epidemiologic reports) was received from the York County medical and osteopathic communities and EPA, Region 3 on the effects of particle emissions on human health (Table 4.1-17 and Table 4.1-18). As stated before, worst-case scenario analyses indicate the highest modeled concentration of TSP/PM_{10} released from the proposed facility would be 1.1 $\mu g/m^3$ in a 24-hour period. This increase from baseline would occur only during the maximum 720-hour overlap time in which the proposed facility would be operating concurrently with the P. H. Glatfelter Company's Power Boiler No. 4. A review of the submitted medical reports indicated that human health effects were analyzed for much larger emission levels or increases ranging from 10 $\mu g/m^3$ to 375 $\mu g/m^3$. Effects were noted for human health factors such as asthma, respiratory disease deaths, and total mortality, and for various groups, such as neonates and adult populations of various study groups in the United States and other countries. Many of the studies suggest that there is approximately a 1-percent rise in death rates for each 10 $\mu g/m^3$ increase in particulate matter (PM_{10}).

Table 4.1-18 is a summary of particulate effects on mortality in six United States cities or areas (Philadelphia, PA; Detroit, MI; Steubenville, OH; St. Louis, MO; Kingston, TN; and Utah County, UT). This table lists the range of total suspended particulates (TSP)/particulate matter (PM_{10}) concentrations, the average concentration, the daily mortality range, and the increased mortality in percent for each 100 $\mu g/m^3$ increase in total suspended particulates (TSP)/particulate matter (PM_{10}) concentrations. The results indicate that for the six cities studied, there was a 4- to 7-percent increase in the mortality rate for each 100 $\mu g/m^3$ increase in total suspended particulates (TSP) and a 16- to 17-percent increase for each 100 $\mu g/m^3$ increase in particulate matter (PM_{10}). By extrapolating on the results of these epidemiologic studies to much lower levels, the maximum particulate matter (PM_{10}) increase of 1.1 $\mu g/m^3$ associated with the proposed project (for at most 720 hours each year) could translate to mortality increases of 0.16 to 0.17 percent for those days in which the proposed project and the P. H. Glatfelter Company's Power Boiler No. 4 are operating simultaneously. It should be recognized that extrapolating these epidemiologic results to analyze effects of short-term, intermittent (720 hours over the course of 1 year) exposures at much lower concentrations of particulate matter (PM_{10}) (1.1 $\mu g/m^3$) is very questionable, given that (1) linear extrapolation of dose-response may be inappropriate, (2) threshold concentration levels could exist below which particle effects are non-existent, (3) epidemiologic results may be significant or "robust" at 100 $\mu g/m^3$ concentrations, but would be "invisible" at lower concentrations due to confounding or interfering parameters, and (4) (perhaps most importantly) the etiology of the disease to understand the cause and effect relationship between particles and health effects is unclear or unknown. However, recent hypotheses have been offered (but not proven) by the scientific community to explain on a physiological basis the results of *epidemiological studies showing an association between particulate air pollution and exacerbation of illness in people with respiratory disease and increases in mortality due to cardiovascular and respiratory disease (Seaton et. al., 1995). It has been hypothesized that ultra-fine, acidic particles are able to provoke alveolar inflammation, with release of mediators capable, in susceptible individuals, of causing exacerbations of lung disease and of increasing blood coagulability, thus explaining the observed increases in cardiovascular and respiratory deaths associated with urban pollution episodes.*

Overall, the proposed project would not increase particle loadings in the York air basin compared to current baseline on an annual basis, and the increases in particle concentrations during the maximum 720 hours of joint YCEP and P. H. Glatfelter Company Power Boiler No. 4 operation would be small when compared to existing ambient concentrations.

Much of the sulfur dioxide (SO_2) from the proposed project could be oxidized eventually into secondary sulfates (i.e., sulfate not initially released as sulfates), such as ammonium sulfate ($(NH_4)_2SO_4$) and ammonium bisulfate (NH_4HSO_4). These sulfates could be additional contributors to fine particle loadings in the York air basin and beyond. Reaction rates of a few percent per hour are typical, with higher rates being measured under conditions of higher humidities. Sulfate-containing particles have been known to substantially contribute to particle loadings, especially in coal-burning regions (Gordon, et al. 1994). In addition, ammonium bisulfate (NH_4HSO_4) could become hydrated to form complexes (such as $NH_4HSO_4 \bullet 4H_2O$) (Cooper, 1993) which would then contribute to aerosol loadings.

It is difficult to accurately predict the quantities of sulfate particles that would be formed locally by the oxidation of sulfur dioxide (SO_2) emissions from the proposed YCEP project, since the kinetics for sulfate formation ($SO_4^=$) are dependent on a number of factors that include the presence of oxidants such as hydrogen peroxide (H_2O_2) and ozone (O_3); the presence of catalysts (e.g. iron) (Cooper, 1993); and most importantly, meteorological mixing and transport. In addition, the role these secondary sulfates play in causing health effects is currently unknown. However, it should be noted that the proposed project (in concert with the curtailment of the P. H. Glatfelter Company's Power Boiler No. 4) would reduce the amount of sulfur dioxide (SO_2) by approximately 2,419 tons/yr (based on permitted levels) and 650 tons/yr (based on conservative expected estimates). Thus, it is believed that the amount of sulfate particles [derived from sulfur dioxide (SO_2)] would actually decrease in the area due to the proposed project.

Carbon Monoxide (CO). ***The proposed project would add approximately 1,700 tons/yr*** of carbon monoxide (CO) into the York air basin. Worst-case scenario analyses indicate the highest modeled YCEP concentration of carbon monoxide (CO) released from the proposed facility would be 97 $\mu g/m^3$ (0.085 ppm) for a 1-hour period. This maximum is well below the NAAQS value of 40,000 $\mu g/m^3$ for a 1-hour period. This increase from baseline would occur during the maximum 720-hour overlap time in which the proposed facility would be operating concurrently with P. H. Glatfelter Company's Power Boiler No. 4. A review of the submitted medical reports for acute human health effects to carbon monoxide (CO) indicate that in Denver, there were higher frequencies of respiratory complaints on days where the mean value for the 1-hour maximum ambient level of carbon monoxide (CO) was 27.2 ppm (or ~31,000 $\mu g/m^3$). This 27.2-ppm increase in carbon monoxide (CO) is over 300 times the amount of increase, which would be due to the proposed facility. Thus, exposure to carbon monoxide (CO) emissions attributable to the proposed facility should have no discernible impact to human health.

Lead (Pb). Lead (Pb) emissions are a potentially significant concern because of reports of elevated blood lead (Pb) levels in children in York County ***(York Bureau of Health, 1993)***. The risk assessment evaluates lead (Pb) uptake as a combination of background exposure and additional exposure due to potential emissions from the proposed facility. Annual emissions of lead (Pb) from the proposed project are estimated at 38.9 lbs. ***Worst-case scenario analyses indicate that the modeled (maximum ground-level) lead (Pb) concentration released from the proposed facility would be 0.000161 $\mu g/m^3$ in a 24-hour period. This modeled maximum is used as a conservative estimate for the quarterly air quality standard. This value is well below the NAAQS value of 1.5 $\mu g/m^3$ for a quarterly period.***

The maximum annual average ground-level concentration of lead (Pb) in air from the proposed project is estimated to be 3.3×10^{-5} $\mu g/m^3$. Exposure could also occur by ingesting soil on which airborne lead (Pb) has settled. Soil samples were analyzed at the site of the proposed facility. Concentrations ranging from 6.0 to 22 mg/kg were detected. These pre-existing levels are significantly higher than the additional lead (Pb) levels in soil expected from the proposed project, which are estimated to be 0.039 mg/kg over the life of the proposed project.

The EPA estimates dietary lead (Pb) uptake to be 15.7 μg/day. Total lead (Pb) uptake includes dietary lead (Pb) uptake and uptake through inhalation and ingestion of environmental lead (Pb). Using average background soil concentrations and worst-case additional lead (Pb) soil concentrations and ground-level airborne concentrations resulting from the proposed project, the calculated average concentration of lead (Pb) in blood, 4.8 μg/***deciliter (***dl***)***, would not pose a significant threat to human health *(Environ, 1994b)*.

Stevens et al. (1990) reported that for blood lead (Pb)-level concentrations between 6.3 μg/dl and 10 μg/dl, there are reported increases in birth defects, effects on mental development and learning ability, elevations in blood pressure, contributions to low birth weight, and impacts on the hearing thresholds in children.

Moreover, the incremental lead (Pb) uptake resulting from the proposed project is estimated to be two orders of magnitude less than the uptake due to pre-existing background exposure, and lead (Pb) uptake from environmental sources would be two orders of magnitude less than the EPA's estimate of normal dietary lead (Pb) uptake. Using the above data, blood lead (Pb) levels directly attributable to the proposed project were calculated to be less than 2×10^{-4} μg/dl for adults and 1×10^{-3} μg/dl for children. Under worst-case exposure assumptions, increases in blood lead (Pb) levels in children attributable to environmental lead (*Pb*) from the proposed project are calculated to be *0*.02 percent of blood lead (Pb) levels expected from EPA-estimated dietary lead (Pb). Exposure to lead (Pb) emissions attributable to the proposed facility would not be expected to pose a health hazard.

Mercury (Hg). *Mercury (Hg) emissions are a potential concern since elemental mercury (Hg) volatilizes during combustion, and could remain in the vapor state through the baghouse where particles would be captured. While overall particle capture would be expected to be 99.9 percent or greater, mercury (Hg) could be expected to pass through the baghouse and be emitted out the stack. Moreover, mercury (Hg) has the potential to bioaccumulate once it is released into the environment. Therefore, mercury (Hg) was included in the human health risk assessment conducted for the proposed project. To assess the "worst-case" emissions, no removal of mercury (Hg) was assumed [i.e., emission estimates assume that 100 percent of the mercury (Hg) present in the feed coal is being released to the atmosphere].*

The "worst-case" additional ground-level air concentration of mercury (Hg) attributable to the proposed project would be 2.1×10^{-4} μg/m^3, which would be lower than measured ambient air mercury (Hg) concentrations in many remote or "pristine" locations (Fergusson, 1990). The maximum estimated mercury (Hg) concentration in nearby surface water from the proposed project would be 0.000056 mg/L. This "equilibrium" concentration is well below levels which would be expected to pose a risk to human health. The results of the risk assessment indicates that the risk from mercury (Hg) attributable to the proposed project from all ingestion and inhalation pathways would not be expected to adversely affect human health.

Metals [other than lead (Pb) ***and mercury (Hg)]***. The proposed project is expected to release small quantities of metals through flue gas leaving the stack. All of these metals would be dispersed and diluted through normal air circulation, and the expected maximum annual average ground-level air concentrations would range from a high of 6.5×10^{-4} $\mu g/m^3$ for fluoride to 9.1×10^{-7} $\mu g/m^3$ for cadmium. No toxicologically significant exposure due to the proposed facility would be anticipated, and hazard indices for the metals (Table 4.1-20) emitted from the proposed facility are all less than 1, which indicates that no adverse effects are anticipated. In addition, cancer risks due to metal exposures would be less than the 10^{-4} to 10^{-6} range adopted by EPA for denoting acceptable risk levels (Table 4.1-21). Therefore, metals emission from the proposed project are not expected to adversely effect human health.

Volatile Organic Compounds(VOCs)/***Ozone (O_3).*** ***Approximately 45 tons/yr of VOCs would be added to the York air basin due to the operation of the proposed project. This 45 tons/yr represents the maximum permitted VOC emissions for the proposed facility adjusted for the curtailment of P. H. Glatfelter Company's Power Boiler No. 4. VOCs*** identified as being of potential concern include benzene, toluene, ethylbenzene, and xylenes (collectively referred to as BTEX), and formaldehyde. All of these compounds are toxic to humans. Additionally, benzene and formaldehyde are human carcinogens.

All of these compounds would be dispersed and diluted through normal air circulation. The maximum annual average ground-level air concentrations for these compounds is estimated to be 3.8 $\mu g/m^3$ for xylenes. The concentrations for other VOCs are estimated to be an order of magnitude lower. The primary exposure path for VOCs is inhalation. Based on this path and on the expected maximum ground-level air concentrations, the HQs for all of the VOCs are less than 1 (Table 4.1-20), which indicates no adverse effects on health are anticipated. Additionally, the increased cancer risk from VOCs are all on the order of 10^{-8} or lower (Table 4.1-21). These are substantially less than the 10^{-4} to 10^{-6} range adopted by the EPA for evaluating insignificant risks. Therefore, VOCs emitted from the proposed project are not expected to adversely effect human health.

VOCs and oxides of nitrogen (NO_x) have been implicated as precursors in the generation of atmospheric ozone (O_3). As discussed in Section 4.1.2.1, the VOCs emissions are under 50 tons/yr and would not necessitate emission reduction credits (ERCs) for the project which lies within the Northeast Ozone Transport Region (NOTR). Since the proposed project is in the Northeast Ozone Transport Region, offsets of 1.15 to 1 of oxides of nitrogen (NO_x) emissions would need to be obtained. Thus, at least one of the precursors (i.e., NO_x) in the formation of ozone (O_3) would decrease due to the

Table 4.1-20. Summary of potential noncancer health risks from exposure to boiler stack emissions.

Exposure Type	Pathway-Specific Hazard Indices		
	AIR	SOIL[1]	FOOD[2]
Child[3]			
Metals[4]	1×10^{-2}	2×10^{-2}	6×10^{-1}
Volatile Organic Compounds	1×10^{-4}	NA	NA
Polycyclic Aromatic Hydrocarbons	5×10^{-7}	6×10^{-6}	3×10^{-6}
Summary Hazard Index for Exposure Pathway⁺⁺:	**1×10^{-2}**	**2×10^{-2}**	**6×10^{-1}**
Adult			
Metals[4]	3×10^{-3}	2×10^{-3}	1×10^{-1}
Volatile Organic Compounds	2×10^{-5}	NA	NA
Polycyclic Aromatic Hydrocarbons	1×10^{-7}	1×10^{-6}	6×10^{-7}
Summary Hazard Index for Exposure Pathway⁺⁺:	**3×10^{-3}**	**2×10^{-3}**	**1×10^{-1}**

1 Exposure pathway includes both ingestion and dermal contact.

2 Includes consumption of locally produced beef, milk, and vegetables. A childhood milk ingestion rate of 500 grams per day was used in the assessment based on guidance by the United States Department of Agriculture (*USDA, 1992*).

3 Childhood exposure is based on an average body weight of 17 kilograms and exposure durations of 6 years using exposure factors for children, followed by 24 years using adult exposure factors per EPA guidance documents (*EPA, 1990b, c; 1992*).

4 Does not include lead, which is addressed separately in the text.

++ As explained in the text, the **Hazard Index** is not a measure of relative risk; rather, it indicates whether adverse health effects would be expected to result from the expected exposure pathways. A **Hazard Index** <1 indicates that no adverse effects to human health would be expected to result from the potential exposure to emissions expected from the proposed project.

NA Not Applicable.

Source: Data from Environ, 1994b.

Table 4.1-21. Summary of potential excess cancer risks from exposure to boiler stack emissions.

Exposure Type	Pathway-Specific Cancer Risks: AIR	SOIL[1]	FOOD[2]
Child[3]			
Metals[4]	1×10^{-7}	2×10^{-7}	4×10^{-8}
Volatile Organic Compounds	2×10^{-8}	NA	NA
Polycyclic Aromatic Hydrocarbons	8×10^{-11}	1×10^{-9}	8×10^{-9}
Total Risk for Pathway:	**1×10^{-7}**	**2×10^{-7}**	**5×10^{-8}**
Adult			
Metals[4]	1×10^{-7}	1×10^{-7}	4×10^{-8}
Volatile Organic Compounds	2×10^{-8}	NA	NA
Polycyclic Aromatic Hydrocarbons	8×10^{-11}	7×10^{-10}	7×10^{-9}
Total Risk for Pathway:	**1×10^{-7}**	**1×10^{-7}**	**5×10^{-8}**

[1] Exposure pathway includes both ingestion and dermal contact.

[2] Includes consumption of locally produced beef, milk, and vegetables. A childhood milk ingestion rate of 500 grams per day was used in the assessment based on guidance by the United States Department of Agriculture (*USDA, 1992*).

[3] Childhood exposure is based on an average body weight of 17 kilograms and exposure durations of 6 years using exposure factors for children, followed by 24 years using adult exposure factors per EPA guidance documents (*EPA 1990b, c; 1992*).

[4] Does not include lead, which is addressed separately in the text.

NA The pathway-specific exposure for these substances is not applicable.

Source: Data from Environ, 1994b.

proposed project. In addition, it is estimated that a 45 tons/yr increase of volatile organic compound (VOC) emissions could result in a maximum formation of 0.4 ppb of ozone (O_3). This value of 0.4 ppb of ozone (O_3) is comparatively low in relation to a "background" maximum in the York air basin of approximately 350 ppb, an average daily maximum of approximately 112 ppb, and an annual average of approximately 50 ppb of ozone (O_3). The 0.4 ppb of ozone (O_3) is much lower than those concentrations implicated with adverse health effects (see Table 4.1-17). Thus, it is not anticipated that any adverse health impacts would result from the increase in VOCs [and subsequent formation of ozone (O_3)] from the proposed project.

Polycyclic Aromatic Hydrocarbons (PAHs) As a group, PAHs are comprised of compounds with the potential for causing cancer, as well as noncarcinogenic effects. Exposure to PAHs can occur through inhalation and ingestion as well as through the human food chain. All of these pathways were evaluated in the risk assessment. Carcinogenic effects were evaluated using benzo(a)pyrene, the only PAH for which extensive published carcinogenic toxicity is available. Noncarcinogenic toxicity was evaluated for naphthalene, the most toxic of the noncarcinogenic PAHs. The HI for PAHs from the proposed project is less than 1, which indicates no adverse effects on health are anticipated. Increased cancer risk from PAH emissions from the proposed project is on the order of 10^{-8} or lower. Therefore, PAHs emitted from the proposed project are not expected to adversely effect human health. Table 4.1-20 and Table 4.1-21 summarize the noncarcinogenic and carcinogenic risks (respectively) to human health for both children and adults which would be expected from exposure to boiler stack emissions from the proposed project (excluding radionuclides).

Radionuclides To assess the potential ground-level impact of radionuclides emissions from the proposed facility, an estimate of the dose and cancer risk posed to the affected population was modeled using the CAA Assessment Package-1988 (CAP-88). Table 4.1-22 provides the ***risk*** results from the CAA Assessment Package-1988 (CAP-88) modeling analysis ***based on the corrected emission rates contained in the revised radionuclide emissions report (Weston, 1995). In addition, this table also contains DOE's independent estimate of risk based on its own estimation of radionuclide emissions (see Table 4.1-12a). The results of this assessment indicate that the individual total lifetime fatal cancer risk to the affected population from the emission of radionuclides from the proposed project would be 2.4 x 10^{-6} (2.1 x 10^{-7} based on DOE's independent emissions estimates). In its 1989 decision not to regulate radionuclide emissions from coal-fired boilers (54 FR 51654), the EPA noted that "the baseline maximum individual risk (MIR) from coal-fired boilers, 2.5 x 10^{-5}, is very low, well below the presumptively safe level of approximately 1 x 10^{-4}." Radionuclide emissions from the proposed project*** *would not be expected to expose the affected population to risks higher that the presumptively safe level used by the EPA. Additionally, the assessment of risks due to radionuclide emissions from the proposed project did not consider the reduction in radionuclide emissions which would result from the curtailment of P. H. Glatfelter Company Power Boiler No. 4, which DOE estimated would be approximately 53.8 mCi/year (see Table 4.1-2a).*

When the radionuclide emissions from the proposed YCEP facility are translated into dose rates to the public, the proposed YCEP project could deliver a maximum effective radiation dose of up to 0.03 mrem/yr to individuals depending on dispersion of the ash particulates, exposure pathways, and dose assimilation. This dose estimate does not include any emission reductions from the curtailment of the P. H. Glatfelter Company's Power Boiler No. 4.

Table 4.1-22. CAP-88 pathway risk summary for the radionuclide emissions.

Pathway	Selected Individual Total Lifetime Total Cancer Risk[1]
Ingestion	2.32×10^{-06} (2.08×10^{-07})
Inhalation	4.69×10^{-11} (2.10×10^{-11})
Air Immersion	4.89×10^{-18} (3.87×10^{-16})
Ground Surface	3.75×10^{-08} (3.62×10^{-09})
Internal	2.32×10^{-06} (2.08×10^{-07})
External	3.75×10^{-08} (3.62×10^{-09})
TOTAL	2.36×10^{-06} (2.11×10^{-07})

Source: Weston, 1995.

[1] *Numbers in parentheses are CAP-88 results based on radionuclide emissions as independently correlated by DOE (see Table 4.1-12a).*

An expected dose of 0.03 mrem/yr can be put in perspective by comparing this value to normal doses of radiation. The estimated annual dose to the average individual in the United States population is 360 mrem/yr (Murray, 1989). Out of a total of 360 mrem/yr, an individual receives an average of 200 mrem/yr from radon gas (primarily in their home), 27 mrem/yr from cosmic rays, 28 mrem/yr from rocks and soils, and 40 mrem/yr from inside their body (primarily from natural potassium-40 in food). Total radionuclide emissions from all coal-fired electric generating utilities combined account for only about 1 percent, or less, of the average annual dose. The dose a person receives varies widely depending on location, time, and activity, but it is unlikely that an individual would receive less than 100 mrem/yr (the natural background radiation dose). The estimated maximum dose the local population is likely to receive from the proposed YCEP project would be a 0.01 percent increase over the existing average radiation exposure. Such a small

increase in radiation dose has not been found to increase the incidence of disease, mutation or teratogenic (i.e., causing malformations of an embryo or a fetus) effects, despite several attempts to document low-level radiation effects (Yallow, 1988; and National Research Council, 1990).

Cooling Tower Emissions

Combustion of coal at the proposed facility would produce steam used to generate electricity in steam turbines. Steam leaving the turbines would be subsequently cooled in a heat exchanger for reuse in the turbines. Circulating water would be used to cool steam in the heat exchanger, and would become heated in the process. The heated circulating water would be passed through a cooling tower to lower the temperature of the water through evaporation. To avoid excess buildup of dissolved solids in the recirculating cooling water, and to replace water lost through evaporation, make-up water from the secondary clarifiers of the P. H. Glatfelter Company's wastewater treatment plant would be added to the recirculating water. This wastewater would contain low levels of dissolved solids, salts, and chemical compounds. In addition, it is anticipated that the VOCs in the recirculating water would volatilize directly to the atmosphere from the water passed through the cooling tower. Consequently, the recirculating water would contain various substances that could be released to the atmosphere during evaporation.

The concentrations of these substances in the ambient air and the amount deposited on the ground surface in the vicinity of the facility would depend on the amounts of substances present in the recirculating water and on the dispersion of the cooling tower evaporation plume and the local atmospheric conditions. From this plume dispersal, residents located in the surrounding area may be exposed to cooling tower emissions. To assess the potential human health effects of cooling tower emissions, DOE directed YCEP to conduct a human health risk assessment for cooling tower emissions.

Using site-specific information and data provided by YCEP, a human health risk assessment of cooling tower emissions was conducted, consistent with methods prescribed by the EPA in its guidance documents. The cooling tower risk assessment, which is available in the public reading rooms (Appendix A) (*Environ, 1994c*), presents a bounding analysis, providing an upper bound on potential human health risks posed by the cooling tower operation. Both exposure and risk were estimated for an individual located at the point of greatest estimated concentration and exposed continuously for 30 years.

YCEP developed a pilot plant to evaluate cooling tower operations, and conducted chemical analyses of cooling tower make-up water (derived from secondary effluent from P. H. Glatfelter Company) and cooling tower blowdown to evaluate potential releases to the atmosphere. Four inorganic substances — cyanide, manganese, phosphorus, and selenium — and one organic substance — chloroform — were detected above laboratory detection limits in samples of the cooling water blowdown. Manganese, phosphorous, and chloroform were also detected in samples of the cooling tower make-up water. Although phosphorus was detected in both samples, it was not evaluated further in the risk assessment because there is no indication that potential health effects would result from exposure to low levels of phosphate (the phosphorus detected in the make-up water and blowdown is likely to be in the form of phosphate ion). Human health risk associated with releases of cyanide, manganese, selenium, and chloroform from the cooling tower were evaluated quantitatively.

Based on the dose-response relationship, a toxicity value was derived for each substance of concern. EPA has estimated and compiled toxicity values for a significant number of chemicals for which exposure may occur through either ingestion or inhalation. These toxicity values in turn, are compared to estimates of exposure dose to assess the likelihood of human health effects. Environmental concentrations of substances released from the cooling tower were estimated in this assessment based on estimated emission rates of water and VOCs from the cooling tower, and a mathematical simulation of the air dispersion of cooling tower releases and subsequent deposition on the surrounding area.

The potential for risks to human health for individuals living or working in the area surrounding the proposed YCEP facility was estimated for substances that may potentially be released from the cooling tower. For inorganic substances, several exposure pathways, including inhalation of ambient air, ingestion of soil and dermal contact with soil, consumption of beef and milk from locally raised livestock, and consumption of locally grown vegetables were considered. It should be noted that methods for estimating accumulation of cyanide in vegetables, beef, and milk were not readily available. Therefore, cyanide risks due to food pathway exposures were considered qualitatively. Potential exposure to organic substances (i.e., chloroform) was assumed to occur through inhalation of air in the vicinity of the YCEP facility. Of the four substances considered in the health risk assessment, only chloroform is a known carcinogen.

Table 4.1-23 summarizes the potential adverse effects to the health of both children and adults posed by cooling tower emissions from the proposed project. The lifetime excess cancer risk from exposure to chloroform from the cooling tower is less than 2×10^{-8}. This risk is well below the generally acceptable risk (10^{-6}) suggested by the EPA in the National Oil and Hazardous Substances Pollution Contingency

Table 4.1-23. Summary of potential human health risks from exposure to cooling tower emissions.

Exposure Type	Pathway-Specific Hazard Indices for Non-cancer Health Effects		
Child[3]	**AIR**	**SOIL**[1]	**FOOD**[2]
Cyanide	NA	1×10^{-7}	++
Manganese	7×10^{-4}	10×10^{-6}	6×10^{-7}
Selenium	NA	1×10^{-6}	7×10^{-6}
Hazard Index for Exposure Pathway	7×10^{-4}	2×10^{-6}	8×10^{-6}
Adult			
Cyanide	NA	2×10^{-8}	++
Manganese	2×10^{-4}	2×10^{-7}	1×10^{-7}
Selenium	NA	3×10^{-7}	2×10^{-6}
Hazard Index for Exposure Pathway	2×10^{-4}	5×10^{-7}	2×10^{-6}
	Pathway-Specific Cancer Risks		
Child	**AIR**	**SOIL**[1]	**FOOD**[2]
Chloroform	2×10^{-8}	NA	NA
Adult			
Chloroform	2×10^{-8}	NA	NA

[1] Exposure pathway includes both ingestion and dermal contact.

[2] Includes consumption of locally produced beef, milk, and vegetables. A childhood milk ingestion rate of 500 grams per day was used in the assessment based on guidance by the United States Department of Agriculture (*USDA, 1992*).

[3] Childhood exposure is based on an average body weight of 17 kilograms and exposure duration of 6 years using exposure factor for children, followed by 24 years using adult exposure factors per EPA guidance documents (*EPA, 1990b,c; 1992*).

NA Not Applicable.

++ Methods for estimating the accumulation of cyanide into beef, milk, and vegetables is not readily available. Therefore, potential adverse effects for cyanide via the food pathway were not quantified.

Source: Data from Environ, 1994c.

Plan (*NCP, 40 CFR 300.430*). The HQs for exposures to noncancerous substances are all less than 1, as are the pathway-specific HIs. Therefore, emissions from the cooling tower would not be expected to adversely affect human health.

Summary of Boiler Stack and Cooling Drift Emission Effects on Human Health

Potentially hazardous substances emitted from the proposed project include: acid gases, particulate matter, toxic metals [including lead (Pb) and mercury (Hg)], radionuclides, VOCs, PAHs, chloroform, and cyanide. The total concentrations of acid gases and particulate matter in the ambient air are expected to decrease as a result of this proposed project due to emissions reductions which would occur with the curtailment of P. H. Glatfelter Company's Power Boiler No. 4. Additional lead (Pb) concentration in soils resulting from the proposed project amount to less than three-tenths of 1 percent of the average background lead (Pb) concentrations in soils on the site. As previously discussed in this section, under worst-case exposure assumptions, increases to blood lead (Pb) levels directly attributable to the proposed project would be four orders of magnitude less than continued exposure to pre-existing conditions. ***The worst-case additional ground level air concentration of mercury (Hg) attributable to the proposed project would be 2.1 x*** 10^{-4} $\mu g/m^3$***, which would be lower than the measured ambient air mercury (Hg) concentrations in many pristine areas.***

Quantitative risk assessments that focused on toxic metals, radionuclides, VOCs, PAHs, chloroform, and cyanide were conducted to assess the potential effects of these emissions to human health. Exposure assumptions used in these assessments were conservative, and included exposure factors for both children and adults as suggested by the EPA in its guidance documents.

The results of these assessments, which are summarized in Table 4.1-24, indicate that the lifetime excess cancer rate from potential exposure to emissions from the proposed project would be less than 3 in 1 million, which is ***in*** the ***range of*** generally accepted lifetime cancer ***risks*** (1×10^{-4} to 1×10^{-6}). Cancer risks for both children and adults were found to be similar for inhalation (air) and food exposure pathways. The similarity in child versus adult risks were due primarily to the interaction of two competing variables within the exposure dose equations used for the inhalation and food exposure pathways: body weight (which is inversely proportional to carcinogenic unit risk) and exposure duration (which is directly proportional to carcinogenic unit risk). In these risk equations, a 17 kg and 70 kg body weight were assumed for a child and adult, respectively. Exposure durations of 6 years (child) versus 24 years (adult) were also assumed. Soil ingestion, rather than soil dermal exposure, was the important soil exposure route for children. Higher cancer risks due to soil exposure for children when compared

Table 4.1-24. Summary of potential human health risks from the proposed project.

Exposure Type	Pathway-Specific Hazard Indices for Noncancer Effects: AIR	SOIL	FOOD	
Child	<2 x 10^{-2}	<3 x 10^{-2}	<7 x 10^{-1}	
Adult	<4 x 10^{-3}	<3 x 10^{-3}	<2 x 10^{-1}	
	Pathway-Specific Excess Cancer Risks			
	AIR	**SOIL**	**FOOD**	***RADIONUCLIDES****
Child	<2 x 10^{-7}	<3 x 10^{-7}	<5 x 10^{-8}	***<3 x 10^{-6}***
Adult	<2 x 10^{-7}	<2 x 10^{-7}	<5 x 10^{-8}	

** **Child versus adult risks were not determined for radionuclide emissions.***

Source: **revised from** *Environ, 1994b, c, Weston, 1995.*

to adults could be attributed to the higher level of soil ingestion by children (200 mg/day for child; 100 mg/day for adult). ***Radionuclide emissions (through the ingestion pathway) accounted for the majority of cancer risk to the public associated with the proposed project.***

HQs for noncarcinogenic substances are all less than 1, and Hazard Indices for all pathway-specific exposures to noncarcinogenic substances are less than 1 (as shown in Table 4.1-24), indicating that adverse, noncancer health effects due to emissions from the proposed project would not be expected. HQs (for non-carcinogenic effects) for children were always higher than those for adults primarily due to differences in body weight (body weight is inversely proportional to risk). To a lesser extent, a larger ingestion amount of certain materials for children could explain the higher hazard indices. It was assumed in the exposure dose equations that children would consume more milk (0.5 kg/day versus 0.4 kg/day) and soil (200 mg/day versus 100 mg/day) when compared to adults. The food exposure route seemed to be the most important pathway for noncarcinogenic effects to both children and adults. In particular, mercury (Hg) levels in beef contributed to most of the risk associated with the food pathway.

Based on the information presented in Table 4.1-24, the proposed project should, therefore, have no measurable adverse effects to human health.

The results of the YCEP health risk assessments support the findings of a recent study conducted by the Electric Power Research Institute (EPRI) (Lamarre, 1995) that concluded that the trace emissions of chemical substances from 594 fossil-fired power plants appeared to pose no significant risk to humans. The EPRI assessment focused on 16 of the 189 hazardous air pollutants targeted by the 1990 Clean Air Act Amendments that were selected on the basis of their presumed presence in the exhaust of power plant stacks in quantities believed significant enough to be of regulatory concern [arsenic (As), benzene (C_6H_6), beryllium (Be), cadmium (Cd), chlorine (Cl), chromium (Cr), dioxins/furans, formalydehyde (CH_2O), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), PAHs, radionuclides, selenium (Se), and toluene (C_7H_8)]. The assessment concluded that the bulk of the 594 power plants studied showed minimal carcinogenic and non-carcinogenic risks, falling far below the indices of concern to regulators, even under worst-case maximally exposed individual (MEI) assumptions. Given the MEI assumptions, the carcinogenic risk to individuals in the vicinity of all but three plants was below 1 in 1 million; the highest risk posed was 1.7 in 1 million. Under the more realistic, reasonably exposed individual (REI) assumptions, none of the plants posed a carcinogenic risk greater than 1 in 1 million. For non-carcinogenic risks, none of the plants had an HI greater than 1, and about two-thirds of the plants had indices below 0.01. The highest MEI-based index was 0.5, while the highest REI-based index was 0.3. In addition, the risks from radionuclides were studied separately in that modeling was performed for eight representative plants. These results showed that humans are exposed to radionuclides primarily through particles deposited on the ground surface and through ingestion of the substances in food. Calculations showed annual individual doses all to be less than 25 percent of the levels considered significant.

4.1.3 Geology and Soils

As stated in section 4.1.1, Setting, EPA and PADER regulations require a NPDES permit for all earthmoving activities disturbing 5 acres ***(2 hectares)*** or more of land. An erosion and sedimentation plan must be developed in accordance with 25 Pennsylvania Code, Section 102.5 as authorized under the Pennsylvania Clean Streams Law, and must be available at all times at the project site. Construction of the proposed facility would be consistent with approved guidelines for erosion and sedimentation control. Erosion would be minimized by beginning cleanup and revegetation operations immediately following completion of construction activities. Other mitigative measures to be employed include perimeter silt fencing, restriction of heavy truck traffic to designated corridors during very wet or dry periods, implementation of dust-abatement practices as needed, construction of sedimentation basins along runoff interception and/or discharge channels, and stabilization of these channels. The erosion and sedimentation plan also must address stormwater discharge from a site during the construction phase, to ensure that proposed erosion and sedimentation control measures adequately protect nearby water resources. For further details, Appendix K of the EIV provides the Erosion and Sediment Control Plan for the preliminary land development and subdivision plan for the proposed project; this plan has been submitted to the York County Conservation District for review and comment (see Appendix A for available public reading rooms).

Construction of the proposed facility would involve minor alteration to the existing topography. Soil erosion potential is expected to be minimal. Facility operation also would not significantly affect earth resources at the site. Following construction, site soils would be stabilized through implementation of an extensive landscaping plan. This, and the generally flat topography planned for the developed site, would ensure that erosion would be minimized during facility operation *(ENSR, 1994)*.

4.1.3.1 Geology

Construction Impacts. Based on surface observations, a need for rock excavation has not been identified. However, the actual extent of subsurface rock is as yet unknown and cannot be estimated until detailed engineering studies are completed in the vicinity of major facility structures. It is anticipated that geologic conditions at the site would not be altered as a result of construction, and no geologic features have been identified that require special design or construction methods.

Operation Impacts. The operation of the proposed Cogeneration Facility would not significantly affect existing earth resources, including geology.

4.1.3.2 Soils

Construction Impacts. Earthwork for the proposed site would entail ***the following***:

- removal of approximately 37,465.4 m^3 (49,000 yds^3) of material not having appropriate structural support characteristics;
- importation of approximately 37,465.4 m^3 (49,000 yds^3) of material having the appropriate support characteristics;

- removal of 124,629.8 m^3 (163,000 yds^3) of material displaced by concrete and other infrastructure; and

- temporary removal of 64,226.4 m^3 (84,000 yds^3) of material that would later be used ***for*** backfill***ing*** around foundations and infrastructure, and for grading, berming of the facility, and landscaping purposes *(ENSR, 1994)*.

Impacts to soils could include the loss of some excavated soil from water and wind erosion, reduction in soil quality from mixing topsoil with subsoil, and soil compaction caused by frequent passage of construction equipment. Due to the relatively flat site topography in the area of the main facility footprint, soil erosion would be expected to be minor *(ENSR, 1994)*. Standard construction practices to control erosion would be implemented during construction of the proposed facility. The soil to be permanently removed from the site could be reused by local excavating contractors for fill purposes *(ENSR, 1994)*.

Operation Impacts. Once the proposed facility is operational, no specific mitigation measures would be necessary; site soils would be stabilized through the use of vegetation. No operation is planned that would impact soil quality. If a spill were to occur, procedures contained in the Preparedness, Prevention, and Contingency (PPC) plan and the Spill Prevention Control and Countermeasures (SPPC) plan (see Section 4.1.6.3) would be followed.

4.1.4 Water Resources and Water Quality

This section discusses the potential impacts to the water resources expected to occur from construction and operation of the proposed project. It describes the various project facilities that would affect water resources, and evaluates the expected effects as they relate to both local and regional water quality and quantity.

4.1.4.1 Regulatory Requirements

Activities that affect water resources are required to comply with applicable Federal, state, regional, and local regulatory programs. This section presents a summary of pertinent requirements; more information is provided in Chapter 9.

National Pollutant Discharge Elimination System (NPDES)

The Commonwealth of Pennsylvania, through PADER, has been delegated authority for Federal NPDES permit review and, therefore, has authority over stormwater and industrial wastewater discharges to surface waters of the Commonwealth. Additionally, PADER has review and approval authority over the design and operation of industrial water pretreatment systems. Compliance with appropriate water quality limitations is required through these PADER approvals and state Water Quality Certification. The proposed project would require a NPDES General Permit for stormwater discharge. In addition, P. H. Glatfelter Company's existing industrial wastewater discharge permit would require modification to allow for accepting and treating the proposed project's industrial wastewater discharge. The review and evaluation for approval of modifications would be conducted by the PADER Bureau of Water Quality.

Susquehanna River Basin Commission (SRBC)

The project area would be in the jurisdiction of the Susquehanna River Basin Commission (SRBC), a regional agency that has review and approval authority over projects involving major surface water or groundwater withdrawals, consumptive use, and/or projects requiring a commitment of water to a specific use for greater than 10 years. The 10-year criteria includes withdrawals from surface waters and groundwaters, as well as the discharge of process wastewaters. Because of the projected consumptive use of the proposed project, SRBC approval would be required.

Warm Water Fishery ***(WWF)***

Title 25, Chapter 93 of the Pennsylvania Code defines the waters of Codorus Creek in the vicinity of the proposed discharge as having a water quality classification of "WWF," which signifies a warm water fishery. As a result of this classification, the stream must be protected for the maintenance and propagation of fish species and additional flora and fauna that are indigenous to a ***WWF. WWF water quality criteria are listed in Table D-1 (Appendix D).***

4.1.4.2 Surface Water (excluding Stormwater)

Daily water usage during construction would depend on the nature of the construction activities performed, but water would be required primarily for dust control and potable consumption. The projected demand would range from 5,000 to 15,000 ***gallons per day*** (gpd). Water needed for construction activities would be supplied by P. H. Glatfelter Company's water supply system. Spring Grove Water Company and P. H. Glatfelter Company currently have adequate capacity to satisfy this demand.

Portable sanitary facilities would be utilized for sanitary wastes during the construction period. These wastes would be transported off site for final treatment and disposal. No change to existing sewage systems would result from the handling, treatment, or discharge of sanitary wastes during construction of the proposed facility.

Surface water usage during operation of the proposed facility and its effects are discussed in the following sections.

4.1.4.2.1 Water Flow Description

A water balance diagram (average daily flow and maximum daily flow) for the proposed YCEP Cogeneration Facility is presented in Figure 2.1-7. The total average daily water supply requirements for the facility would be 4.2 mgd with a maximum of 5.7 mgd. Approximately 4.***165*** mgd of this total would be utilized for cooling unit make-up requirements. The remainder of the total would be utilized for boiler make-up ***(excluding returned condensate)***, miscellaneous in-plant activities (i.e., routine maintenance and cleaning operations, dust control, and area washdown), and potable water supply demands of the proposed facility. To minimize the total water demands of the proposed facility and the volume of wastewater discharged, internal recycle/reuse procedures would be employed. Condensate from the steam host would be returned to the condenser for reuse in the steam generator. Boiler blowdown and water treatment system recycling would be used to supply a portion of the proposed project's cooling tower make-up.

The three main sources of process wastewater that would be generated by the proposed facility are cooling tower blowdown, stormwater runoff, and sanitary wastes. Other minor sources of wastewater are identified in more detailed water balance diagrams in Appendix H. Process stream characteristics and proposed disposition for cooling tower blowdown and sanitary wastes are described in the following paragraphs.

4.1.4.2.2 Water Supply and Capacity Issues

The proposed YCEP facility would obtain the required water for its operation from three different existing sources controlled by the P. H. Glatfelter Company and the Spring Grove Water Company. No groundwater aquifer or surface water withdrawal intakes would be required for the proposed facility under normal operating conditions. Back-up water supplies may be necessary for cooling water make-up and boiler water make-up. It is expected that the use of these back-up supplies would be rare and temporary resulting from the emergency loss of the primary water supply. The mill pond would serve as back-up supply for cooling water. Back-up boiler water make-up would consist of either raw mill pond water or potable water.

Potable Water Use

The proposed YCEP facility would require potable water for sanitary use and some process uses. The potable water demand would average ***2,800*** gpd with a maximum of ***4,500*** gpd. The Spring Grove Water Company would supply the potable water needs from their water supply system. The Spring Grove Water Company obtains its water supply from Kessler Pond. The existing system has adequate capacity to meet the needs of its existing customers and the proposed YCEP facility without any water treatment equipment modifications or increases in the water allocation requirement.

Cooling Water System

The total cooling water system make-up requirements for the proposed YCEP facility would average 4.2 mgd, with a maximum of 5.7 mgd. This water requirement would be entirely supplied from the P. H. Glatfelter Company wastewater treatment plant secondary effluent and by recycling internal water streams in the proposed YCEP facility. To satisfy the YCEP cooling water requirements, an average of 4.1 mgd, with a maximum of 5.4 mgd, of treated P. H. Glatfelter Company wastewater discharge would be provided to the proposed YCEP facility. The remaining cooling tower make-up (averaging 0.1 mgd, with a 0.3 mgd maximum) would be supplied by reusing internal wastewater streams, such as the boiler water make-up waste stream, the boiler blowdown, and the boiler island drains.

The P. H. Glatfelter Company wastewater treatment system currently discharges an average of 12.5 mgd of secondary effluent to Codorus Creek. A portion of this water would be pumped through an underground pipeline from the P. H. Glatfelter Company treatment facility's clarifiers to the proposed

YCEP facility's cooling tower. Based on current P. H. Glatfelter Company water allocation and operations, adequate water supply would be available from the secondary effluent source for proposed YCEP cooling water needs. Because P. H. Glatfelter Company treated wastewater would be used to provide YCEP cooling tower requirements, no additional surface water releases from Lake Marburg would be required to support this proposed project .

Steam Condensate Recycling

The proposed YCEP facility would supply up to 400,000 pounds per hour of high pressure steam to the P. H. Glatfelter Company. In return, process water make-up for the YCEP steam system (i.e., boiler make-up) would be provided by the P. H. Glatfelter Company's boiler feed water or condensate systems, which would be returned to the proposed YCEP facility. For each pound of steam supplied to the P. H. Glatfelter Company, one pound of condensate and/or boiler feed water would be returned to the proposed Cogeneration Facility, resulting in an average return flow of 0.98 mgd and a maximum flow of 1.15 mgd.

With the curtailment in operation of the P. H. Glatfelter Company Power Boiler No. 4, the associated process water make-up would be used in the proposed YCEP facility. The existing process water system has adequate capacity to supply both the P. H. Glatfelter Company and the proposed YCEP facility needs, the existing water allocation and water treatment systems are adequate for both needs. No additional surface water allocation from Codorus Creek is expected.

4.1.4.2.3 P. H. Glatfelter Company Wastewater Characteristics

Cooling water system make-up requirements for the proposed YCEP facility would be supplied from the P. H. Glatfelter Company wastewater treatment plant discharge, located on the eastern side of the P. H. Glatfelter Company's property. A portion of the P. H. Glatfelter Company's wastewater would be pumped through an underground pipeline from the P. H. Glatfelter Company treatment facility secondary clarifiers to the proposed facility. The consumptive requirements would vary based upon ambient weather conditions and plant electricity production levels. The average consumption would be approximately 2.5 mgd; the maximum consumption would be approximately 2.8 mgd of the P. H. Glatfelter Company wastewater.

YCEP conducted laboratory analyses and received data from the P. H. Glatfelter Company to determine the properties (physical and chemical) of the wastewater. The laboratory analysis indicated that P. H. Glatfelter Company wastewater is higher in calcium hardness, chloride, total organic carbon, and sulfate than water typically used in cooling tower applications. Total hardness ranges from 420 to 696 ppm, chlorides range from 692 to 995 ppm, and the sulfate levels range from 145 to 265 ppm. Table 4.1-25 provides characteristics of the P. H. Glatfelter Company effluent stream. It should be noted that the P. H. Glatfelter Company ***has recently completed*** a Pulp Mill Modernization Project. An oxygen delignification step in the treatment process should improve the dissolved solids content and color in the treated effluent.

4.1.4.2.4 Treatment Requirements for P. H. Glatfelter *Company* Wastewater

In the third quarter of 1993, a pilot plant study was initiated by YCEP to evaluate the proposed use of P. H. Glatfelter Company's wastewater as a supply source for the proposed facility's cooling water requirements. The purpose of the pilot plant study was to determine how the wastewater from the P. H. Glatfelter Company wastewater treatment plant could most effectively be used as cooling tower make-up water.

The primary technical issue identified during the laboratory analysis phase was the elevated level of calcium hardness in the P. H. Glatfelter Company wastewater. While a cooling tower reuses water by recirculation, some water is removed via a blowdown stream to prevent excessive build-up of dissolved minerals in the recirculation water. This build-up of dissolved minerals results primarily from the evaporation of water during the mechanical draft cooling of the recirculation water. An excess build-up of dissolved mineral could cause fouling (scale formation) on the heat exchanger components and/or increase metal corrosion rates for system components. Therefore, it is necessary to limit the concentrations of certain constituents (i.e., calcium hardness) in the recirculating water system. A basic principle for cooling tower operation is that when there are fewer cycles of operation, a higher quantity of cooling tower make-up is required and there is more blowdown stream.

The pilot plant study indicated that it was technically feasible to utilize the P. H. Glatfelter Company wastewater supply directly in the cooling tower as the water make-up source. However, water treatment chemicals would be used directly in the cooling tower for corrosion and microorganism control (as described in the next section). The cooling tower operation would be limited to 2.5 cycles to minimize the level of constituents in the recirculating water so that the water would not cause fouling in the heat

Table 4.1-25. Water quality characteristics for P. H. Glatfelter Company wastewater.

	Annual Average	Maximum Daily	Minimum Daily
Flow (mgd)	12.2	16.5	2.0
pH (S.U.)	7.4	8.9	6.9
BOD (mg/l or ppm)	6	20	1
TSS (mg/l or ppm)	13	51	3
Temperature (°F)	87	99	52

Source: 1993 Discharge Monitoring Reports submitted to PADER.

Parameter	Mean	Range
Total Alkalinity (ppm)	180	108-240
Hardness (ppm)	552	420-696
Calcium (ppm)	490	360-586
Conductivity (μmohs/cm)	3356	3000-3700
Chloride (ppm)	854	692-995
Sulfate (ppm)	217	145-265
Sodium (ppm)	426	355-498
Total Organic Carbon (ppm)	90	77-99

Source: Nine analyses performed during the period of March 1990 to March 1992.
Note: All analyses were performed using EPA Protocols.

exchange equipment. The detailed analysis of the feasibility of reusing this wastewater source is provided in the YCEP Wastewater ***Reuse*** Feasibility ***Study*** located in the public reading rooms (Appendix A).

4.1.4.2.5 Cooling Tower Blowdown Characterization

Process heat would be dissipated using a conventional wet cooling tower system that would operate on a continuous basis using mechanical draft cooling units. Water would be utilized as the heat transfer medium. Cooling tower blowdown would be minimized to the extent possible; however, blowdown would be required to prevent excessive build-up of dissolved solids in the recirculation water, which would occur from the concentration of dissolved salts and minerals due to evaporative water loss during mechanical draft cooling of the recirculation water. Accumulation of these dissolved solids would have the potential to promote scale formation on the steam condenser core and/or increase corrosion rates for system components (e.g., piping and pumps).

The volume of blowdown produced would vary with the allowable cycles of concentration (i.e., the factor by which recirculation water mineral concentrations would be increased from evaporative effects) for the system. The incoming water supply for the cooling tower would originate from the secondary treatment plant effluent. Based on incoming water quality characteristics, it is anticipated that the system would be capable of operating at two to three cycles of concentration. The cooling tower blowdown volumes depicted in Figure 2.1-7 were calculated based on the system operating at an anticipated average rate of 2.5 cycles of concentration. The technical analysis for Codorus Creek water quality impacts used the blowdown flow of 1.87 mgd to account for anticipated variabilities in blowdown flow during normal operations.

The projected constituents and concentrations of the proposed facility cooling tower blowdown stream are presented in Table 4.1-26. These concentrations were developed based on a pilot plant testing program at the projected 2 to 3 cycles of concentration. This pilot plant program was conducted in the fall 1993 and utilized P. H. Glatfelter Company secondary treatment plant effluent as the source of incoming water to the cooling tower, which also was operated using the same parameters as the proposed cooling tower. (The pilot plant program also initiated a water sampling program to determine the characteristics of the incoming water and cooling tower blowdown streams.)

The pilot plant program served as the means for determining the appropriate water treatment program that would be required for use of the P. H. Glatfelter Company secondary treatment plant effluent stream in the cooling tower. Based on the pilot plant program and other existing reference data, it was determined that the proposed water treatment program would include a disinfectant, a chemical dispersant, and sulfuric acid. A chlorine dioxide (ClO_2) solution would be used as the disinfectant to prevent a build-up of algae in the recirculation water. A commercial phosphate polymer would be used to limit scale formation on the cooling system components (e.g., heat exchangers, piping, and pumps). Sulfuric acid (H_2SO_4) would also help to control corrosion and scaling on cooling water system components, as well as to maintain the water pH within acceptable limits for discharge to the P. H. Glatfelter Company secondary treatment plant. The water treatment would occur within the actual cooling tower recirculation water system. It should be noted that VOCs were not sampled in the tower blowdown stream. It was assumed that all VOCs that enter the cooling tower with the make-up water would be released in the air leaving the cooling tower, because the tower would behave as an air-stripping device for VOCs.

The analysis of water quality impacts to Codorus Creek from the anticipated use of secondary treatment plant effluent for cooling tower incoming water assumed a 4.7 mgd make-up flow to allow for the variability of incoming water quality. The maximum evaporation operating case would be an upset case, expected to occur only if the cooling tower operated at the maximum evaporation rate (2.8 mgd), and the make-up water quality of the incoming P. H. Glatfelter Company secondary effluent allowed the cooling tower to operate at 2.5 cycles. Of the 4.7 mgd of incoming water, 2.8 mgd would be evaporated during cooling tower operation and 1.9 mgd would be discharged to the P. H. Glatfelter Company secondary treatment plant as cooling tower blowdown.

Table 4.1-26. Cooling tower blowdown characteristics.

Constituent	Concentration (mg/l)[a]
Calcium	403[b]
Sodium	1,067[b]
Chloride	1,190[b]
Sulfate	593[b]
Total Dissolved Solids	4,750[c]
Silicate	16[c]
Volatile Organic Compounds (VOCs)	0[d]
pH (standard units)	8.2[c]
Oil & Grease	<5[c]
Suspended Solids	33[b]
Biochemical Oxygen Demand (BOD)	6[b]
Chemical Oxygen Demand (COD)	259[c]
Temperature (°F)	90[c]

[a] Except for pH and temperature
[b] Expected constituents
[c] Considered worst-case conditions for evaporation
[d] Not sampled - see text

Source: YCEP 1994a; ENSR 1994.

4.1.4.2.6 Analysis for Combined Cooling Tower Blowdown/P. H. Glatfelter Company Wastewater Effluent/Pulp Mill Modernization Project

The P. H. Glatfelter Company ***has recently completed*** a Pulp Mill Modernization Project. One component of the modernization project includes the installation of oxygen delignification prior to chemical bleaching on the softwood or pine fiber line. Effluent from the oxygen delignification process will be condensed and recycled through a new black liquor recovery boiler. This change will result in a large decrease in the mass and concentration of dissolved solids that are discharged first to the wastewater treatment plant and finally to Codorus Creek. These anticipated changes in the composition of the P. H. Glatfelter Company secondary effluent were considered in planning for the utilization of the secondary effluent stream in the proposed YCEP cooling tower system and would not have an impact on the use of wastewater in the proposed cooling tower system.

Projected ***characteristics*** of the secondary treatment plant effluent stream ***prior to*** and after completion of the P. H. Glatfelter Company Pulp Mill Modernization Project, and ***of*** the effluent after start-up of the proposed YCEP facility, are presented in Table 4.1-27. Concentration (ppm) and mass (lbs/day) of total dissolved solids (consisting of chloride, sulfate, calcium, and sodium constituents) in the secondary treatment plant effluent ***are expected to*** decrease ***as a result of the recently completed*** Pulp Mill Modernization Project. The effluent color ***is*** also ***expected to decrease***.

Once the proposed YCEP facility begins operation, the mass of total dissolved solids (i.e., chloride, sulfate, calcium, and sodium) would be the same, but the concentration would increase because the evaporation of 2.8 mgd of effluent during cooling tower operation would reduce the discharge flow from 12.5 mgd to 9.7 mgd. The mass of total suspended solids (TSS) and biochemical oxygen demanding (BOD) substances would decrease with the start-up of the proposed facility.

Codorus Creek is designated a WWF by PADER water quality standards. The color level under the water quality standard is ***50*** color units (CU). However, a portion of Codorus Creek is allowed to meet a different color level because ***the*** P. H. Glatfelter Company operations, ***particularly*** the pulping and bleaching processes that remove lignins and tannins from wood fibers, cause pulp mill effluents to be brown in color. The P. H. Glatfelter Company has entered into a consent agreement with PADER which requires the company to reduce in-stream color to an annual average of 200 CU, with a monthly average of ***no more than*** 225 CU. To fulfill this consent agreement, P. H. Glatfelter Company ***has installed*** an oxygen delignification system on the primary source of color at the facility, the pine fiber line. The oxygen delignification system ***is anticipated to decrease*** mean in-stream color from 220 CU to 150 CU. Operation of the proposed Cogeneration Facility would then cause a subsequent increase to 165 CU (assuming that no loss in color would occur when the effluent passes through the cooling tower system).

In the P. H. Glatfelter Company's current NPDES permit, PADER has granted an exception to Pennsylvania's water quality criteria for temperature under Section 316(a) of the Clean Water Act (CWA). To qualify for the exception, the P. H. Glatfelter Company successfully demonstrated in 1979 that the original effluent limits were more stringent than necessary to "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on" the Codorus Creek [CWA, Section 316(a)]. This exception, which is incorporated in its NPDES permit, applies only to the P. H. Glatfelter Company. As part of the NPDES permit modification needed for the proposed project, PADER would decide whether or not to lower the temperature limits in accordance with the anticipated temperature reduction caused by the proposed project.

Operation of the proposed YCEP facility would be expected to lower the in-stream temperature for two reasons: First, the cooling tower blowdown from the proposed YCEP facility would be cooler than P. H. Glatfelter Company's wastewater [blowdown = 32°C (90°F), compared to 36°C (97°F) for P. H. Glatfelter Company's wastewater]; so the mixing of blowdown water with P. H. Glatfelter Company's wastewater would reduce the temperature of the effluent discharge. Second, the total volume of effluent would be smaller, and the smaller volume of warm effluent mixed with creek water would yield a cooler mixture downstream. The reduced heat load and reduced BOD would result in an increased dissolved oxygen concentration in Codorus Creek waters, especially during summer and fall low-flow periods.

The existing P. H. Glatfelter Company discharge permit established limits for BOD, suspended solids, total phosphorus, color, and temperatures. The quantitative permit limits associated with this permit (Industrial Permit Number 0008869, September 1989), as well as current and projected discharge levels (with the Pulp Mill Modernization Project and the proposed YCEP facility) are presented in Table 4.1-28. Projected discharge parameters would not exceed the permit levels under the operating conditions of the proposed YCEP facility.

4.1.4.2.7 Effects on Codorus Creek

The proposed project could affect water quality in Codorus Creek directly by changing the effluent characteristics of ***the*** P. H. Glatfelter Company's wastewater discharge and ***by*** indirectly by reducing flow (dilution) in Codorus Creek as a result of the projected increase in consumptive use.

Table 4.1-27. Characteristics of effluent discharged to Codorus Creek from the P. H. Glatfelter Company secondary treatment plant.

Parameter	Current Operation[1]		Modernization Project Complete[2]		After Start-up of Proposed Facility[3]	
	PPM	Lbs/Day	PPM	Lbs/Day	PPM	Lbs/Day
Total Dissolved Solids	2,350	244,988	1,900	198,075	2,447	198,075
Chloride	850	88,613	476	49,620	613	49,620
Sulfate	250	26,063	237	24,700	306	24,700
Calcium	170	17,723	161	16,785	208	16,785
Sodium	450	46,913	427	44,515	550	44,515
Suspended Solids	13	1,355	13	1,355	15	1,213
BOD	6	626	6	626	7	566
Temperature (°F) - Summer*	97	--	97	--	96	--
Temperature (°F) - Winter*	78	--	78	--	75	--

[1] Current discharge for the P. H. Glatfelter Company.
[2] Expected discharge after modernization is complete.
[3] Expected combined discharge after proposed YCEP project is complete.
* Temperature of discharge.

Source: ERM, 1994a.

Quantitative Effects

The potential effects of the proposed project's consumptive water use on water elevations in Lake Marburg, P. H. Glatfelter Company's water withdrawal, flow from the mill pond, stream flow downstream of the P. H. Glatfelter Company NPDES outfall, and stream flow at the York gaging station ***were modeled with*** the HEC-3 Program (Reservoir System Analysis for Conservation), a FORTRAN program developed by the ***United States*** Army Corps of Engineers (ACOE), Hydrologic Engineering Center. The assumptions and flow values used for this modeling are presented in Appendix G. The model evaluated flows at four locations to account for all significant inflows, outflows, surface water

Table 4.1-28. P. H. Glatfelter Company existing wastewater discharge permit limits, current discharge levels, and projected levels with proposed Cogeneration Facility.

Discharge Parameter	Current Levels	Modernization Project	Levels Projected by YCEP Project	Limit
5-day BOD	6 mg/L	6 mg/L	7 mg/L	25 mg/L (May 1 to October 31)[a] 38 mg/L (November 1 to April 30)[a]
Suspended Solids	13 mg/L	13 mg/L	15 mg/L	118 mg/L[a]
Total Phosphorus	0.12 mg/L	0.12 mg/L	0.16 mg/L	Average monthly: 2.0 mg/L Maximum daily: 4.0 mg/L Instantaneous maximum: 5.0 mg/L
Color	220 color units	150 color units	165 color units	200 platinum-cobalt color units, annual average
Temperature[a]	Summer 81°F Winter 57°F	Summer 81°F Winter 57°F	Summer 80°F Winter 55°F	Maximum weekly average immediately downstream of the outfall: January 60°F February 69°F March 78°F April 87°F May 87°F June 87°F July 87°F August 87°F September 87°F October 84°F November 80°F December 70°F

[a] Current and projected temperature are based on low-flow estimates developed from the Lake Marburg Engineering Study. The permitted levels apply to Codorus Creek immediately downstream of the P. H. Glatfelter Company outfall ***and are limits accepted by PADER under a statutory exception in the CWA, Section 316(a) [33 U.S.C. § 1326(a)].***

Source: ***Environ, 1994a; P. H. Glatfelter Company (Robert Callahan, personal communication)*** intakes, and flow control measures between the headwaters of Codorus Creek and an arbitrary point downstream of P. H. Glatfelter Company's wastewater outfall. These four locations were as follows:

Location 1 -	Lake Marburg
Location 2 -	Mill pond
Location 3 -	P. H. Glatfelter Company Plant
Location 4 -	Downstream of P. H. Glatfelter Company's outfall

The projected YCEP consumptive ***water*** use by the proposed facility would average ***3.9 cfs (***2.5 mgd***), with a maximum of 4.3 cfs (2.8 mgd). T***his would reduce P. H. Glatfelter Company's secondary effluent discharge to 15.***0*** cfs (9.7 mgd). However, ***assuming there would be no need to release water to meet water quality standards,*** this consumptive use would have no effect on P. H. Glatfelter Company permitted withdrawals from Lake Marburg***, nor would it increase P. H. Glatfelter Company's*** consumptive use rates. The model showed that the greatest effect from increased consumptive use would be downstream of P. H. Glatfelter Company's discharge. ***A***verage flow during a normal year would be reduced ***an estimated*** 4.9 percent, from 8***8*** to 83 cfs (5***7*** to 54 mgd), and the average ***flow during a*** low-flow year would be reduced ***9.6*** percent from 45 to 41 cfs (29 to 26 mgd). It is expected that the impact from the increase in consumption would be attenuated downstream. The average flow at the York gaging station ***during a normal year*** would decrease ***1.7*** percent from 250 to 246 cfs (16***2*** to 1***60*** mgd). During low-flow years, average flow would decrease 3.7 percent, from 115 to 111 cfs (74 to 72 mgd). A summary of these consumptive use effects is presented in Table 4.1-29.

As noted by several commenters, severe drought during the summer could have greater impacts. Under the requirements of P. H. Glatfelter Company's SRBC permit, the minimum flow during a severe summer drought may not be reduced below 7.62 cfs (4.9 mgd) at the mill pond dam. ERM (1994a) found that the proposed project would not affect P. H. Glatfelter Company's ability to provide the SRBC required flow. This is because P. H. Glatfelter Company would not have to withdraw additional water from the mill pond to meet YCEP's needs. However, when flow from the mill pond drops to 7.62 cfs during a drought, the P. H. Glatfelter Company must either release water from its reservoirs to maintain the required minimum flow or must cease withdrawals. YCEP's consumptive use would decrease the minimum flow downstream by 18 to 20 percent from the current minimum downstream flow. The current minimum flow below P. H. Glatfelter Company's discharge is about 21 cfs (13.6 mgd), based on statistical analysis of daily discharge data from the Spring Grove Gage for the period from 1970 through September, 1990 (ERM, 1994a). The YCEP facility would increase the consumptive

Table 4.1-29. Summary of consumptive use effects.

Parameters	Normal Year		Low-flow Year (1981)	
	Existing	With YCEP Project	Existing	With YCEP Project
Average Flow at Spring Grove	88 cfs[a] *(57 mgd)*	83 cfs *(54 mgd)*	45 cfs[b] *(29 mgd)*	41 cfs *(27 mgd)*
Average Flow at York	250 cfs[c] *(162 mgd)*	246 cfs *(160 mgd)*	115 cfs[d] *(74 mgd)*	111 cfs *(72 mgd)*
Maximum consumptive use from proposed YCEP Facility	---	4.3 cfs *(2.8 mgd)*	---	4.3 cfs *(2.8 mgd)*
Percentage decrease of flow at Spring Grove	---	4.9%	---	9.6%
Percentage decrease of flow at York	---	1.7%	---	3.7%

[a] Average of USGS mean annual discharge at Station Number 01574500 for the calendar years 1971 to 1992.
[b] USGS mean annual discharge at Station Number 01574500 for calendar year 1981.
[c] USGS average discharge at Station Number 01575500 for calendar years 1971 to 1992.
[d] USGS mean annual discharge at Station Number 01575500 for the calendar year 1981.

Source: ERM, 1994a.

use by a maximum of 4.3 cfs, and could reduce the minimum flow of Codorus Creek to as little as 16.7 cfs (10.8 mgd). This represents a 20-percent decrease from minimum flow.

Qualitative Effects

Because the proposed project would not require additional water releases from Lake Marburg and would not greatly affect flow characteristics in Codorus Creek above P. H. Glatfelter Company's wastewater discharge, it should not affect (either directly or indirectly) water quality upstream of the discharge location.

Although constituent concentrations (in ppm) of P. H. Glatfelter Company's wastewater would increase due to evaporation [of up to 2.8 mgd (4.3 cfs)], the mass loadings (in pounds per day) to Codorus Creek would not increase. Operation of the proposed YCEP project would decrease effluent BOD ***loadings*** and suspended solids loadings as a result of a higher level of treatment (i.e., oxidation). ***However, concentrations of BOD and suspended solids in the effluent would increase (see Table 4.1-27) due to evaporation of cooling tower water.*** In addition, proposed YCEP project operations would reduce P. H. Glatfelter Company's wastewater effluent volume by 25 percent. Consumptive use of this heated water would help reduce the quantity of heated water discharged to Codorus Creek and thus decrease creek temperature. ***Decreased creek temperature would tend to improve*** the dissolved oxygen (DO) concentration ***downstream from the*** P. H. Glatfelter Company's ***outfall.***

Under low-flow ***year*** conditions (i.e., 45 cfs***)*** at the ***Spring Grove gage (which includes the P. H. Glatfelter Company discharge volume)*** and 115 cfs at the York gage, as occurred in 1981), the following outfall and in-stream conditions were projected.

- For the P. H. Glatfelter Company NPDES-permitted outfall:
  - Because of the increased level of water treatment (when processing the wastewater for use in the cooling tower), the BOD loading would be reduced by 10 percent.
  - Total dissolved solids (TDS) concentrations would decrease by 19 percent (compared to current operations) following the P. H. Glatfelter Company Modernization Project (1,900 ppm versus 2,350 ppm). With the addition of the proposed YCEP project, TDS ***concentrations*** would increase 29 percent from those new modernization levels, for a net increase of 4 percent in TDS concentration compared to current (without modernization) baseline (2,447 ppm versus 2,350 ppm).
- For Codorus Creek:
  - Because a lower volume of heated water would enter the creek from the outfall ***and because the effluent's temperature would be lower, in-stream temperatures would decrease by 1 to 2 degrees in the summer and by 2 to 3 degrees in the winter.*** The net reduction in thermal loading to the stream would decrease ***stream temperature, allowing increased*** dissolved oxygen (DO) concentrations in Codorus Creek. ***Adequate dissolved oxygen concentrations are critical for the survival of gill-breathing aquatic species, especially during warm seasonal and low-flow conditions.***

- The proposed project's consumptive water use means that less water would leave the outfall; thus, metal (e.g., lead and copper) concentrations in the creek would increase ***in proportion to the volumetric reduction in flow. For a low-flow year, concentrations of most constituents (except BOD and suspended solids) would increase by an average of 9.5*** percent ***near the outfall***, and by ***3.5*** percent at the York gaging station (RM 13.8). Effects of the Pulp Mill Modernization Project would partially offset the effects of the proposed project so that net in-stream concentrations would increase by smaller percentages than those reported above.

In addition, under normal flow conditions, the proposed YCEP consumptive use would reduce average stream flows at the P. H. Glatfelter Company ***outfall and, therefore, increase concentrations of most constituents*** by ***4.6*** percent from levels observed after ***the*** Pulp Mill Modernization ***Project***; at the USGS gage station in York, the average flow would be reduced by 1.7 percent, ***with a 1.6 percent increase in concentrations of constituents***. ***O***verall, ***the*** loadings ***of constituents*** would remain the same after pulp mill modernization.

4.1.4.2.8 Lake Marburg

Historically, Lake Marburg's elevation is held at 189.9 m (623 ft) when possible. However, this level can be decreased to maintain minimum downstream flow requirements and to satisfy P. H. Glatfelter Company's water needs. This lake was constructed in the late 1960s by the P. H. Glatfelter Company as a reservoir to satisfy its water demands. In an agreement between the P. H. Glatfelter Company and the Commonwealth of Pennsylvania, a maximum lake drawdown [to 182.9 m (600 feet)] was established, and the Commonwealth of Pennsylvania agreed to maintain the Codorus State Park surrounding Lake Marburg. The P. H. Glatfelter Company operates this reservoir so as to maintain lake elevations as close to 189.9 m (623 feet) as possible. Lake drawdowns to elevations as low as 188.*7* m (619 ft) have been demonstrated to have little effect on recreation in Codorus State Park. ***However, the Pennsylvania Fish and Boat Commission suggests that a connection exists between drawdowns and poor spawning success of yellow perch that could represent an impact on angling.***

Throughout the active recreational season (Memorial Day to Labor Day), the monthly average lake elevation would remain above 188.*7* m (619 ft) during a normal year. Lowest elevations of 187.*8* m (615.9 ft) would normally occur during the month of November. During a low-flow year, the average lake elevation would be reduced to 18*7.8* m (615.*9* ft). During the active recreational season, the lake's elevation would be above 188.7 m (618.8 ft). Lowest elevations [185.7 m (609.2 ft)] would occur in the month of January.

Modeling analysis of Lake Marburg using HEC-3, developed by ACOE, showed ***the following***:

- Monthly average and minimum flows from the mill pond would not be affected by the proposed YCEP facility;
- The SRBC-required flow of 7.6 cfs (4.9 mgd) ***over the mill pond dam*** would be satisfied during normal and low-flow years; and
- No additional releases from Lake Marburg would be required to support the proposed YCEP facility.

The most recent water-supply studies indicate sufficient water is available in Codorus Creek for all existing uses during typical summer droughts. However, the impact of a prolonged severe drought deserves consideration. P. H. Glatfelter Company is allowed under current regulatory restriction to draw down Lake Marburg to a pool elevation of the 182.9 m (600 ft), which is 7 m (23 ft) below the normal pool elevation. During the 25 years that Lake Marburg has been in existence, the lowest pool elevation was 185.7 m (609 ft), which occurred in 1991.

The potential for an extended severe drought to affect a surface water supply is usually determined from natural stream flow histories and the use of probability analyses to predict future events. Such studies for Codorus Creek have been complicated by the existence of large impoundments and the practice of low-flow augmentation from these impoundments which change natural stream flow characteristics. Both of these complicating factors have rendered stream flow data from recent years unsuitable for extrapolating the magnitude and duration of effects on stream flow that would be caused by rare (greater than 10 year recurrence interval), severe drought events.

In the event of an extended severe drought, YCEP (and P. H. Glatfelter Company from which YCEP would obtain its cooling water) would have to find alternative water sources or cease operations if the minimum flow (7.62 cfs) could not be maintained at the mill pond dam. Alternatively, P. H. Glatfelter Company must receive a variance from its permit before lowering Lake Marburg below 600-ft pool elevation in an effort to augment stream flow.

Although Lake Marburg has not been lowered to the minimum permitted pool elevation during a summer drought, in the event of a prolonged severe drought, lake levels would drop at an accelerating rate due to a shrinking lake storage per foot of drawdown and a diminishing natural stream recharge. Drawdowns might be necessary to maintain required minimum flow over the mill pond dam, or to meet present or future water quality standards, while fulfilling municipal and industrial needs.

If unforeseen exceedances of water quality standards occur and variances are not granted, P. H. Glatfelter Company would have to release more water from Lake Marburg or other reservoirs during periods of very low-flow to dilute contaminants. The end result is that Lake Marburg or other reservoirs would experience lower water levels than anticipated. However, the proposed project's water usage is met by P. H. Glatfelter Company's current water withdrawals, and would not in itself contribute to additional withdrawals.

4.1.4.2.9 Effects on Other Water Resources (SRBC)

During low ($Q_{7\text{-}10}$) flow conditions, HEC-3 modeling indicated that the proposed consumptive use would not affect P. H. Glatfelter Company's ability to provide the SRBC-required flow of 7.6 cfs (4.9 mgd). *However, YCEP's water consumption would reduce downstream flow. Near the point of P. H. Glatfelter Company's discharge, flow would be reduced by up to 20 percent, with a consequential increase by up to 26 percent in the concentrations of some constituents. The relative loss of flow (in percent) and the concentration of constituents would diminish downstream. ERM (1994a) concluded that the loss of flow would not cause downstream dischargers to violate the terms of their permits (to the extent that effluent discharge limits are based on a dilution flow of 7.62 cfs over the mill pond dam). However, if the NPDES permits of downstream dischargers are based on current minimum flow rather than the 7.62 cfs, YCEP's contribution to downstream exceedances would be a factor because the 4.3 cfs water loss is a non-negligible fraction (11 to 12 percent of the 40.5 cfs equivalent $Q_{7\text{-}10}$ flow at the York gage, RM 13) of the total water flow in those sections of the creek.*

4.1.4.3 Stormwater

Construction Impacts. Stormwater runoff during construction would be collected at the existing P. H. Glatfelter Company stormwater/sediment pond where it would be settled and filtered into the groundwater. An existing stand of vegetation between the proposed construction area and the site perimeter would be maintained as a buffer for stormwater runoff that would flow to the northeast toward Kessler Pond and the mill pond.

Operation Impacts. Impacts from stormwater runoff during operation of the proposed facility would be minimized through facility design features that include using P. H. Glatfelter Company's existing stormwater retention basin, dust controls, enclosed materials storage areas, provisions for safe handling of materials, and implementation of a facility-specific stormwater pollution prevention plan.

The stormwater management collection system for the proposed project would be constructed with York County Conservation District requirements. The system would consist of a combination of swales, culverts, inlets, and underground pipes to convey runoff to the existing P. H. Glatfelter Company stormwater retention basin. Approximately 2.5 to 2.9 million gallons of storage capacity would be required to accommodate runoff from the proposed facility. This storage capacity would be available in the P. H. Glatfelter Company's existing retention basin, which would be capable of handling runoff from the proposed facility for 24-hour, and 10- and 25-year storm events. The stormwater retention basin discharges to the mill pond upstream of the P. H. Glatfelter Company process water intake. No adverse impact to the existing P. H. Glatfelter Company retention pond or surrounding surface water would be expected to occur as a result of project operation.

Coal delivery to the proposed facility would occur via railcar and would be unloaded through a series of enclosed conveyors in order to minimize dust and exposure to rainfall. Once unloaded, the coal would be stored in enclosed silos and all handling operations would occur under cover. The proposed coal storage and handling process would prevent environmental exposure to dust, as well as protect dust from exposure to rainfall. Consequently, no adverse impact to stormwater would be anticipated from coal delivery handling.

Most chemicals would be delivered to the facility in closed bulk containers and stored inside the cooling tower treatment building, the demineralizer building, or the ***selective non-catalytic reduction*** (SNCR) building. All chemical handling areas would be designed with curbs and drains to route any spills to enclosed pumps for subsequent treatment. Consequently, stormwater would not become contaminated by any potential spill and no adverse impact to surface water would be expected to result.

The SNCR ammonia storage tank and other water treatment chemical storage tanks would be designed with secondary containment. The secondary containment area would contain a lock valve that would be open to a sump. In addition, all large storage tanks would be equipped with level analyzers, which would serve to notify plant personnel in the event of a leak. Detailed site emergency procedures for all chemical storage areas would be described in the facility operations plan. Proper installation, maintenance, and monitoring of structural stormwater controls, as well as proper training of personnel regarding handling of materials and good maintenance practices, would minimize potential impacts to surface waters from stormwater runoff. No adverse impacts would be expected to occur to surface waters.

A stormwater management program for facility operation is required by the PADER Bureau of Soil and Water Conservation, Division of Soil Resources and Erosion Control. The operational stormwater management plan would be prepared and filed with the PADER six months prior to start-up of the facility. The construction stormwater management plan is discussed in the YCEP Erosion and Sedimentation Control Plan. This plan considers the use of the existing P. H. Glatfelter Company stormwater retention basin which was initially designed for and constructed to handle the potential stormwater flows from the P. H. Glatfelter Company facilities including the proposed project site. The plan includes all the necessary water runoff calculations, and construction plans and details which would be installed by YCEP during construction to comply with the PADER erosion and sedimentation regulations. For further details, refer to the Erosion and Sediment Control Plan presented in Appendix K of the ***Environmental Information Volume*** (EIV) (available in the public reading rooms, see Appendix A).

4.1.4.4 Groundwater

Construction Impacts. In instances when a shallow water table is encountered during construction activities, dewatering may be required. Dewatering is used to lower the groundwater level in excavations to allow for installation of foundations, piping, and other plant systems. Any excess water generated from the dewatering process would be directed to the existing P. H. Glatfelter Company retention pond where settling of suspended solids would occur. No long-term impact to groundwater is anticipated to occur as a result of dewatering activities. The water table levels would assume their original contours following the cessation of dewatering activities.

Operation Impacts. No impacts to groundwater resources would occur from operation of the proposed project. Groundwater underlying the project site has been sampled and found to be relatively free of contamination (Section 3.1.4.2). Five monitoring wells have been established on site, and would be sampled periodically to assess groundwater conditions and quality prior to acquisition of property. Areas within the constructed plant site containing fuel, lubricants, or chemical substances would be protected with retaining walls and impervious barriers and drained to sumps for collection and removal. This would prevent chemical spills and leaks from mixing with stormwater runoff and entering the groundwater system.

4.1.4.5 Floodplains

The DOE regulation (10 CFR ***Part*** 1022) implementing Executive Order 11988 — Floodplain Management, and Executive Order 11990 — Protection of Wetlands, require DOE to avoid direct and indirect support of development in floodplains and wetlands wherever there is a practicable alternative. Where there is ***no*** practicable alternative, DOE is required to prepare a "Floodplain/Wetlands Assessment" discussing the effects on the floodplain/wetlands, and consideration of alternatives. DOE is also required to provide opportunity for public review of any plans or proposals for actions in floodplains (and new construction in wetlands). The "Floodplains/Wetlands Assessment," discussing the effects on floodplains and wetlands anticipated from the proposed project, has been prepared and included, in part, in Section 4 of the ***FEIS***, as required by DOE regulation [10 CFR 1022.12(b)]. For a full review of the floodplains/wetland assessment, please refer to these additional sections of the ***FEIS***: Section 3.1.4.3 (Floodplains--Affected environment); Section 3.1.5.5 (Wetlands--Affected environment); Section 3.1.14.4 (Floodplains--Affected environment of utility corridor), Section 3.1.14.5 (Wetlands--Affected environment of utility corridor), Section 4.1.5.5 (Wetlands--Environmental consequences of proposed project), Section 4.1.14.4 (Floodplains--Environmental consequences of proposed utility corridor), Section 4.1.14.5 (Wetlands--Environmental consequences of proposed utility corridor), and Chapter 9 (Regulatory Compliance and Permit Requirements). Opportunity ***for*** public review of the proposed action affecting floodplains/wetlands ***was*** provided through Public Notice in the Federal Register ***(59 FR 60614)***, through public hearings and comment period for this Final Environmental Impact Statement (***FEIS***).

For actions which would be located in a floodplain, DOE regulations require a brief "Statement of Findings" describing the proposed action, location, alternatives considered, a statement as to whether the action conforms to applicable state or local floodplain protection standards, and a brief description of steps to be taken to minimize potential harm to or within the floodplain. The "Statement of Findings," for this proposed action ***has been*** incorporated in the ***FEIS***, as provided by DOE regulation [10 CFR 1022.15(b)(5)] ***(see Section 9.5 Statement of Findings - Floodplains)***.

Portions of the proposed rail ladder tracks, a rail spur, and a portion of the steam supply and condensate return pipelines to P. H. Glatfelter Company would be located on land within the 100-year floodplain of Codorus Creek. Alternative locations for these rail facilities were reviewed, but the proposed alignment, which parallels the existing rail facilities, appeared to have the least adverse environmental effects and would disturb the least amount of vegetation and soils. Due to the proposed YCEP facility site being on the south side of Codorus Creek and the P. H. Glatfelter Company facility being on the north side, a stream crossing is unavoidable for these pipelines connecting the two facilities. Additionally, segments of some service roads would fall within the 500-year floodplain of Codorus Creek. The new ladder tracks and rail spur for the proposed project would require an expansion of the existing YorkRail right-of-way on P. H. Glatfelter Company property. The rail structures associated with the proposed facility would be similar to, and closely parallel, the existing YorkRail Main line at the same elevation. The additional right-of-way expansion within the 100-year floodplain for new rail construction would impact an area approximately ***8 m (***25 ft***)*** wide and ***427 m (***1,400 ft***)*** long (approximately 0.80 acre; 0.32 hectare). The floodplain area potentially affected by these proposed facilities is shown on Figure 4.1-3.

Project facilities that would fall within the 100-year floodplain of Codorus Creek ***the following***:

- Approximately 0.8 acres (0.32 hectares) required for expansion of the YorkRail right-of-way to accommodate the new ladder tracks and rail spur;

- Approximately 0.3 acres (0.12 hectares) required to accommodate a portion of the steam and condensate return pipelines to P. H. Glatfelter Company [approximately 0.012 acres (0.005 hectares) would be permanently occupied by pipe supports].

Construction Impacts. Impacts during construction would include equipment and vehicle access, earth disturbance, sedimentation, erosion from exposed soils, damaged vegetation, and placement and compaction of fill to support new rail lines. In addition, the steam and condensate return pipeline to P. H. Glatfelter Company may require permanent pipe supports to be placed within the floodplain. Accessways would be temporarily developed to allow personnel and equipment ingress and egress to construct the proposed facilities. Approximately 4 acres (2.0 hectares) of floodplain would be temporarily disturbed during construction to access and complete the permanent facilities.

Any earth disturbance activities which result in exposed soils would be restored by providing seeding and revegetation. Silt fencing would also be installed prior to construction to prevent sediment washing in

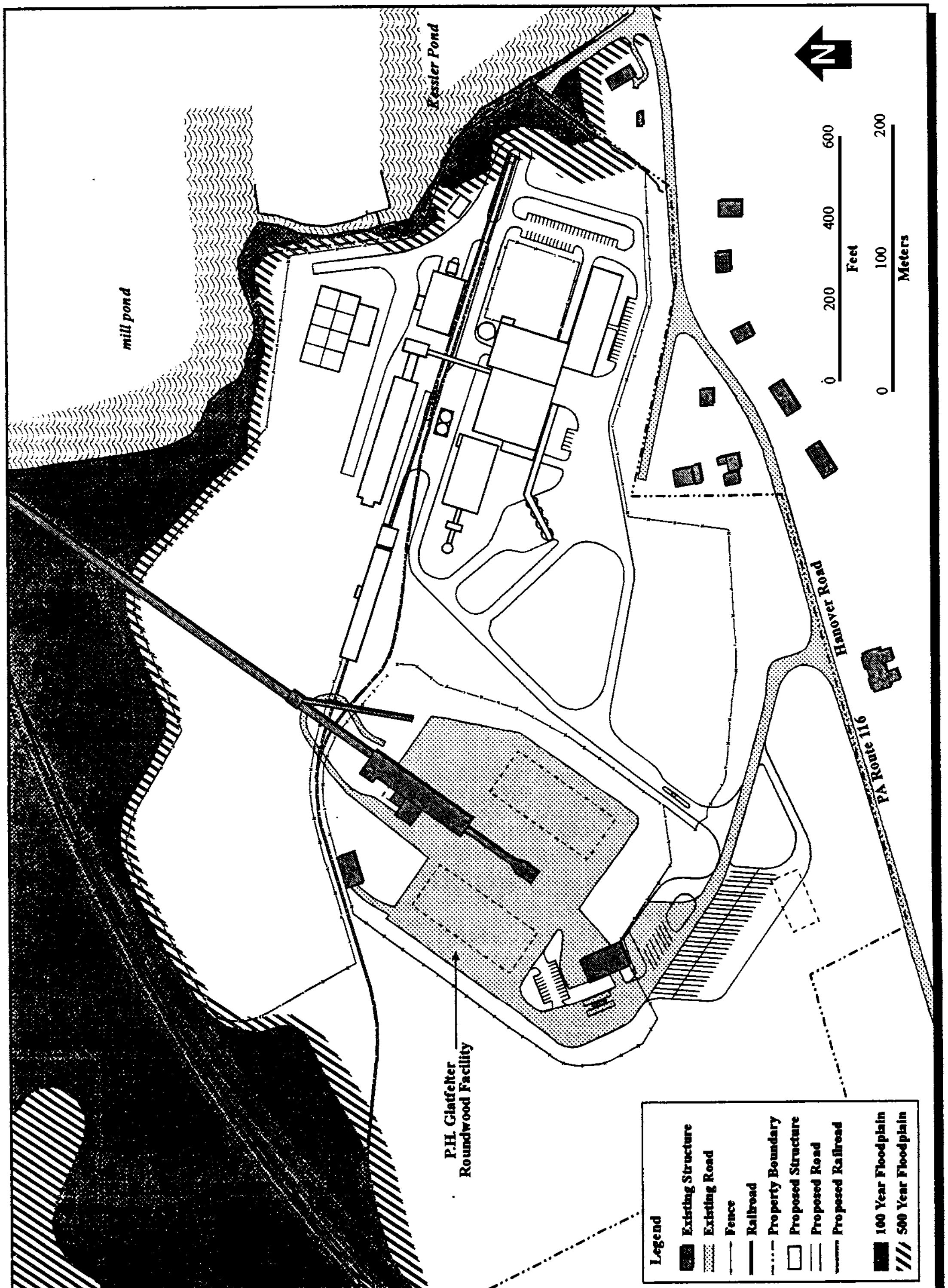

Figure 4.1-3. Location of the proposed *C*ogeneration *F*acility relative to the 100- and 500-year floodplains.

surface waters. This would be accomplished as soon as possible to prevent erosion and sedimentation control problems.

Operation Impacts. Approximately 1.1 acres (0.44 hectares), as described above, of *the* 100-year floodplain would be occupied by new rail connections and steam and condensate return pipeline corridor facilities. The steam and condensate return pipelines would be above ground, supported by the pipe supports at an elevation above the recorded flood high water line. There would be some periodic minor disturbance due to personnel and equipment entry for inspection and maintenance of the new ladder tracks, rail spur, and steam and condensate return pipelines to P. H. Glatfelter Company. Disturbance would only occur if heavy equipment was needed for maintenance of the facilities.

4.1.5 Biological Resources and Biodiversity

This section identifies impacts to biological resources and biodiversity that would be associated with construction and operation of the proposed Cogeneration Facility at the North Codorus Township site.

4.1.5.1 Aquatic Ecosystems

As described in Chapter 3, the aquatic ecosystems of Codorus Creek are markedly different above and below the P. H. Glatfelter Company discharge. Downstream from the outfall, the community structure is dominated (in numbers and biomass) by pollution-tolerant species and habitat generalists (Denoncourt, 1992; PADER, 1989). The trophic structure is skewed, although intact (Denoncourt, 1992; PADER, 1989.). Physical and chemical properties of the habitat also change between upstream and downstream sample sites. Downstream from the waste discharge point, sharp increases are seen in temperature, color, chemical oxygen demand (COD), total organic carbon (TOC), total dissolved solids (TDS), conductivity, hardness, aluminum (Al), chloroform ($CHCl_3$) and phenols (C_3H_8O) (PADER, 1987, 1989; SRBC, 1991). Decreases are seen for dissolved oxygen (DO) (PADER, 1987, 1989, SRBC, 1989.). An organic "flocculent" material is frequently observed downstream (Hatcher, 1975; PADER, 1989; Denoncourt, 1992), coating the stream bottom, filling spaces between cobbles, and forming layers several inches thick in pools. Mats of <u>Sphaerotilus</u> (bacteria), thick growths of <u>Fissidens</u> (moss), dense filamentous algae and increased aquatic plant growth have been reported immediately downstream (PADER, 1989). Odor, apparently generated by the bacteria, is reported as a nuisance downstream from the discharge (Hatcher, 1975).

The purpose of this section is to describe the impacts from the proposed project. Anticipated impacts of the recently completed Pulp Mill Modernization Project will be described, as appropriate, in this section. Overall, minimal net impacts from the combination of the Pulp Mill Modernization Project and the proposed project would be expected.

The Pulp Mill Modernization Project itself should bring beneficial impacts. Substantial reductions in the effluent concentrations of inorganic dissolved solids (especially chloride) and wood pulping products (e.g., tannins and lignins) will reduce the in-stream salinity, TOC, BOD, COD and color.

However, some of these gains would be partially or totally offset by the proposed project. For example, reductions in concentrations of chloride would be partially offset by the proposed project; and total dissolved solids would increase slightly over concentrations existing prior to the Pulp Mill Modernization Project. Concentrations of most inorganic constituents, though reduced by the Pulp Mill Modernization Project, would increase above the concentrations observed before the Pulp Mill Modernization Project. Concentrations of most organic constituents, on the other hand, would remain below the concentrations observed before the Pulp Mill Modernization Project.

The proposed project would have some beneficial impacts of its own. For example, effluent temperature, total suspended solids (TSS) and biological oxygen demanding substances would decrease. As a result, in-stream temperatures would be reduced and dissolved oxygen would increase.

If, as claimed by PADER (1995), thermal and organic loading are the most limiting factors for the aquatic ecosystem, the net effect of the Pulp Mill Modernization Project and the proposed project would be a slight improvement in habitat conditions.

Existing fish and benthic macroinvertebrate data for the affected reach of Codorus Creek immediately upstream and downstream of the P. H. Glatfelter Company facility suggest that the habitat in the creek remains viable for a number of species. Pollution-sensitive taxa are present, and their distribution in the benthic community downstream of the P. H. Glatfelter Company outfall suggest that the current P. H. Glatfelter Company discharge is not acutely impacting the aquatic community structure. However, PADER (1989) noted the abundance of pollution-tolerant species downstream from the P. H. Glatfelter Company outfall and suggested that the aquatic community was evidence of organic or thermal overload (which indicates that the total organic or thermal load is in excess of the stream's assimilative capacity). Additionally, biotic index values reported in Environ *(1994a)* indicate a decline in water quality (reduction in Diversity Index and in Index of Biologic Integrity) downstream from the P. H. Glatfelter Company outfall.

Construction Impacts. Because stormwater runoff from construction activities would be diverted to stormwater retention ponds and no runoff would be expected to reach Codorus Creek, no long-term adverse impacts to aquatic ecosystems would be anticipated to occur from construction of the proposed Cogeneration Facility. Short-term impacts may be encountered from dust contamination resulting from windblown particles and truck traffic.

Operation Impacts. In order to determine the potential for impacts to aquatic organisms in Codorus Creek, the extent to which the proposed Cogeneration Facility would change the existing P. H. Glatfelter Company discharge was examined and then comparison studies were conducted. Impacts *to* Codorus Creek also were assessed by determining the anticipated physio-chemical changes that would occur in Codorus Creek with the addition of the proposed Cogeneration Facility discharge to the P. H. Glatfelter Company wastewater discharge.

Studies Using Current and Projected Characteristics of the P. H. Glatfelter Company Discharge

A 1986 toxicological study of Codorus Creek did not identify the P. H. Glatfelter Company facility as a source of acute toxicity in the creek; however, significant toxicity to daphnids (Ceriodaphnia dubia) was observed upstream of the P. H. Glatfelter Company outfall. PADER (who conducted the study) hypothesized that the toxicity was from old waste lagoons located adjacent to the stream, the Spring Grove sewage treatment plant, and combined sewer overflow discharges, all located upstream of the P. H. Glatfelter Company outfall. A study conducted by EA, Inc. (1989) found no acute toxicity associated with effluent sampled in June, 1988, but did observe a reduction in the number of young produced by aquatic invertebrates downstream from the P. H. Glatfelter Company outfall. Neither acute nor chronic toxicity was associated with effluent sampled in September, 1988. The authors attributed the difference in results between the two sampling events to upset conditions which occurred in early June, and concluded that the effluent from the P. H. Glatfelter Company outfall was having no discernible toxic effect on the biota of Codorus Creek.

Two studies have been conducted to determine potential biological impacts to Codorus Creek from color discharged to the creek. PADER *(1989)* conducted an in-situ periphyton growth study in Codorus Creek, as well as a laboratory planktonic algae growth study to determine impacts from the P. H. Glatfelter

Company color discharges to the creek. A second study was conducted by EA, Inc. *(1989)*. This study consisted of in-situ studies on the effect of color levels on the primary productivity of Codorus Creek near the P. H. Glatfelter Company outfall in June and September 1988.

The PADER *(1989)* in-situ periphyton growth study compared chlorophyll *a* concentrations in periphyton colonies that were established on glass plates both upstream and downstream of the P. H. Glatfelter Company outfall. The colonies located downstream of the P. H. Glatfelter Company outfall had 50- to 90-percent reductions in chlorophyll *a* concentrations compared to the colonies located upstream. These data indicate that primary productivity is potentially reduced in the area of Codorus Creek that receives P. H. Glatfelter Company wastewater discharge. However, the results of this study may have been obscured by the deposition of settled solids on colony samples. ***It is also possible that periphyton growth was reduced due to the effects of ambient copper levels. Copper is a known algicide and herbicide, and is known to inhibit plant growth and photosynthesis (EPA, 1985e). However, as with aquatic animals, copper-resistant strains of phytoplankton have been developed through acclimation in chronic exposure tests. Copper and other metal-resistant strains or species of algae have also been documented in impacted aquatic ecosystems. In addition, such algae are capable of maintaining free copper activity below harmful levels, especially in eutrophic (organically enriched) waters (EPA 1985e).***

The EA, Inc. *(1989)* study indicated that effluent color from the outfall combined with high levels of stream shading caused reduced light levels in Codorus Creek at depths greater than 35 cm ***(13.8 inches)***, which resulted in reduced periphyton growth. There was no significant difference in periphyton primary productivity at shallow depths of less than 35 cm ***(13.8 inches)*** between stations located upstream and downstream of the P. H. Glatfelter Company outfall.

The planktonic algae growth study conducted by PADER *(1989)* compared growth under two different scenarios. One scenario used light filtered through P. H. Glatfelter Company wastewater. The second scenario used light filtered through P. H. Glatfelter Company wastewater diluted with Codorus Creek water collected upstream of the P. H. Glatfelter Company outfall to yield a color level of 250 platinum-cobalt color units. A 48-fold cell count reduction was observed for the undiluted P. H. Glatfelter wastewater compared to the diluted wastewater.

These studies indicated that a decreased color level in the P. H. Glatfelter Company wastewater discharge could increase the primary productivity in the affected section of Codorus Creek. Although the studies did not quantify the change in color required to produce a marked increase in primary productivity, the reduced color level after completion of the P. H. Glatfelter Company Pulp ***Mill*** Modernization Project would be anticipated to produce a positive impact on primary productivity.

Constituents not regulated by the current discharge permit that would be discharged from the proposed Cogeneration Facility at levels above detection limits were compared against water quality criteria for warm water habitats applicable to the section of Codorus Creek in the vicinity of the P. H. Glatfelter Company facility. ***Eight*** constituents were evaluated based on water quality data collected during pilot plant tests that occurred in October 1993 and through P. H. Glatfelter Company effluent monitoring data. Chemicals detected during the pilot plant tests but not governed by the existing P. H. Glatfelter Company NPDES permit included manganese, chloroform, cyanide, and selenium. These four chemicals also were detected in the P. H. Glatfelter Company effluent through NPDES discharge monitoring requirements. Two additional chemicals, aluminum and chloride, were consistently listed in the P. H. Glatfelter Company effluent monitoring data. The current and projected in-stream concentrations of the chemicals ***investigated*** are presented in Table 4.1-30 ***(from Environ, 1994a; ERM, 1994a)***.

These data are based on the low and mean flows in the section of Codorus Creek located downstream of the P. H. Glatfelter Company discharge point. The projected in-stream concentrations represent a location 274.2 m (900 ft) downstream of the discharge point.

Applicable water quality criteria to which the ***eight*** chemical parameters were compared were determined from the EPA acute and chronic Ambient Water Quality Criteria (AWQC) for the Protection of Aquatic Life and are presented in Table 4.1-31. Some of the criteria were adjusted ***to account*** for site-specific conditions. ***While the recalculation of the AWQC was done in accordance with EPA guidelines (Water Quality Standards Handbook, 1994, Section 3.7), the adjusted site-specific criteria are for analytical and comparison purposes only.*** EPA acute and chronic AWQC were used for manganese, selenium, and chloroform without adjustment.

As shown in Table 4.1-30, current chloride levels exceeded the chronic AWQC (230 mg/L) at both low-flow and mean-flow conditions (EPA, 1988a). However, the Pulp Mill Modernization Project is expected to lower chloride concentrations by approximately 25 percent to levels below the chronic criteria (ERM, 1994a). Projected levels after start-up of the YCEP project would increase but would not be expected to exceed the EPA AWQC at either mean-flow or low-flow year conditions.

Table 4.1-30. Current and projected Codorus Creek parameter concentrations at low and mean flow.

Discharge Parameter	Current Level in Creek (mg/L)		Projected Level in Creek (mg/L)*	
	Low-flow	MeanFlow	Low-flow	Mean Flow
Aluminum	0.50	0.50	0.55	0.54
Chloride	379	319	246	207
Cyanide	0.01	0.01	0.01	0.01
Manganese	0.39	0.41	0.43	0.45
Selenium	<0.003	<0.003	<0.005	<0.004
Chloroform	0.02	0.01	0.01	0.01
Copper	***0.015***	***0.008***	***0.016***	***0.008***
Lead	***0.003***	***0.001***	***0.003***	***0.001***

* After P. H. Glatfelter modernization project has been completed. These data ***(Environ, 1994a)*** are based on the low and mean flows in the section of Codorus Creek located downstream of the P. H. Glatfelter Company discharge point ***except for copper and lead mean flow data (ERM, 1994a) which are based on mean flows in the section of Codorus Creek above P. H. Glatfelter Company discharge.***

The EPA acute AWQC for aluminum also was utilized without adjustment. However, EPA's chronic AWQC for aluminum ***(0.087 mg/L)*** may be overprotective of the aquatic community currently existing in this section of Codorus Creek. The chronic AWQC for aluminum is considered to include conservative safety factors for protection of brook trout (*Salvelinus fontinalis*) and striped bass (*Morone saxatilis*) *(EPA, 1988b)*. It is assumed that the warm water habitat in the reach of Codorus Creek receiving the P. H. Glatfelter Company wastewater is not a suitable habitat for trout or striped bass. For aquatic species other than brook trout and striped bass, the EPA *(1988b)* criteria document for aluminum identifies a chronic effects threshold of 0.748 mg/L. This threshold is identical to the acute criterion for aluminum and was used as the ***analytical/comparative*** chronic criteria for aluminum *(Environ, 1994a)*.

The EPA acute and chronic ambient water quality criteria for chloride were utilized without adjustment. It should be noted, however, that these criteria were assumed to be overprotective of the organisms in

Table 4.1-31. Available EPA *or State* criteria for proposed *C*ogeneration *F*acility wastewater parameters not regulated in existing P. H. Glatfelter Company wastewater permit.

Discharge Parameter	EPA *or State* Ambient Water Quality Criteria (mg/L)[1]		Recalculated Warm Water Criteria (mg/L)[2]		Applicable Water Quality Criteria for Codorus Creek (mg/L)	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Aluminum	0.75	0.087	---	0.748	0.75	0.748
Chloride	860	230	---	---	860	230
Cyanide	0.022	0.0052	---	0.011	0.022	0.011
Manganese	1.0	1.0	---	---	1.0	1.0
Selenium	0.02	0.005	---	---	0.02	0.005
Chloroform	28.9	1.24	---	---	28.9	1.24
Copper	*0.018*	*0.012*	—	—	*0.018*	*0.012*
Lead	*0.082*	*0.003*	—	—	*0.082*	*0.003*

1 Criteria from *EPA (1991)* except for aluminum *(EPA 1988b)*, manganese *(EPA 1988c), lead, and copper (25 Pa. Code Section 16.51).*

2 Please consult text for explanation of recalculated criteria.

Codorus Creek because of their basis on: (1) a "generic" acute toxicity value (i.e., Final Acute Toxicity Value) of 1,720 mg/L derived from tests with 13 species; and (2) application of a generic acute-to-chronic toxicity ratio derived from chronic laboratory toxicity studies with a cladoceran (*Daphnia pulex*), the cold water fish rainbow trout (*Onchorynchus mykis*), and the fathead minnow (*Pimephales promelas*) *(EPA 1988a)*. Consequently, the acute toxicity levels for 90 percent of the species tested were greater than the Final Acute Toxicity Value by a factor of at least 1.5.

The EPA acute AWQC for cyanide was utilized without adjustment. The EPA chronic AWQC for cyanide was adjusted because it may be overprotective of the typical aquatic species inhabiting Codorus Creek. This criterion was derived largely on the basis of the high sensitivity to cyanide of certain trout and salmon species (*Salvelinus fontinalis, Onchorynchus mykis,* and *Salmo salar*) *(EPA, 1984a)*. Because these are cold water species and, therefore, do not inhabit the warm water section of Codorus Creek near the P. H. Glatfelter Company outfall, a recalculation of the guidelines was performed. By excluding the sensitive cold water species and applying guidelines for deriving AWQC *(EPA, 1985a)* to the remaining species, ***the analytical/comparative*** recalculated chronic criterion of 0.011 mg/L was derived.

The projected concentrations of the ***eight*** chemicals in Codorus Creek following start-up of the proposed facility, under both low- and mean-flow conditions, are compared to the applicable acute and chronic water quality criteria in Table 4.1-32.

For both low- and mean-flow conditions, projected concentrations of manganese, selenium, and chloroform would be less than the EPA ambient water quality criteria. In addition, a comparison of projected low- and mean-flow concentrations of aluminum and cyanide in Codorus Creek during operation of the proposed Cogeneration Facility with ***recalculated*** acute and chronic water quality criteria for warm water aquatic species indicated that these chemical concentrations are below levels likely to adversely impact aquatic organisms in Codorus Creek.

Acute and chronic ambient water quality criteria would not be exceeded with the projected concentration of chloride (207 mg/L) in Codorus Creek under mean-flow conditions. The projected chloride concentration in Codorus Creek during low-flow year conditions would not exceed EPA's acute ambient water quality criterion but would marginally exceed the EPA's *(1988a)* chronic AWQC by a factor of approximately 1.1. However, the projected low-flow concentration of chloride (246 mg/L) is less than the chronic maximum acceptable toxicant concentration (372.1 mg/L) for the most sensitive species tested (a cladoceran) and below the chronic maximum acceptable toxicant concentration (4,343.1 mg/L) for the warm water fish species (fathead minnow). Consequently, no significant impacts to aquatic organisms in Codorus Creek would be anticipated to result from the projected chloride levels, primarily because the ambient water quality criterion value is conservative, the exceedance would be marginal, and the exceedance would only occur under low-flow conditions.

Copper concentrations in Codorus Creek currently exceed chronic EPA AWQC during periods of low-flow (ERM, 1994a). The proposed Cogeneration Facility would not increase the amount of copper, but would increase the concentration of copper during low-flow due to evaporative losses. The concentration during low-flow would increase from 14.74 to 16.29 μg/L. At a water hardness of 100 mg/L, the EPA chronic criteria for copper is 12 μg/L, while the acute value is 18 μg/L. These criteria increase to 21.4 μg/L and 34.1 μg/L, respectively, at a hardness of 200 mg/L, which is more typical

Table 4.1-32. Comparison of projected Codorus Creek parameter concentrations at low and mean flow with applicable ambient water quality criteria.

Discharge Parameter	Projected Level in Codorus Creek (mg/L)		Applicable Water Quality Criteria (mg/L)		Would Projected Level Exceed Criterion?			
					Acute		Chronic	
	Low-flow	Mean Flow	Acute	Chronic	Low-flow	Mean Flow	Low-flow	Mean Flow
Aluminum	0.55	0.54	0.75	0.748[1]	No	No	No	No
Chloride	246	207	860	230	No	No	Yes	No
Cyanide	0.01	0.01	0.022	0.011[1]	No	No	No	No
Manganese	0.43	0.45	1.0	1.0	No	No	No	No
Selenium	<0.005	<0.004	0.02	0.005	No	No	No	No
Chloroform	0.01	0.01	28.9	1.24	No	No	No	No
Copper	*0.016*	*0.008*	*0.018*	*0.012*	*No*	*No*	*Yes*	*No*
Lead	*0.003*	*0.001*	*0.082*	*0.003*	*No*	*No*	*No*	*No*

[1] Please consult text for explanation of recalculated criteria [based on warm water species expected to inhabit Codorus Creek in the vicinity (300 m or 984 ft) of the proposed project].

of flow downstream of the P. H. Glatfelter Company's outfall. There are several significant issues that must be considered when evaluating the AWQC values for copper and other metals.

First, available toxicity data, along with hardness values for P. H. Glatfelter Company's discharge and Codorus Creek, indicate that toxic impacts would not occur because high hardness levels would decrease toxicity of copper. Hardness is associated with the precipitation of metals and the formation of suspended solids in aquatic systems. These mechanisms act to reduce the availability of metals to exert their toxic effects. Metals such as copper may be rendered unavailable to most organisms by adhering to suspended matter, by complexing with minerals, and by utilization as a trace nutrient by aquatic biota. Copper toxicity also decreases proportionately in surface waters with a Total Organic Carbon (TOC) concentration greater than 2-3 mg/L (EPA 1985e). Table 4.1-25 indicates TOC levels *in the P. H. Glatfelter Company wastewater ranging from 77-99 mg/L. The combination of water hardness and high levels of suspended and dissolved solids, TOC, and other minerals are expected to result in considerable complexing of copper in Codorus Creek, decreasing bioavailability, and therefore, decreasing toxicity.*

Second, aquatic communities have demonstrated the ability to develop tolerance to chronic exposures of certain contaminants. Laboratory tests have indicated that salmon acclimated to long-term, sub-lethal levels of copper have developed increased tolerance to acute levels. Chronic exposure to copper and other metals induces the production of specific enzymes by the fish which work to increase tolerance to ambient levels of metals. Thus, sudden increases of copper, chloride, or other minerals are more harmful than continuous low-level exposure (Chapman, personal communication). Because Codorus Creek has continuous levels of copper, lead, chlorides, and other contaminants at sub-lethal concentrations, the existing aquatic community could be expected to have developed such tolerances.

Third, while it is possible that copper-sensitive aquatic species may be adversely impacted at these concentrations, it is highly unlikely that such organisms inhabit WWF portions of Codorus Creek. Natural concentrations up to 10 μg/L of copper have been documented in unimpacted United States waters (EPA, 1985e), and such naturally occurring concentrations limit biological communities in aquatic systems (Chapman, personal communication).

Average stream flow in Codorus Creek downstream from the P. H. Glatfelter Company outfall would be reduced by 4.9 percent during normal-flow years because of the consumptive use of 4.3 cfs by the proposed facility. The effect would be exacerbated in low-flow years, when the consumptive use by the proposed facility would represent a reduction in average stream flow of 9.6 percent. This reduction in flow would potentially affect aquatic organisms immediately downstream from the P. H. Glatfelter Company's outfall during low-flow years by reduced mixing and by loss and segregation of habitat as the depth and cross-sectional area of Codorus Creek would be reduced to accommodate the lower stream flow. These impacts would not be expected to have a noticeable effect on aquatic communities and would be attenuated naturally downstream as drainage area increases.

4.1.5.2 Terrestrial Ecosystems

Habitat types potentially impacted by construction and operation of the proposed YCEP Cogeneration Facility would include approximately 12 acres (4.8 hectares) of cultivated land, approximately 2 acres

(0.8 hectares) of maintained area (including a softball field), approximately 0.3 acres (0.12 hectares) of successional field, and small areas [i.e., less than 0.1 acres (0.04 hectares)] of hardwood forest.

Construction Impacts. The primary use of undeveloped land surrounding the proposed project site is agricultural, thus providing similar habitat to the cultivated land that would be directly impacted. It is possible that any wildlife displaced from cultivated lands could relocate and adapt to the habitats of the surrounding areas.

Operation Impacts. Because displaced wildlife would be expected to relocate during construction, no impacts resulting from operation of the proposed project would be expected.

4.1.5.3 Threatened and Endangered Species

No threatened or endangered species are known to occur on the proposed project area. Direct consultations were conducted with the Pennsylvania Fish Commission, Pennsylvania Game Commission, Pennsylvania Natural Diversity Inventory, and ***United States*** Fish and Wildlife Service regarding threatened and endangered species. Subsequent correspondence received from these agencies stated that "except for occasional transient species, no federally listed or proposed threatened or endangered species are known to exist in the project impact area," and "except for occasional transient individuals, no state listed endangered or threatened species are known to occur within the proposed project area." The ***United States*** Fish and Wildlife Service further stated that "no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the Fish and Wildlife Service." Letters from these agencies are provided in Appendix E.

Virtually the entire proposed site has been previously disturbed by agricultural, industrial, or dredge disposal activities. Current uses of the property, such as the existing softball field, mowed grass fields, and areas of agricultural corn production, indicate that no suitable high quality habitat is available for threatened and endangered species. Surrounding areas have been similarly disturbed by agricultural, industrial, or residential activities.

Construction Impacts. No rare or threatened species of plant or animal has been reported to occur on the proposed site. ***Therefore, no impacts would be expected to occur.***

Operation Impacts. Because no rare or threatened species of plant or animal has been reported on the proposed site, ***no impacts would be expected to occur as the result of the proposed facility operations.***

4.1.5.4 Biodiversity

Conservation of biological diversity has been recognized as a major national and global goal. In January 1993, the CEQ published a report entitled Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act. Although this report is not formal guidance on the subject of biodiversity, options for the analyses of biodiversity in NEPA documents are presented. The loss of biological diversity has ecological, economic, and aesthetic consequences concerning the variety of life found in natural systems. Main factors that contribute to declining biodiversity include physical alteration of natural areas, pollution, overharvesting of species, introduction of exotic species, disruption of natural processes, and global climate change. Agricultural, recreational, and industrial activities have altered the natural character of the proposed site and adjacent areas proposed for utility infrastructure. Agricultural cultivation and recreational activities continue to be practiced at the proposed site.

Construction Impacts. Land disturbances resulting from construction activities could have an adverse impact on the biodiversity of terrestrial ecosystems. Similar habitats are available in the area surrounding the proposed site. Stormwater runoff would be directed to the stormwater retention pond and therefore, would not directly impact the biodiversity of organisms in Codorus Creek.

Operation Impacts. Impacts to terrestrial ecosystems are expected to be minimal. Only a small parcel of hardwood forest [less than 0.1 acres (0.04 hectares)] would be altered. Cultivated land comprises the remainder of land to be altered that may provide wildlife habitat; cultivated land is the primary undeveloped land surrounding the proposed project site. This type of land *is* readily accessible to dispersed wildlife. The evaluation of projected physio-chemical changes to the creek (see Section 4.1.5.1, Aquatic Ecosystems) suggests that it would be unlikely for the biodiversity of aquatic ecosystems in the vicinity of Codorus Creek to be adversely impacted by operation of the proposed facility.

4.1.5.5 Wetlands

A small area of identified Wetland B (within the 100-year floodplain) would be unavoidably traversed by the steam ***[46 cm (18 inch) diameter insulated pipe]*** and condensate return ***[20 cm (8 inch) diameter]*** pipelines from the YCEP Facility to P. H. Glatfelter Company. The steam pipeline to the P. H. Glatfelter Company facility would be located along the edge of mill pond, and traverse the breakwater between mill pond and Kessler Pond, impacting Wetland B depicted on Figure 3.1-10. Routing the steam and condensate return pipeline on the overhead conveyor between the P. H. Glatfelter Company's Roundwood Facility and main mill facility was considered as an alternative to the route traversing Wetland B. However, the conveyor was not adequate to support these two pipelines; therefore, the breakwater was selected as the preferred route. Wetland values, such as floodplain stabilization, ecological diversity, and water quality improvement are not expected to be adversely impacted by the proposed project's construction and operation.

Construction Impacts. A total of approximately 0.3 acres (0.08 hectares) of wetlands, [0.05 acres (0.02 hectares) of Wetland B and 0.25 ***acres*** (0.1 hectares) of Codorus Creek], would be occupied by new steam and condensate return pipeline corridor facilities. Impacts during construction would include construction vehicle access, sedimentation, erosion from exposed soils, damaged vegetation, and possible placement of pipe supports across the wetland to support the steam and condensate return pipelines to P. H. Glatfelter Company. Accessways would be temporarily developed to allow personnel and equipment ingress and egress to construct the proposed facilities. Wetland B as shown in Figure 3.1-10 extends along the entire eastern edge of the proposed site, and cannot be avoided. ***Any earth disturbance which results in exposed soils or damaged vegetation would be restored by returning the affected area to grade and natural vegetation as soon as possible. Silt fencing would also be installed prior to construction to prevent sediment washing in surface waters. This would be accomplished as soon as possible to prevent erosion and sedimentation control problems.***

Operation Impacts. There would be some periodic minor disturbance due to personnel and equipment entry for inspection and maintenance of the new steam pipeline to P. H. Glatfelter ***Company***. Disturbance would only occur if heavy equipment was needed for maintenance of the facilities.

It is expected that the affected wetlands would be restored to original condition after construction of the pipeline facility, and that a Section 404 Dredge and Fill Permit from the ACOE may not be necessary. It is also anticipated, barring unforeseen circumstances, that the regulated activities that would impact 0.3 acres (0.08 hectares) of jurisdictional wetland could be authorized by ACOE under Nationwide Permit Number 12, Backfilling and Bedding For Utility Lines, and/or Nationwide Permit Number 26, Headwaters and Isolated Water Discharges. However, coordination with the ACOE, including on-site review, would be required prior to the authorization of any wetland disturbing activities, and their recommendations will be explicitly followed for required mitigation.

4.1.6 Human Health and Safety

The proposed Cogeneration Facility would be subject to ***United States*** Occupational Safety and Health Administration (OSHA) General Industry standards (29 CFR Part 1910). Construction- and operation-related risks would be minimized by YCEP's ***adherence to*** OSHA and Air Products and Chemicals, Inc. health and safety standards *(ENSR, 1994)*. ***The proposed facility structures would be designed and constructed to resist the effects of earthquake motion as determined by Section 1612 of the BOCA National Building Code. The following criteria would be used for the design: Seismic Hazard Exposure Code - Group I and Seismic Performance-Category B. These criteria would provide adequate safety from earthquakes which, given the infrequency and low intensity of seismic activity in the area, would not be expected to exceed level VI on the modified Mercalli scale (approximately equivalent to magnitude 5 on the Richter scale).***

Construction Impacts. During construction, OSHA Construction Industry standards (29 CFR Part 1926) would be followed. These standards establish practices, chemical and physical exposure limits, and equipment specifications to preserve employee health and safety. Construction permits and safety inspections would also be employed in an effort to minimize the frequency of accidents and further ensure worker safety.

Operation Impacts. In each of the last 6years (1989-1994), the rate of recordable injuries for Air Products employees has been well below the average reported for all Chemical Manufacturers Association (CMA) members. In large part, that is due to Air Products' commitment to safety inspections and safety training, for both employees and contractors. Employees who potentially could be exposed to chemicals would be trained on their safe handling. Construction and operation equipment would be required to meet all applicable safety design and inspection requirements, and personal protective equipment would meet regulatory and consensus standards for adequacy *(ENSR, 1994)*.

YCEP would develop an internal "Spill Prevention, Control, Countermeasure, and Hazardous Waste Contingency Plan" for the prevention of accidents, which would include explicit procedures to be followed in an emergency *(ENSR, 1994)*.

The proposed facility would have a Plant Safety Manual that would serve as a guide for providing a safe and healthy work environment for employees, visitors, contractors, *and* the community. The manual would be used as a reference and training source for employees and would describe the proper and safe manner for working within the facility. The Plant Safety Manual would be composed of the following: (1) requirements for personal protective equipment (eye, head, foot, ear, respiratory protection); (2) accident reporting and investigation procedures; (3) safety training requirements; (4) stipulations for inspections and audits; (5) chemical hazard information [material handling, Material Safety Data Sheet (MSDS) information, hazard communication program]; (6) emergency response procedures; (7) an industrial hygiene program; (8) *a* medical program; and (9) engineering safety procedures. Employees would be trained in safety procedures prior to working in the facility. Refresher training also would be provided.

A comprehensive training and start-up program would be implemented to ensure safe and efficient operation of the new Cogeneration Facility. It is anticipated that training for the new facility would be given through a plan developed by YCEP, and supervised by employees currently responsible for operations at similar facilities. Furthermore, two sections of the Air Products Standard Practice manual, New Employee/Transferee Safety Training and On-going Safety Training Program, would govern the safe operation of the proposed facility. Process training is comprehensive and facility/operation specific. An operator's progression through the entire training cycle is dependent upon personal ability and motivation and the complexity of the operation. The training cycle, typically 1 to 2.5 years, might progress as follows:

1. *Initial Safety Training* — *2 to 3 weeks*
   General company training and facility-specific training.

2. *Detailed process training* — *2 to 3 months*
   Systematic training for developing a fundamental understanding of each process system as well as the relationships between process systems.

3. *Junior operator status* — *1 to 2 years*
   Hands-on training accomplished by having the junior operator accompany a "top operator." The junior operator would gain valuable experience while receiving guidance in decision making situations.

*4. **Oral Boards*** ***4 to 6 hours***

This oral exam will ensure that an operator seeking full operator status has a thorough understanding of all processes and procedures necessary to operate the plant. The Oral Boards are typically administered by a management team including the plant manager, production superintendent, and shift supervisor.

4.1.6.1 Solid Waste

This proposed project would generate municipal wastes, sanitary wastes, and ash byproduct. The major portion of the solid wastes would be ash byproduct, which is anticipated to have a beneficial use in mine reclamation applications. In addition, the proposed facility would generate solid waste that would be classified as hazardous wastes regulated under the Resource Conservation and Recovery Act (RCRA). Discussion of solid hazardous waste impacts is provided in Section 4.1.6.2.

Landfill space would be needed to dispose of municipal waste generated at the proposed facility. Solid waste disposal locations within York County were identified in Section 3.1.6.2. Sufficient landfill capacity is available to satisfy all waste disposal requirements for the facility.

Construction Impacts. YCEP would be ultimately responsible for the safe disposal of all wastes. A private contractor would dispose of debris generated during the construction of the facility at an appropriate landfill, or the recycling center when possible. It is estimated, based on Air Products' previous experience with facility construction of this type, that 7,646 m^3 (10,000 yds^3) of construction waste would be generated over the 3-year construction period. Each contractor would be responsible for ensuring that the waste material they generate is properly disposed; it is anticipated that waste disposal would occur locally. Portable restrooms for employee use during the construction period would be provided by a private contractor.

Operation Impacts. Because the proposed facility would utilize a significant quantity of coal each year, it contributes to the national demand of coal products and indirectly to the impacts related to coal mining and its commercial preparation. The mining and preparation of coal from underground sources has the potential to produce additional waste material. At least half of the Appalachian coal mined from underground sources is cleaned, and refuse generated from the cleaning and preparation of coal can amount to as much as half a ton for each ton of cleaned coal produced *(DOE, 1989a)*. The proposed project would use approximately 0.91 million tons of coal per year *(ENSR, 1994)*, and project specifications call for all of this coal to be washed. Based on the above waste per ton of coal estimate, approximately 0.45 million tons/year of coal refuse could potentially result from mining and cleaning. These types of impacts are analyzed in DOE's Programmatic EIS *(DOE, 1989a)*.

For comparison purposes, the total coal production in the United States in 1992 was slightly more than 1,000 million tons *(Energy Statistics Sourcebook, 1993)*. The ***United States*** demand for Appalachian coal alone is projected to be 519 million tons by the year 2000 *(Energy Information Administration, 1993)*. The coal used by the proposed project, at maximum combustion rates, would amount to less than one-tenth of one percent of the total coal mined in the United States annually, and less than two-tenths of one percent of the projected utilization of Appalachian coals by the year 2000 (the point when the proposed facility would complete the 24-month demonstration period and begin commercial operation).

Municipal waste generated by the proposed YCEP Cogeneration Facility would be approximately 3 tons per month. The majority of this waste would consist of paper and cardboard, which would be disposed of through a private contractor.

The CFB combustion process utilizes coal and limestone in the boiler. After combustion, the resulting limestone ash byproduct material would come from two areas: bottom ash material from the CFB boiler and fly ash from the pollution control equipment (boiler baghouse). The fly ash and bottom ash byproduct materials are dry and inert, consisting of an alkaline heterogenous mixture of coal ash, calcium sulfate, and calcium oxide. The bottom ash and fly ash materials would be conveyed separately to different on-site enclosed storage silos having a total capacity of approximately 3,100 tons (a 4-day supply). During full operation, the expected quantity of ash byproducts to be generated would be up to 270,000 ***tons/yr*** (based upon trial burns conducted by the boiler manufacturer). The ash handling system, located in the ash silo area, would include ash conditioning equipment to dampen the ash with water, thus minimizing the potential for fugitive dust emissions prior to loading it into totally enclosed 25-ton net capacity trucks. The trucks would be used in accordance with applicable state regulations.

The proposed facility would not produce large quantities of ash byproducts requiring handling and disposal until after start-up, scheduled for December 31, 1997. Potential beneficial uses for the ash byproduct would be related to its high lime content (because of the presence of calcium oxide); high concentrations of silicon, aluminum and iron (Table 4.1-33); and its tendency to harden. Potential uses for this material include use as a sludge stabilization agent, an agricultural soil additive, and as a road bed aggregate. The preferred method of ash byproduct disposal would be its use for mine reclamation.

Reclaiming coal mine areas with ash byproduct as backfill in a reclamation project can help restore the topography of the mined area, and the alkalinity of the ash byproduct can help neutralize the pH of the acid mine water that results from coal mining operations.

Table 4.1-33. Typical mineral content of CFB ash.

Mineral	Percentage
Silica (SiO_2)	48.0
Alumina (Al_2O_3)	22.0
Ferric Oxide (Fe_2O_3)	14.0
Lime (CaO)	12.0
Sulfur Trioxide (SO_3)	3.0
Other Oxides [Potassium Oxide (K_2O); Sodium Oxide (Na_2O); Barium Oxide (BaO); and Manganese Oxide (Mn_3O_4)]	1.0

Source: ENSR, 1994.

During operations, the proposed project would generate as much as 31 tons per hour of ash byproduct. This would result in an estimated 41 truckloads of ash byproduct leaving the proposed facility daily. The pH of the ash product is expected to be between 10 and 12, ***which is below the level of 12.5, at which the material*** would be classified as hazardous under 40 CFR 261.22. YCEP would test ***the ash*** waste ***prior to disposal to ensure its nonhazardous*** characteristics.

YCEP proposes to transport the facility ash byproduct to the Harriman Coal Corporation (Harriman) in Schuylkill County, Pennsylvania. Harriman has an existing anthracite surface mine area that is currently permitted to accept coal ash as backfill material (PADER Permit #54803004C4). This reclamation site is located in a sparsely populated anthracite mining area. The Bureau of Mining and Reclamation has encouraged Harriman to use coal ash to reclaim the site topography, since the previous owner used all of the available native soils to backfill several nearby abandoned areas *(ENSR, 1994).*

Harriman has the capacity to accept, in a single mine reclamation pit, the entire 270,000 ***tons/yr*** that the proposed Cogeneration Facility could produce, for a period of 15 to 20 years. A commercial agreement between YCEP and Harriman, executed in 1993, provides YCEP with exclusive rights to this single pit. Harriman also has adjacent permitted pits that could accommodate the proposed facility's ash byproduct for an additional 10 to 15 years. The impact from disposal of the ash byproduct would be positive and long-term due to its beneficial use in mine reclamation *(ENSR, 1994).*

Ash would be conditioned and hauled ***112 km*** *(*70 mi*)* to the Harriman Coal Corporation, mine reclamation site, where it would be used for fill associated with mine reclamation. The trucks used to haul ash would, at a minimum, be completely covered to minimize fugitive emissions and prevent leaking. YCEP would require that the ash hauler comply with all applicable Federal, state, and local statutes, ordinances, and motor vehicle codes; and would require that trucks hauling ash adhere to designated truck routes. YCEP would establish standards regarding environmental practices, historic safety records, and insurance coverages to minimize any potential impact on the environment or the communities in which YCEP owned or contracted vehicles would operate.

4.1.6.2 Hazardous and Toxic Materials and Wastes

Construction Impacts. Storage of hazardous and solid waste generated by the construction of the proposed facility would be the responsibility of the contractor generating the waste. YCEP would ensure that proper procedures are followed.

Operation Impacts. YCEP would register with EPA as a generator of waste material and obtain a hazardous waste identification number. It is anticipated that the proposed facility would qualify as a small quantity generator of hazardous waste (less than 1,000 kg per month) and would satisfy applicable state and Federal requirements for small quantity generators *(ENSR, 1994)*.

As part of the proposed Cogeneration Facility operation, chemicals (for water treatment) and lubricants (for mechanical equipment upkeep) would be used and stored on site. These ***hazardous*** materials would include oil and grease, diesel fuel, solvents (for degreasing equipment), caustics and sulfuric acid, water treatment chemicals, and aqueous ammonia *(ENSR, 1994)*.

Oils and greases would be present on site as an inherent part of the mechanical equipment. A supply of approximately twelve (12) 55-gallon drums would be stored on site for replenishing equipment needs. These drums would be kept inside buildings to prevent exposure to rainfall.

Two above-ground diesel storage tanks containing the fuel supply for emergency equipment would be located on site. The facility's fire water pumps would have a 250-gallon storage tank. This tank would be located within a building along with the fire water pumps near the P. H. Glatfelter Company water intake at the mill pond. The second storage tank would be a 500-gallon tank used for a diesel-powered emergency backup electrical generator. This electrical generator would be used to provide power to the site in the event of a power failure at the proposed Cogeneration Facility. This generator and diesel storage tank would be located northeast of the boiler building. Both diesel fuel storage tank areas would be equipped with sufficient secondary containment to prevent a release of diesel fuel in the event of a tank leak *(ENSR, 1994)*.

Solvent material would be kept on site for normal maintenance use such as degreasing of machine parts. ***The spent degreasing solvents would be the only hazardous waste generated by the proposed facility. Hazardous materials, such as fuel or water treatment chemicals, would be consumed by the process and would not result in the generation of hazardous waste materials.*** YCEP would contract with an outside firm (***e.g***, Safety Kleen, Inc.) to provide a self-contained 90-pound solvent unit. This unit would be equipped with an apparatus allowing the operator to rinse machine parts and recycle the solvent. Approximately once each month, the contracted firm would replace the solvent unit with a fresh unit. Because of the limited and intermittent use of this material, no special regulatory provisions are required for VOC emissions control. The contracted firm ***is expected to recycle approximately 70 percent of*** the spent solvent for future use. ***The remaining 30 percent of material from the spent degreasing unit would consist of oils, sediment, and water. The water would be removed and discharged under the contracted firm's NPDES permit. The residual oils and sediment would be incinerated, in accordance with applicable permits, in a cement kiln as part of a fuel augmentation program. It is anticipated that no more than 11 kg (25 lbs) of residue would be incinerated each month.*** The solvent contained in the Safety Kleen parts washer is a petroleum naphtha with trace (< 1 percent) concentrations of benzene, xylene, toluene, and/or 1,1,1-trichloroethane. ***While*** the spent solvent would be a RCRA hazardous waste, this solvent is not listed as an extremely hazardous substance (EHS) under Title III of the Superfund Amendments and Reauthorization Act (SARA) and consequently, is not subject to the requirements of Section 302. Because this solvent is not an EHS, reporting under Section 312 of the ***Emergency*** Planning and Community Right-to-Know ***(EPCRA)*** (Tier I and/or Tier II) is required only if a facility has more than 4,536 kg (10,000 pounds) on site at any time during the reporting period. At no time would 4,536 kg (10,000 pounds) of solvent be stored on the proposed facility site. ***In fact, during*** facility construction and operation, less than 1,000 kg (2,205 lbs) per month of the solvent would be stored and handled on site; however, the ***proposed*** Cogeneration Facility would require an EPA Small Quantity Generator Notification: Hazardous Waste Identification Number *(ENSR, 1994)*.

Most of the chemicals to be used at the proposed facility would be delivered in closed bulk containers and stored in the cooling water treatment building, the demineralizer building, or outside in silo/tanks depending on the quantity and use location of each chemical. The chemicals would be used primarily for cooling water and boiler water treatment, and would include alum or coagulants, caustic and sulfuric acid material, soda ash, hydrated lime, and polymers. Small quantities of miscellaneous chemicals and equipment lubricants would be stored within the maintenance and storage buildings. Curbs and drains would be installed at all chemical storage areas to route any spill to enclosed sumps for collection and/or treatment. Outdoor storage tanks would be situated within diked concrete areas; sufficient secondary containment would be provided to prevent a release. All transport piping would be constructed of compatible material to prevent corrosion or deterioration by the liquid being carried *(ENSR, 1994)*.

The estimated quantities of on-site storage of chemicals for water treatment and pollution control equipment are as follows:

- Cooling water treatment chemicals
  - Dispersant (phosphate polymer) — 7,500 gallons
  - Biocide (NaOCl, $NaClO_2$, HCl) — 3 x 7,500 gallons
- Sulfuric Acid (H_2SO_4) — 12,000 gallons
- Caustic (NaOH) — 12,000 gallons
- Aqueous Ammonia — 30,000 gallons

Small quantities of miscellaneous chemicals would be stored within the maintenance and storage buildings. All chemical storage areas would contain curbs and drains to route spills to enclosed sumps for collection and/or treatment. Outdoor storage tanks would be surrounded with diked concrete areas that would provide sufficient secondary containment of the storage tank to prevent a release to the environment. Transport piping would be constructed of compatible material to prevent corrosion or deterioration by the liquid being carried.

The water treatment chemicals would be added directly into the water systems such as cooling water, process water, and steam systems for control of corrosion and scaling. These chemicals would dissolve in the water system and decompose into their anions, cations, or elemental compounds, precluding the need for disposal. The water treatment and pollution control materials that would be used during operations at the proposed facility would not generate any hazardous waste.

Approximately 1,600 lbs/hr of aqueous ammonia (27 wt. percent) would be required for use in the SNCR system. This would equal a daily flow requirement of 38,400 pounds or 19.2 tons. Assuming the use of 25-ton capacity delivery trucks, delivery would be required every 1.3 days or just over 5 trucks per week. Although it would require greater volumes, YCEP proposes to use aqueous ammonia instead of anhydrous ammonia because aqueous ammonia is safer to handle and store. The ammonia storage tank would be located within a fully contained and diked concrete area that would provide sufficient secondary containment to prevent a release *(ENSR, 1994)*.

A chlorine dioxide solution would be used in the cooling water recirculating system as the biocide for controlling microbiological growth (algae). The chlorine dioxide material is an effective biocide with constant activity over a broad pH range. The chlorine dioxide solution, which would be made on site in a water stream, can be produced by mixing sodium chlorite (***$NaClO_2$***) with sodium hypochlorite ***(NaOCl)*** and hydrochloric acid (HCl) or by mixing sodium chlorate ($NaClO_3$) and ***hydrochloric acid*** (HCl).

Although the chlorine dioxide solution for biocide control is a more expensive option than chlorine gas, the use of chlorine dioxide was determined to be the best alternative for this cooling water treatment application for the following reasons.

- The chlorine dioxide solution would avoid the need for storage and use of gaseous chlorine material; otherwise, on-site storage of 4 or 5 one-ton cylinders of gaseous chlorine would be needed.

- The cooling water source would be the P. H. Glatfelter Company wastewater effluent, which is elevated in organic material. Chlorine dioxide tends to react with organics by oxidation and does not appreciably produce chlorinated organics (chloramines and chlorinated phenolics) that could be produced with the use of gaseous chlorine.

- Chlorine dioxide has a positive effect on phenolic compounds if found in the water supply. The chlorine dioxide and phenolic compounds reaction process causes a breakdown of the phenolic compounds to carbon dioxide and water.

- When using gaseous chlorine, the potential exists for chloroform and other trihalomethanes to form during the water treatment process. Because of its chemical properties, chlorine dioxide does not tend to contribute to the formation of chloroform or trihalomethanes.

Chlorine dioxide is currently being used in potable water treatment to remove tastes and odors, and in cooling water systems to control microbiological growth (algae). It also has wide application in the food-processing and paper-making industries.

The Hazardous Substance Database (HSDB) maintained by the National Institutes of Health, National Library of Medicine, was searched for the materials expected to be stored or for materials which are trace components of degreasing solvents used at the proposed facility. The HSDB provides ratings of chemicals by EPA and the World Health Organization (WHO). EPA and WHO have not rated sodium hydroxide (NaOH), propane, alum, 1,1,1-trichloroethane, ammonia, hydrated lime (calcium hydroxide), or petroleum naphtha for carcinogenicity. Sodium chlorite ($NaClO_2$), sodium hypochlorite (NaOCl), hydrochloric acid (HCl), xylenes, and toluene are rated Class D, not classified as carcinogenic to humans due to insufficient evidence linking these chemicals to cancer. Sulfuric acid's (H_2SO_4) rating indicates occupational exposure to strong inorganic acid mists is carcinogenic to humans. Benzene is rated Class A, a human carcinogen. This rating, however, does not indicate a level of carcinogenicity for benzene, only that evidence suggests the chemical is a probable cause of cancer in humans.

Prior to plant start-up and the first delivery of any chemicals, the facility would develop a Preparedness, Prevention, and Contingency (PPC) plan that would include procedures for prompt handling and reporting (within 24 hours) of any spill in accordance with regulatory requirements as well as a list of measures to mitigate such a release. The PPC plan is required by PADER as part of the Commonwealth's regulatory program. The proposed facility also would develop a SPPC plan, required by the U.S. EPA, that would outline engineering design measures incorporated into the proposed facility to ensure that the potential for oil and chemical spills would be minimized. In the unlikely event of a significant release of any chemical solution, spilled liquid would be retained within the concrete containment area. Interconnecting piping, located overhead or within trenches, would collect and route potential spills directly to a sump for proper treatment. A low point gravity drain routed to the demineralizer sump would be provided in the truck containment area to remove accidental spillage in this area *(ENSR, 1994)*.

4.1.7 Noise

Noise is of environmental concern because it can cause annoyance and adverse health effects. Noise is measured in decibels (dB). One decibel is considered the lowest audible sound to humans. Decibels increase logarithmically and reach a painful level to the human body around 140 dB. Sound pressure levels of separate sounds are not arithmetically additive. For example, if one sound of 70 dB is added to another sound of 70 dB, the total is 73 dB, a 3-decibel increase, and not 140 dB. When sound pressure levels are measured on a meter using the A-weighting filter network, they are expressed as dBA. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear. Typical A-weighted sound levels are listed in Table 4.1-34.

Noise impact assessments involve three basic steps. The first step is to determine baseline noise levels at points in the community where people could potentially be adversely affected; these points (referred to as noise-sensitive receptors) are generally the residences, schools, and parks closest to the proposed site. Sensitive noise receptors selected to characterize noise levels in the vicinity of the proposed facility, as well as existing noise levels at these locations, determined through monitoring *(ENSR, 1994)*, are presented in Section 3.1.7 and Appendix F.

The second step in a noise impact assessment is to predict the change in noise level at sensitive receptors that would result from both the construction and operation of the proposed facility. After determining the probable change in the noise environment, the third and final step of the assessment is to evaluate these changes according to applicable standards and guidelines *(ENSR, 1994)*.

The Noise Control Act of 1972 mandated the EPA to "develop and publish criteria with respect to noise" and then "publish information on the levels of environmental noise the attainment and maintenance for which in defined areas under various conditions are requisite to protect the public health and welfare with an adequate margin of safety" *(EPA, 1974)*. This referenced "levels" document represents the EPA's response to a congressional mandate. In the foreword to the document, the EPA emphasized that its contents "do not constitute Agency regulations or standards." The EPA also indicated that the yearly average values identified as "levels" such as $L_{dn} \leq 55$ dBA, are not regulatory goals but should be interpreted as levels below which there would be no reasonable suspicion that the general public would be at risk from identified noise impacts *(EPA, 1978)*. The results presented in the document are intended to be a starting point for determining noise criteria that fit specific local needs and situations. Given the heavy industrial character of the project area and corresponding baseline noise environment, noise standards were set with reference to specific factors governing human response to noise, as described in the EPA's "levels" document *(EPA, 1974)*. In general, the level of impact on human receptors resulting from changes in noise caused by a project is linked to a number of interrelated factors, including the level of existing, non-project noise sources; people's attitudes concerning the project; the number of people exposed; and the type of human activity affected (e.g., sleep, recreation, or conversation).

Table 4.1-34. Typical A-weighted sound levels.

Sound Level (dBA)	Location/Source	Subjective Impression
180	Rocket engine (3 feet)	Severe pain
160	Sonic boom	
140	Threshold of pain	Slight pain
130	Hydraulic press (3 feet)	
120	Pneumatic riveter (3 feet)	Extremely loud
110	Unmuffled motorcycle (3 feet)	
100	Chain saw (3 feet)	Very loud
90	Train (100 feet)	
80	Truck traffic (50 feet)	Moderately loud
70	Auto traffic (50 feet)	
60	Normal conversation	Typical
50	Typical office	
40	Bedroom at night	Quiet
30	Whisper	
20	Sound test booth	Very quiet
10		
0	Threshold of hearing	Total silence

Although there are no formal Federal, state, or local noise criteria applicable to the proposed project, the nearby existing mainline railroad facility currently is, and the proposed train operations on the project site would be, covered by EPA noise regulations that pre-empt regulation by other governmental bodies *(42 U.S.C. § 4916)*. The railroad entity responsible for the delivery of coal (Yorkrail) would be subject to EPA noise regulations limiting the amount of noise generated by certain main line and rail yard activities, including locomotive, railcar, and coupling operations (40 CFR Part 201). Locomotive and coupling noises were included in the impact assessment of the proposed project *(ENSR, 1994)*.

The noise effects of the proposed facility were evaluated for both construction and operational conditions. Conservative assumptions were employed in the modeling to ensure that all potential concerns were identified. Because the proposed project site is in close proximity to existing industrial noise and trucking operations, and some surrounding residential areas have baseline L_{dn} values over 55 dBA, the following qualitative standard was in its initial design: Permanent, long-term changes to the noise environment resulting from operation of the facility should be limited to indiscernible sound levels.

During peak construction periods, noise from the site would be audible during the daytime at the closest receptors for which noise impacts were assessed. During operation, mitigation measures incorporated into the design of the facility would ensure that changes in existing noise levels at outdoor receptors surrounding the site would be minimal *(ENSR, 1994)*.

Construction Impacts. Noise impacts at receptor locations were analyzed for each major phase of construction work activity. Since construction activities would be confined to daytime hours, no noise impacts would occur during the nighttime. The analysis assumed typical mixes of on-site construction equipment (e.g., bulldozers, graders, cranes, trucks, etc.), and employed a point source propagation model (ERTNOI). The results of this analysis are summarized in Table 4.1-35. The projected increase in noise resulting from construction activity at the proposed site would be 3 dBA or less (a just discernible increase) at all receptor locations and through all construction phases. Construction noise would not represent a permanent, long-term change in the existing noise environment; it would be limited in duration to the time required to complete the various construction phases. Following completion of construction activities, construction noise impacts would cease. The complete noise analysis is included in Appendix I of the EIV, which is available in the public reading rooms (Appendix A) *(ENSR, 1994)*.

In addition to on-site, non-episodic activities incorporated into the noise analysis, construction would involve the purging of dirt and construction debris from steam systems. Typically, this episodic activity is scheduled for several brief periods near the end of construction. Because purging could result in very high noise levels, special mitigation measures such as ***using*** silencers, minimizing the occurrence, scheduling purging during less sensitive times of the day, and providing advance notice to the potentially affected public would be utilized *(ENSR, 1994)*.

Heavy duty trucks used in construction also represent an off-site source of noise along access routes to the project; on-site usage was included in the construction noise model. Although equipment contractors have not yet been selected, truck traffic would be expected primarily to utilize York Road (Route 116), an existing high volume truck route. Construction truck traffic would be scheduled throughout the daytime hours and the resulting noise would be consistent with existing transportation noise *(ENSR, 1994)*.

Table 4.1-35. Preliminary comparison of existing and predicted construction noise levels (L_{eq}, dBA).

Receptor Location				Baseline Noise Level (Daytime)	Construction Phase Noise Levels*							
					Excavation		Concrete Pouring		Steel Erection		Mechanical	
Map Key	Land Use Description	Distance (feet)**	Direction (feet)**		Total	Increase	Total	Increase	Total	Increase	Total	Increase
1	Residential	700	S	61	64	3	62	1	64	3	62	1
2	Residential	1200	SW	65	65	0	65	0	65	0	65	0
3	Recreational	1000	SE	60	62	2	60	0	62	2	60	0
4	Industrial/ recreation	1400	E	57	59	2	58	1	59	2	58	1
5	Residential	1900	E	60	61	1	60	0	61	1	60	0
6	Residential	3200	W	46	48	2	47	1	48	2	47	1
7	Agricultural (Chickens)	2400	W	51	53	2	52	1	53	2	52	1

* Totals are logarithmic sum of baseline plus noise component due to construction noise from project. Increases are relative to baseline noise level.

** With respect to the approximate acoustical center of project equipment.

Source: Teplitzky, 1978 as reported in ENSR, 1994.

The construction of the steam and condensate return lines would be of limited duration and would occur in proximity to existing noise sources from the P. H. Glatfelter Company mill. Insulation and other noise mitigation techniques would be employed on major pieces of construction equipment. With these mitigation measures, the predicted increase in noise levels at the nearest outdoor receptor locations during normal periods is expected to be minimized *(ENSR, 1994)*.

Operation Impacts. To assess future noise levels that would be associated with normal operation of the proposed facility, potential noise sources and their locations in relation to each other and to the off-site noise receptor locations were identified. Principal noise sources would include the cooling tower stack, induced draft fan, coal car unloading operation, and various blowers and fans. Intermittent noise from uncoupling of the unit trains, expected to occur only once every 4 to 5 days, also was analyzed. The offset effects related to the removal or shut down of existing equipment (e.g., P. H. Glatfelter Company Power Boiler No. 4) were not included in the analysis because accurate data on the noise contributions of this equipment were not measurable (plant operating requirements precluded direct measurements). The degree of noise reduction associated with nonuse of this equipment would be expected to be relatively small *(ENSR, 1994)*.

The levels of noise expected to occur at receptor locations were modeled using the same point source propagation model (ERTNOI) used for the construction noise model. The model includes the most significant factors affecting the propagation of noise out-of-doors. All sources were assumed to operate continuously, except for sources associated with coal unloading, a non-continuous operation that would be performed only during daytime hours. The detailed analysis of operational noise is included in Appendix I of the EIV, which is available in the public reading rooms (Appendix A); the analytical results are summarized, and compared to existing noise levels, in Table 4.1-36 *(ENSR, 1994)*, which shows that the predicted increase in noise resulting from facility operation during both daytime and nighttime periods would be minimal. Noise levels associated with the proposed project would be lower during nighttime hours because activities associated with coal car unloading would cease. The limited extent of noise impacts would be attributable, in part, to the incorporation of significant noise attenuation features into the design of major noise sources, and to the planned provision of noise insulation in enclosure walls *(ENSR, 1994)*.

Steam Venting

Steam produced by the CFB boiler would drive the turbine, and a portion of this steam would be sent to P. H. Glatfelter Company for use in its paper-making process. Under normal operating conditions, the steam would be transported through various vessels (e.g., heat exchangers, condenser) and piping systems within the facility. Under other conditions, steam pressure may deviate from the standard operating pressure and the release of steam to protect vessels and piping systems from over-pressurization would be required. This protection would occur primarily by two means: (1) an automatic pressure control valve and (2) a safety relief valve.

The primary method of steam relief would be from an automatic pressure control valve. This valve would electronically sense an irregular high pressure condition, and trigger the opening of an orifice that would allow steam to be vented to the atmosphere until normal pressure could be obtained. To lessen the noise associated with the high velocity release of steam, the control valve would be equipped with a vent silencer. Silencers are open-ended vessels containing baffles designed to reduce the velocity of steam, and acoustical material to dampen the sound. The other method for venting steam would use a

Table 4.1-36. Baseline and project operational noise levels.

Receptor Location Characteristics				Existing (Baseline) Noise Levels (dBA)		Projected Noise Levels (dBA)*					
						Project Noise		Project + Existing		Increase***	
Location	Land Use	Distance (feet)*	Direction (feet)*	Day** (L_d)	Night** (L_n)	Day (L_d)	Night (L_n)	Day (L_d)	Night (L_n)	Day (L_d)	Night (L_n)
1	Residential	700	S	61	50	55	50	62	53	1	3
2	Residential	1200	SW	65	56	54	48	65	56	0	0
3	Recreation	1000	SE	60	52	54	53	61	55	1	3
4	Industrial/ recreation	1400	E	57	55	50	46	58	56	1	1
5	Residential	1900	E	60	55	47	43	61	55	1	0
6	Residential	3200	W	46	40	45	40	49	43	3	3
7	Agricultural (Chickens)	2400	W	51	43	48	43	53	46	2	3

* With respect to the approximate acoustical center of project equipment.

** L_d refers to daytime (7:00 am - 10:00 pm). L_n refers to nighttime (10:00 pm - 7:00 am) noise level.

*** Increase is total with respect to existing noise levels.

Note: The representation of project noise includes the additional noise of a switcher locomotive (located in the vicinity of the unloader building) and coal car unloading. Intermittent sources such as steam venting and rail car coupling are not included in this table. (Please refer to text.)

Source: ENSR, 1994.

safety relief valve that would open when a high pressure condition was sensed. It is anticipated that, because monthly maintenance would be conducted on the automatic control valve, the use of the safety relief valves would occur infrequently. Due to safety, operation, and maintenance considerations, this valve would not be equipped with a silencer.

Railcar Coupling

The results of the railcar coupling noise analysis are presented in Table 4.1-37. Because of the distance between Receptors 1 through 5 and the railcars, minor increases in noise levels at these locations would

Table 4.1-37. Predicted rail car coupling noise.

Receptor Location Characteristics		Predicted Coupling Noise[a] Daytime L(maximum), dBA	Noise Levels (dBA) Existing (Baseline)[b]		Comparison of Coupling Noise Relative to Existing Noise
Location	Land Use		Daytime L_{90}	Daytime L_{10}	
1	Residential	50	58	62	Below
2	Residential	52	52	67	Below
3	Recreational	38	57	61	Well below
4	Industrial/ recreational	40	54	59	Well below
5	Residential	38	56	63	Well below
6	Residential	56	41	49	Above
7	Agricultural (Chickens)	60	47	54	Above

[a] Coupling operations located within the siding area located to the northwest of the proposed project.

[b] L_{90} and L_{10} refer to the noise level that is exceeded 90 and 10 percent of the time, respectively, the indicated noise level values therefore illustrate the general range of existing noise levels.

Source: ENSR, 1994.

result. Receptors 6 and 7, because of their relative proximity to the track where coupling operations would occur, would experience increases in excess of 10 dBA, which is perceived as a doubling in loudness. However, the infrequency of this event, and its occurrence only during daytime periods, should reduce its effect upon human activity associated with the residence of Receptor 6 *(ENSR, 1994).*

Receptor 7 is a chicken breeding farm. Railcar coupling noise outside the chicken house would be predicted to be approximately 60 dBA (Table 4.1-37). Because of the building envelope, noise levels inside the chicken house would be reduced by at least 10 dB or more. Based upon a study of the effect of low flying jet planes on chicken behavior, noise levels well over 70 to 80 dBA seem to be required before serious disturbance of chickens occurs *(EPA, 1971b).* Railcar coupling noise at 60 dBA is not expected to impact the chicken breeding operation at Receptor 7 *(ENSR, 1994).*

Low noise design equipment would be used as appropriate. Where necessary to provide further sound attenuation, equipment noise sources would be enclosed in insulated buildings designed to absorb noise. The coal and ash byproduct conveyor systems would be enclosed for noise control purposes. Unloading of coal from railcars would occur within an insulated building equipped with entrance doors. Additional mitigation features would include extended fan housings on the cooling tower, thermal and acoustic insulation around the induced stack draft fan, and discharge silencers on the ventilation and forced draft fans. The spatial orientation of the major noise production structures would be planned to block direct propagation of noise to off-site receptors. The cumulative result of these noise reduction measures would be to minimize the increase in background noise at the off-site receptors due to operation of the proposed facility *(ENSR, 1994).*

4.1.8 Transportation and Traffic

Construction Impacts Traffic associated with the construction phase of the project was estimated for the month of greatest construction employee activity. A peak employment of 974 persons was assumed which would result in an additional 712 vehicles accessing the project site. A rider occupancy of 1.15 persons per vehicle was assumed, as were slightly staggered work schedules that would result in less vehicular activity during the traditional morning (7 ***to*** 8 A.M.) and evening (5 ***to*** 6 P.M.) peak hours. Conservatively assuming an average increase in construction employee traffic of 178 vehicles over the entire construction period, traveling an average of ***18 km (***40 mi***)*** one way per day, where 80 percent of the driving is rural (accident rate, 1.4×10^{-7} no./km) and 20 percent suburban (accident rate, 2.7×10^{-6} no./km), an increased accident risk of fewer than 4 accidents per year could potentially occur during the construction period *(DOE, 1986;* ***United States*** *Nuclear Regulatory Commission, 1977).*

All material laydown and employee parking areas would be provided on site. Facility security would enforce a ban of on-street parking. Traffic conditions throughout the construction period would be monitored. If congestion should be noted, additional mitigation measures such as scheduling of shifts to further avoid peak periods or the stationing of traffic control personnel at critical locations would be instituted.

A capacity analysis for the A.M. and P.M. peak hours was performed at three key intersections in close proximity to the proposed project site. Traffic impacts during project construction are described in terms of changes to the Level of Service (LOS).

York Road (PA Route 116) and Colonial Valley Road (SR 3053)

During the A.M. peak hour, eastbound traffic approaches on Colonial Valley Road (Route 3053) at York Road (Route 116) would experience a degradation from LOS D to LOS E. All other approaches would operate at a LOS C or better.

During the P.M. peak hour, traffic on Colonial Valley Road (Route 3053) at the westbound approach of York Road (Route 116) would operate at LOS D. The westbound traffic going through the intersection or turning south onto York Road (Route 116) would experience the greatest delays because this intersection is not signalized.

York Road (PA Route 116) and Roundwood Facility Access Drive

Northbound traffic turning west into the proposed project site during the A.M. peak hour would operate at LOS E, compared to a LOS A without construction traffic. The small amount of traffic exiting the site onto York Road (Route 116) would operate at LOS F. Delays would result primarily because this intersection is not signalized.

During the P.M. peak hour, LOS F conditions would exist for traffic exiting north and south onto York Road (Route 116). Again, the lack of a controlled intersection would be primarily responsible for these delays.

Access to the construction site would be from the existing access drive to the Roundway Facility. This driveway would be able to accommodate all categories of facility construction vehicles, and is at a location with adequate sight distance available to ensure safe entry and exit. To address the existing problems of occasional disruption to traffic flow on York Road (Route 116) from an overflow of log truck queues on the driveway, an additional storage area to accommodate the queue would be provided. This action would mitigate the existing problem in addition to providing construction vehicles unimpeded access to the site.

York Road (PA Route 116), Jefferson Road (PA Route 516), and Lehman Road (SR 3078)

Construction-related traffic would not degrade the LOS at this intersection during the A.M. peak hour. Traffic approaching the intersection from Lehman and Jefferson Roads (Routes 3078 and 516) would not worsen the service level, which is currently LOS D. Additionally, future northbound traffic on York Road (Route 116), currently at LOS D, is projected to operate at the same level.

During the P.M. peak hour, delays would continue on Lehman and Jefferson Roads (Routes 3078 and 516) at the intersection approach. Southbound traffic on York Road (Route 116) would, as a result of construction traffic, operate at LOS E as opposed to LOS C without construction traffic.

Operation Impacts. The 1993 traffic volumes were projected *5* years to 1998, the anticipated year of commercial operation for this project, using a growth factor of 2.9 percent per year. This growth factor was determined by taking an average growth rate for the *20*-year period between 1970 and 1990 for North Codorus Township and several neighboring municipalities (Heidelberg, Jackson, Codorus, and Springfield Townships). The actual annual growth rate from 1980 to 1990 was 1.2 percent per year. The annual growth rate used by the Pennsylvania Department of Transportation (PennDOT) for the area is 1.75 percent. Then, generated trips to and from the proposed project site were combined with the projected 1998 traffic volumes to arrive at traffic volumes that are considered the "Projected Conditions with Development." Future trips related to the proposed project were based on projected employment figures at the plant and the number of goods and materials deliveries that would be expected. These assumptions were based on other similar cogeneration plant operations.

The following specific assumptions were used to develop traffic forecasts. During operation of the plant, 70 people would be employed. The facility would operate *3* 8-hour shifts per day and require 55 of these 70 people throughout the shifts. For study purposes, the estimate of 55 people per *5*-day week were distributed as follows: 25 people (8 A.M. to 4 P.M.), 15 people (4 P.M. to 12 A.M.), and 15 people (12 A.M. to 8 A.M.). These numbers conservatively assume no car-pooling would take place. There would also be limestone and ash removal trucks entering and exiting the plant. It is estimated that 70 of these trucks per 8-hour day, per 5-day week, would enter and exit the site, with approximately 9 trucks entering and exiting during each hour of the peak hour periods (7 *to* 9 A.M.; 4 *to* 6 P.M.). Table 4.1-38 summarizes the estimated trip generation for this proposed development.

The projected increase in traffic resulting from operation of the proposed facility would be approximately 125 vehicles per day, for a total projected access driveway volume of 325 vehicles per day ***(125 vehicles/ day resulting from operation of the proposed facility plus 200 vehicles/day resulting from the current Roundwood Facility operation). Each vehicle accessing the proposed facility would generate 2 trips (one entering and one existing) which would impact the affected transportation infrastructure***. Of the

Table 4.1-38. Summary of vehicle trips during proposed project operation.

Land Use	Size	Vehicle Trips			
		7-9 A.M. Enter	Peak Hr Exit	4-6 P.M. Enter	Peak Hr Exit
Electricity Cogeneration Facility	55 employees/3 shifts	25	15	15	25
	25 people (8 AM to 4 PM)				
	15 people (4 PM to 12 AM)				
	15 people (12 AM to 8 AM)				
	Trucks	9	9	9	9
	Total	34	24	24	24
	Coal Trucks*	5	5	5	5
	Total (During Emergency)	39	29	29	39

*Coal supply emergency only.

Notes: 1) The actual peak hour, when the maximum traffic volumes occur, is for a one hour period which typically occurs between 7-9 A.M. and 4-6 P.M.

2) It is assumed that each employee would drive separately.

Source: ENSR, 1994.

250 new trips, 68 would occur during the morning peak hour (39 entering and 29 exiting) and 68 would occur during the evening peak hour (29 entering and 39 exiting). Assuming conservatively that 80 percent of the driving is rural (accident rate, 1.4×10^{-7} no./km) and 20 percent suburban (accident rate, 2.7×10^{-6} no./km), an increased accident risk of approximately 2 accidents per year could potentially occur during the operation of the proposed facility *(DOE, 1986; United States Nuclear Regulatory Commission, 1977).*

The following impacts would also occur as a result of the proposed action.

Intersection of York Road (PA Route 116) and Colonial Valley Road (SR 3053)

The intersection currently operates at acceptable levels of service (LOS D or better), and would continue to operate at these levels with projected traffic volumes. The proposed plant would generate approximately 38 additional A.M. peak hour trips and 38 additional P.M. peak hour trips on an average weekday. This represents an increase in total intersection traffic of 5 percent during the A.M. peak hour and 5 percent during the P.M. peak hour.

Intersection of York Road (PA Route 116) and the Roundwood Facility Access Drive

The intersection currently operates at a LOS E for vehicles exiting the Roundwood Facility during the A.M. peak hour. The Roundwood Facility closes at 3:30 in the afternoon, and little or no traffic uses the access drive during the P.M. peak hour. The project LOS for the intersection during operation of the proposed project would be LOS A for northbound left turns and LOS E and F for the outbound approach from the Roundwood Facility. The LOS E and F from the Roundwood Facility would be caused by anticipated high traffic volumes on York Road (Route 116), which would result in an inability of vehicles to safely enter the traffic stream. This situation would occur during the peak hours, while the off-peak hours would operate at satisfactory levels. On an average weekend, the proposed project would generate approximately 68 additional A.M. peak hour trips and 68 additional P.M. peak hour trips. This represents an increase in total intersection traffic of 8 percent during the A.M. peak hour and 8.5 percent during the P.M. peak hour. The intersection is currently unsignalized, and the possibility of installing a traffic signal was investigated. Traffic volumes, however, did not warrant a traffic signal as determined by Publication No. 201, "Engineering and Traffic Studies" published by the Pennsylvania Department of Transportation. Based on traffic studies, the average daily vehicle count on the section of York Road (Route 116) that runs past the proposed site is in excess of 7,000 vehicles *(ENSR, 1994)*.

Intersection of York Road (PA Route 116), Jefferson Road (PA Route 516), and Lehman Road (SR 3078)

This is an unconventional intersection, characterized by two closely spaced minor street approaches that enter York Road (Route 116) from the same direction. The approaches of Jefferson Road (Route 516) and Lehman Road (Route 3078) create confusion regarding vehicle right-of-way. Based on the capacity analysis, this intersection currently operates below acceptable levels. The proposed project would generate approximately 53 additional A.M. peak hour trips and 54 additional P.M. peak hour trips through this intersection on an average weekday. This represents an increase in total intersection traffic of 5 percent during both the A.M. and P.M. peak hours.

In order to attain acceptable levels of service for this intersection, several alternatives were investigated. First, the possibility of installing a traffic signal was evaluated. ***With this measure alone, traffic conditions during the periods of facility operation would be improved over those currently existing at this intersection. However, this improvement proposed mitigation measure has been approved by PennDOT.*** This improvement alone, however, ***will*** not bring the LOS up to acceptable levels. Several lane improvements were then investigated. It was determined that by constructing additional lanes on the north-, south-, and westbound approaches in conjunction with the traffic signal installation, acceptable levels of service could be achieved.

Vehicular Emissions

Potential impacts to air quality from vehicular emissions resulting from additional traffic was discussed in Section 4.1.2.10. These emissions would be expected to include oxides of nitrogen (NO_x), carbon monoxide (CO), and volatilized hydrocarbons.

Rail

At full operating capacity, coal would be delivered by rail every 4 to 5 days in trainloads of 90-100 cars. Both CSX and Conrail can accommodate 100 percent of the coal requirements for the proposed facility. Shifting cars at the proposed site would not result in the blocking of grade crossings.

4.1.9 Land Use

The key regulatory consideration related to land use compatibility is local land use regulation (the manner in which a community regulates land use and development). The significance of land use impact is determined through an examination of the extent to which the proposed facility would be consistent with community development goals and compatible with other surrounding land uses *(ENSR, 1994)*.

4.1.9.1 Existing Land Use

Construction Impacts. Impacts to land use are assessed in terms of an operational facility; consequently, impacts to land use from construction of the proposed facility would be the same as those for facility operation described below.

Operation Impacts. The proposed project would be located adjacent to and on property owned by P. H. Glatfelter Company. YCEP would purchase this property prior to construction of the proposed Cogeneration Facility. The appearance of the various industrial structures of the paper mill and the types of activities normally conducted there are compatible with the appearance and activities that would be associated with the proposed facility. Most non-industrial land uses in the vicinity of the proposed site are located in Spring Grove Borough on the far side of the existing paper mill. Only a small number of non-industrial land uses, primarily residences located south of the proposed site, would not be buffered from the facility by either distance or intervening industrial structures. A vegetative screen would be provided by landscaping in order to screen these residences from the proposed YCEP facility. Because of the long historical presence of the P. H. Glatfelter Company at its present site, these scattered residences have generally coexisted with the industrial activities of the mill *(ENSR, 1994)*.

4.1.9.2 Land Use Trends and Controls

Construction Impacts. No change in land use trends and controls would be required for construction of the proposed project. The area of the proposed site is presently designated for industrial purposes. Consequently, construction of the proposed facility is compatible with current land use trends and controls.

Operation Impacts. The proposed project would require approval under the North Codorus Township Land Development Ordinance and, once received, would comply with local land development requirements *(ENSR, 1994)*.

4.1.10 Pollution Prevention

The proposed YCEP Cogeneration Facility would incorporate design and operating features that would assist in preventing pollution to the environment. These prevention measures are described in the following paragraphs.

Construction Impacts. Construction of the proposed facility would be consistent with approved guidelines for erosion and sedimentation control. Erosion would be minimized by beginning the cleanup and revegetation operations immediately following completion of construction activities. Other mitigative measures to be employed include perimeter silt fencing, restriction of heavy truck traffic to designated corridors during very wet or dry periods, implementation of dust-abatement practices as needed, construction of sedimentation basins along runoff interception and/or discharge channels, and stabilization of any such channels.

Operation Impacts. As a project company wholly-owned by Air Products, the proposed YCEP Cogeneration Facility would implement the pollution prevention programs that have been adopted by Air Products. Air Products has adopted the requirements of the Chemical Manufacturers Association (CMA) Responsible Care Pollution Prevention Code of Management Practices. Though not enforceable by Federal, state, or local agencies, this code commits member companies to improve performance in response to public concerns about the impact of chemicals on health, safety, and the environment. This Pollution Prevention Code consists of 14 voluntary management practices that provide the framework for companies to achieve ongoing reductions in the amount of contaminants and pollutants generated and released to the environment. This code stresses several key concepts: (1) All waste, all media — applies to all wastes and releases to all media (e.g., air, water, land); (2) Preferred reduction hierarchy — maintains a pollution prevention hierarchy in which source reduction is preferred over recycle/reuse/reclaim which is preferred over treatment; and (3) Continuous improvement — requires ongoing reductions of wastes and releases with a goal of establishing a long-term downward trend in the amount of wastes generated and releases to the environment (i.e., it requires continuous improvement as long as wastes or releases are generated). An annual audit is conducted at each Air Products and Chemicals, Inc. facility to ascertain its progress in implementing Air Products and Chemicals' "practice in place" definitions of each management practice. Facilities are required to establish goals to meet the requirements of each Responsible Care Code. Existing facilities would be required to comply by June 1996. The proposed Cogeneration Facility would be anticipated to be in full compliance 4 years after start-up. Further details regarding the 14 management practices are presented in the EIV (see Appendix A for a list of public reading rooms).

In addition, the CFB combustion technology and the ***best available control technology (BACT)*** emission control equipment would minimize air pollution by controlling the release of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) from the facility's exhaust stack. The proposed facility's material handling systems for coal, limestone, and ash byproducts would be completely enclosed to minimize fugitive dust emissions to the environment. Any potential emission points in the material handling systems would be equipped with dust control systems.

Chemical and storage areas would be equipped with secondary containment to eliminate the potential for discharge to the surrounding environment in the event of a tank leak or a system leak. All water treatment chemicals for use in the facility would be selected so as to not cause a negative impact on the environment (e.g., the cooling tower circulating water system would use a phosphate-based rather than a heavy-metal based treatment program).

Ash byproducts resulting from the coal combustion process would be used as beneficial use material for mine land reclamation rather than disposed of in a landfill, eliminating the need for landfill space.

The facility operations manual would include a Commonwealth-required PPC plan that would describe procedures for prompt handling and reporting of accidental releases. The plan would be submitted as part of the facility's NPDES (operational) stormwater permit application process. The facility operations manual also would provide a SPCC plan that would outline measures for minimizing the potential for oil discharges into the Nation's waterways as required by the Federal Water Pollution Control Act, and described in 40 CFR Parts 110, 112, 114, and 153.

A Preventive Maintenance (PM) Program that identifies procedures for reducing the potential for equipment failures that could result in releases would be implemented at the proposed facility. The procedures would include identification of applicable equipment systems, periodic inspections, adjustments, and parts replacement.

General good housekeeping practices would also be followed at the proposed facility. These practices would include neat and orderly storage of chemicals, prompt cleanup of small spills, regular refuse removal, maintenance of dry and clean floors, and proper storage of containers away from walkways and roads.

4.1.11 Cultural Resources

This section describes impacts to historical and archaeological resources that would result from construction and operation of the proposed project at the North Codorus Township site.

Federal legislation requires that any project involving Federal action with the potential to impact cultural resources listed in or eligible for listing in the National Register of Historic Places must be reviewed in accordance with regulations issued by the Advisory Council on Historic Preservation. Contacts have been made with the Pennsylvania Historical and Museum Commission ***(Bureau for Historic Preservation)***, the Historical Society of York County, and the York County Planning Commission to determine the presence of, and ***thus*** the potential for impacts to, archaeological sites or historical ***resources*** on or near the proposed YCEP site.

4.1.11.1 Historical Resources

In 1995, a survey of historical properties was performed by Historic York, Inc., to determine if resources eligible for inclusion on the National Register of Historic Places were within the vicinity of the proposed YCEP plant site. This survey was evaluated by the Bureau for Historic Preservation, Pennsylvania Historical and Museum Commission in March and April of 1995 (correspondence provided in Appendix E). Three districts and eight individual resources within the viewshed of the proposed site were identified as eligible for listing on the National Register of Historic Places (Figure 3.1-13a). One of the districts, identified as the Hill District (also known as the Glatfelter Estate), was previously determined to be eligible for listing on the National Register of Historic Places in 1984.

The Bureau determined that the proposed Cogeneration Facility would have an adverse visual effect on the Hill District and one individual resource, number FF-30 (Christian Hershey Farmstead, see Figure 3.1-13a). Following the Bureau's finding of adverse "visual effect," DOE entered into consultation with the Bureau, in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980, 1992, and regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation.

DOE submitted "Adverse Effect Documentation" to the Bureau (correspondence dated 4/20/95 from J. Wachter to B. Barrett in Appendix E) which requested reconsideration of the finding of "adverse effect" for one resource, # FF-30 (due to the reduction of impact through vegetative screening), and initiated the consultation process for mitigation of unavoidable adverse visual effects to the Hill District. After reviewing DOE's "Adverse Effect Documentation," the Bureau determined that resource number FF-30 (Christian Hershey Farmstead) would not be adversely affected by the proposed project (see correspondence dated April 28, 1995 from B. Barrett to J. Wachter in Appendix E of the FEIS). The Bureau also indicated that mitigation of adverse visual effects to the Hill District could be accomplished

through non-traditional methods (see Table 4.4-1 in Section 4.4). The Section 106 consultation process between DOE and the Bureau is ongoing at the present time to determine appropriate mitigation of unavoidable adverse visual effects. Completion of the Section 106 consultation process will result in the execution of a Memorandum of Agreement (MOA) between the Bureau and DOE that specifies mitigation actions and schedules for completion.

4.1.11.2 Archaeological Resources

The literature search, geomorphological investigation, and Phase I Survey conducted at the proposed site did not reveal the presence of any archaeological resources. ***Correspondence from the Bureau for Historic Preservation (B. Barrett to S. Van Ooteghem, April 14, 1995) indicated all archaeological reports submitted for the proposed project meet required standards and specifications, and that*** no further ***archaeological investigation*** is deemed necessary ***(see Appendix E)***.

4.1.12 Socioeconomic Resources

Because of the skilled construction labor force existing in the York County area, it is anticipated that much of the required construction workforce for the proposed project would be hired regionally. This would have a positive impact on regional unemployment rates. During construction, supporting local retail establishments would be positively impacted by increased revenues. The overall regional economy would benefit from an influx of wage dollars. Because much of the labor force would be supplied locally, increased demands on public and community services, educational facilities, health care and human services, police and fire protection, and public utilities would be minimal.

To the extent practical, depending on availability of skills, the 70-person full-time workforce for the operational facility would be derived from the local labor force. Permanent relocation of facility employees into the area would be minimal and should have little discernible impact on population, labor, or housing in York County. Negligible impacts to water, sewer, and roadway services; and schools, fire, and police protection services would be anticipated.

4.1.12.1 Demographics

Population

Construction Impacts. Construction is anticipated to occur for a period of 36 months with initial clearing and rough grading requiring approximately 20 workers. The largest workforce would be needed for a 6-month period with a 1-month peak requiring approximately 975 workers. Following this 1-month peak, the number of required workers would gradually decrease. Because it is anticipated that the local labor force would be heavily drawn upon, the influx of nonlocal workers is expected to be minimal.

Operation Impacts. Seventy full-time workers in the areas of engineering, operations, management, and support would be required to operate the proposed facility. As with the construction phase, it is expected that the local labor force would be used to a large extent; therefore, increases in the area's population from worker relocation would not be expected. However, if all the workers with families were to move into York County, the population would be anticipated to increase by approximately 185 individuals (based on an average ***Pennsylvania household*** size of 2.64 persons).

Housing

Construction Impacts. Because YCEP anticipates drawing largely from the locally and regionally available workforce, a large influx of construction workers to the area is not expected, and therefore, no significant impact to available housing would occur.

Operation Impacts. York County has adequate available housing to accommodate the 70 operations workers and their families in the event that there w***ere to be*** a complete influx of nonlocal operations workers into York County.

4.1.12.2 Local and Regional Economic Activity

Employment

Construction Impacts. The construction phase of the proposed project would require skilled laborers in the following categories: carpenters, cement masons, iron workers, welders, pipefitters, boilermakers, crane operators, general laborers, bricklayers, millwrights, plumbers, sheet metal workers, insulators, painters, electricians, and engineers. On average, 276 construction workers would be required for each of the *3* construction years. It is anticipated that 123 of these workers would be York County laborers. The use of local laborers should have a positive impact on employment in the area by temporarily decreasing the rate of unemployment during the construction phase.

Operation Impacts. The 70 full-time permanent employees that would compose the operations staff of the proposed project would be hired from the local labor force to the extent possible. Consequently, minimal relocation of nonlocal laborers to the area would be expected. The impact ***of these newly created positions, along with new positions in related sectors, would be positive but not significant (i.e., less than 0.1 percent effect in reduction of the unemployment rate in York County)*** because of the relatively small number of new positions.

Income

Construction Impacts. It is expected that 90 percent of the construction workforce, an average of 276 workers, would be Pennsylvania residents and would be employed for each of the *3* construction years. Total annual earnings would equal approximately $15 million. Average individual earnings would be more than double the reported average annual income for Pennsylvania residents in 1990 (Table 3.1-20). An additional 163 jobs would also be created on a statewide level to support the construction of the proposed facility. These additional jobs would generate approximately $8.6 million per year. The total wages paid would be $6.7 million annually. Additionally, support jobs associated with the proposed project would number approximately 57 jobs with annual wages totaling approximately $2.9 million. Increased income from construction would have a positive impact on the average income for York County residents. The impact would be short-term, lasting only the duration of the construction period *(Rose, 1992 as cited in ENSR, 1994)*.

Operation Impacts. The 70 employees required for operation of the proposed facility would be highly skilled and would have total annual earnings of $3.4 million. This payroll, combined with the expenditures for maintenance activities and other necessary supplies and services, would result in the generation of an additional $5.7 million in wages and salaries (***Rose, 1992 as cited in ENSR, 1994)***. Direct incomes earned by the 70 operations employees and indirectly generated incomes would have a positive impact for York County.

Sales Revenue

Construction Impacts. Total direct expenditures including wages and purchases of local goods (i.e., in York County) would be expected to average $35.3 million annually during the 3-year construction phase. Using a multiplier of 1.35 that accounts for secondary economic activity, an additional $12.3 million in annual sales would be anticipated. ***[Economic interdependence is measured in terms of multipliers by utilizing a tool called an input-output model, IMPLAN I-O, developed by the United States Forest Service in conjunction with several other government agencies (Rose, 1992 as cited in ENSR, 1994)].*** These sales should have a positive impact in York County.

For Pennsylvania, annual direct expenditures including wages and salaries during construction would be more than $62 million. With the ripple effect (using a multiplier of 1.35), annual expenditures of $96 million would be expected to result. These direct and indirect expenditures are expected to have a positive impact for the Commonwealth.

Operation Impacts. Electricity sales revenue (value of output) of $110 million annually would be anticipated during the projected 25-year lifespan of the facility. This revenue would be anticipated to have a direct, positive impact on the local and regional economy. An additional $23 million generated annually by suppliers and other businesses associated with facility operation also would be anticipated and would positively impact the local and regional economy.

Tax Revenue

Construction Impacts. Increased tax revenues occurring from construction of the proposed facility would result in short-term, positive impacts on the local economy.

Operation Impacts. Annual state and local tax revenue resulting from operation of the proposed project would be approximately $6.3 million. This tax revenue would have a positive impact on state and local economies. Use of tax revenues would benefit local and state infrastructure and government programs, including schools, roadway systems, and hospitals, thus indirectly stimulating productivity and industry in the area.

The proposed project would pay approximately $500,000 in property taxes, directly benefitting the Spring Grove School District and York County.

Real Estate

Construction Impacts. Construction is anticipated to last approximately 36 months and is expected to have little effect on local real estate values due to the short-term nature of the activity and the general familiarity and acceptance of construction practices in developed communities.

Operation Impacts. The proposed project would be located on an unzoned parcel of land in an area of mixed land use. The immediate vicinity of the proposed facility includes an industrial use, eight private residences, two commercial operations, and a recreational facility. A portion of the analysis done for this FEIS suggests a positive impact to local property values would result from the proposed facility. For example, the proposed project would result in increases in local employment and tax revenue. Increases in local tax revenue could also have a positive benefit to local infrastructure.

Factors associated with the proposed facility which may have an adverse impact include visual impacts and increases in noise and traffic. The combination of both potentially positive and adverse impacts, in addition to other factors unrelated to the proposed project, make assessing the impact to local property values difficult on a general level. The broad-based positive impacts of increased tax base, jobs, and infrastructure could tend to mitigate any local adverse impacts due to traffic, noise, and aesthetics. For this reason, the proposed project would not be expected to adversely impact real estate values.

4.1.12.3 Public Services

Education

Construction Impacts. Because construction would be temporary and a large part of the workforce would be hired locally, any resulting influx of families/children is not expected to have an adverse impact on existing educational services.

Operation Impacts. The operations workforce would consist of 70 people and would be hired mostly from the locally available workforce to the extent possible; *therefore*, no adverse impacts to *existing* educational services would occur.

Health Care and Human Services

Construction Impacts. Demand for health care and human services resulting from an influx of construction workers and their families is not expected to adversely impact local availability because the majority of the labor force would be anticipated to reside in the local area already.

Operation Impacts. A comprehensive training program at the proposed facility including emergency response procedures would serve to minimize impacts to health care services. First aid stations, eyewash stations, and drench showers provided on site would facilitate emergency care, minimizing dependency on community services. Consequently, no adverse impact to available community health care and human services is anticipated to occur as a direct result from project operation.

In addition, no significant impact would occur from an increased demand for health care and human services from operations workers and their families because the labor force would be relatively small and would be comprised mostly of current residents. Even if all operations workers and their families migrated to York County, causing an increase in population of approximately 185 persons (based on an average ***Pennsylvania household*** size of 2.64 persons), no adverse impact would occur to health care and human services.

Police Protection

Construction Impacts. Because the majority of the construction labor force would be hired from local reserves, no discernable impact to the availability of police protection services during the construction of the proposed facility would be expected.

Operation Impacts. Even if all operations workers and their families migrated to York County, causing an increase in population of approximately 185 persons (based on the average ***Pennsylvania household*** size of 2.64 persons), no adverse impact would occur to available police protection services. This impact would be even less significant if population influx were limited, as anticipated, by using the local labor force for the permanent operation of the facility.

Fire Protection

Construction Impacts. ***The activities associated with building the proposed facility (excavation, concrete pouring, steel erection, mechanical) are normal to the construction industry, and would not be expected to pose an unusual fire risk. Also, b***ecause the majority of the construction labor force would be hired from local reserves, the availability of fire protection services during the construction of the proposed facility is not expected to be adversely impacted.

Operation Impacts. The operational facility would provide on-site training in fire protection and emergency response procedures. The facility would also have a comprehensive on-site fire protection system designed in conformance with Uniform Fire Code and applicable National Fire Protection Association standards, and state and local requirements. The fire water system would include a fire water supply loop, fire hydrants, sprinkler systems, and hoses. This system would serve to minimize any impacts to community fire protection services from the operation of the facility.

In addition, the relocation of permanent employees to the local area is expected to be minimal (worst case of 185 individuals including families). Adequate community fire protection resources appear to exist and to accommodate the ***largest*** expected increased population in the area.

Parks and Recreation

Construction Impacts. The Lions Club picnic pavilion and fishing area would be temporarily impacted by the noise and visual characteristics of construction. Access to these facilities would not be blocked. These impacts are expected to be short-term.

Operation Impacts. The Lions Club picnic pavilion and fishing area would realize a long-term, direct impact from the introduction of additional industrial structures into its viewshed. These structures would not be dramatically different from the elements in the existing viewshed.

The attainability of water quality standards designated to provide for the protection and propagation of fish and wildlife and for recreation in or on the water should not be impacted by the proposed project compared to baseline conditions. In addition, the proposed project would not require the release of additional water from Lake Marburg, so recreation activities related to lake use***, including the Class A wild brown trout fishery (located downstream of Lake Marburg),*** are not expected to be influenced.

The primary reason that the proposed project would not affect Lake Marburg's level is that its water consumption is from P. H. Glatfelter Company's independent withdrawals. It is noted, however, that there may be a connection between drawdowns in Lake Marburg and poor spawning success in yellow perch and periodically low year class strength (letter from L. Young, PA Fish and Boat Commission to DOE, dated January 10, 1995). Thus, this drawdown effect (unrelated to the proposed project) could represent a potential impact to recreation in terms of angling.

Utilities

Rate Impacts. Typically, the scope of the impact analysis for socioeconomic or any other resources contained in an EIS is devoted largely to analyzing effects on the physical environment and human health. It is difficult to link the effects of electric utility rates to environmental or human health impacts. Due to the public interest on electric utility rates issues, the following discussion is provided. The discussion focuses on the predictability of future electric utility rates.

It is difficult to accurately and specifically predict the effect of the proposed project on the economics of electricity or electric rates, especially in the long term and in a localized region. Therefore, the analyses on these topics in this Environmental Impact Statement are generic in nature. Rapidly changing externalities, such as future energy market supply and demand conditions throughout the grid, prices of various fuels, inexpensive hydropower from Canada entering the northeastern United States, and the potential inability to transmit power could all have an influence on future electric rates. Regardless of any analysis, the Pennsylvania Public Utility Commission (PUC) has primary jurisdiction to ensure that intra-state electric utility rates are established in the public interest.

Met-Ed has recently reported that the cost of electricity from the proposed project would be higher than that of other electricity-generating options, such as buying electricity on the open market or from the construction and operation of a new gas-fired combined cycle facility. A Met-Ed spokesperson has reported that the current cost per kilowatt-hour (KWh) of buying short-term electricity on the open market would be 3.5 to 4 cents, as opposed to the contracted price of 6.8 cents from the proposed project (York Dispatch, Feb. 10, 1995). In a letter sent to DOE (Seltzer to Van Ooteghem, March 14, 1995; Appendix E), Met-Ed projects that the first-year costs of electricity from the proposed project would be 6.5 cents/KWh, as compared to 4.4 cents/KWh from a comparably sized gas-fired combined-cycle facility. To translate these "differential" costs into an effect on the consumer, Met-Ed predicts *that the average residential customer (using 500 KWh per month) would pay an additional $2.35 each month (York Sunday News, March 19, 1995).*

DOE, as well as Met-Ed, acknowledges that significant changes are presently underway in the electric utility industry. The passage of the Energy Policy Act of 1992 by Congress, and subsequent regulatory actions by the Federal Energy Regulatory Commission regarding transmission access, have exposed the generating portion of the electric industry to significant competition. This environment of change makes it extremely difficult to predict the future cost of electricity, especially on a 25-year planning horizon. In a letter from Seltzer to Van Ooteghem dated January 27, 1995 (Appendix E), a Met-Ed spokesperson alluded to the uncertainties of future energy markets by referencing "...the vagaries of the long-term energy supply market." Given this changing environment, the accurate prediction/extrapolation of factors such as fuel prices (e.g., gas, coal) that would affect future costs of energy, would be impossible to make. The volatility of the energy market can be exemplified by the once-projected economic benefits associated with the proposed project (a present value of $260 million) so dramatically changing over a 2- to 3-year period based on Met-Ed's own analysis. DOE believes it is not possible to predict accurately the future market over the next 25 years given this unstable environment.

However, it is important to note that unlike the hypothetical gas-fired combined-cycle plant proposed for analysis by Met-Ed, the proposed YCEP project, due to the nature of its approved contract, could not pass any extra costs along to the Met-Ed's ratepayers if, indeed, the economics of energy production become more unfavorable (e.g., due to increases in fuel prices) in the future. The proposed project would tend to guard against passing the uncertainties of the energy market on to the consumers by providing predictably priced electricity. Moreover, the PUC has determined that "the prices for which energy and capacity (under the Met-Ed/YCEP Agreement) will be available will be below Met-Ed's avoided cost by any reasonable standard of measure." (Opinion and Order, Docket No. F-910549, p. 12, December 2, 1991).

It is possible that, given current market conditions, Met-Ed could negotiate cheaper sources of electricity compared to the proposed project (e.g., buying "excess" electricity on the open market) which would serve to meet their reserve margin needs in the <u>short term</u>. However, it is not possible to predict any effect of the proposed project on long-term electric rates due to the uncertainties in the energy markets and the specific factors contributing to any long-term analysis.

Construction Impacts. Due to the large proportion of the construction labor force that would be hired locally, no significant impact to public utilities would occur. Construction-related water supply needs are projected to be between 5,000 and 15,000 gallons per day (gpd). The Spring Grove Water Company and the P. H. Glatfelter Company have existing capacity to satisfy the construction demand.

Operation Impacts. Spring Grove Water Company currently has the capacity to satisfy the potable water demands of the proposed facility. The P. H. Glatfelter Company would be responsible for and has the capacity to meet all other water demands of the company.

The Spring Grove Borough Sewer Authority Wastewater Treatment Plant does not have available capacity to handle the proposed facility's ***sanitary*** wastewater discharge. However, public services would not be used for sanitary wastewater treatment or discharge because all ***wastewater would be treated by*** YCEP's on-site treatment system and then piped with cooling tower blowdown to the P. H. Glatfelter Company secondary treatment plant basin for ***additional*** treatment. The P. H. Glatfelter Company secondary treatment plant has sufficient capacity to process the proposed facility's wastewater.

4.1.13 Environmental Justice

The construction and operation of the proposed project is not expected to have disproportionately high and adverse human health or environmental effect*s* on the minority community located northeast of Spring Grove ***in Jackson Township***. This community, located near the intersection of Route 116 and Stoverstown Road, has a minority population of 12.2 percent of the total population in the census tract block group, compared to a county-wide minority population of 4.6 percent.

The minority community is approximately 5 km (3.1 mi) northeast of the proposed project site. The town of Spring Grove is physically located between the minority community and the proposed project site. The Lincoln Industrial Park (also known as the Commerce Industrial Park) is located approximately 2.6 km (1.5 mi) north of the community on Bowman Road. The Pfaltzgraff Company's Thomasville manufacturing plant is located in this industrial area.

Predominate winds in the region, based on data collected at the West Manchester site (see section 3.1.2), are from the northwest, south and southwest. Air quality dispersion modelling was conducted to determine the potential impact of the proposed facility on sensitive receptors in the region. The closest sensitive receptor to the minority community in Jackson Township is the Codorus Church, located at

Stoverstown Road and Graybill Road. The peak 3-hour concentration for ***sulfur dioxide*** (SO_2) at this receptor was estimated to be 12.17 $\mu g/m^3$. The highest 3-hour peak concentrations were estimated to be at York Township Elementary School (32.00 $\mu g/m^3$), northeast of the proposed site in the city of York, and the Friedensaals Church (26.18 $\mu g/m^3$), southeast of the proposed facility. Similarly, the 24-hour and annual peak concentrations at Codorus Church (3.48 $\mu g/m^3$ and 0.22 $\mu g/m^3$, respectively) were estimated to be low when compared to the estimates modeled for other regional receptors. These other ***sulfur dioxide*** (SO_2) concentrations were estimated to be as high as 8.62 $\mu g/m^3$ for 24-hour peak concentrations and 0.69 $\mu g/m^3$ for annual peak concentrations.

Construction Impacts. ***Construction of the proposed facility would not have disproportionately high and adverse human health or environmental effects on low-income communities because most construction-related impacts would occur on the proposed site and be of short duration. Expected offsite impacts, such as construction-related noise and traffic impacts, would not disproportionately affect the low-income community because of its distance 1.4 km (3.0 mi) from the proposed site.***

Operation Impacts. Based on air dispersion modeling results ***(See Section 4.1.2.6)***, it is not expected that the proposed facility would have disproportionately high and adverse human health or environmental effects on low-income or minority communities. Other more localized impacts ***(e.g., noise and traffic impacts)*** would tend to occur closer to the proposed ***project*** than ***to*** the minority community location 5 km (3.1 mi) northeast of Spring Grove. ***There is no expectation of unique risk to the minority community attributable to lifestyle, such as subsistence on fish from the Codorus Creek.***

4.1.14 Environmental Consequences of the Proposed Utility Corridors

This section analyzes the potential impacts to human and environmental resources resulting from the construction and operation of utility corridors associated with the proposed site in North Codorus Township. Analysis of the potential impacts, both beneficial and adverse, are discussed for each environmental topic discussed in Section 3.1.14.

The proposed utility corridors, with the exception of approximately 3 km (1.9 mi) of the 6.1 km (3.8 mi) electrical interconnection, are all located within the boundaries of the YCEP Cogeneration Facility plant site, or on property owned by the P. H. Glatfelter Company. Most of these areas have been developed by the P. H. Glatfelter Company, and are currently occupied by industrial buildings and facilities or by wastewater treatment facilities. The internal electrical intraconnection, water supply

line, and wastewater return/primary cooling line would all be sited within this industrial complex, and the visual impacts they would produce are of limited significance, compared to the dominant presence of the existing industrial facilities.

The water supply and wastewater return/cooling pipelines would be buried, causing only short-term impacts during their construction. The internal electrical intraconnect would be an aerial power line supported by two poles, connecting the YCEP facility with the P. H. Glatfelter Company facility at the current electrical substation on P. H. Glatfelter property. The visual effects of this power transmission line would be dwarfed by the two large industrial facilities it would rest between.

The 6.1 km (3.8 mi) electrical interconnection between the YCEP Cogeneration Facility and the Metropolitan Edison Company (Met-Ed) substation at Bair, Pennsylvania, is the portion or component of the utility corridor that would produce the most significant visual effects. This power line would originate at the Cogeneration Facility amid heavy industrial facilities, but would emerge from an industrially developed site and cross lands that are largely undeveloped, and used mostly for agriculture and recreation. It would affect existing land uses, and the visual setting (including the view from some historically significant properties), and would produce electric and magnetic fields (EMFs) near some residences and a proposed recreation trail. The proposed power line and switchyard at Bair would be visible from several residences, and the line would run parallel [within 30.5 m (100 feet)] to a proposed recreation trail for approximately 0.8 km (0.5 mi). Construction of the power line would alter some wildlife habitat, disturb some riparian and forest vegetation, and cause short-term effects to soil and vegetative resources. The line would be sited within a 100-year floodplain for a portion of its length.

4.1.14.1 Setting

Construction Impacts. Short-term visual impacts would occur during construction of the proposed utility corridors. Some long-term impacts would occur as a result of clearing of deciduous trees.

Operation Impacts. Impacts to affected settings from utility corridors during operation of the proposed Cogeneration Facility are described below.

<u>Utility Pipeline and Electrical ***Intra***connection</u> The location of the proposed electrical ***intra***connection, steam/condensate return lines, water supply line and the wastewater discharge and primary cooling tower lines would be largely on P. H. Glatfelter Company property within the industrial visual unit. Because

these proposed elements are located within visual areas already impacted by industrial facilities, few additional visual impacts would be expected to result.

Electrical Interconnection Corridor to Bair The potential scenic impacts of ***the*** proposed electrical interconnection poles ***and conductor wires*** would be influenced by the distance of the observer from the pole structure, the environment surrounding the tower, the physical characteristics of the tower, and the visibility of the tower. Using these criteria, it was determined that five critical viewpoint areas existed for the proposed electrical interconnection corridor:

- Viewpoint 1 would consist of the view from the residential road in Bair leading into the substation area in which the ***switchyard addition*** associated with the substation would be visually prominent;

- Viewpoint 2 would consist of the view towards the ***United States Army Corps of Engineers*** (ACOE) flood control property from the intersection of Sunnyside Road and Martin Road, in which the electrical interconnection poles would be visible;

- Viewpoint 3 would consist of the view within the ACOE flood control property from the pull-off area along Sunnyside Road, in which the electrical interconnection poles would not be visible;

- Viewpoint 4 would consist of the view where the proposed electrical interconnection traverses Martin Road looking north, in which the electrical interconnection poles would be prominent; and

- Viewpoint 5 would consist of the view of the point where the proposed electrical interconnection would traverse Martin Road looking south, in which the electrical interconnection poles would be visible, but would be slightly less prominent due to the presence of vegetative background.

4.1.14.2 Air Quality

Construction Impacts. Air pollution sources during the construction phase of the project would include vehicular exhaust emissions from the construction equipment and "fugitive" particles from the excavation and vegetation clearing. Since vehicular exhaust and fugitive emissions would be emitted at or close to ground level, maximum impacts due to these emissions typically would occur within or very close to the project areas, with decreasing impacts ***for*** distances beyond these areas. Potential minor fugitive dust emissions would result from minimal excavation and vegetation clearing associated with the underground utility crossings, as well as from minimal, selective clearing of vegetation for the electrical interconnection right-of-way. Appropriate mitigation measures would minimize construction-related air pollutant emissions.

Operation Impacts. Impacts associated with the facility operation along the proposed electrical interconnection would include periodic maintenance in the form of vegetation control measures. These temporary impacts would be similar in extent to those discussed for construction impacts.

4.1.14.3 Geology and Soils

Geology

Geologic features are not expected to be impacted from the proposed construction or operation of the utility pipeline and electrical interconnection.

Soils

Construction Impacts. Each of the proposed utility lines would require some excavation of soil and subsoil. A summary of the amount of earth material to be excavated, and the amount of material that would be permanently displaced is presented in Table 4.1-39. Any earth fill that remains after excavations are backfilled would be distributed for reuse.

The steam line/condensate return line would be built above ground on pilings and would require minimal excavation.

Table 4.1-39. Summary of earth excavation activities during utility line installation.

Utility Line	Length (ft)	Width (ft)	Depth (ft)	Total Excavated Material (yd^3)	Total Displaced Material[1] (yd^3)
3.8 mile Electrical Interconnection (46 poles)	5[2]	5[2]	20	852	852
Internal Electrical Intraconnection (2 poles)	5[2]	5[2]	20	37	37
Water Supply Line	2,500	1.5	5	700	140
Wastewater Return/Primary Cooling Line	4,400	5	6	4,889	1,628
Combined Lines	700	12	6	1,870	625
Totals				8,572	3,212

[1] Denotes after backfilling.
[2] *Each pole would require excavation of a hole 5' long x 5' wide x 20' deep.*
Source: ERM, 1994b

The remaining utility interconnect lines (i.e., water supply line, wastewater return line, and primary cooling line) would involve more extensive excavation. These lines would follow a combined utility line corridor that would traverse the breakwater between the mill pond and Kessler Pond. The water supply line and wastewater return line/primary cooling line would require excavation in addition to that of the combined utility line corridor due to portions of these lines that occur before connecting with the combined utility line (see Table 4.1-39).

Construction activities for the proposed electrical interconnection alignment would include pole placement, foundation installation, and clearing of rights-of-way. Temporary roads would be needed to provide access for construction equipment. For level terrain, earth moving would not be required for the installation of temporary roads, and therefore, earth disturbance would be very limited. In cases where steep slopes are present, extensive earth moving activities would be required to provide a stable base for the roadways. In addition, the presence of steep slopes often indicates a high probability of encountering rock at shallow depths, making further earth disturbance necessary. After construction operations are completed, all temporary roads would be removed and restored to pre-existing conditions. An unimproved access way would be maintained in the right-of-way for periodic maintenance and inspection.

The clearing methods that would be utilized during the construction phase would depend on specific situations encountered. The most common method would cause little disturbance of soil. This method, called "drop and lop," would leave cleared limbs and logs stacked to provide wildlife cover. Complete clearing within a right-of-way would be limited to a 12.2-m (40-ft)-wide portion centered directly under the wire called the "wire zone." The remainder of the right-of-way located on either side of the wire zone is called the "edge zone." Selective clearing would occur in the edge zone, allowing compatible tree and brush species to be left in place. Tall, deciduous trees creating a safety hazard would be removed from the entire right-of-way area. Clearing and maintenance operations within the right-of-way are discussed in greater detail in Section 4.1.14.5.

Operation Impacts. No impacts to soil would be associated with the operation of the various utility line interconnections.

4.1.14.4 Water Resources and Water Quality

Surface Water

Construction Impacts. No long-term impacts to surface ***water resources*** would occur during utility line installation. Potential minor impacts would occur due to sedimentation and erosion. Removal of streamside vegetation along the electrical corridor would also impact water resources by causing a slight increase in the stream temperature. The flowing water of the stream and the narrow width within these reaches would serve to minimize the effects of this temperature increase.

Operation Impacts. No impacts to surface water resources from the proposed utility corridors would be anticipated during operation of the various utility line interconnections.

Groundwater

Construction Impacts. No long-term impacts to groundwater would occur during utility line installation ***due to the inert nature of the construction and foundation materials for the steel and wood poles.***

Operation Impacts. No impacts to groundwater resources would be anticipated during operation of the various utility line *inter*connections.

Floodplains

Small areas of the Codorus Creek 100-year floodplain would be unavoidably impacted by development to connect the proposed project with utility (electric) substation facilities. As discussed in Section 2.2.5.1, four alternative routes for the electrical interconnection were originally considered by YCEP. The FCP route was selected as the preferred alignment because it would maximize use of compatible land, minimize visual impacts to private residences, meet Met-Ed siting requirements, and could be constructed with little impact to the surrounding area. Approximately 14 to 22 power line utility poles would be located at approximately 137-m (450-ft) intervals on land within the 100-year floodplain of Codorus Creek. These single shaft utility poles would be constructed of either steel or wood and range in height from 17.4 to 25.9 m (57 to 85 ft). The electric interconnect, required to provide a connection between the *proposed* YCEP Cogeneration Facility and Met-Ed's existing Bair Substation, would intersect the 100-year floodplain of Codorus Creek on property controlled by ACOE, and property owned by P. H. Glatfelter Company. It is estimated that 4 *to* 8 utility poles would be located on land belonging to P. H. Glatfelter Company, and 10 *to* 14 utility poles would be located on land controlled by ACOE. Placement of these utility poles would occur on approximately 0.013 acres (0.005 hectare) of *the* 100-year floodplain. The areas potentially affected by these proposed electric interconnect facilities are shown on Figure 3.1-15.

Construction Impacts. Approximately 0.013 acres (0.005 hectares) of *the* 100-year floodplain, as described above, would be occupied by new electric interconnect utility poles. Impacts during construction would include equipment and vehicle access, earth disturbance from pole placement, sedimentation, erosion from exposed soils, and damaged vegetation. Accessways would be temporarily developed to allow for personnel and equipment ingress and egress to construct the proposed facilities. Initial clearing would be accomplished both by hand cutting and by mechanical equipment. Plac*ing* the poles and stringing conductor wire would require some access by heavy equipment. Construction activities would be scheduled to avoid wetter periods of the year to the greatest extent possible.

Operation Impacts. Approximately 14 to 22 utility poles would be permanently located within the 100-year floodplain. These poles would be exposed to flood waters of Codorus Creek, and could act to "catch" debris washed downstream during flood conditions. Loss of one or more utility poles caused by flooding could disrupt power delivery from the YCEP facility. Other impacts would include periodic, routine inspection of utility lines and poles. These inspections may result in a pole or poles and conductor requiring replacement. Replacement of poles and conductor would require temporary access for personnel and equipment and ***would*** result in some surface disturbance to soils and vegetation similar to impacts expected during construction, although of lesser magnitude.

Any earth disturbance activities which result in exposed soils would be restored by providing seeding and vegetation. Silt fencing would also be installed prior to construction to prevent sediment washing in surface waters. This would be accomplished as soon as possible to prevent erosion and sedimentation control problems.

4.1.14.5 Biological Resources and Biodiversity

Aquatic Ecosystems

Construction Impacts. Potential short-term impacts associated with erosion and surface runoff would be minimized by implementing an approved erosion and sediment control plan throughout the construction phase of the project.

Operation Impacts. Short-term impacts to wildlife habitat may result from periodic maintenance of the interconnection corridors. Vegetation control measures, necessary to maintain right-of-way access and minimize safety hazards, would result in temporary disturbances to vegetation and increases in noise levels, and may be disruptive to wildlife.

Terrestrial Ecosystems

Construction Impacts. Vegetation removal along the utility lines and electrical interconnections would result in the loss of approximately ***3.7*** acres (***1.5*** hectare) of disturbed upland woody vegetation and 0.***8*** acres (0.***3*** hectares) of wetland woody vegetation on the P. H. Glatfelter Company property; ***0.9*** acres (***0.4*** hectares) of wooded area along stream crossings and on ACOE Flood Control Property would also be removed. It is anticipated that vegetation removal and clearing within the Indian Rock Dam project would affect the area licensed to the Pennsylvania Game Commission (PGC). Any habitat modification in this area would require coordination with both ACOE and PGC prior to construction. Vegetation management strategies would be used to minimize forest fragmentation. Low impact clearing methods planned for this operation would not require heavy equipment and all vegetation removed would be left in the right-of-way. Logs and limbs would be reduced to chip materials and left as mulch.

Construction of the *e*lectrical *i*nterconnection *c*orridor would primarily consist of initial clearing, pole foundation installation, pole placement, and wire (conductor) stringing. Work in the *e*lectrical *i*nterconnection *c*orridor is expected to take place during the dry season to minimize damage to vegetation and soils, and expedite construction of the transmission facilities.

That portion of the electrical interconnection right-of-way which is expected to traverse wooded areas would consist of two zones: the "wire zone," ***which would be*** the central 12.2-m (40-ft) wide section directly under the wire, and the "edge zone," which would be an area 9.1-m (30-ft) wide on each side of the wire zone [for a total corridor width of 30.5 m (100 ft)]. All vegetation in the wire zone would be cut to near-ground level during construction. This would be accomplished by hand crews in riparian areas, and where adequate access is available in upland wooded areas, a small bulldozer may be used to clear trees. The only vegetation control required in the edge zone would be removal of "danger trees," which would be those trees that have the potential to grow high enough to obstruct or interfere with the conductor wires. These trees would be cut by hand crews using a "drop and lop" method (fell***ing*** the tree, ***then*** cutting and scattering the branches where it falls). It is expected that no other vegetation control would be implemented in the edge zone. Typically, a sapling/shrub community would develop following construction, providing edge habitat along the forested sections and increasing biodiversity of the affected area.

Pole foundation installation would require drilling shafts 1.2 to 1.5 m (4 to 5 ft) in diameter and 4.6 to 6.1 ***m*** (15 to 20 ft) deep. It is anticipated that a truck-mounted drill rig would be used to drill the shafts. A bentonite seal or steel casing may be used in the drilled shaft to prevent shaft caving. Once a shaft is drilled and cased, a reinforcing cage and anchor bolt cage would be installed, and concrete poured to ***1*** foot above existing grade. For this work, a small front-end loader, an over-the-road dump truck, and a concrete truck would probably be used. No foundations are expected to be sited in wetland or riparian areas.

Once the foundations are installed, a crane-and-bucket truck (30 ***to*** 60 tons, telescoping boom) would install the steel or wood poles. The poles would be anchored to the foundations with anchor bolts, and once these were securely fastened, insulators and stringing hardware (pulleys and ropes) would be installed on the poles. Approximately 4 to 5 poles would be placed per day.

The stringing operation would begin with the static wire. The wire would be connected to a rope which would be pulleyed up each pole. The wire would then be pulled through the sheaves and sagged prior to connecting the phase conductors. Stringing areas would be required for the setup of the tension machine and wire spools [which each contain 3,050 m (10,000 ft) of phase conductor]. The pulling machine would be placed beyond the first or last pole and ***would*** draw the wire (via the pull rope) through the blocks on each pole. Once the wire is pulled, it would be sagged to the proper amount of sag (tension) and attached to the insulators. It is expected that only two stringing areas would be required for a line of this length [approximately 6.1 km (3.8 mi)].

Required truck access during construction would be accomplished by creating temporary access roads with a stone fill on top of a geotextile filter cloth to protect the existing ground. Earthmoving is not expected to be required for the installation of the access roads. The stringing operation should not affect riparian habitat since the pulling rope would be tossed across the creek and carried to the next pole location. It is expected that the stream crossings would be strategically placed to coincide with areas already impacted by roads or rail, to minimize affects to natural resources.

The Pennsylvania Game Commission in its review of the DEIS concurred with DOE's selection of the Flood Control Property (FCP) alternative as the preferred electrical interconnect corridor alternative (see letter from McDowell to Wachter dated January 30, 1995 in Appendix E). However, the Pennsylvania Game Commission stated that there would be some impacts to wildlife habitats that could be addressed through proper mitigation.

These mitigative actions are as follows:

- ***The riparian areas along Codorus Creek which would be cleared for the transmission line should be planted with various low-growing shrub species to replace lost wildlife habitat.***

- ***The construction of the transmission line through that portion of the FCP leased to the Pennsylvania Game Commission should be coordinated with the agency to avoid conflicts with hunting seasons, farming, and other management activities.***

- ***In order to increase breeding habitat for waterfowl species, wood duck nesting boxes and other waterfowl nesting structures should be placed along Codorus Creek to replace***

any large trees which would be removed. Also, kestrel nesting boxes, bat boxes, and other wildlife nesting/resting structures could be placed on the single-shaft steel or wooden poles which would support the transmission line.

- ***Warm-season grass species should be planted to provide both food and cover for wildlife at different times of the year. These warm-season grasses survive with less moisture and fertility than cool-season grasses; and***

- ***Brush piles should be constructed with vegetation that would be cleared/trimmed for pole and transmission line placement to provide cover for wildlife.***

Operation Impacts. Short-term impacts to wildlife habitat may result from periodic maintenance of the interconnection corridor. Vegetation control measures, necessary to maintain right-of-way access and minimize safety hazards, would result in temporary disturbances to vegetation and increases in noise levels and ***could*** be disruptive to wildlife.

In those areas along the interconnection route where vegetative cover currently exists, the following maintenance measures would be expected.

- Access to the interconnection right-of-way would be from existing public roads. An access way would be maintained within the right-of-way to allow maintenance vehicle access. If temporary access roadways would be required, the temporary roads would be returned to their original state or better.

- Control of vegetation within the edge zone would only consist of removal of the "danger" trees -- those species that have a potential to grow high enough to obstruct the wires. These trees would be selectively cut and the stumps treated with an herbicide (currently, Met-Ed recommends using the herbicide Garlon 3A as a 50 percent water solution). No other vegetation control would be implemented in the edge zone of the right-of-way.

- Control of vegetation within the wire zone would be controlled by selective clearing, which would include removal of all woody type vegetation. Approximately 2 percent of the utility corridor is upland woody vegetation.

- A chemical herbicide would be used to control stumps of deciduous trees. No widespread use of chemical herbicides would be expected. The environmental protection section within the proposed easement with the ACOE states that "the parties shall protect the premises against pollution of its air, ground, and water." This section would require that all work within the right-of-way — including the use of any pesticide or herbicides — be conducted in compliance with Federal, state, and local statutes and regulations related to protection of the environment.

- When conducting selective clearing or cutting, an effort would be made to prevent damage to "compatible" plants in the right-of-way which do not interfere with electrical transmission.

- Brush and vegetation which has been cleared during maintenance operations would be reused within the electrical interconnection corridor for wildlife habitat.

Threatened and Endangered Species

Construction Impacts. No impacts to threatened or endangered species are expected to occur from installation of the proposed utility corridors.

Operation Impacts. No impacts to threatened or endangered species are expected to occur from the utility corridors during operation of the proposed Cogeneration Facility.

Biodiversity

Construction Impacts. The impacts from construction of the proposed Cogeneration Facility to the biodiversity of aquatic ecosystems, ***which are discussed*** in Section 4.1.5.4, also pertain to the utility corridors. Short-term, adverse impacts to terrestrial ecosystems as a result of displacement of species during construction activities would be moderated by the availability of similar habitats in the surrounding area and the temporary nature of the activities.

Operation Impacts. The impacts from operation of the proposed Cogeneration Facility to the biodiversity of aquatic ecosystems described in Section 4.1.5.4 also pertain to the utility corridors.

Permanent adverse impacts to terrestrial ecosystems as a result of displacement of species due to maintenance activities would be moderated by availability of similar habitats in the surrounding area.

Wetlands

On November 21, 1994, the United States Army Corps of Engineers inspected the delineation of waters of the United States, including jurisdictional wetlands, associated with the electric interconnect route. This inspection determined that all wetland delineations had been identified correctly and accurately (correspondence from J. Johnson to S. Van Ooteghem, dated 3/31/95; see Appendix E).

Construction Impacts. The utility corridors would generally avoid development in wetlands. However, small areas of identified wetland areas would be impacted by portions of the cooling tower supply line and cooling tower return pipelines, which would traverse over identified wetland areas 12, 13, and 14, as shown on Figure 3.1-15. Approximately 0.2 acres (0.08 hectares) would be required to accommodate the cooling tower supply and return pipelines (pipeline corridor) on these identified wetlands. These pipelines would extend along existing pipeline corridors for much of the length. Other alternative routes were reviewed; however, those alternatives, in general, appeared to have a greater impact to residential areas, less compatible land usage, and more construction impacts.

Approximately 0.2 acres (0.08 hectares), as described above, of wetland areas 12, 13, and 14 would be occupied by new cooling tower pipeline corridor facilities. Impacts during construction would include construction vehicle access, earth disturbance from trenching, sedimentation, erosion from exposed soils, damaged vegetation, and placement and compaction of fill. Accessways would be temporarily developed to allow for personnel and equipment ingress and egress to construct the proposed facilities. Low impact clearing methods, ***such as hand clearing and siting of brush,*** proposed for the wetland areas would not require heavy equipment.

Operation Impacts. Cooling tower supply and return pipelines would be buried approximately ***1.5 m (5 ft)*** beneath the surface, and should not require any earth- or vegetation- disturbing maintenance activities. An exception to this would be in the case of a leak or pipeline failure, in which sections of the pipeline corridor would be disturbed by re-excavation and pipe replacement. Short-term impacts may result from periodic maintenance of the interconnection. Vegetation control measures would be necessary to maintain right-of-way access and minimize safety hazards. These control measures would result in temporary disturbance to vegetation.

It is expected that the affected wetlands will be restored to original condition after construction of the pipeline facilities, and that a Section 404 Wetland Permit from ACOE would not be necessary. It is also anticipated that the regulated activities that would impact 0.2 acres (0.08 hectares) of jurisdictional wetlands could be authorized by ACOE under Nationwide Permit Number 12, Backfilling and Bedding For Utility Lines, and/or Nationwide Permit Number 26, Headwaters and Isolated Water Discharges. However, coordination with ACOE ***would*** be conducted prior to any wetland disturbing activities, and their recommendations ***would*** be followed for required mitigation. Any earth disturbance activities which result in exposed soils or damaged vegetation would be restored by returning the affected area to grade and natural vegetation as soon as possible. Silt fencing would also be installed prior to construction to prevent sediment washing in surface waters. This would be accomplished as soon as possible to prevent erosion and sedimentation control problems. All vegetation removed would be left in the right-of-way. Logs and limbs cut during these activities would be reduced to chip materials and left as mulch.

4.1.14.6 Human Health and Safety

<u>Electric and Magnetic Fields (EMFs)</u>

During the public comment period on the Draft Environmental Impact Statement, several comments were received regarding the electric and magnetic fields (EMFs) that would be created by the proposed electric transmission line and switchyard facilities, and their potential to affect human health in the local area. Specifically, most comments concerned the potential for EMFs to affect those residences in close proximity to the Bair substation facilities, and to future users of the proposed York - Hanover rail/trail. The uncertainties surrounding the health effects due to EMFs are discussed in Section 3.1.14.6 of this FEIS. This section will discuss the potential EMF intensities that were modeled for the proposed facilities, and their relationship to residences at Bair and the proposed rail/trail.

Although reviewers have not concluded that EMFs at levels found in the environment produce adverse health impacts, the uncertainties of scientific research has led to some public concern. One policy option proposed in response is that concerned individuals or electricity providers limit exposures in those cases where it can be done with small investment of money and effort. This policy option is called "prudent avoidance." YCEP has taken steps toward limiting exposures in two ways: 1) the triangular (delta) conductor layout (the configuration of the lines on the pole) of the proposed transmission line is one that minimizes magnetic field levels in the vicinity of the line; 2) wherever possible, the proposed alignment is routed away from residences and schools to minimize the potential

for public exposure. As a general guideline, Met-Ed, who would own and operate the proposed electrical interconnection lines *and switchyard* constructed by YCEP, attempts to maintain a 100-m (328-ft) minimum setback from residences, schools, churches, and other public gathering places for siting new 115 kV electric transmission lines. YCEP included this setback guideline in its criteria for siting the proposed electrical interconnect route.

In addition to meeting Met-Ed setback requirements and implementing the "prudent avoidance" actions discussed previously, YCEP has negotiated purchase options on residential properties near the proposed switchyard in Bair. Specifically, purchase options have been negotiated for the Whiteleather residence, which is the dwelling nearest the existing Bair Substation (and proposed switchyard), and for the Artz property, which is approximately 18 acres (7.3 hectares) in size. The Artz property encompasses the open field on the west and southwest side of the Bair Substation, of which approximately 1 acre (0.4 hectares) would be partially utilized to site the proposed switchyard.

Construction Impacts. There would be no EMF impacts or effects expected to occur during construction of the Bair switchyard facility. The new facility would not be "energized" with electricity during construction, and therefore would not produce electric or magnetic fields. Upon project approval, the negotiated purchase options on the Whiteleather and Artz properties would most likely be executed and YCEP would assume ownership of these properties.

Operation Impacts. YCEP retained the services of Electric Research & Management, Inc. to model potential magnetic field intensities that could be expected from operation of the proposed transmission line, switchyard, and interconnection with existing Met-Ed lines. Electric Research & Management, Inc. personnel contacted Met-Ed for the maximum load flow case that could be expected from the proposed configuration. The resulting modeling represents the "peak load flow condition" for the Year 2000 on all lines connected to the Bair substation and switchyard. The model is based on the following electric current assumptions:

- *572 amperes in the YCEP line into the switchyard;*
- *179 amperes in the Met-Ed line northwest out of the switchyard;*
- *315 amperes in the Met-Ed line southeast out of the switchyard; and*
- *85 amperes in the feeder to the Bair substation out of the switchyard.*

Results of the modeling are presented in Figure 4.1-4 as contour lines of expected magnetic field intensities. The maximum magnetic field predicted by the model was 150 milligauss (mG) inside the proposed switchyard. As shown in Figure 4.1-4, the field intensity falls off rapidly and the highest magnetic field expected to extend beyond the switchyard perimeter fence would be 10 mG. The expected magnetic field intensity at the closest (Whiteleather) residence would be less than 1 mG. These fields are modeled for "peak load" conditions, and represent the maximum fields that would be produced by the proposed facilities. A comparison of field intensities produced by common household appliances is presented in Table 3.1-25a.

Other questions raised during the public comment period concerned the potential EMF effects on the recreation rail/trail proposed to pass through this area. According to correspondence received from Mr. Timothy Fulton, Chairman of the York County Rail/Trail Authority, the proposed rail/trail would closely follow the old York to Hanover trolley route. It is assumed that users of this trail would be in the vicinity of the electric switching and substation facilities for very short periods of time (hiking, biking, riding) and the duration of their potential exposure to EMFs would be short term. The areas of maximum exposure would be where the trail would pass near the existing Bair Substation, and where the trail would pass directly beneath the transmission lines coming into the (proposed) switchyard (Figure 4.1-4). This area of maximum exposure would constitute a distance of approximately 107 m (350 feet), where trail users would potentially be exposed to magnetic fields of 10 mG. Once beyond the point where the trail would pass under the lines, the fields drop off drastically, and trail users would be exposed to fields between 1.0 and 5.0 mG. This exposure would continue for approximately 0.8 km (0.5 mi), the distance the proposed trail would closely parallel the proposed transmission line. At the point where the transmission line would cross Codorus Creek (near the bridge on Sunnyside Road), the trail and transmission line separate, and for all practical purposes, the trail leaves the zone influenced by transmission line electric and magnetic fields.

Solid Waste

Construction Impacts. Accepted procedures would be implemented when disposing of solid waste during construction of the utility corridors, including reuse of woody debris associated with clearing along the ***electrical interconnection*** right-of-way ***for wildlife cover as discussed in Section 4.1.14.5 of the FEIS.*** A private contractor would be responsible for disposal of construction materials at an appropriate landfill or for the salvage or recycling of materials. The York County Solid Waste Authority requires that licensed haulers be used for disposing at the Modern Landfill or the York County Incinerator.

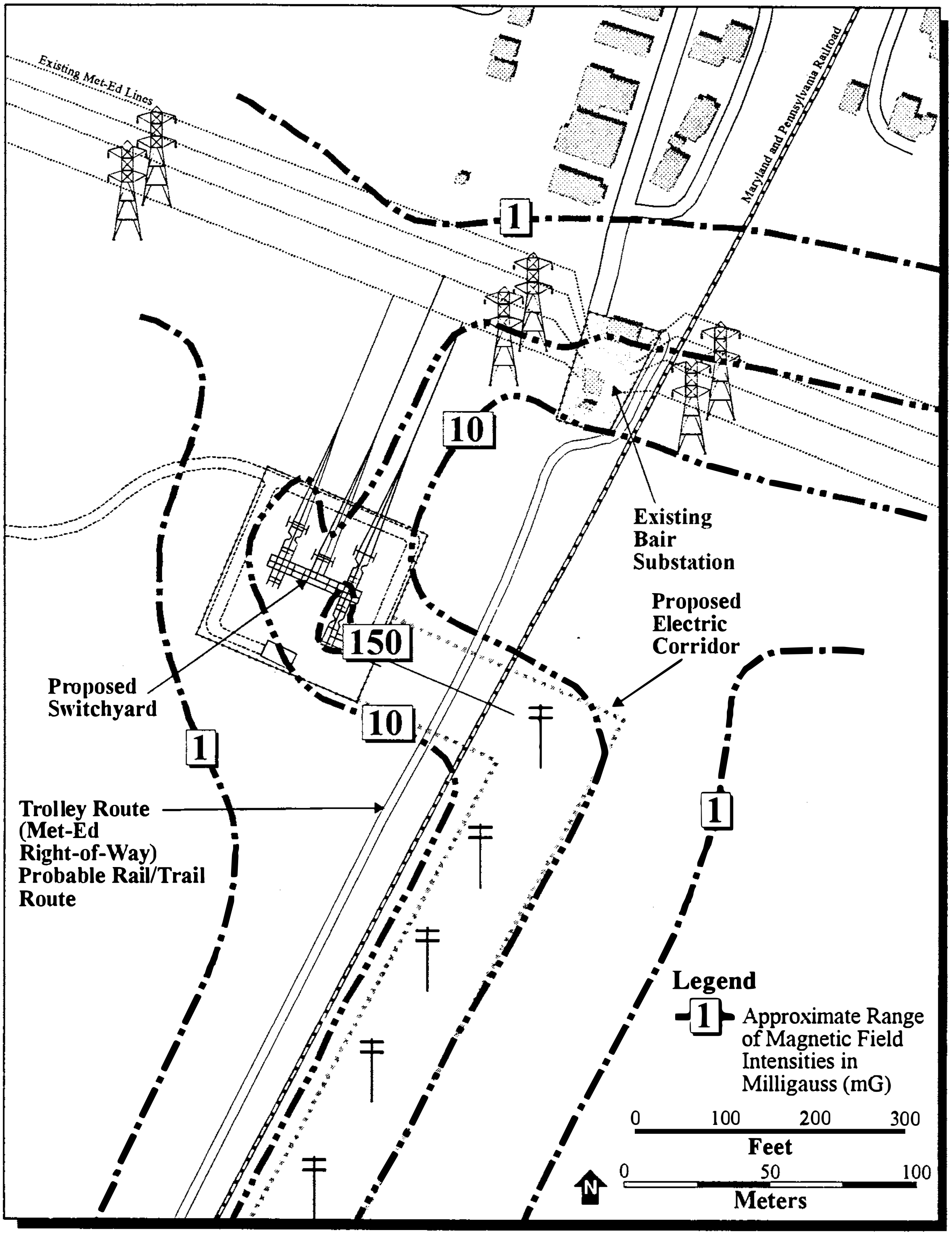

Figure 4.1-4. Modeled maximum electromagnetic field (EMF) intensities expected from the proposed switchyard and electric transmission line.

Operation Impacts. The only solid waste that would potentially be generated from the operation of the utility lines would be woody debris associated with the clearing of rights-of-way during periodic vegetative control activities. Any debris generated would be minimal, and would be properly disposed or recycled. Woody debris ***from maintenance clearing within the electrical interconnection right-of-way would*** be left in place to promote habitat use of certain upland game species.

4.1.14.7 Noise

Construction Impacts. Construction activity would be restricted to daytime hours and would, therefore, not perceptibly change the existing noise environment in this area. Construction of the electrical ***intra***connection, wastewater discharge line, and steam and condensate return lines would be of limited duration and would occur near the existing noise sources at the P. H. Glatfelter Company paper mill.

There would be some noise associated with construction of the proposed power transmission line and switchyard facility. The proposed switchyard is located over 122 m (400 ft) from the nearest residence, and is approximately 61 m (200 ft) southwest of the present Bair Substation. This location is several hundred feet further away from residences than originally planned. Should the project go forward, negotiated purchase options on the Whiteleather and Artz properties would most likely be executed, and YCEP would assume ownership. Noise levels affecting these and other residences in Bair would be comparable to those produced by similar standard construction activities. Some diesel-powered heavy equipment, dozers, loaders, dump trucks, ready-mix concrete trucks, and other vehicles would be present on site for a short duration.

Operation Impacts. ***Once constructed, the switchyard facility would be landscaped with trees and shrubs around the outside perimeter fence. Due to the dual effect of landscape vegetation and the switchyard site being moved further away from existing residences, no perceptible noise is expected to accompany operation of the switchyard or power transmission lines.***

4.1.14.8 Transportation and Traffic

The proposed pipeline corridors for the potable water supply, the primary cooling water make-up, and the wastewater return lines would cross two roads as well as Codorus Creek. Each pipeline would consist of steel casing that would be jacked and bored under the road to avoid disturbing traffic. The remainder of the corridor would be located along access roads and Rockery Road. The primary cooling water supply and the wastewater return would both cross Rockery Road. No other pipeline corridors would cross roadways. The proposed electrical interconnect would cross York Road (Route 116) and four secondary roads. Poles would conform to Pennsylvania Department of Transportation guidelines for minimum distance to the roadway edge.

The proposed utility pipeline corridor for steam/condensate return and the electrical raceway would cross the right-of-way of the Yorkrail line before connecting with the P. H. Glatfelter Company steam system. The pipeline corridor at that crossing would be made via the existing pipe bridge maintained by the P. H. Glatfelter Company. No other proposed pipeline corridors would cross railway facilities. The electrical interconnection corridor alignment would cross and then conjoin the Maryland & Pennsylvania right-of-way in the final segment approaching the ***proposed switchyard near the*** Bair substation.

Construction Impacts. Equipment involved in the construction of the proposed utility pipelines and electrical interconnections would result in a minimal increase in traffic on local roads and York Road (Route 116). YCEP would obtain a Highway Occupancy Permit to bore beneath York Road (Route 116). The traffic on the affected roadways would be slowed during working hours, although appropriate measures would be taken to ensure traffic flow through these areas could be maintained at all times. These roads would have normal passage when construction crews are not working.

Construction of the electrical interconnection to Bair would require the construction of temporary access roads at four principal locations using methods that generate very little earth disturbance [*e.g.*, placing geotextile filter cloth on existing surface and covering the fabric with a 0.3-m (1-ft) layer of clean rock fill]. The electrical interconnection would cross township roads used by farmers and residents, and construction activity would be scheduled to minimize disturbances to traffic on these roads. The electrical interconnection construction activity would have little effect on existing roadway or railway facilities.

Operation Impacts. It is expected that access to the corridor would be provided primarily by existing roadways and that no new roadways or easements would be required. Maintaining the proposed pipelines and electrical interconnection facilities would have very little effect on transportation in the project area. General maintenance activity of the pipelines would be brief and infrequent. Long-term operation of the proposed facilities would not be expected to affect transportation in the project area.

4.1.14.9 Land Use

Construction Impacts. Short-term impacts to land use would occur during the construction phase as a result of temporary disturbances during pole installation.

Existing Land Use

Utility Pipelines. Siting of the proposed utility connections within the existing industrial parcel would not adversely impact land use during the construction phase. The proposed utility pipeline would be compatible with current industrial land use.

Electrical Interconnection. The electrical interconnection alignment would not permanently alter the industrial or wooded/riparian land uses in the vicinity except within the identified right-of-way. Existing industrial uses would continue in proximity to the pole foundations. In some instances, the interconnection would cross wooded or riparian lands. Woody vegetative cover would be removed by the clearing that would take place.

Prime farmland would not be negatively altered by the project. Construction and placement of each pole would temporarily disturb approximately 2.3 m^2 (25 ft^2) of surface and potentially would require temporary access to the area for periodic maintenance. No permanent conversion of prime agricultural land would be expected to occur.

Land Use Trends and Controls

Existing and future land uses are an important factor for evaluating the alignment of the interconnection facility, and the amount of land incompatible to siting such a facility must be minimized. Utility corridors, transportation rights-of-way, industrial land, and certain government lands are perhaps the most desirable, compared to residential, commercial, and timber land, which are less desirable. Minimizing encroachment on private land is important in reducing the probability of existing and future land use conflicts. Due to the increasing public concern over the presence of electromagnetic fields and their relation to human health, a general policy of "prudent avoidance" would be observed when siting new electric lines in the vicinity of residential units. The dominant existing land uses on the area proposed for the electrical interconnection corridor are light ***industry***, agriculture, wildlife conservation, and flood control. The flood control property is under the jurisdiction of the ACOE. The electrical interconnection would not interfere with any of these land uses, *including* management of the Indian Rock Dam Reservoir project as a dry reservoir for flood control and wildlife conservation area.

Because the property on which the proposed electric switchyard would be built is currently zoned for agricultural use, York County Energy Partners, L.P. (YCEP) would have to obtain a "special exception use" for public utilities, as set forth in § 150-15 of the West Manchester Township Zoning Code. Pursuant to § 150-302(D)(1)(c) of the Code, YCEP must prove "the use of adjacent land and buildings will not be discouraged and the value of adjacent land and buildings will not be impaired by the location, nature and height of the buildings, walls and fences." § 150-346(f) of the Code specifically requires that public utilities "shall emit no obnoxious noise, glare, dust, odor, vibration, electrical disturbance, or any other objectionable impact beyond the subject property."

Upon completion of the proposed addition of an electric switchyard by YCEP, landscaping of the area surrounding the switchyard compatible with local scenery would occur (see Figure 3.1-14c). In addition, mitigation of visual effects due to the addition of the proposed switchyard near the Bair substation on historic resources in West Manchester Township may be required based on the DOE's completion of Section 106 consultation with the Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation (see Section 4.1.14.11). This mitigation would most likely involve the planting of trees and shrubs to obscure the view of the switchyard from residences in the area. Mitigation methods would need to be approved by the Pennsylvania Historical and Museum Commission.

Operation Impacts. The impacts to land use from the utility corridors during operation of the proposed *electric interconnection and switchyard facility would be to establish a new utility corridor approximately 6.1 km (3.8 mi) in length in areas where one does not presently exist, and to increase the width of an established corridor by 30.5 m (100 ft) for approximately 0.8 km (0.5 mi). It would also remove approximately 1.0 acre (0.4 hectares) from potential agricultural production to be used for a permanent electric switchyard.*

4.1.14.10 Pollution Prevention

Construction Impacts. The discussion of pollution prevention strategies and impacts relevant to the construction of the proposed facility at the North Codorus Township site, *as* presented in Section 4.1.10, also pertains to construction.

Operation Impacts. The discussion of pollution prevention strategies and impacts relevant to operation of the proposed facility at the North Codorus Township site, *as* presented in Section 4.1.10, also pertains to the related utility corridors.

4.1.14.11 Cultural Resources

Construction Impacts. The impacts to historic and archaeological resources from construction of the proposed utility corridors are described below.

Historical Resources

Utility Pipelines The construction and alignment of project pipelines ***have been determined not to affect*** historic properties.

Electrical Interconnection ***As a result of the Historic Sites Survey submitted March 17, 1995 (Historic York, Inc., 1995), the Bureau for Historic Preservation determined that one district and three individual resources within the viewshed of the electrical interconnect route were eligible for listing in The National Register of Historic Places. These National Register Eligible resources are listed in Section 3.1.11.1 and can be seen in Figure 3.1.13a. The Bureau also determined that the proposed electrical interconnect and switchyard would have an adverse visual effect on two of the individual resources near Bair (GG-44E and GG-45B).***

Following the Bureau's finding of "adverse visual effect," DOE entered into consultation with the Bureau in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, and the regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation.

DOE submitted "Adverse Effect Documentation" to the Bureau (correspondence dated 4/20/95 from J. Wachter to B. Barrett; in Appendix E of the FEIS) which requested reconsideration of finding of "adverse visual effect" for one resource, number GG-45B (see Figure 3.1-13a), and initiated the consultation process for mitigation of unavoidable adverse visual effects for the other. DOE's rationale for reconsideration of "adverse effects" to resource GG-45B is based on mitigation (see Table 4.4-1 in Section 4.4) provided by the proposed switchyard landscaping plan, which includes planting of full-sized deciduous and evergreen trees and shrubs (see Figure 3.1-14c) around the switchyard perimeter.

The proposed landscaping should obscure much of the switchyard facility from the viewshed of Resource GG-45B. After reviewing DOE's "Adverse Effect Documentation," the Bureau determined that resource number GG-45B (Jonas Law House) would not be adversely affected by the proposed switchyard or electrical interconnect (see correspondence dated April 28, 1995, from B. Barrett to J. Wachter; Appendix E in the FEIS)

DOE has determined that adverse visual effects to resource GG-44E are unavoidable, due to the proximity of one power pole location near the barn on this property. This pole location was chosen to avoid impacting adjacent wetlands and riparian areas.

The Bureau for Historic Preservation has also indicated that mitigation of unavoidable adverse visual effects to resource number GG-44E may be accomplished through non-traditional methods. The Section 106 consultation process is ongoing between DOE and the Bureau to resolve mitigation of unavoidable adverse visual effects (see Table 4.4-1 in Section 4.4) to resource Number GG-44E. Completion of the Section 106 consultation process will result in execution of a Memorandum of Agreement (MOA) between the Bureau and DOE that specifies mitigation actions and schedules for completion.

Archaeological Resources *Correspondence from the Bureau for Historic Preservation (B. Barrett to S. Van Ooteghem, dated April 14, 1995 [Appendix E]) indicated that all archaeological reports submitted for the project (including the electrical interconnect and switchyard) meet the required standards and specifications and that no further archaeological testing is necessary.*

Construction Impacts

Utility Pipelines YCEP has conducted a Phase I archaeological investigation as requested by the Bureau of Historical Preservation. No evidence of archaeological resources was discovered. ***The Bureau has agreed that the use of geotextiles at the locations of temporary access roads would mitigate the need for archaeological investigations at those locations [see Table 4.4-1 in Section 4.4].***

Electrical Interconnection YCEP has conducted a Phase I archaeological investigation as requested by the Bureau of Historical Preservation. No evidence of archaeological resources was discovered. ***The Bureau has agreed that the use of geotextiles at the location of temporary access roads would mitigate the need for further archaeological investigation.***

Operation Impacts. ***No*** *i*mpacts to historic and archaeological resources ***are expected to occur*** from ***operation of*** the utility corridors ***or electrical interconnection.***

4.1.14.12 Socioeconomic Resources

The construction of the proposed electrical interconnection and the utility pipeline corridors would make up only a small percentage of the total estimated construction cost of the proposed facility.

Demographics

Construction Impacts. The discussion of impacts to population and housing described in Section 4.1.12.1 for the proposed action at the North Codorus Township site also would be applicable to the construction of the proposed utility corridors.

Operation Impacts. The discussion of impacts to population and housing described in Section 4.1.12.1 for the proposed action at the North Codorus Township site also would be applicable to the proposed utility corridors during operation of the proposed project.

Local and Regional Economic Activity

Employment

Construction Impacts. The construction of the proposed project would begin in 1995 and would take approximately 36 months. The construction of the proposed electrical interconnection would probably occur during months 30 through 36 of the construction phase and would utilize 67 person-months of construction labor. The utility lines would probably be constructed during months 27 through 31 and would require 124 person-months of construction labor.

Operation Impacts. The discussion of employment presented in Section 4.1.12.2 for the proposed action would be applicable to the proposed utility corridors during operation of the proposed Cogeneration Facility.

Unemployment

Construction Impacts. The discussion of unemployment presented in Section 4.1.12.2 for the proposed action at the North Codorus Township site also would be applicable to the construction of the proposed utility corridors.

Operation Impacts. The discussion of unemployment presented in Section 4.1.12.2 for the proposed action at the North Codorus Township site also would be applicable to the proposed utility corridors during operation.

Income

Construction Impacts. It is anticipated that the construction of the proposed electrical interconnection and utility corridors would produce a share of the economic benefits described in Section 4.1.12.2 approximately equal to its proportion (i.e., construction of the utility corridors) of total construction costs.

Operation Impacts. It is anticipated that the impacts to income from the proposed utility corridors during operation of the proposed Cogeneration Facility would be equivalent to those presented for the proposed action at the North Codorus Township site in Section 4.1.12.2.

Sales Revenue

Construction Impacts. It is anticipated that the construction of the proposed electrical interconnection and utility corridors would produce a share of the economic benefits described in Section 4.1.12.2 in a proportion approximately equal to its proportion (i.e., construction of the utility corridors) of the total construction costs.

Operation Impacts. It is anticipated that the impacts to sales revenue from the proposed utility corridors during operation of the proposed Cogeneration Facility would be equivalent to those presented for the proposed action at the North Codorus Township site in Section 4.1.12.2.

Tax Revenue

Construction Impacts. It is anticipated that the construction of the proposed electrical interconnection and utility corridors would produce a share of the economic benefits described in Section 4.1.12.2 in a proportion approximately equal to its proportion (i.e., construction of the utility corridors) of the total construction costs.

Operation Impacts. It is anticipated that the impacts to tax revenue from the proposed utility corridors during operation of the proposed Cogeneration Facility would be equivalent to those presented for the proposed action at the North Codorus Township site in Section 4.1.12.2.

Public Services

Construction Impacts. Impacts to education, health care and human services, police protection, fire protection, parks and recreation, and utilities as a result of construction of the proposed electrical interconnection and utility pipeline corridors would be similar to those described for the proposed action at the North Codorus Township site in Section 4.1.12.3.

Operation Impacts. Impacts to education, health care and human services, police protection, fire protection, parks and recreation, and utilities as a result of the proposed electrical interconnection and utility pipeline corridors during operation of the proposed Cogeneration Facility would be similar to those described for the proposed action at the North Codorus Township site in Section 4.1.12.3.

Real Estate

Construction Impacts. Impacts associated with the placement of the utility corridors would be short-term visual impacts and some long-term impacts associated with the clearing of deciduous trees, which would not be expected to affect property values.

Operation Impacts. The proposed electrical interconnection corridor crosses a mix of land uses including light industrial, agricultural, conservation and flood control properties. The proposed route is not expected to impact or cause permanent conversion of any prime agricultural land. Placement of the electrical poles and conductor lines would entail a slight visual impact. However, it is expected there would be little effect on property valuations in the immediate or surrounding areas.

4.1.14.13 Environmental Justice

The construction and operation of the proposed electrical utility connections are not expected to have a disproportionately high and adverse human health or environmental impact on the minority community located in Jackson Township near Route 116 and Stoverstown Road. The utility corridor would be closest to this community near its terminus at the existing Bair ***sub***station. The proposed corridor would be between 915 m and 1.067 m (3000 to 3500 feet) from the minority community. The corridor would be sited along existing easements and more unpopulated areas. Numerous residences near the Bair ***sub***station are located in closer proximity to the proposed utility corridor than the minority community, including homes along Grandview Drive, Smith Drive, Sunnyside Road, and Stoverstown Road. In addition, an existing electric transmission line bisects the minority community at Route 116, south of Biesecker Road.

Construction Impacts. Construction of the proposed utility corridors would not be expected to have an adverse or disproportionate impact on low-income or minority communities in the region. The minority community located in Jackson Township is not expected to experience visual or noise-related impacts from construction due to the distance from the proposed corridor and ***electric switchyard.***

Operation Impacts. The operation of the proposed utility corridors would not be expected to have an adverse or disproportionate impact on low-income or minority communities in the region. The minority community located in Jackson Township is further from the proposed corridor than over 70 homes located in the Bair community. No EMF impacts to this minority community are expected, due to its distance from the corridor.

4.2 Environmental Impacts of the Proposed Project at the Alternative Site Location

This section presents the analyses of potential impacts from the construction and operation of the proposed project at an alternate site. ***Comparisons are made with the level of impacts at the proposed site (see also Section 2.3).***

4.2.1 Setting

The design of the proposed Cogeneration Facility (Figure 4.2-1) at the West Manchester Township alternative site would incorporate architectural and landscaping features that would integrate the facility into the surrounding area to the greatest extent possible. Neutral colors would be used on the exterior of facility structures. Existing treelines would be preserved and would serve to screen the facility from adjacent properties and to shield it from existing land uses in the vicinity.

Construction Impacts. Visual impacts during construction of the proposed Cogeneration Facility at the alternative site and its associated utility interconnections would be of limited duration and nature. Impacts would result from the temporary on-site activities of construction teams and equipment used for excavation and fill activities, building construction, and service road construction. Cranes, trucks, bulldozers, and smaller tools and vehicles would be utilized. Upon completion of construction, landscaping and regrading would be conducted.

A parking area for construction workers would be established on a vacant parcel just south of the site. The alternative site would be visible from residences south of Route 30, as would much of the construction activity. The golf course to the west and southwest of the site would be partially shielded from construction activities by a hedgerow and rolling topography. Intervening vegetation would obstruct views from the Honey Run residential development, except for views of equipment taller than existing treelines or topography. Thick vegetation would screen construction activity from the view from the intersection of Baker Road and Route 234. Construction-related impacts would be expected to be short-term.

Operation Impacts. Approximately 20 percent of the 47-acre (19 hectares) site in West Manchester Township would be developed to accommodate the ***proposed*** Cogeneration Facility footprint. The major visual elements of the facility would include the building housing the CFB boiler, the fuel storage enclosure and penthouse, the fuel conveyor and fuel silo bay, and the exhaust stack. The CFB boiler building, approximately 61.0 m (200 ft) in height, would be at the center of the facility. The fuel storage building would be north of the boiler building and would be approximately 56.4 m (185 ft) in height. The enclosed fuel conveyor [64.0 m (210 ft) at its highest point] would extend from the storage building to the fuel silo bay located directly to the east of the boiler building. The fuel silo bay would be approximately 67.1 m (220 ft) high, and the exhaust stack, located in the southwest portion of the facility layout, would be 106.7 m (350 ft) in height.

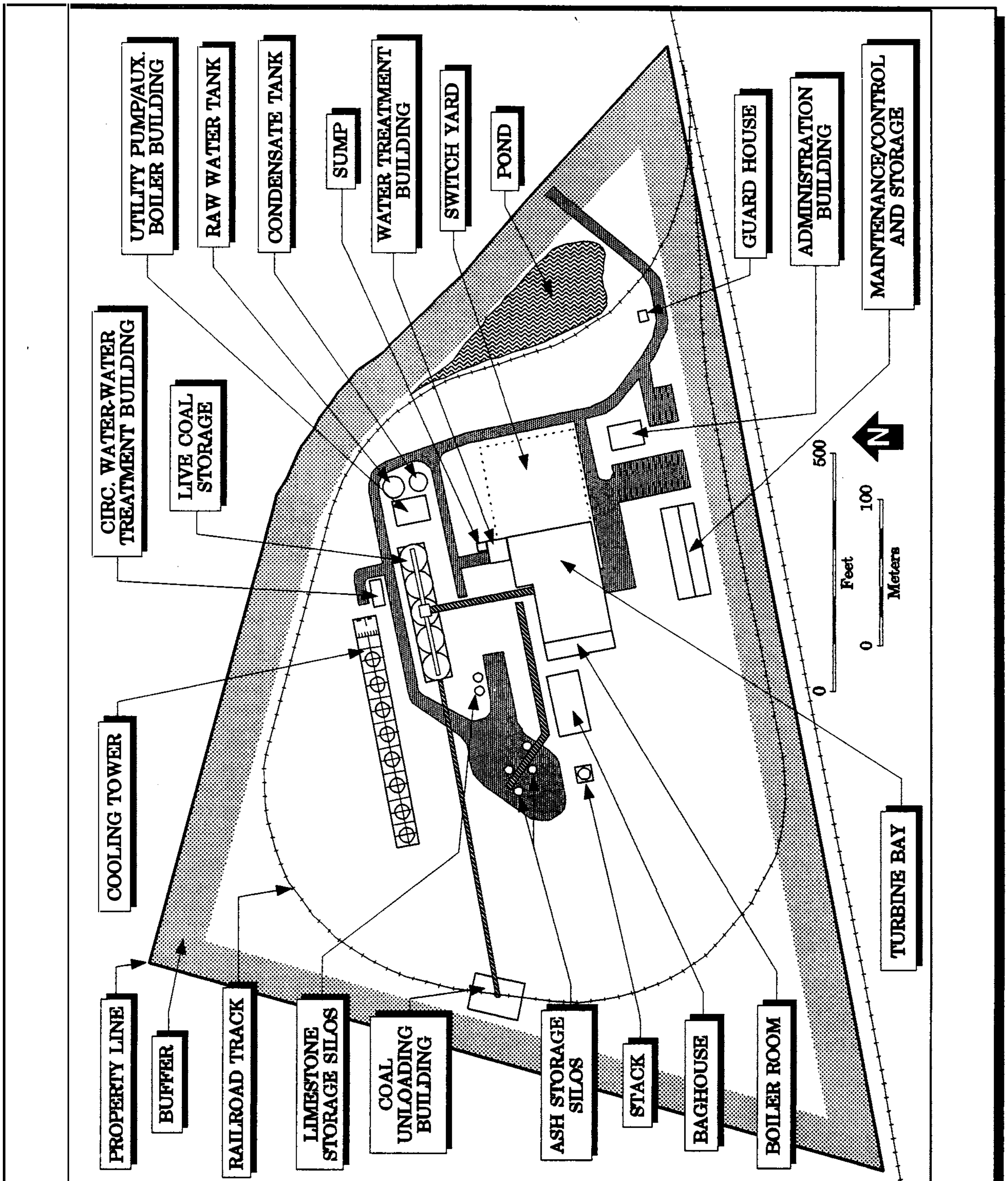

Figure 4.2-1. Proposed YCEP Cogeneration Facility site plan for the West Manchester Township site. ***Source: ENSR, 1992.***

The industrial function of the proposed Cogeneration Facility at the West Manchester Township alternative site would be consistent with the existing structures located nearby at the J.E. Baker surface mining and brick manufacturing complex. Intervening structures, topography, and vegetation would screen many of the views of the proposed facility. The most visible features would be project elements that extend above the vegetation to the immediate west. These structures would be consistent with the quarrying and manufacturing operations to the north and east, and the commercial development along Route 30 to the south. The proposed Cogeneration Facility would be compatible with the surrounding land use.

4.2.2 Air Quality

Construction Impacts. The impacts from construction of the proposed facility at the West Manchester Township would be similar to those described for the proposed facility at the North Codorus Township site. Air impacts from traffic would also be similar ***to*** those for the North Codorus Township site.

Operation Impacts. Air pollutant emissions would result from coal combustion in the primary CFB boiler and from the natural gas-fired auxiliary boiler during operation of the proposed project. The hourly criteria pollutant emissions due to operation of the main boiler at 100 percent (baseload), 75 percent, and 50 percent operating load are presented in Table 4.2-1. Emissions generated by the main boiler would be controlled through SNCR for limiting oxides of nitrogen (NO_x) emissions to 0.125 lbs/MMBtu, a baghouse for limiting emissions of particulate matter to 0.011 lbs/MMBtu, and limestone injection into a single train CFB boiler to limit sulfur dioxide (SO_2) emissions to 0.25 lbs/MMBtu.

A PSD Air Quality Permit Application was not filed for the project at the West Manchester Township alternative site. Potential air quality impacts from this alternative site have been estimated by comparing the overall air emissions that would result from operation at the West Manchester Township site to anticipated emissions from operation of the North Codorus Township site.

The CAA ***Amendments*** of 1990 require that certain air emission reductions occur when a project is constructed. These minimum mandatory reductions would be required at both the West Manchester Township alternative site and the North Codorus Township site. By the year 2000, a facility located at the West Manchester Township alternative site would be required to obtain sulfur dioxide (SO_2) allowances. Sulfur dioxide (SO_2) emissions would be required to be reduced at a location in the United States in the same amount (i.e., a one-to-one reduction) as those that would be emitted if the facility were constructed.

Table 4.2-1. Hourly criteria pollutant emissions of CFB boiler operation at the West Manchester alternative site facility.

Pollutant	50% Load	75% Load	100% Load
Sulfur Dioxide:			
lbs/hr	295	432	525
lbs/MMBtu	0.25	0.25	0.25
Nitrogen Dioxide:			
lbs/hr	239	220	277
lbs/MMBtu	0.20	0.125	0.125
Carbon Monoxide:			
lbs/hr	269	304	332
lbs/MMBtu	0.22	0.17	0.15
Particulate (PM_{10}):			
lbs/hr	13	19	24
lbs/MMBtu	0.011	0.011	0.011
VOCs, Non-Methane:			
lbs/hr	--	<22	<22
lbs/MMBtu	0.018	0.013	0.01

Source: ENSR, 1992

Oxides of nitrogen (NO_x) emissions also would have to be offset (i.e., reduced). The oxides of nitrogen (NO_x) reductions would be required to be implemented at the onset of facility operation. For each ton of oxides of nitrogen (NO_x) that may be emitted by the facility (i.e., the maximum permitted emissions), a reduction of 1.15 tons would be required.

A comparison of anticipated emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulates (PM_{10}) from a 227-MW coal-fired facility located at both the West Manchester Township alternative site and the North Codorus Township proposed site is presented in Table 4.2-2. Emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}) from a facility constructed at the West Manchester Township alternative site would be greater than ***overall*** emissions anticipated at the North Codorus Township site in all cases, for all years. The steam supply provided from the West Manchester Township alternative site to the J.E. Baker Company would not create the opportunity to generate the measurable emissions reductions in the York County vicinity as would the steam supply to the P. H. Glatfelter Company from the North Codorus Township site. In addition, the emission reduction of sulfur dioxide (SO_2), ***which would be required by the year 2000*** for the West Manchester Township alternative

Table 4.2-2. Comparison of SO_2, NO_x, and PM_{10} emissions at the two proposed sites based on maximum permitted emissions after emissions allowances and offsets.

SO_2 in Tons Per Year

Year	North Codorus Township Site	West Manchester Township Site
1998	(2657)	2300
1999	(2657)	2300
2000 and beyond*	(2419)	0

*Although net emissions after SO_2 allowances would be zero for the West Manchester Township site, the corresponding one-to-one reduction would not be available from the steam host. The corresponding reductions would be obtained from a location within the United States.

( )Denotes negative number.

NO_x in Tons Per Year *(Tons/Yr)*

Year	North Codorus Township Site	West Manchester Township Site
All	*(216)***	*(182)**

( )Denotes negative number.

PM_{10} in Tons/*Yr*

Year	North Codorus Township Site	West Manchester Township Site
All	(65)	*107**

( )Denotes negative number.

Source: Compiled from information included in ENSR, 1992,1994.

* *Personal communication from G. Kinsey, YCEP, to J. Gorland, EG&G dated 4/20/95.*

** *216 tons/yr reduction in NO_x required; 272 tons/yr anticipated based on additional offsets.*

site, would not ***necessarily*** occur at the same location. ***These offsets may*** occur within the same air basin or within Pennsylvania, ***but, as noted previously, sulfur dioxide (SO_2) allowances may be purchased from a facility located anywhere in the United States.***

Impacts from Cooling Tower Vapor Emissions

The *proposed* facility at the West Manchester Township alternative site would have a single, nine-cell linear mechanical draft cooling unit (LMDCT). In order to assess impacts from fogging and/or icing on nearby roadways as a result of project operation, a modeling analysis of the proposed cooling unit was conducted. The SACTI model *(EPRI, 1984; Engineering and Environmental Science, 1987 as cited in ENSR, 1992)* was used for the modeling analysis.

In addition to using the SACTI model, five years (1985 to 1989) of hourly surface meteorological data from Capital City Airport in Harrisburg, Pennsylvania, and concurrent upper air data from Dulles International Airport in Sterling, Virginia, were analyzed. Modeling parameters for the cooling unit analysis are presented in Table 4.2-3. The key roadways included in the analysis were Emigs Mill Road (bordering the site to the north and east), Route 234, Route 30, Baker Road, and Bowman Road. Icing and fogging also were evaluated for the Yorkrail railroad.

The modeling analysis indicated that operation of the cooling unit at the alternative site would have minimal impacts on the roadways and railroad surrounding the *proposed* facility. Based on a 5-year average (1985 to 1989), Emigs Mill Road would experience less than 0.5 hours of fogging annually, and this would be restricted to a location east of the cooling unit. No other roadways surrounding the facility would be impacted by the cooling unit. There would be no occurrences of cooling unit-induced icing on any roadway surrounding the facility. The cooling unit plume would cause less than 15 minutes/year of fogging and/or icing on the adjacent Yorkrail tracks. Based on the modeling results and the conservative nature of the SACTI model, the cooling unit would not be expected to adversely impact the region surrounding the facility at the West Manchester Township alternative site.

4.2.2.1 Health Risk Assessments

Dr. ***Alan*** Ducatman, director of the West Virginia University's Institute of Occupational and Environmental Health, conducted a study on the potential human health effects resulting from the ground level concentrations of emissions from the *proposed* facility at the alternative site. The ground level concentrations of emissions were determined from analytical air modeling studies. Parameters included in the air modeling consisted of local climate, meteorological conditions, local terrain, building and stack height, and emission rate.

Table 4.2-3. Input to the SACTI model for evaluation of icing and fogging associated with the cooling unit at the West Manchester Township site.

Fixed Parameters	Input
Type of Tower	Linear Mechanical Draft
Site Latitude (deg)	39.9
Site Longitude (deg)	76.8
Tower Height (m)	12.2
Tower Length (m)	115
Tower Width (m)	14.9
Tower Axis Direction (deg)	79 W of N
Effective Diameter (m)	21.9
Number of Cells Up	9
Air Flow rate (kg/sec)	3,200
Drift Rate (g/sec)	504.7
Total Heat Dissipation (MW)	317

Source: ENSR, 1992.

The health assessment focused on the following emissions: sulfur dioxide (SO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10}) and acid aerosol (sulfuric acid), mercury (Hg), and lead (Pb). The study concluded that the ground level concentrations of the evaluated emissions from the ***proposed*** Cogeneration Facility at the alternative site would not expose the York County community to a health risk. Although the substances evaluated do not represent the total composition that would be emitted from the stack, they do include those substances that have been identified by the ***United States*** EPA as having the potential to affect human health and are of concern to the residents of the York area. Each one of these substances is discussed individually below.

Sulfur Dioxide

The study found that sulfur dioxide (SO_2) background levels for the York area would be predicted to increase by 0.00044 parts per million (ppm). This level would not have a detectable effect upon human health and would be between 90 and 280 times below the levels associated with human health effects ***identified*** in any ***of the*** stud***ies cited by Dr. Ducatman (1992)***. Current sulfur dioxide (SO_2) levels in York County are at a level comparable to "control" levels used for comparisons to more polluted areas in epidemiological studies *(Ducatman, 1992)*.

Oxides of Nitrogen (NO_x)

Oxides of nitrogen (NO_x) were modeled to increase by 0.00039 ppm. This concentration would not have a health significance; it is hundreds of times below the outdoor threshold for detecting excess disease *(Ducatman, 1992)*.

Particulate Matter (PM_{10}) and Acid Aerosol

Particulate matter (PM_{10}) would increase background concentration by 0.059 $\mu g/m^3$ according to the Ducatman study. Associated aerosol increase would be less than 0.035 $\mu g/m^3$. These concentrations would be far below any measured or modeled level that resulted in an adverse health impact found in studies ***cited by Ducatman (1992)***. Particulate concentrations would be more than 300 times below the level at which health effects have been attributed ***as cited by Ducatman*** *(1992)*.

Mercury (Hg)

The modeled mercury (Hg) concentration was 0.000056 $\mu g/m^3$. The associated level of absorption over a lifetime would be equivalent to having 4 or 5 silver (amalgam) dental fillings for not more than five days. Any potential adverse health effect from this level of absorption would not be detectable, even in the most sensitive or susceptible person *(Ducatman, 1992)*.

Lead (Pb)

The modeled lead concentration was 0.000015 $\mu g/m^3$. The associated level of absorption over a lifetime would be comparable to the normal ingestion of lead contained in several quarts of drinking water containing the permissible level of lead. The contribution of lead of this magnitude is of no public health significance, and any effect would not be measurable *(Ducatman, 1992)*.

4.2.3 Geology and Soils

This section discusses the impacts on geology and soils from construction and operation of the ***proposed*** facility at the West Manchester Township alternative site.

4.2.3.1 Geology

Construction Impacts. Test boring data collected by Schnabel Engineering Associates *(1992)* indicate that varying amounts of rock excavation would potentially be required during different phases of construction. Ram hoes, jackhammers, and/or blasting would be used for this excavation, which would potentially include removing large boulders, rock pinnacles, and unsuitable rock at subgrade elevations. The actual extent of rock excavation required is undetermined because elevation of the underlying bedrock is highly variable.

Operation Impacts. No ***adverse*** impact to geological features would be expected to occur as a result of operation of the ***proposed*** Cogeneration Facility at the alternative site.

4.2.3.2 Soils

Construction Impacts. Construction would involve site grading, preparation, and placement of fill, which would alter the existing topography. Construction activities would comply with approved guidelines for erosion and sediment control. Erosion would be minimized by implementing cleanup and revegetation operations immediately following completion of construction activities, as well as the use of perimeter silt fencing, restriction of heavy truck traffic in designated corridors during extreme wet or dry periods, as-needed implementation of dust-abatement practices, construction of sedimentation basins along discharge channels, and stabilization of discharge channels during construction activities.

Excavation would be necessary to equalize the approximately 12.2-m (40-ft) rise in elevation between the southeastern and northwestern portions of the site. Excavation also would be required for construction of the foundations for major on-site structures including the building that would house the CFB boiler, the baghouse, the exhaust stack, the feedwater heat, and turbine bays, ***as well as*** the silos used for limestone, ash byproduct, and fuel storage. The non-organic soils found on the site would be expected to be suitable for uses such as compacted fill for loaded structures, pavements, and embankment construction, as well as for landscaping and grading purposes. A total of 98,762.6 m^3 (129,169 yds^3) of on-site excavated materials would be used for site preparation and access roadway construction.

Construction impacts to soil would include loss of excavated soil from water and wind erosion, reduction of soil quality from mixing topsoil with subsoil, and soil compaction from activities of construction equipment. Soil erosion would be minor due to the relatively flat topography in the area where the main facility would be constructed.

Operation Impacts. The impacts to soils as a result of operation of the proposed Cogeneration Facility at the alternative site would be similar to those described for the North Codorus Township proposed site. Landscaping enhancements would increase vegetation, which would serve to stabilize soil and minimize erosion potential.

4.2.4 Water Resources and Water Quality

This section discusses the impacts on water resources and water quality from construction and operation of the proposed facility at the West Manchester Township alternative site.

4.2.4.1 Surface Water

Construction Impacts. The water supply demand during construction of the proposed facility ***at the alternate site*** would vary from day to day depending on the nature of construction activities. The project water supply requirements would be 30,000 to 100,000 gpd, which would be supplied by the York Water Company municipal distribution system. The York Water Company is permitted to withdraw up to 30 mgd from existing surface water supplies. It currently provides approximately 19.5 mgd of water to the customers on its distribution system; therefore, no adverse impact would be expected to result to the York Water Company's service due to construction of the proposed facility at the alternative site.

Portable restrooms would be provided on site to handle sanitary wastes during construction. These wastes would be transported off site for final treatment and disposal. The handling, treatment, or discharge of sanitary wastes during construction would not be expected to impact existing sewage systems or surface water.

An Erosion and Sedimentation Control Plan would be developed to describe site-specific control measures to be utilized during construction. This plan would comply with Chapter 102 requirements under Pennsylvania's Clean Streams Law. Guidance for this plan would be obtained from the "Erosion and Sediment Pollution Control Program Manual," prepared by Pennsylvania's Bureau of Soil and Water Conservation, Division of Soil Resources and Erosion Control.

Operation Impacts. A water balance diagram for the West Manchester Township alternative site is shown in Section 2.2.3, Figure 2.2-4. Stormwater volumes were estimated based on one-year, 24-hour storm (identified as daily average) and 10-year, 24-hour storm (identified as daily maximum) events. The total daily water supply requirements for the facility would range from 2.75 to 3.0 mgd. Approximately 2.7 mgd would be used to satisfy cooling unit make-up requirements. The remainder of the water would be used for boiler make-up, miscellaneous in-plant use (e.g., routine maintenance and cleaning operations, dust control, and power block area washes), and for the potable water supply needs of the facility.

Water supply needs would be met by the York Water Company distribution system. The York Water Company operates Lake Williams and Lake Redmond, both of which serve as water supply reservoirs within the Codorus Creek Basin. Raw water is obtained through two surface water intakes that are located downstream of the reservoirs on the South Branch of Codorus Creek. Presently, the York Water Company has a permitted withdrawal allocation of 30 mgd [42.6 ***cubic feet per second*** (cfs)] from the South Branch of Codorus Creek. This allocation requires that a minimum 6.0 cfs reservoir release downstream of Lake Williams be maintained, as well as a minimum 7.5 cfs release downstream of the water company intake structure *(Packard, 1992 as cited in ENSR, 1992)*. Based on 1990 data, the York Water Company provides approximately 19.5 mgd to its residential, commercial, and industrial customers. An internal study completed by the York Water Company confirmed that water would be available to meet the needs of the ***proposed*** facility built on the West Manchester Township alternative site.

Based on evaluation of average daily discharge data collected at stream gaging stations within the Codorus Creek Basin, adequate surface water resources would be available to meet the water supply needs of the facility without adversely impacting downstream water use(s) during periods of normal or excess rainfall. Some concern is associated with consumptive use of water within the basin under drought conditions. Consumptive use for the ***proposed*** facility at the alternative site would range between 2.5 and 2.6 mgd, which is greater than the SRBC regulatory threshold of 20,000 gpd. Consequently, the ***proposed*** facility at the alternative site would be subject to SRBC's consumptive use compensation requirement.

The internal recycling/reuse of water would minimize the total water demands of the ***proposed*** facility, as well as limit wastewater discharges. Condensate from the steam host would be returned to the condenser for reuse in the steam generator (Figure 2.2-4). Boiler blowdown would be reused to offset a portion of the facility's cooling unit make-up requirements. Effluent from the ***proposed*** facility's holding pond would be used for ash quench. A net water savings of 80 to 180 gpm would be obtained through the employment of recycling and reuse.

The four primary sources of process wastewater at the proposed facility would be cooling unit blowdown, demineralizer regeneration, miscellaneous plant maintenance wastes, and sanitary wastes. These waste streams and their disposal methods are described in the following paragraphs.

Cooling Unit Blowdown

As with the proposed project at the North Codorus Township site, a continuously operating conventional wet cooling unit system would be utilized for process heat dissipation and condensation of steam to water in the steam turbine condenser. Mechanical draft cooling units would be utilized, and the heat transfer medium would be water. Cooling unit blowdown would be minimized, but some blowdown would be required to prevent excessive buildup of dissolved solids that result in scale formation and corrosion.

The blowdown volume would vary, depending on cycles of concentration, which are projected to be 8 to 12 cycles for the ***proposed*** facility built at the alternative site. The cooling unit blowdown volumes (110 to 120 gpm) presented in Figure 2.2-4 were calculated based on 8 to 12 cycles of concentration.

Chemical additives used in the cooling unit would be routine and would consist of sodium hypochlorite ***(NaOCl)*** (a disinfectant to prevent biofouling), a non-hazardous corrosion inhibitor (to limit scale formation and minimize corrosion), and sulfuric acid ((H_2SO_4)) (to maintain acceptable pH in discharge and control corrosion). Periodic use of a commercially available biocide or slimicide would be necessary to control biofouling of the condenser.

Projected cooling unit blowdown characteristics and concentrations based on 8 to 12 cycles of concentration are presented in Table 4.2-4. The cooling unit blowdown would either be directed to the facility's holding pond where it would combine with a portion of the facility's stormwater runoff, or ***would be*** discharged directly to the outfall on Codorus Creek. All ambient water quality and thermal discharge criteria would be met, as would EPA pretreatment standards. The proposed facility discharge would not be expected to adversely impact on Codorus Creek.

Table 4.2-4. Projected cooling tower blowdown concentrations for the facility at the West Manchester Township site.

Parameter	8.0 Cycles of Concentration	12.0 Cycles of Concentration
Total alkalinity (ppm $CaCO_3$)	50.0	50.0
P-alkalinity (ppm $CaCO_3$)	0	0
Aluminum (ppm Al)	0.6	0.9
Calcium (ppm $MgCO_3$)	480	750
Chloride (ppm Cl)	168	280
Copper (ppm Cu)	0.06	0.09
Iron (ppm Fe)	0.20	0.30
Magnesium (ppm $MgCO_3$)	176	275
Manganese (ppm Mn)	0.016	0.025
pH (S.U.)	7.5	7.5
Sodium (ppm Na)	49	76
Sulfate (ppm SO_4)	580	934
Total Dissolved Solids (ppm)	1,100	1,800
Zinc (ppm Zn)	0.50	0.80

Source: ENSR, 1992

Demineralizer Regeneration

High purity demineralized water is required for boiler make-up in order to prevent scale formation and corrosion in the boiler, heat exchanger, and steam turbine. The demineralization process would be conducted using weak acid cation/anion exchange technology. This would result in the production of two low-volume waste streams (Figure 2.2-4): (1) an exchange resin regeneration waste, and (2) a regeneration rinse waste. The projected effluent characteristics and volumes for each of these streams are presented in Tables 4.2-5 and 4.2-6, based on operational experience at the Air Products Cambria facility in Edensburg, Pennsylvania.

Table 4.2-5. Flow rate and chemical composition of the demineralizer regeneration wastes at the West Manchester site.

Parameter	Average Concentration (ppm)	Maximum Concentration (ppm)
Flow Rate (gpd)	2,680	6,700
BOD	1.50	3.00
COD	10.00	20.00
TOC	1.50	3.00
TSS	1.50	3.00
TDS	10,875	10,875
NH_3 as N	1.47	0.60
Oil/Grease	0	0
NO_2 as N	9.80	4.00
Total Organic N	0.10	0.20
Total Phosphorus	0.20	0.40
Sulfate	5,256	5,256
Copper	0.44	0.88
Zinc	0.10	0.19
Aluminum	0.64	1.28
Iron	6.00	12.00
Magnesium	50.00	100.00
Manganese	1.60	3.20

Source: ENSR, 1992.

Prior to discharge to the York City Wastewater Treatment Plant, the exchange resin regeneration waste stream would be neutralized to a pH of 6.0 to 9.0. It would then be combined with the regeneration rinse waste and discharged to the treatment plant. This combined discharge would meet all rules and regulations governing industrial discharge to the sanitary collection network. The proposed discharge is within the capability of the treatment plant to treat and meet required effluent limits.

Table 4.2-6. Flow rate and chemical composition of demineralizer rinse waste associated with the West Manchester Township site.

Parameter	Average Concentration (ppm)	Maximum Concentration (ppm)
Flow Rate (gpd)	1,340	3,350
BOD	1.50	3.00
COD	10.00	20.00
TOC	1.50	3.00
TSS	1.50	3.00
TDS	173.00	346.00
NH_3 as N	0.30	0.60
Oil/Grease	0	0
NO_2 as N	2.00	4.00
Total Organic N	0.10	0.20
Total Phosphorus	0.20	0.40
Sulfate	40.00	80.00
Copper	0.06	0.11
Zinc	0.01	0.02
Aluminum	0.08	0.16
Iron	0.37	0.74
Magnesium	6.30	12.60
Manganese	0.20	0.40

Source: ENSR, 1992.

Miscellaneous Facility Maintenance Wastes

Miscellaneous facility maintenance waste streams would originate from the power block area washes, discharges to plant floor drains, and other routine cleaning operations. The miscellaneous waste streams would be conveyed to the holding pond where they would combine with stormwater runoff and undergo removal of suspended solids and/or sediment. Following settling, the wastewater would be discharged directly to Codorus Creek along with the cooling unit blowdown. The proposed facility would be required to obtain an NPDES industrial waste discharge permit for discharges into Codorus Creek.

Sanitary Waste

The ***proposed*** facility's sanitary wastes would be discharged directly to the West Manchester Township Sewer Authority's sanitary collection network for transport to the York City Wastewater Treatment Plant. The York City Wastewater Treatment Plant has the adequate capacity to handle the anticipated flows from the proposed project at the alternative site.

Wastewater Discharge to Codorus Creek

Title 25, Chapter 93 of the Pennsylvania Code defines the waters of Codorus Creek in the vicinity of the proposed discharge as having a water quality classification of "WWF," signifying a warm water fishery. As a result of this classification, the stream must be protected to allow for the maintenance and propagation of fish species and additional flora and fauna indigenous to a warm water fishery. Important water quality issues related to the proposed discharge are described in the following paragraphs.

TDS data are not available for the main stem of Codorus Creek; however, baseline TDS concentrations are anticipated to be similar to or slightly greater than TDS concentrations measured in the South Branch of Codorus Creek (a slight***ly*** increased concentration in the main stem may occur from upstream wastewater inflows from the P. H. Glatfelter Company). TDS concentrations reported by the York Water Company suggest that baseline concentrations in the South Branch of Codorus Creek may range from 100 to 150 mg/L. Assuming a similar range for the main stem, the projected increase in TDS concentrations from cooling unit blowdown were estimated. An increase of 30 mg/L TDS following complete mixing was estimated based on a maximum daily cooling unit blowdown volume of 230,400 gpd, a blowdown TDS concentration of 1,800 mg/L, a baseline stream TDS concentration of 200 mg/L, and a Q_{7-10} estimate of 19.9 cfs. Based on the assumption that initial mixing would occur over one-third of the stream width, the increase in concentration within the zone of initial dilution would be approximately 100 mg/L.

The dissolved oxygen (DO) concentration of the proposed discharge would vary with effluent temperature. Re-aeration within the cooling unit system and mixing of miscellaneous plant maintenance wastes in the facility pond would serve to keep the DO concentration of the resulting discharge from dropping below the WWF daily average ambient water quality criteria of 5.0 mg/L. The ***biochemical oxygen demand*** (BOD) of the combined waste stream would be anticipated to remain below 25 mg/L at all times.

Discharges that add heat of artificial origin to receiving waters must meet traditional water criteria as well as PADER thermal discharge criteria as defined in Title 25, Chapter 93 of the Pennsylvania Code. In accordance with Chapter 97 of the Pennsylvania Code, the discharge of heated wastewater may not result in a change of more than 1.14°C (2°F) during a 1-hour period. The ***proposed*** facility's discharge would be capable of meeting PADER thermal discharge criteria due to the available in-stream dilution capacity and the proposed facility's use of a stormwater detention pond for cooling prior to discharge.

Addition of chlorine to the cooling unit system would be limited in order to comply with EPA new source pretreatment standards for steam electric-generating facilities. Chlorine discharge from the ***proposed*** facility would be closely monitored. The average daily chlorine residual concentrations would not be anticipated to exceed 0.2 mg/L (i.e., the new source pretreatment standard for chlorine residual).

Based on operation of the Air Products' Cambria facility, it is anticipated that the ***proposed*** facility at the West Manchester Township alternative site would be capable of meeting all effluent limitations defined by EPA's pretreatment standards for new sources, for total suspended solids, oil and grease, pH, chlorine residual, zinc, and PCBs.

Wastewater Discharge to the York City Wastewater Treatment Plant

The York City Wastewater Treatment Plant presently has adequate hydraulic capacity available to accept the estimated average daily discharge of 6,500 gpd of demineralizer regeneration and sanitary waste from the facility at the West Manchester Township alternative site. The treatment plant was initially designed and permitted to treat 26 mgd of wastewater. The current average monthly flow to the ***proposed*** facility is 11 mgd which is less than 50 percent of maximum design capacity. Consequently, the discharge from the ***proposed*** facility at the alternative site would represent less than a one-tenth of one percent increase in the average daily flow to the ***proposed*** facility.

The demineralizer regeneration waste stream would consist of naturally occurring dissolved salts and minerals that are constituents of the raw water make-up from the ***proposed*** facility at the alternative site.

This waste stream would be neutralized prior to discharge. Because of the available dilution capacity at the treatment plant (i.e., nearly 1,700:1) under average daily flow conditions, the treatment plant can be expected to meet required effluent limits with discharge from the ***proposed*** facility at the alternative site.

Stormwater Management

Impacts from stormwater runoff during facility operation would be minimized through proposed features such as an on-site detention basin, dust controls, enclosed materials storage areas, provisions for safe handling of hazardous materials (e.g., secondary containment for aqueous ammonia tanks), and implementation of a facility-specific stormwater pollution prevention plan.

The stormwater collection system for the ***proposed*** facility at the alternative site would be designed in accordance with West Manchester Township requirements. It would consist of a permanent on-site detention basin that would collect the runoff via swales, culverts, inlets, and underground piping. The basin would be sized to ensure that off-site stormwater discharge rates do not exceed pre-development levels. If stormwater were to be discharged to Honey Run, it would be discharged at rates less than existing conditions in order to reduce local flooding along Emigs Mill Road. The basin would be sized to accommodate runoff from the 10- and 25-year, 24-hour storm events. It is anticipated that storage capacity would be at least 2.5 to 2.9 million gallons.

The measures to prevent contaminated runoff from coal delivery and storage, chemical delivery and storage, and SNCR ammonia storage would be the same as those described for the proposed facility at the North Codorus Township site.

4.2.4.2 Groundwater

Construction Impacts. Construction dewatering would be required during construction activities if a shallow water table were encountered. Dewatering would be conducted to temporarily lower the groundwater level in excavations so that foundations, piping, and other plant systems could be properly installed. Water collected from the dewatering process would be directed to an on-site basin for settling of suspended solids prior to release. The water table levels would return to their original contours following completion of dewatering activities.

Operation Impacts. No groundwater would be used during operation at the West Manchester alternative site.

4.2.4.3 Floodplains

Construction Impacts. No FEMA-mapped 100-year floodplain areas extend onto the proposed alternative site.

Operation Impacts. No FEMA-mapped 100-year floodplain areas extend onto the alternative site.

4.2.5 Biological Resources and Biodiversity

The following section describes impacts to biological resources and biodiversity from construction and operation of the ***proposed*** facility at the West Manchester Township alternative site.

4.2.5.1 Aquatic Ecosystems

Construction Impacts. Construction of the ***proposed*** facility at the alternative site would be consistent with approved guidelines for erosion and sedimentation control. Erosion would be minimized by beginning the cleanup and revegetation operations immediately following completion of construction activities. Other mitigative measures to be employed include: perimeter silt fencing; restriction of heavy truck traffic to designated corridors during very wet or dry periods; implementation of dust-abatement practices as needed; construction of sedimentation basins along runoff interception and/or discharge channels; and stabilization of any such channels. These measures would mitigate potential impacts to aquatic ecosystems during construction ***at*** the West Manchester alternative site.

Operation Impacts. Wastewater discharged to Codorus Creek is not expected to prevent compliance with water quality criteria and pretreatment standards for TDS, DO concentration, thermal discharge, and chlorine. Measures would be implemented to prevent contaminated stormwater runoff from coal delivery and storage, chemical delivery and storage, and SNCR ammonia storage from entering aquatic ecosystems.

4.2.5.2 Terrestrial Ecosystems

Construction Impacts. The West Manchester Township alternative site and the surrounding area are considered to be of low ecological sensitivity due to their previous and current land uses, ***which*** include agriculture, golf course development, and surface mining. Development of the alternative project site would be expected to have a temporary impact on natural communities.

The proposed utility interconnections would cross lands that have been subject to intensive alteration for human uses, including agriculture, industry, commerce, and housing. Construction activities would produce minimal disturbances along these routes because the dominant communities are herbaceous and could be restored to their pre-existing conditions within one or two growing seasons following completion of construction. A small, unavoidable loss of vegetation would occur with the construction of the access roadway.

Operation Impacts. The West Manchester Township alternative site and the surrounding area are considered to be of low ecological sensitivity due to their previous and current land uses which include agriculture, golf course development, and surface mining. It is anticipated that any wildlife present at the alternative site would be readily displaced to available habitat in the surrounding area.

4.2.5.3 Threatened and Endangered Species

Construction Impacts. No threatened or endangered species of plant or animal *was* reported to occur on the alternative site or associated infrastructure routes.

Operation Impacts. No threatened and endangered species of plant or animal were reported to occur on the alternative site or associated infrastructure routes.

4.2.5.4 Biodiversity

Impacts to biodiversity that would result from physical alteration of natural areas, pollution, or disruption of natural processes are expected to be temporary.

Construction Impacts. Land disturbances resulting from construction activities would minimally effect the biodiversity of terrestrial ecosystems because similar habitats are available in the area surrounding the ***alternative*** site. Stormwater runoff would be directed to the stormwater retention pond to mitigate influence on the biodiversity of organisms in Codorus Creek.

Operation Impacts. The terrestrial ecosystems potentially altered at the West Manchester Township alternative site are ***previously*** disturbed areas ***which*** are not biologically diverse. Similarly, the effects to biodiversity of aquatic ecosystems would be minimized because the projected wastewater discharge would remain in compliance with water quality and pretreatment standards for those parameters contained in the wastewater discharge (see Section 4.2.5.1, Aquatic Ecosystems).

4.2.5.5 Wetlands

Construction Impacts. No wetlands are located on the West Manchester Township alternative site.

The proposed electric transmission line route and its alternatives would cross a narrow wetland associated with Honey Run. The crossing would consist of an overhead span, and vegetation in the existing meadow wetland would not require additional management for right-of-way maintenance. No alterations to wetlands would be expected to occur. The domestic/demineralizer wastewater discharge pipeline route would not cross any wetland resources. The non-contact wastewater discharge pipeline would cross approximately 4.8 km (3 mi) of wetlands between the alternative site and its discharge to Codorus Creek.

Short-term impacts to herbaceous wetlands have typically occurred with placement of underground utility pipelines in these wetlands. Appropriate construction practices would be followed, as required by the ACOE Nationwide Permit [33 CFR 330.6(b)(12)], which allows blanket authorization for such activities. By following appropriate construction practices, vegetation would be expected to be fully restored within one to two growing seasons after construction is completed.

The preferred proposed natural gas pipeline route along Emigs Mill Road and the Yorkrail railbed would not pass through any wetland resources. A limited, temporary impact to wetlands would occur from installation of the natural gas pipeline along the proposed alternative route. The route crosses few wetlands, and all construction would take place in areas that were previously altered for roadway construction and use. Construction would occur during periods of low-flow in Honey Run and an unnamed tributary and if necessary, the flow would be diverted during construction. Erosion control measures would be practiced to reduce siltation. Following completion of construction, the affected areas would be restored to their original contour, and altered areas would be revegetated with appropriate species.

The proposed access roadway connection would not cross any wetlands.

Operation Impacts. No wetlands are located on the West Manchester Township alternative site.

4.2.6 Human Health and Safety

The procedures and actions that would be taken to ensure the health and safety of workers during construction and operation of the ***proposed*** project at the West Manchester Township alternative site are the same as those presented for the North Codorus Township site (please refer to Section 4.1.6).

4.2.6.1 Solid Waste

Construction Impacts. Impacts associated with solid wastes during construction of the ***proposed*** facility at the alternative site would be similar to those at the North Codorus Township site.

Operation Impacts. Impacts associated with solid wastes during operation would be similar to those at the North Codorus Township site.

4.2.6.2 Hazardous and Toxic Materials and Wastes

Construction Impacts. Impacts associated with hazardous and toxic materials and wastes during construction at the West Manchester Township alternative site would be similar to those at the North Codorus Township site.

Operation Impacts. It is anticipated that the impacts associated with hazardous and toxic materials and wastes during operation would be similar to those at the North Codorus Township site.

4.2.7 Noise

There are no formal Federal, state, or local noise criteria that are applicable to the ***proposed*** project built at the alternative site. ***EPA (1974) identified an outdoor day-night sound level of 55 dBA as the level***

below which no suspected risk to the general population would be anticipated from the identified effects of noise. The 55 dBA level is not considered a standard by EPA because it contains a margin of safety and does not incorporate technical or economic factors. EPA recognizes the 55 dBA level as a starting point for determining an appropriate local noise standard. The evaluation of impacts for the ***proposed*** facility at the West Manchester alternative site considered who would be exposed to the noise, current levels of noise, and the change in noise level resulting from project construction and operation. In addition, a design guideline for project noise of 60 dBA (day-night average) evaluated at the closest residences to the project at the alternative site was used in the noise assessment. This design guideline was used because of the close proximity of four residences along Emigs Mill Road, which demarcates the northeastern property line, and the existing source of noise from traffic along this road.

Several sensitive receptors near the proposed site were identified and analyzed for potential noise-related impacts. These sites included the following: (A and B) residences along Emigs Mill Road to the north and east of the site [(approximately 289.6 m (950 ft) from the center of the site)]; (C) a golf course located to the west of the site (approximately 457.2 m (1,500 ft) from the center of the site); (D) residences located 640.1 m (2,100 ft) directly to the south of the site; and (E) a trailer park located to the southeast of the site [(731.5 m (2,400 ft) from the center of the site)]. The locations of these sensitive receptors are presented in Figure 3.2-2.

The nearby existing Yorkrail railroad operations, as well as the train activities associated with the ***proposed*** project at the alternative site, are subject to EPA noise regulations that preempt regulation by other governmental bodies *(42 U.S.C. § 4916)*. These regulations serve to limit the amount of noise associated with mainline and rail yard activities, including locomotive, railcar, and coupling operations (40 CFR Part 201). The railroad company selected for delivery of coal and removal of ash byproduct also would be subject to these EPA noise regulations.

Construction Impacts. A construction noise model *(Teplitzky, 1978 as cited in ENSR, 1994)* was utilized to predict the noise from construction equipment expected to be operating on the West Manchester Township alternative site. The noise contributions of typical mixes of on-site construction equipment (e.g., bulldozers, graders, cranes, trucks) were used in the model for each construction phase based upon average equipment utilization factors. (A utilization factor is an empirically determined value that represents the percent of time during the typical work day that a particular piece of equipment is operated at maximum effort.) In practice, construction equipment seldom operates at its noisiest conditions, and average levels for engine-powered equipment are typically 6 to 13 decibels less than the maximum level.

Noise levels may vary hourly depending on equipment utilization patterns. The noise metric recommended by the EPA to characterize a varying noise level environment is the L_{eq} *(EPA, 1974 as cited in ENSR, 1992)*.

Predicted average daytime noise levels from construction of the ***proposed*** facility at the alternative site are presented in Table 4.2-7. The comparison of noise levels during construction with existing daytime noise conditions allows for assessment of construction-related impacts. The Federal Highway Administration's traffic noise prediction model *(FHWA, 1978)* and estimated values of non-peak hour traffic volumes (1:00 to 2:00 ***P.M.***) on Emigs Mill Road and Route 30 were used to adjust the baseline measurement samples from the L_{90} statistic to a baseline L_{eq} value.

Daytime noise levels at Locations A and B (representing residences to the north, northeast, and east of the site) and at Location C would increase by approximately 14 to 20 dBA. Noise level increases at Locations D and E would range from 3 to 12 dBA. An increase of 3 dBA would be just noticeable above the existing noise level environment, whereas an increase of 10 dBA would be perceived as a doubling of existing daytime noise levels.

The purging of steam systems of dirt and construction debris would be scheduled for several brief periods near the end of construction. This process may result in extremely high noise levels. To limit the noise during this process, special mitigation measures would be utilized to limit the noise including efforts to minimize the extent of the process, scheduling the process during daylight hours, and providing advance notice to the potentially affected public.

Heavy-duty trucks used during construction would be an off-site source of noise along the access routes to the alternative site. Truck traffic would be expected to occur on Route 30, which serves as a major highway nearby. Noise impacts to sensitive areas would be minimized by avoiding the use of the local street system to the extent possible.

Construction noise at the alternative site would not be subject to any noise regulations. Construction activities would generally be limited to daytime hours in an effort to minimize noise impacts. Changes in the outdoor noise level environment at the four residences closest to the proposed project West Manchester Township site would be clearly perceptible. The noise increase at the more distant receptors to the south (Location D) and southeast (Location E) would be imperceptible to just perceptible. Construction noise would be short-term and would occur during daytime hours.

Table 4.2-7. Comparison of existing and predicted construction noise levels (L_{eq}, dBA) for the facility at the West Manchester site.

Receptor Location				Construction Phase Noise Levels*							
Map Key	Land Use Description	Distance and Direction (feet)**	Baseline Daytime (L_{eq})***	Excavation		Concrete Pouring		Steel Erection		Mechanical	
				Total	Increase	Total	Increase	Total	Increase	Total	Increase
A	Residential	950 NE	46	65	19	61	15	65	19	60	14
B	Residential	950 N	44	64	20	61	17	64	20	60	16
C	Recreational (Golf)	1500 W	42	62	20	58	16	62	20	57	15
D	Residential	2100 S	45	57	12	53	8	57	12	52	7
E	Residential	2400 SE	50	56	6	53	3	56	6	53	3

* Totals are logarithmic sum of baseline plus noise component due to construction noise from project. Increase is relative to baseline noise level.

** With respect to the approximate center of project site.

*** Computed L_{eq} (dBA) based on estimated early afternoon traffic noise (1:00 to 2:00 pm).

Source: ENSR, 1992

Operation Impacts. Noise levels associated with normal operation of the ***proposed*** facility at the alternative site were projected through a series of actions including: (1) review of available project information to identify major potential sources of noise; (2) evaluation and ranking of identified major noise sources in terms of relative significance; (3) incorporation of significant noise sources in a point source propagation model (ERTNOI) to evaluate noise levels at selected locations in the community; and (4) application of noise controls to the most significant noise sources to mitigate potential noise impacts.

The major sources of potential noise associated with the ***proposed*** facility at the West Manchester Township alternative site are presented in Table 4.2-8, along with the corresponding anticipated preliminary noise control requirements. The principal sources of environmental (outdoor) noise from the ***proposed*** facility at the alternative site would be the cooling unit, induced draft fan, coal car unloading, and various blowers and fans. Other noise sources would be generally less significant because they intrinsically emit less noise or because they would be located within acoustically insulated building structures so that their contribution to outdoor noise would be negligible. The indicated noise controls are tentative and subject to change based upon use of actual vendor data, when available.

Table 4.2-8. Principal sources of outdoor noise* associated with the facility at the West Manchester Township site.

Source	Emission Sound Power Level** (L_{eq}, dBA)	Tentative Noise Control	Noise Reduction (dBA)
Cooling Tower	107	Low noise unit or use of intake/discharge silencers	7
Induced Draft Fan	106	Tuned discharge silencer	27
Rail Car Unloading (daytime only)	99	Insulated unloading structure, no shaker	17
Coal Crusher	98	Insulated enclosure	20
Main Transformers (227 mva)	97	Low noise unit and/or barrier	10

* Other sources of noise are assumed to produce negligible contribution to overall noise.
** Includes the indicated noise reduction effect; does not include trajectory or other site-specific effects.

Source: ENSR, 1992

Noise emission levels were obtained from representative vendor data, as well as from basic empirical relationships. A point source propagation model (ERTNOI) was used to evaluate noise levels at designated sensitive noise receptors. This model incorporates the most significant factors that affect noise propagation out-of-doors. Atmospheric absorption, source directivity, barriers, and vegetation are all factors in noise propagation.

Atmospheric effects are dependent on molecular absorption attenuation. Summer conditions 15 °C (59°F), 70 percent relative humidity) were selected for evaluation because people are more likely to spend time outdoors under these conditions. The induced draft fan (chimney) noise emission would have trajectory characteristics, which means that noise emission varies with the angular orientation about the source. An angle of 90° from the vertical was assumed for noise emission from the top of the chimney. For source-to-receptor directions, an acoustic barrier effect or attenuation through ground absorption may occur when project buildings or terrain block the line of sight between the source and receptor. These factors were not included in the preliminary analysis. Because the alternative site plan includes a 30.5-m (100-ft) wooded buffer strip along the perimeter of the site, an attenuation factor was employed for those sources with a height lower than the assumed 12.2 to 18.3 m (40 to 60 ft) height of medium density tree growth.

The major potential sources of outdoor noise were used in the model to characterize noise for the ***proposed*** project at the alternative site. For the analysis, all sources were assumed to be continuously operated except for sources associated with coal unloading, which would occur only in the daytime. The main auxiliary boilers, boiler feed pumps, and turbine generator were not included as major potential sources of outdoor noise because they would be located within an enclosed building structure designed to provide enough noise reduction to produce a negligible contribution to outdoor noise. The coal and ash byproduct conveyor system also would produce negligible contributions to overall noise because they would be enclosed.

Existing noise levels during warm weather and predicted noise levels associated with operation of the ***proposed*** facility at the alternative site are presented in Table 4.2-9. Noise levels associated with operation of the ***proposed*** facility at the West Manchester alternative site would be highest at the closest residences to the north and northeast of the site (Locations B and A, respectively). The project L_{dn} at these residences would be 55 and 54 dBA, respectively. At Location C (golf course), the projected L_{dn} would be 48 dBA. These values are all within the 60-dBA design guideline for the facility at the alternative site.

Outdoor noise levels at Locations A and B would be increased by approximately 1 dBA during the daytime period. This increase would not be perceived because a 3-dB change in environmental noise is considered just noticeable, a 5-dB change is distinctly noticeable, and a 10-dB change is perceived as a doubling in loudness.

Locations D and E to the south and southeast of the site would have L_{dn} values less than 46 dBA, and maximum noise level increases there would likely be imperceptible.

Table 4.2-9. Existing and projected operation noise levels at the facility at the West Manchester Township site.

Receptor Location Characteristics				Noise Levels (dBA)					
					Future***				
Evaluation Location	Land Use	Direction*	Approximate Distance* (feet)	Existing (Baseline)**	Daytime (L_d)	Nighttime (L_n)	Daynight (L_{dn})	Daytime (Total)	Increase
A	Residential	NE	950	46	51	50	57	52	6
B	Residential	N	950	44	53	51	58	53	9
C	Recreational (Golf Course)	W	1500	42	47	43	50	48	6
D	Residential	S	2100	45	43	42	48	47	2
E	Residential (Trailer Park)	SE	2400	50	42	41	47	41	1

* With respect to alternative project site center.
** Based upon brief daytime measurement samples (at locations closest to the indicated evaluation locations).
*** L_d refers to daytime (7:00 am - 10:00 pm) project noise; L_n refers to nighttime (10:00 pm -7:00 am) project noise; L_{dn} refers to daynight average noise level and includes 10 dBA nighttime factor; Increase represents difference between "daytime total" and "existing" daytime noise levels.

Source: ENSR, 1992

4.2.8 Transportation and Traffic

Construction Impacts. Construction-related impacts at key intersections in the study area can be divided into two groupings:

- East Berlin Road intersections and
- Route 30 intersections.

Existing intersections along East Berlin Road that were studied include ***the following***:

- East Berlin Road and Baker Road Southbound*;*
- East Berlin Road and Baker Road Northbound*;* ***and***
- East Berlin Road and Emigs Mill Road.

These intersections would experience, with one exception, no change in LOS as a result of construction traffic. The one exception is during the P.M. peak hour at East Berlin Road/Emigs Mill Road, when the northbound approach is projected to decline from LOS D to LOS E. The minimal effect of construction traffic on this grouping of intersections can be attributed to both the smaller volumes of existing traffic (compared to the intersections on Route 30) and the less frequent use of these roads by workers for access to the site.

Existing intersections that were studied along Route 30 include ***the following***:

- Route 30 and Trinity Road*;*
- Route 30 and Emigs Mill Road*;*
- Route 30 and Hanover Road*;*
- Route 30 and Bowman Road*;* ***and***
- Route 30 and KBS Road.

With the exception of the presently signalized intersection of Route 30 and Trinity Road, these locations are expected to experience significant changes to existing levels of service (LOS) as a result of anticipated construction traffic. The most pronounced changes would occur at intersections where construction traffic would need to execute a left turn onto or from Route 30.

The two intersections to be created by the realignment of Emigs Mill Road as the facility driveway are projected to operate at acceptable levels of service except for the left turn from the realigned Emigs Mill Road onto Route 30 eastbound (projected to operate at LOS F during both the A.M. and P.M. peak hours).

Most of the intersection approaches affected by construction traffic are presently operating at unsatisfactory levels of service. This is attributable to the large peak hour traffic volumes on Route 30 that make it difficult for left-turning vehicles waiting at minor streets to find acceptable gaps in the mainstream traffic flow. Although the situation would be aggravated by construction traffic, unsatisfactory LOS precede the introduction of construction traffic to these roadways.

Operation Impacts. Vehicle trips required by operation of the proposed facility at West Manchester were estimated based upon experience at similar cogeneration plants. From that experience, it is estimated that 70 people would be employed to operate the facility over a *7*-day week; weekend operation would require an additional 15 to 20 employees. Weekday operations would be organized in three shifts. The primary shift, with 25 to 30 employees, would be from 8:00 A.M. to 4:00 P.M.; 15 to 20 people would be employed to staff each of the remaining shifts required for 24-hour operation (4:00 P.M. to 12:00 A.M., and 12:00 A.M. to 8:00 A.M.).

The following two categories of trucks would also be associated with operation of the facility.

- Less than 40 trucks per day would be employed to transport limestone to and remove ash from the facility. These vehicle trips would occur throughout an 8-hour day; the number of trucks accessing the facility during each of the peak hours was conservatively estimated at 5 trucks.

- In the unlikely event that rail delivery of coal is disrupted, approximately 100 trucks per day, delivering on a 24-hour schedule, would be required to transport coal to the facility. For this period (until rail service resumes), approximately five coal trucks were projected to enter and depart the facility during each peak hour.

The maximum total peak hour trip generation by the operational facility (during the unlikely event of rail disruptions) would be ***as follows***:

A.M. peak hour - 40 vehicles entering (30 employees, 5 limestone and ash trucks, and 5 coal trucks), and
30 vehicles exiting (20 employees, 5 limestone and ash trucks, and 5 coal trucks).

P.M. peak hour - 30 vehicles entering (20 employees, 5 limestone and ash trucks, and 5 coal trucks), and
40 vehicles exiting (30 employees, 5 limestone and ash trucks, and 5 coal trucks).

The effect of traffic associated with facility operation on peak hour traffic operations is minimal. At only one intersection (Route 30 and Emigs Mill Road) does facility traffic lower the LOS from the level that exists without facility operation. At that location, proposed facility traffic would cause southbound traffic performance on Emigs Mill Road to decline from LOS C to LOS D during the A.M. peak hour only. The construction of the realigned Emigs Mill Road would likely allow the existing intersection of Emigs Mill Road with Route 30 to be closed, and Emigs Mill Road to be designated for local access only.

Planned Roadway Improvements

The roadway network in the vicinity of the ***proposed*** project is scheduled to undergo several improvements in the near future. The Pennsylvania Department of Transportation (PennDOT) is planning to reconstruct Route 30 in the area of the proposed facility. The reconstruction will involve the provision of a five-lane cross-section (two through lanes in each direction and a left turn lane), with a four-foot median separating opposing travel lanes. In addition to the lane configuration changes, PennDOT proposes to install a traffic signal at the intersection of Route 30 (West Market Street) and Hanover Road (SR 0116).

These improvements are scheduled to be implemented by 1995. To evaluate their likely operation, the intersections that would be affected by the proposed actions were reanalyzed (for all future scenarios) incorporating the improvements.

In addition to the PennDOT actions, further potential improvements were identified in the Comprehensive Traffic Study for Dover and West Manchester Townships *(ARI Engineering, 1988)*. These include the construction of an interchange at Route 30 and East Berlin Road and the upgrading of Baker Road between East Berlin Road and the township line. However, because specific information regarding timetables for these recommended improvements was not available, an analysis of their potential effect upon traffic performance was not conducted.

Signal Warrant Analysis

The primary cause of traffic performance deficiencies in the study area is the combination of prevailing high volumes of traffic along the arterial roadways (particularly Route 30) and the absence of signals controlling access to these routes from the intersecting minor roadways. The mitigation measure that would most effectively address this problem would be the installation of traffic signals at the problem intersections.

The installation of signals requires the meeting of at least one of the traffic signal warrants identified in PennDOT's Publication No. 201, "Engineering and Traffic Studies." The warrants listed are ***as follows***:

- Minimum vehicular volume warrant;
- Interruption of continuous traffic warrant;

- Minimum pedestrian volume warrant;
- School crossing warrant;
- Progressive movement warrant;
- Accident experience warrant;
- Systems warrant;
- Combination warrant;
- Average daily traffic volume warrant;
- Short-term minimum vehicular and pedestrian volume warrant;
- Short-term interruption of continuous vehicular traffic and pedestrian volume warrant; and
- Peak hour vehicular volume warrant.

Sub-chapter E of this PennDOT publication lists specific volumes and time periods with which an intersection must comply in order to be considered as meeting that particular warrant. Each unsignalized study area intersection was analyzed according to PennDOT guidelines to determine if any of the PennDOT warrants might be met. In addition to the Route 30/Hanover Road intersection (already proposed by PennDOT for signal installation), the intersection of East Berlin Road and Emigs Mill Road was found to meet signal warrants. The intersection of Route 30 and the Realigned Emigs Mill Road was found to nearly satisfy warrants; it is expected that signal installation would be warranted in the near future.

Rail Impacts

The following two categories of potential impacts to transportation from rail shipment of coal to the ***proposed*** YCEP Cogeneration Facility ***at the West Manchester alternative site*** were assessed:

- the ability and preparedness of the rail systems to accommodate facility coal shipments; and
- the effect of increased rail traffic upon roadway operations at crossings.

All three of the rail lines likely to be used presently transport coal; the appropriate rail infrastructure to accommodate facility coal shipments is, therefore, in place. Conrail and CSX have available capacity to handle the small increase in traffic represented by the addition of one unit coal train (about 115 cars) per week. Upon arriving at Yorkrail's Lincoln Yard, the train would be broken down into three smaller trains (less than 40 cars per train) before proceeding along Yorkrail track to the facility. Yorkrail presently runs 10 trains per week along the line that would be used; the addition of three small trains would be easily accommodated by Yorkrail. Use of rail to transport coal would, therefore, be consistent with existing rail infrastructure and capacity; it would, moreover, contribute to the economic viability of the rail companies serving the region, while avoiding the addition of coal trucks to the local highway network.

The primary impact to other transportation modes accompanying facility use of rail for coal shipment would be the potential for added delays at grade roadway crossings. Because of the relative density of these crossings along the local Yorkrail alignment (in comparison to such crossings along the long distance routes from the coal fields), these potential added delays are likely to be more noticeable along the Yorkrail track between the Lincoln Yard and the facility.

4.2.9 Land Use

The following section describes impacts to existing land use, as well as land use trends and controls from construction and operation of the ***proposed*** facility at the West Manchester Township alternative site.

4.2.9.1 Existing Land Use

Construction Impacts. Construction of the ***proposed*** facility at the alternative site would impact the existing agricultural land use. However, the site is designated to be used for industrial purposes.

The overhead transmission lines that would be required for connection with the existing Met-Ed transmission system would be constructed on Yorkrail property to the extent possible. The proposed lines would likely be compatible with the existing character of the site vicinity.

The process steam pipeline that would be connected to the J.E. Baker Company would be located within the context of the intensive quarrying operations and would be consistent with the existing land use character of the surrounding area.

The remaining utility interconnections would be installed underground and their operation is compatible with the rural residential, open space, and agricultural land uses through which they would pass. The placement of the majority of the domestic/demineralizer wastewater pipeline within Yorkrail property would likely be compatible with its surroundings.

Operation Impacts. The proposed project would be compatible with existing industrial land uses in the immediate vicinity, especially the J.E. Baker quarrying and brick manufacturing operation adjacent to the alternative site.

4.2.9.2 Land Use Trends and Controls

Construction Impacts. As described in Section 3.2.9.2, the West Manchester alternative site would be located within the General Industrial Zone, which is the most intensive level of industrial zoning in the township. A number of zoning ordinances exist which would have to be addressed regarding lot size, setbacks, outdoor storage, driveways, landscaping, stormwater control, and building height. In order to construct the ***proposed*** facility at the alternate site, a building height variance would need to be secured from West Manchester Township. Coordination would be conducted with the appropriate zoning authority through which the proposed interconnection would pass.

Operation Impacts. Operation of the ***proposed*** facility at the West Manchester Township alternative site would be compatible with designated community plans for the area as outlined in the West Manchester Township Zoning Ordinance. As described in Section 3.2.9.2, the West Manchester alternative site would be located within the General Industrial Zone, which is the most intensive level of industrial zoning in the township. A conditional use permit may be required because the project is not included as a specifically permitted use within the General Industrial Zone. The ***proposed*** project at the alternative site is consistent with the stated purpose of this zone.

The alternative site has suitable building area for the ***proposed*** Cogeneration Facility and is of adequate size to comply with the minimum area requirements that apply to the General Industrial Zone. The majority of proposed facility structures are less than the 30.5-m (100-ft) maximum permitted height, and/or they would accommodate the appropriate setback distances relative to their height as required by Section 150-194 of the Zoning Ordinance. Features exceeding the maximum height ***[***e.g., the 106.7-meter (350-foot) stack***]*** would require zoning approval.

Materials would be stored on site and removed in accordance with Section 150-204 of the Zoning Ordinance. Vegetative ground cover would be maintained in undeveloped portions of the alternative site, as required by Section 150-202 of the Zoning Ordinance; exterior lighting would be installed in compliance with Section 150-233. The Zoning Ordinance would also be followed for off-street loading, off-street parking, signs, and access drives.

4.2.10 Pollution Prevention

The facility at the alternative site would incorporate design and operating features that would assist in preventing pollution to the environment. These prevention measures are described in the following paragraphs.

Construction Impacts. Construction of the facility at the alternative site would be consistent with approved guidelines for erosion and sedimentation control. Erosion would be minimized by beginning the cleanup and revegetation operations immediately following completion of construction activities. Other mitigative measures to be employed include perimeter silt fencing; restriction of heavy truck traffic to designated corridors during very wet or dry periods; implementation of dust-abatement practices as needed; construction of sedimentation basins along runoff interception and/or discharge channels; and stabilization of any such channels.

Operation Impacts. The ***proposed*** facility at the alternative site would incorporate ***best available control technology (BACT)*** air pollution control equipment to minimize potential impacts including SNCR for reducing emissions of oxides of nitrogen (NO_x), a baghouse for controlling particulate matter emissions, and limestone injection, which would result in greater than 92 percent efficiency for control of sulfur dioxide (SO_2) emissions. A state-of-the-art materials handling system would be employed to minimize potential particulate matter emissions associated with the transfer and handling of fuel and other materials.

Wastewater disposal would incorporate best engineering design practices. Appropriate treatment and a settling basin would be utilized to ensure that Federal and state standards for point source discharges were met.

4.2.11 Cultural Resources

Construction and operation of the ***proposed*** facility at the West Manchester Township alternative site would be conducted in accordance with Section 106 of the National Historical Preservation Act of 1966, which requires that any project involving a Federal action with the potential to impact cultural resources listed in or eligible for listing in the National Register of Historical Places must be approved by the Advisory Council on Historic Preservation.

4.2.11.1 Historical Resources

Construction Impacts. Contacts made with the Pennsylvania Historical and Museum Commission, the Historical Society of York County, and the York County Planning Commission indicated that no historic properties in the vicinity of the West Manchester Township alternative site would be affected by the development of the proposed facility.

Operation Impacts. Contacts made with the Pennsylvania Historical and Museum Commission, the Historical Society of York County, and the York County Planning Commission indicated that no historic properties in the vicinity of the West Manchester Township alternative site would be affected by the development of the proposed facility.

4.2.11.2 Archaeological Resources

Construction Impacts. Contacts made with the Pennsylvania Historical and Museum Commission, the Historical Society of York County, and the York County Planning Commission regarding the existence of potentially significant archaeological resources in the area resulted in the request that a Phase I archaeological survey be conducted at the West Manchester Township alternative site. This survey would be conducted if the West Manchester site were selected for the proposed project.

Operation Impacts. Contacts made with the Pennsylvania Historical and Museum Commission, the Historical Society of York County, and the York County Planning Commission regarding the existence of potentially significant archaeological resources in the area resulted in the request that a Phase I archaeological survey be conducted at the West Manchester Township alternative site. This survey would be conducted if the West Manchester site were selected for the proposed project.

4.2.12 Socioeconomic Resources

Construction Impacts. Because of the skilled construction labor force existing in the York County area, it would be anticipated that much of the required construction workforce for the project at the alternative site would be hired regionally. This would be beneficial to regional unemployment rates. During construction, supporting local retail establishments would benefit from increased revenues. The overall regional economy would likely benefit from an influx of wage dollars. Because much of the labor force would be supplied locally, demands on public and community services, educational facilities, health care and human services, police and fire protection, and public utilities would be expected to be within the capability of the existing services.

Operation Impacts. To the extent practical, depending on availability of skills, the 70 person full-time workforce for the operational facility would be derived from the local labor force. Permanent relocation of ***proposed*** facility employees into the area would be expected to be minimal.

4.2.12.1 Demographics

Population

Construction Impacts. The construction impacts to population from the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to population from operation of the facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Housing

Construction Impacts. The construction impacts to housing from the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to housing from operation of the facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

4.2.12.2 Local and Regional Economic Activity

Employment

Construction Impacts. The impacts to employment from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to employment from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Income

Construction Impacts. The impacts to income from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to income from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Sales Revenue

Construction Impacts. The impacts to sales revenue from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to sales revenue from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Tax Revenue

Construction Impacts. The impacts to tax revenue from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to tax revenue from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

4.2.12.3 Public Services

Education

Construction Impacts. The impacts to education from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to education from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Health Care and Human Services

Construction Impacts. The impacts to health care and human services from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to health care and human services from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Police Protection

Construction Impacts. The impacts to police protection from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to police protection from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Fire Protection

Construction Impacts. The impacts to fire protection services from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. The impacts to fire protection services from operation of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Parks and Recreation

Construction Impacts. Nearby recreational areas (i.e., Briarwood Golf Course) would be temporarily adversely impacted by the noise and visual characteristics associated with construction. These impacts would be expected to be short-term.

Operation Impacts. The project at the alternative site would be compatible with the existing industrial uses in the immediate project area, especially because of the existing extensive quarrying and brick manufacturing operations at the J.E. Baker Company located on Emigs Mill Road east of the site. Access to the Briarwood Golf Course to the west of the ***alternative*** site would not be expected to be hindered by ***proposed*** project operations.

Utilities

Construction Impacts. The impacts to utilities from construction of the ***proposed*** facility at the West Manchester Township alternative site would be similar to those described for the North Codorus Township site.

Operation Impacts. No additional requirements for electrical services is anticipated because the electricity demand of the ***proposed*** facility at the alternative site would be met internally. There would be a benefit to available electrical services in that the ***proposed*** facility at the alternative site would serve to fulfill an energy need***; however, as discussed in Section 4.1.12.3 for the proposed facility at the North Codorus Township site, electricity costs from the proposed facility at the alternative site may be higher than other short-term options available to Met-Ed.***

The York Water Company has the capacity to supply ***proposed*** facility water needs. Therefore, no modification to the York Water Company's existing system or service capacity would be expected.

The domestic/demineralizer wastewater generated at the ***proposed*** facility at the alternative site would be pretreated on site prior to its discharge to the York City Wastewater Treatment Plant. The wastewater generated is not expected to impair or overburden the operation of the municipal treatment facility.

4.2.13 Environmental Justice

Construction and operation of the ***proposed*** project at the alternative site has the potential to impact both minority and low-income communities. Although the alternative site is located in an area that is industrialized, three census tract block groups within a 5-km (3.1-mi) radius of the alternative site contain minority population concentrations higher than the county average. In addition, a low-income community is located in the census tract block group in which the alternative site is located. Thus, there is a potential for greater environmental justice-related impacts from the ***proposed*** project at the alternative site when compared to the proposed site.

4.3 Environmental Impacts of the No-Action Alternative

Under the no-action alternative, DOE does not provide Federal cost-shared financial assistance for the proposed YCEP project at either the proposed North Codorus site or the alternative West Manchester Township site. The utility-scale CFB technology probably would not be demonstrated (at the 227-MW scale in a single unit), and the commercialization of the technology would be delayed or eliminated for economic reasons. Because utility and private sectors generally would select known and demonstrated technologies, the opportunity to choose this clean coal technology directed at reducing air emissions at costs lower than those of conventional pollution control technologies may be eliminated. The no-action alternative also would not fulfill the need for the proposed action as described in Chapter 1.

As discussed in Section 2.2.4, should DOE not fund the proposed project, it would be reasonably foreseeable that either a coal-fired or a natural-gas-fired ***proposed*** facility could be selected to enter into a power sale agreement with Met-Ed to meet the projected energy shortfall. Therefore, to analyze and make comparisons between the proposed action and the reasonably foreseeable consequences from the no-action alternative, the proposed YCEP project and its environmental consequences are compared to ***the following***:

(1) a 227-MW natural gas-fired combined cycle facility, with no associated steam host or associated air emissions reductions;

(2) a 227-MW coal-fired facility consisting of two 114-MW CFB boiler units (Note: it is not ***as*** reasonably foreseeable that a 227-MW single CFB would be used, since no units that size have been attempted in the United States)***; and***

(3) a short-term purchase agreement with the PJM Interconnection Power Pool which currently maintains a cumulative capacity of 55,575 MW.

As explained in Section 2.2.4, at the present time it is not reasonable to attempt to select a specific site for which to discuss these potential outcomes from the no-action alternative. Therefore, the analysis of the potential scenarios resulting from the no-action alternative was conducted as if each project would be constructed at an appropriate "generic" site. It is assumed, for the purpose of this comparison, that the generic site would be appropriately zoned, would have access to all required infrastructure to support the project (e.g., rail service, gas transmission lines, water supply, wastewater discharge facilities) and otherwise would be in an appropriate location to provide for Met-Ed's power needs. As a result, certain sections of the following analysis required a qualitative evaluation while others, such as air quality, were analyzed quantitatively.

The following sections provide an analysis of potential impacts to human and environmental resources if DOE chooses the no-action alternative.

4.3.1 Comparison to 227-MW Natural Gas-Fired Combined Cycle Facility

4.3.1.1 Setting

Long-term impacts to the aesthetic qualities of the area, assuming that the site is near the North Codorus site or West Manchester site, would be similar to those described in Sections 4.1.1 and 4.2.1. The proposed YCEP project would require approximately 38 acres (15.4 hectares) for the site while a similar sized gas-fired facility would be constructed on a 10-acre (4.0 hectares) site. In addition, a gas-fired facility would, depending upon design and the surrounding topography, have a lower stack height [approximately 45.7 to 61.0 m (150 to 200 ft)] than the proposed YCEP facility [120.4 m (395 ft)] and a lower building height [approximately 30.5 to 45.7 m (100 to 150 ft)] than the proposed YCEP facility [57.9 m (190 ft)].

4.3.1.2 Air Quality

Permitted emissions levels for a gas-fired combined-cycle facility in Pennsylvania, as well as a comparison to the proposed YCEP project's emissions (both before and after considering reductions from the P. H. Glatfelter Company) are provided in Table 4.3-1. The emission levels for the gas-fired facility are considered BACT for a gas-fired combined-cycle facility and would be considered a reasonable basis on which to estimate air emissions from such a facility. As shown in Table 4.3-1, total air emissions, on a maximum permitted basis, would be lower for the 227-MW gas-fired combined-cycle facility than the YCEP facility. ***In addition, radionuclide emissions from the gas-fired plant should be much lower than the 255 mCi/yr that would be associated with the proposed project (with curtailment of P H. Glatfelter Power Boiler No. 4).*** However, the YCEP project, as proposed, offers the opportunity for air emission reductions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulates (PM_{10}). Therefore, air emissions from the YCEP project could compare favorably to a 227-MW gas-fired facility which could reasonably be expected to be a source of electricity for Met-Ed. Secondary emissions associated with the gas-fired combustion facility (e.g., employee vehicle emissions, train emissions, and truck emissions) would be reduced compared to the proposed action because fewer construction and operations workers would be required, and the need for rail delivery of coal and shipments of the limestone-ash byproduct would be eliminated.

4.3.1.3 Geology and Soils

Impacts to geology and soils from a 227-MW gas-fired combined-cycle facility would be similar to those described for the proposed action in Section 4.1.3.

4.3.1.4 Water Resources and Water Quality

A 227-MW gas-fired combined-cycle facility would consume approximately 1 mgd of fresh water for cooling. Currently, nearly all power-generating facilities use fresh water from either surface or groundwater sources. There would be an approximate 50-percent decrease in non-cooling water

Table 4.3-1. Emission rates of a 227-MW natural gas-fired combined cycle facility vs. the proposed YCEP project (tons/yr).

Facility	SO_2	NO_x	PM_{10}	CO	VOCs
227-MW Gas Combined Cycle after NO_x Offsets[1]	26	(36)	23	144	35
YCEP Project before Offsets	2,891	1,437	127	1,726	48
YCEP Project after Offsets[2]	(2,419)	(263)	(65)	1,694	45

1 Includes 1.15:1 offsets of NO_x that would be required under the Clean Air Act Amendments of 1990. SO_2 reductions are not required by this facility.
2 Includes additional non-PHG offsets of NO_x that are required under the Clean Air Act Amendments of 1990.
( ) Indicates a reduction in emissions.

consumption compared to the proposed YCEP project. A 227-MW gas-fired facility would be expected to use approximately 200,000 gpd of water for boiler make-up purposes (for its heat recovery boiler) and to meet general potable water requirements. The proposed YCEP project would require twice as much (approximately 400,000 gpd).

A 227-MW gas-fired facility would be expected to discharge approximately 200,000 gpd of cooling tower water and sanitary wastewater to a treatment facility prior to further discharge to a surface waterway. It would be expected that this discharge would tend to increase the temperature of the surface waterway due to the heat load transferred to the cooling water prior to its discharge. The proposed YCEP project would discharge an average of 1.72 mgd, including cooling tower water and sanitary wastewater, to the P. H. Glatfelter Company wastewater treatment facility prior to being discharged to Codorus Creek. This discharge would tend to lower the temperature in Codorus Creek, compared to current operation, since the cooling tower discharge would be lower than the temperature of the wastewater received from P. H. Glatfelter Company's wastewater plant.

Based on the assumption that the gas-fired facility would be constructed and operated on a suitable site, no impacts to floodplains would be expected.

4.3.1.5 Biological Resources and Biodiversity

It is assumed that any future site selection would take into consideration biological resource and biodiversity factors. Any impacts to biological resources and biodiversity from a 227-MW gas-fired facility would likely be similar to those described for the proposed project at the North Codorus Township site in Section 4.1.5. Because of the reduced spatial requirements [10 acres (4.0 hectares) compared to 38 acres (15.4 hectares)], there would be a potential for reduced habitat disturbance ***with a gas-fired facility.***

Based on the assumption that a 227-MW gas-fired facility would be located on a suitable site, no impacts to threatened or endangered species or to wetlands would be expected.

4.3.1.6 Health and Safety

Health and safety procedures (described in Section 4.1.6) would be updated to reflect the operation of a gas-fired facility. Handling requirements and mitigation procedures associated with coal delivery and processing would not be necessary; instead, handling requirements for natural gas, including leak detection and prevention, would be included. Potential exposures to heavy metals during welding, soldering, grinding, and painting or to organic vapors from painting or cleaning operations would occur and would be evaluated during the construction phase similar to the proposed action. Noise attributed to coal handling and processing equipment would be eliminated. No adverse influences on employees' or the local population's health and safety would be expected.

The electromagnetic fields produced by a 227-MW gas-fired facility would be similar to those proposed by the YCEP project because both are dependent upon the electric current produced by the facility, which, in turn, is dependent upon the facility's maximum generating capacity (in megawatts).

<u>Solid Waste/Hazardous and Toxic Materials and Waste</u>

The primary solid wastes generated by a 227-MW gas-fired facility would come from industrial and other municipal-type sources, which would be disposed of at a local municipal landfill. The volume would be expected to be substantially less than ***that of*** the proposed YCEP project primarily due to the smaller operating staff and the reduced waste generated by a gas-fired facility. A gas-fired facility would not generate limestone-ash byproduct.

4.3.1.7 Noise

Noise generated by a 227-MW gas-fired facility would be required to comply with any applicable local noise ordinances. Impacts from noise generated by the facility on sensitive receptors or nearby activities cannot be directly compared to those of the ***proposed*** YCEP project. However, it is reasonable to assume that, due to similar mechanical equipment noises and appropriate noise abatement equipment, a 227-MW gas-fired facility would contribute to the background noise level a level of noise equivalent ***to that of the proposed*** YCEP project. The gas-cycle jet engines, the primary noise source, w***ould*** be building-enclosed. ***A gas-fired facility would not have noise impacts associated with rail car coupling/decoupling as would a rail-supplied coal-utilizing facility.***

4.3.1.8 Transportation and Traffic

It is assumed, for the purpose of this comparison, that traffic generated from the generic site would be less than that anticipated for the proposed project at the North Codorus Township site due to greatly reduced employment levels. Impact analysis would be determined by rate- and area-specific traffic volumes and roadway carrying capacity. ***In addition, the operation of a gas-fired boiler would eliminate the need for rail traffic for coal delivery and truck traffic for limestone and ash removal. In the event of an interruption of the gas supply, the backup fuel would likely be fuel oil. An emergency supply of oil would be stored on site with continuing supplies being delivered by tanker trucks, thus impacting transportation infrastructure. It is assumed that the construction impacts caused by transportation and traffic would be similar to those projected for the proposed project.***

4.3.1.9 Land Use

It is assumed, for the purpose of this comparison, that the generic site is appropriately zoned, has access to all required infrastructure to support the project, and otherwise is in an appropriate location to provide for Met-Ed's power needs.

4.3.1.10 Pollution Prevention

It is assumed that a 227-MW gas-fired facility would include design and operating features to prevent pollution to the environment utilizing methods, as appropriate, outlined in Section 4.1.10. The volume of solid waste generation would be less than that generated from the proposed action at the North Codorus Township site.

4.3.1.11 Cultural Resources

It is assumed that a 227-MW gas-fired facility would not effect historical, archaeological, or cultural resources.

4.3.1.12 Socioeconomics

Assuming a similar tax structure to York County, a 227-MW gas-fired facility would result in a 40 ***to*** 60 percent reduction in annual property tax payments to local authorities compared to the proposed YCEP project because of the smaller taxable property investment and resulting property assessment. In addition, the United States Government proposed co-funding of 75 million dollars under the CCT Program would not be expended on this gas-fired project.

During both construction and operational phases, the gas-fired facility would contribute fewer dollars into the local economy than the proposed YCEP facility. A 227-MW gas-fired facility would employ approximately 25 ***to*** 30 full-time operators compared to 70 for the proposed YCEP facility. During construction, monthly employment would average approximately 180 persons compared to 350 for the proposed YCEP facility.

In addition, primarily due to the source of fuel supply, fewer dollars would be spent within the Commonwealth of Pennsylvania to operate a gas-fired facility. The source of fuel would most probably be supplied by a single pipeline to the facility. This pipeline would be supplied through a series of gas transmission lines most likely originating from a supply source in the Gulf of Mexico area. Additionally, a backup fuel supply (typically fuel oil) would be required to operate the facility during times when natural gas supply is interrupted.

The cost of electricity from a gas-fired facility may be lower in the short-term. Market forecasts are too uncertain to allow a meaningful long-term comparison to be made. In addition, it is difficult to compare a hypothetical and generic gas-fired facility with a project possessing a power purchase agreement which establishes specific electric rate costs.

4.3.2 Comparison to 227-MW Coal-Fired CFB Facility (two boilers)

4.3.2.1 Setting

A 227-MW twin boiler coal-fired facility would represent a nearly identical visual impact as ***that represented by*** the proposed YCEP project. Depending on the topography of the selected site, design parameters including stack height, maximum building height, and footprint would be similar. Long-term impacts to the aesthetic qualities of the area would be similar to those described in Section 4.1.1 for the proposed action at the North Codorus Township site.

4.3.2.2 Air Quality

A conservative estimate of permitted air emissions from a 227-MW coal-fired facility using two boiler units (the proposed YCEP project uses a single-boiler facility) would be to assume that the emissions would be similar to those of the proposed action if the YCEP project did not produce steam to supply to P. H. Glatfelter Company. The two-boiler coal-fired facility would produce approximately 15 percent lower emission levels (since it is producing less energy by burning less coal and thereby not supplying steam to an adjacent host); however, there would be no related air emission reductions from the curtailment of an existing source (*e.g.*, Power Boiler No. 4) (Table 4.3-2).

4.3.2.3 Geology and Soils

Impacts to geology and soils from a 227-MW coal-fired facility would be similar to those described for the proposed action in Section 4.1.3.

4.3.2.4 Water Resources and Water Quality

A 227-MW coal-fired facility would ***utilize*** approximately 2.5 mgd of fresh water for cooling. There would be an approximate 15-percent decrease in non-cooling water consumption compared to the proposed YCEP project. A 227-MW coal-fired facility would be expected to use approximately 340,000 gpd of water for boiler make-up purposes (for its heat recovery boiler) and to meet general potable water requirements. The proposed YCEP project would require approximately 400,000 gpd.

Table 4.3-2. Emission rates of a 227-MW coal-fired facility vs. the proposed YCEP project (tons/yr).

Facility	SO_2	NO_x	PM_{10}	CO	VOCs
227 MW Coal-Fired (no steam supply) after NO_x Offsets[1]	2,457	(184)	108	1,467	41
YCEP Project before Offsets	2,891	1,437	127	1,726	48
YCEP Project after Offsets[2]	(2,419)	(263)	(65)	*1,694*	*45*

1 Includes 1.15:1 offsets of NO_x, which would be required under the Clean Air Act Amendments of 1990. Does not include SO_2 reductions since it is not reasonable to assume that SO_2 reductions occur within the same air quality region.

2 Includes additional non-PHG offsets of NO_x, which are required under the Clean Air Act Amendments of 1990.

( ) Indicates a reduction in emissions.

NA Not Applicable.

A 227-MW two-boiler coal-fired facility would be expected to discharge *its* cooling tower water and sanitary wastewater to a treatment facility prior to further discharge to a surface waterway. It would be expected that this discharge would tend to increase the temperature of the surface waterway due to the heat load transferred to the cooling water prior to its discharge.

Based on the assumption that a 227-MW coal-fired facility would not be built within a floodplain, no impacts would be expected.

4.3.2.5 Biological Resources and Biodiversity

It is assumed that any future site selection would take into consideration biological resource and biodiversity factors. Any impacts to biological resources and biodiversity from a 227-MW coal-fired facility would likely be similar to those described for the proposed YCEP project in Section 4.1.5.

Based on the assumption that a 227-MW coal-fired facility would be located at a suitable site, no impacts to threatened or endangered species or wetlands would be expected.

4.3.2.6 Health and Safety

Health and safety procedures (described in Section 4.1.6) would be similar. Handling requirements and mitigation procedures associated with coal delivery and processing would be similar to those described for the proposed action. Potential exposures to heavy metals during welding, soldering, grinding, and painting or to organic vapors from painting or cleaning operations would occur and, similar to the proposed action, would be evaluated during the construction phase. No adverse impacts to employee or the local population's health and safety would be expected.

The electromagnetic fields produced by a 227-MW coal-fired facility would be similar to those proposed by the YCEP project since they are dependent upon the electric current produced by the facility, which, in turn, is dependent upon the facility's maximum generating capacity (in megawatts).

A 227-MW coal-fired facility would generate approximately 10 *to* 15 percent less volume of limestone-ash byproduct as the proposed YCEP project because there would be no additional steam production required for an industrial host.

4.3.2.7 Noise

Noise generated by a 227-MW coal-fired facility would need to comply with any applicable local noise ordinances. Impacts from noise generated by the facility on sensitive receptors or nearby activities cannot be compared to those of the proposed YCEP project. However, it is reasonable to assume that, due to similar mechanical equipment noises, a 227-MW *coal*-fired facility would contribute an equivalent level of noise to the background noise level as the proposed YCEP project.

4.3.2.8 Transportation and Traffic

It is assumed, for the purpose of this comparison, that traffic generated from the generic site would be similar to that anticipated for the proposed project at the North Codorus Township site. Impact analysis would be determined by rate- and area-specific traffic volumes and roadway carrying capacity.

4.3.2.9 Land Use

It is assumed, for the purpose of this comparison, that the generic site is appropriately zoned, has access to all required infrastructure to support the project, and otherwise is in an appropriate location to provide for Met-Ed's power needs.

4.3.2.10 Pollution Prevention

It is assumed that a 227-MW coal-fired facility would include design and operating features to prevent pollution to the environment utilizing methods, as appropriate, outlined in Section 4.1.10.

4.3.2.11 Cultural Resources

It is assumed that a 227-MW coal-fired facility would not affect historical, archaeological, or cultural resources.

4.3.2.12 Socioeconomics

Employment during both operation and construction of a 227-MW coal-fired plant would be similar to the proposed YCEP project. Assuming similar property tax rates in the municipality selected for operation, property tax revenue would be comparable to that of the proposed project at the North Codorus Township site. In addition, the United States Government proposed co-funding of 75 million dollars would not be expended on this project. ***The cost of electricity derived from a 227-MW coal-fired twin-boiler facility should be similar to that derived from the proposed action.***

4.3.3 Comparison to PJM Interconnection Power Pool

4.3.3.1 Setting

No new construction of utility lines, substations, or other electrical interconnection infrastructure would be required for utilization of the PJM Interconnection Power Pool.

4.3.3.2 Air Quality

No increases in air emissions from the purchase of 227 MW at existing PJM facilities would occur. A Met-Ed purchase of 227 MW represents 0.4 percent of the existing power pool capacity of 55,575 MW from PJM's 538 generating units. This alternative reduces the potential for development of cost-efficient technology for the reduction of air emissions, which would be realized with the proposed YCEP project.

4.3.3.3 Geology and Soils

Because no new construction would be required, no impacts to geology or soils would occur.

4.3.3.4 Water Resources and Water Quality

Because a relatively small amount of power would be purchased from the existing PJM power pool capacity (i.e., 0.4 percent), nominal increases in water supply requirements or process wastewater at PJM facilities would occur.

Since there would be no new construction associated with this option, no additional adverse impacts to floodplains would occur.

4.3.3.5 Biological Resources and Biodiversity

No additional adverse impacts to threatened or endangered species or wetlands would occur from the implementation of the option to purchase power from the PJM Interconnection Power Pool.

4.3.3.6 Health and Safety

Because PJM Interconnection Power Pool facilities are currently operating, no additional adverse impacts to the health and safety of employees or the local population would be expected from implementation of this plan.

4.3.3.7 Noise

Because the purchase of power would be from existing capacity at PJM operating facilities, this scenario would not significantly affect existing operational noise levels.

4.3.3.8 Transportation and Traffic

Implementation of the PJM Interconnection Power Pool option would not affect existing transportation infrastructure or requirements (e.g., materials transportation) or traffic associated with existing PJM facilities.

4.3.3.9 Land Use

Because no new construction would be required at existing facilities in the PJM power pool, no additional impact on existing land uses would be expected.

4.3.3.10 Pollution Prevention

Existing pollution prevention measures at PJM facilities would not be affected by implementation of the PJM Interconnection Power Pool option.

4.3.3.11 Cultural Resources

Because no new construction would be required to implement the PJM Interconnection Power Pool option, there would be no additional impacts to historical, archaeological, or cultural resources.

4.3.3.12 Socioeconomic Resources

The principal socioeconomic impact of the PJM Interconnection option would be associated with the sale of 227 MW of excess capacity. In the event that such excess capacity was never-before utilized within the power pool, the profits from the sale of 227 MW would be realized among the sellers of this electricity. Because the sale of 227 MW represents 0.4 percent of the total capacity available for sale by PJM power pool facilities, the increase in potential sales would not be significant.

4.3.3.13 Environmental Justice

Because no new construction or increase in transportation, traffic, or power capacity would be required by the PJM power pool option, no disproportionate adverse impact on minority and low-income populations would occur.

4.4 Mitigation and Monitoring

If the proposed YCEP project is constructed and operated, various mitigation measures may be necessary to minimize both direct and indirect impacts to the environment. The following Table 4.4-1 identifies potential mitigation measures that would be taken specifically to ameliorate impacts that have been identified as a result of the proposed project. In accordance with 10 CFR 1021.331 (assuming a favorable Record of Decision), DOE would prepare a Mitigation Action Plan that addresses mitigation commitments and explains how the corresponding mitigation measures would be planned and implemented.

In addition, an Environmental Monitoring Plan (EMP) would be developed for the proposed project, assuming a favorable Record of Decision. This monitoring plan would include the measurement of various emissions from the proposed Cogeneration Facility, including air toxics. The following hazardous air pollutants would be monitored: elements/compounds including antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium; inorganic compounds including chlorine/hydrochloric acid, cyanide compounds, fluorine/hydrogen fluoride, phosphorous/phosphates, and radionuclides; and organic compounds including formaldehyde and semi-volatile and volatile organics.

Due to the potential impact of the proposed project on water resources, especially under low-flow conditions, it would also be recommended that sampling be performed in the Codorus Creek both upstream and downstream of P. H. Glatfelter Company's discharge on a quarterly basis and/or during low-flow events for the demonstration phase of the proposed project. Parameters to be monitored would include temperature, color, total dissolved solids, lead, copper, chloride, free cyanide, phenolics, and chloroform.

Table 4.4-1. Potential mitigation measures for impacts associated with the proposed YCEP Cogeneration Facility.

Section	Mitigation Measures
4.1.2.3	As proposed, the YCEP Cogeneration Facility would provide steam to the P. H. Glatfelter Company for use in the paper mill operation. This would result in the curtailment of operation of the P. H. Glatfelter Company's Power Boiler No. 4. Reduced operations of Power Boiler No. 4 along with additional oxides of nitrogen (NO_x) reduction requirements [NSR regulations would require that oxides of nitrogen (NO_x) be regulated as a nonattainment area pollutant in addition to regulation as an attainment area pollutant for PSD review] would provide a net air quality benefit with respect to sulfur dioxide (SO_2), oxides of nitrogen (NO_x), *and* particles emissions in the AQCR.
4.1.2.10	The primary sources of air emissions during the construction phase of the project would be from construction vehicle exhaust emissions and fugitive dust particulate matter emissions. Air emissions generated during these construction activities would be minimized through the application of proper construction practices. Practices would include periodic wetting and mulching of the construction area to minimize fugitive emissions associated with vehicles traversing the site, particularly large particulate matter associated with wind erosion of disturbed soils. In addition, potential air pollution emissions associated with wind erosion would be minimized by limiting disturbance to the portion of land required for construction of the facility. Any disturbed land would be stabilized as soon as the construction of the facility ha*d* progressed to the point where this measure *were* practical. In addition, potential air emissions associated with construction of the electrical interconnection would be minimized by limiting disturbance to the portion of the land required for pole placement and selective vegetation clearing.
4.1.3	Measures would be taken to minimize the amount of soil disturbance and migration. Terrain exposed at any one time would be limited to the area necessary for a particular phase of construction. Exposed soils would be seeded for short-term stabilization upon completion of each construction phase. Grading activities would be restricted to keep the disturbed area to a minimum. To minimize erosion on slopes, diversion ditches would be installed at appropriate intervals.
4.1.3.2	Appropriate permanent vegetative measures would be employed following final construction activities to prevent erosion of surface areas.
4.1.4.2.2	The project would use the lowest quality available water, as appropriate, rather than relying on community potable supplies.

Table 4.4-1. Potential mitigation measures for impacts associated with the proposed YCEP Cogeneration Facility. (continued)

Section	Mitigation Measures
4.1.7	Insulation and other noise-mitigation techniques would be employed on major pieces of construction equipment. Advance notice would be given to the potentially affected public prior to major noise events such as steam system purging. With these noise mitigation measures, the predicted increase in noise levels at the nearest outdoor receptor locations during normal operations are expected to be minimal. To mitigate noise from operational activities, the proposed facility would be designed to include specific noise reduction and control features. Where feasible, low noise design equipment would be used, and equipment noise sources would be enclosed in insulated buildings designed to absorb noise. The coal and ash byproduct conveyor systems would be enclosed for noise control purposes. Unloading of coal from railcars would occur within an insulated building equipped with entrance doors. Additional mitigation features include extended fan housings on the cooling tower, thermal and acoustic insulation around the induced draft fan, and discharge silencers on the ventilation and induced draft fans. The spatial orientation of the major noise production structures has been planned to block direct propagation of noise to off-site receptors. The cumulative result of these noise reduction measures would be to minimize the increase in background noise at the off-site receptors (0 to 3 dBA increase) due to operation of the proposed facility.

Table 4.4-1. Potential mitigation measures for impacts associated with the proposed YCEP Cogeneration Facility. (continued)

Section	Mitigation Measures
4.1.8	Traffic associated with construction of the proposed facility would increase above current levels, and would affect traffic flow on the roadways providing access to the site. The intersection of York Road (Route 116)/Jefferson Road (Route 516)/Lehman Road, identified in the traffic study as the primary location experiencing operational deficiencies, would be improved prior to the start-up of any peak construction activity. The improvements would consist of, at a minimum, installation of a traffic signal. With this measure alone, traffic conditions during the periods of facility construction and operation would be improved over those currently existing at this intersection. Proposed mitigation measures ***have been*** approved by ***PennDOT***. Access to the construction site would be from the existing access drive to the Roundwood Facility. This driveway would be able to accommodate all categories of facility construction vehicles, and is at a location with adequate sight distance available to ensure safe entry and exit. To address the existing problems of occasional disruption to traffic flow on York Road (Route 116) from overflow of log truck queues on the driveway, an additional storage area to accommodate the queue would be provided. This action would mitigate the existing problem in addition to providing construction vehicles unimpeded access to the site. All material laydown and employee parking areas would be provided on site. Facility security would enforce a ban of on-street parking. Traffic conditions throughout the construction period would be monitored. If congestion should be noted, additional mitigation measures, such as scheduling of shifts to further avoid peak periods or the stationing of traffic control personnel at critical locations, would be instituted. As shown in the transportation study, the associated traffic of employees and truck shipments required to support facility operation would have an effect upon operation conditions at key intersections providing access to the site. The previously discussed mitigation would result in an improvement over existing operational conditions at this location.
4.1.11.1	***Mitigation of adverse visual effects to the Glatfelter Residence (a.k.a. the Hill District) cannot be accomplished through traditional (screening, moving the project) methods. The Pennsylvania Bureau for Historic Preservation has agreed that non-traditional methods, such as historical interpretation, may be used to mitigate adverse visual effects of the proposed project. Appropriate mitigation measures would be determined through completion of the Section 106 (of the National Historic Preservation Act) consultation process, which would result in execution of a Memorandum of Agreement (MOA) between the Bureau and DOE.***

Table 4.4-1. Potential mitigation measures for impacts associated with the proposed YCEP Cogeneration Facility. (continued)

Section	Mitigation Measures
4.1.14.5	Project development has been designed to avoid impacts to wetlands. To the extent possible, impacts to any wetlands identified along the electric interconnection line route would be minimized by crossing the wetland via an overhead span. Selective clearing of vegetation at stream crossings would be limited to the width of the electric interconnection. Any necessary removal of vegetation within wetland areas would be done manually to further minimize impacts associated with mechanical clearing techniques. Slash vegetation removed from the interconnect corridor would be left as mulch. The proposed electrical interconnection was chosen to minimize impacts to wildlife and their associated habitat. The majority of the line has been sited along previously disturbed areas. ***Measures would be taken to minimize the effects on wildlife due to the placement of the utility corridor through Flood Control Property. This Flood Control Property is being leased, in part, by the Pennsylvania Game Commission for wildlife management purposes. Mitigation options would include the following: (1) the riparian areas along Codorus Creek that would be cleared for the transmission line would be planted with various low-growing shrub species to replace lost wildlife habitat; (2) the construction of the transmission line through that portion of the Flood Control Property leased to the Pennsylvania Game Commission would be coordinated with that agency to avoid conflicts with hunting seasons, farming, and other management activities; (3) wood duck nesting boxes and other water fowl nesting structures would be placed along Codorus Creek to replace any large trees that would be removed. This would increase breeding habitat for these species. Also, kestrel nesting boxes, bat boxes, and other wildlife nesting/resting structures could be placed on the single-shaft steel or wooden poles which would support the transmission line; (4) warm season grass species (that survive with less moisture and fertility than cool season grasses) would be planted to provide both food and cover for wildlife at different times of the year; and (5) brush piles would be constructed with vegetation that would be cleared/trimmed for pole and transmission line placement to provide cover for wildlife.***
4.1.14.11	***The proposed landscaping plan for the Bair switchyard facility would eliminate the "adverse visual effect" to historic resource GG-45B (Jonas Law House). The Pennsylvania Bureau for Historic Preservation has agreed that non-traditional mitigation methods may be used to mitigate the visual effects to historic resource GG-44E (M. Eyster Farmstead). Appropriate mitigation measures would be determined through completion of a Section 106 (of the National Historic Preservation Act) consultation, which would result in execution of a Memorandum of Agreement between the Pennsylvania Bureau for Historic Preservation and DOE.***

Table 4.4-1. Potential mitigation measures for impacts associated with the proposed YCEP Cogeneration Facility. (continued)

Section	Mitigation Measures
4.1.14.11	*The Pennsylvania Bureau for Historic Preservation has agreed that no further archaeological investigations would be necessary for temporary access roads if geotextiles are used at those locations (see correspondence dated April 14, 1995 from B. Barrett to S. Van Ooteghem in Appendix E). Therefore, the use of geotextiles rather thqan conventional construction methods would be required for all temporary access roads.*

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5. IMPACTS OF COMMERCIAL OPERATION

Commercial operation of the proposed York County Energy Partners (YCEP) Cogeneration Facility would be anticipated following completion of the 24-month demonstration period. Two scenarios are reasonably foreseeable outcomes of the demonstration and are considered in this chapter: (1) a successful demonstration of the electric utility-sized unit followed by continuation of the project at approximately the same power level using the same facility with circulating fluidized bed (CFB) technology, and (2) an unsuccessful demonstration followed by modification of the existing CFB technology, modification of the facility to operate using more conventional coal technology, or shutdown of the facility.

5.1 Successful Demonstration

The CFB boiler has been demonstrated to be commercially viable on a small scale [i.e., under 100-megawatt (MW)], however, the CFB combustion technology has not been demonstrated ***extensively*** at an intermediate size range of 100- to 300-MW in the United States. Successful demonstration of the proposed YCEP Cogeneration Facility would provide verification that the CFB boiler would be capable of operating at the utility scale in the 250-MW size range. The demonstration would provide technical information regarding environmental and operational performance of the boiler.

If the demonstration is successful, YCEP would continue commercial operation of its unit using the demonstrated technology. The proposed 250-MW gross capacity would assist Metropolitan Edison Company (Met-Ed) in meeting its projected need for an additional 500 to 550 MW of power by the year 2000. The proposed facility also would supply steam to the P. H. Glatfelter Company at a rate of up to 400,000 lbs/hr [at a pressure of 4,136,854 newtons per square meter, pascal (600 pounds per square inch absolute) and a temperature of ***360*** degrees Celsius (680 degrees Fahrenheit)]. Impacts of commercial operation would be equivalent to those contained in Chapter 4, Environmental Consequences, for the following areas:

- Setting;
- Air quality;
- Geology and soils;
- Water resources
- Biological resources/biodiversity;

- Human health and safety;
- Noise;
- Transportation and traffic;
- Land use;
- Cultural resources; and
- Socioeconomic resources.

A successful demonstration of the proposed project also would allow for the availability of the 250-MW-sized unit on the electric utility market. The electric utility market potentially could begin placing orders for these units during the 24-month demonstration period, if the market's needs demand such a schedule. Initial commercial orders would potentially have the same CFB boiler design that would be used for the proposed YCEP Cogeneration Facility. Reusing the design would shorten engineering, design, and construction periods, thus reducing the time between order placement and start-up.

A Repayment Agreement has been signed between the Department of Energy (DOE) and YCEP, and is based on a successful demonstration of the CFB technology. The Repayment Agreement, a 20-year commitment, begins at the end of the demonstration phase of the project. If the demonstration is successful, repayment to DOE could come from two sources; the continued operation of the demonstration facility, and the future sales of the CFB units.

5.2 Unsuccessful Demonstration

Potential operational uncertainties exist with any untested project and technology, and the proposed project, the largest single atmospheric CFB in the United States, is no exception. These uncertainties could lead to an unsuccessful demonstration of the proposed project. For this purpose, the term "unsuccessful demonstration" means that the proposed project failed to operate as designed. This is likely to be manifested as one or more of the following: inability to produce electrical and/or steam energy at designed level; consumption of more fuel and/or limestone to meet its power output requirements than designed; excessive wear of plant components*; or poor environmental performance*.

Because the ***Industrial*** Participant has established a long-term power sales agreement with Met-Ed, it is unlikely that the proposed facility would remain idle following any of the circumstances. Therefore, it is anticipated that equipment and systems would be modified to improve facility performance (i.e., to improve fuel efficiency, reduce excessive component wear) to enable the proposed project to operate to satisfy its commercial requirements.

To provide safety margins in anticipation of unforeseen operational realities, conservative engineering and design practices have been and would be employed. Nonetheless, the uncertainty related to the scale-up of the atmospheric CFB boiler is the greatest factor contributing to potential performance deviations.

Because no atmospheric CFB unit this size is in operation anywhere in the United States, scale-up presents some technical challenge. If problems are encountered, they would most probably result in either a reduced steaming rate (reduce boiler efficiency), an increased demand for internal auxiliary power, or excessive wear on plant components. As an example, if boiler efficiency proved to be less than anticipated a number of corrective actions could be considered:

- Add boiler tubes to increase the area available for heat transfer
- Modify boiler to improve fuel mixing or reduce internal fouling
- Intensify preventive maintenance efforts
- Operate the proposed facility at a reduced power output

If the proposed project's demand for internal auxiliary power exceeds the designed value, alternate equipment might be selected which would lower this demand. Similarly, if wear of certain plant components is deemed excessive, alternative materials could be substituted to increase the operating lives of these components.

DOE, as stated in the Cooperative Agreement, is under no obligation to fund any cost overruns related to the project. However, both the Cooperative Agreement and the Program Opportunity Notice provide mechanisms for YCEP to seek additional monies. DOE participation in any overruns cannot exceed 25 percent (approximately $18.75 million) of DOE's original cost share contribution of $75 million.

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6. CUMULATIVE EFFECTS

This section of the ***Final*** Environmental Impact Statement (***F***EIS) discusses the Proposed Action's incremental contribution to the potential cumulative effects to resources directly and indirectly affected. Following a discussion of the regulatory context within which the analysis has been performed, the scope of the analysis is presented along with the approach and rationale for the resource impacts to be analyzed.

6.0 Summary of Major Changes Since the DEIS

The major changes in this chapter involve updating Section 6.3.3 (Present and Future Effects) to provide additional information related to actual (expected) emissions and chloroform loadings in the air basin.

6.1 Regulatory Requirements

The President's Council on Environmental Quality (CEQ) regulation*s* for implementing the procedural provisions of the National Environmental Policy Act (NEPA) direct that environmental effects be analyzed for three types of impacts: direct, indirect, and cumulative ***(40 CFR 1502.16)***. Direct effects (the CEQ regulation uses the terms effects and impacts synonymously) are caused by the action and occur at the same time and place ***[40 CFR 1508.8(a)]***. Indirect effects are caused by the action but occur later in time or are farther removed in distance, but are still reasonably foreseeable ***[***40 CFR 1508.8***(b)]***. A cumulative impact is an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency (Federal or non-Federal) or person that undertakes such other actions (40 CFR 1508.7).

An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the EIS analysis, and state that "(w)hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR 1502.22). The CEQ regulations do not say that the analysis cannot be performed if the information is lacking.

Consequently, the analysis contained in this section includes what could be reasonably anticipated to occur given the uncertainty created by the lack of detailed ecological investigations to support all cause and effect linkages that may result from the proposed project's effluent emission streams, and the indirect effects related to construction and long-term operation of the facility.

6.2 Scope and Methodology

The scope of this cumulative impact analysis has been defined by comments submitted by the public and affected Federal and state agencies during the ongoing public scoping process for this ***FEIS***. Comments received during early stages of DEIS scoping are reported in the EIS Implementation Plan (available in the ***public reading rooms (Appendix A)***. The scope of the analysis is also a factor of the nature of the proposed action and its likelihood of affecting cause and effect relationships impacting resources on a local or regional level. Because cumulative impacts accrue to resources, it is important that the analysis of impacts focus on specific resources or impact areas as opposed to merely aggregating the myriad of actions occurring in and around the proposed facility and attempting to form some conclusions regarding the affects of the many unrelated actions. Narrowing the scope of the analysis to resources where there is a likelihood of reasonably foreseeable impacts accruing supports the intent of the NEPA process, which is "to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives" [40 CFR 1500.2(b)]. Each resource analyzed has its own spatial boundary, although the temporal boundaries can generally be assumed to equal the life expectancy of the project, 25 years.

The resources and impact areas that were identified through the public scoping process and by an analysis of the nature of the proposed action include air and water quality, and traffic. The lack of linkage between cause and effect relationships and impacts to other resources directly affected by the proposed action preclude their inclusion in this cumulative effects analysis. Human health effects can be linked directly to air and water quality (causes). Consequently, human health is discussed in the sections dealing with these resources as it relates to the pathways of exposure (i.e., inhalation, ingestion) for these resources.

The analysis of cumulative effects, consistent with the CEQ definition, includes past, present, and reasonably foreseeable future actions that may be similar in nature and affect the same resources as the proposed action. Past actions are actions that have affected the resources of concern, and are still residual in the environment. For example, when analyzing road construction through a forest, past actions such as the construction of pipelines and power lines may provide an indication of what the likely outcome of similar actions would be in the future. The residual effects of those activities include such things as the fragmenting of forest tracts and the maintenance of homogeneous vegetation in the power line rights-of-way. Past actions are used to establish context for evaluating the likely outcome of current or future actions. An effective way of using past impacts is through trend analysis. Observing trends in the use or condition of resources can provide an indication of what conditions might prevail if such use is continued.

Present actions are ongoing actions that are usually part of the baseline conditions used in the analysis of the project-specific effects of the proposed action. This baseline is the benchmark against which changes attributable to the proposed action at the site of the impacted resource are compared. For the cumulative effects analysis, the same baseline is used, but it is expanded to capture the residual impacts of past actions. For example, present actions are routinely included in air quality analyses using the National Ambient Air Quality Standards (NAAQS) emission source inventories developed for the NAAQS air quality analysis of the prevention of significant deterioration (PSD) or the review of new emission sources. The NAAQS inventory includes all existing emission sources, sources with PSD permits that have not yet begun to operate, and PSD permit applicants for whom a permit has not yet been issued. The new source review analysis requires that all existing nearby sources [as far away as 50 kilometers (31 miles)] be explicitly modeled for air quality impacts. In the analysis of the cause and effect relationship related to the anticipated impacts, each source represents a cause, and their combined emissions create an effect on air quality, the intensity of which can be determined by comparing the concentration of pollutants emitted to concentrations specified in the NAAQS. The NAAQS concentrations represent thresholds based on human health or environmental effects. Concentrations above the threshold would be considered significant.

Reasonably foreseeable future actions include the proposed action and other actions with a reasonable likelihood to occur within the time frame established for the cumulative effects analysis. For future actions to be relevant to the cumulative effects analysis, the actions must affect resources (i.e., be the cause of some type of effect whether beneficial or adverse) within the established geographic boundaries for the analysis. If the relevant cause and effect relationships would not occur (i.e., the results of proposed or future actions would not ***effect*** some change) within the geographic boundaries of the cumulative effects analysis, either the boundaries have not been appropriately established (i.e., change occurs outside the established boundary), or the effects may be speculative to the point of being beyond relevance. Future actions to be analyzed in the cumulative effects analysis do not have to be similar to the proposed action, but have to ***affect*** the same resources as the proposed action. For example, if hardwood timber was a resource of concern, and the proposed action was the construction of a highway through hardwood timber stand, other actions very dissimilar to road building such as logging and residential development projects, could be actions to consider in the impact analysis.

6.3 Air Quality

6.3.1 Background

The atmosphere is an extremely complex environment in which many natural phenomena and processes occur. The continual superimposition over the products of natural processes ***by*** the products of human activity has polluted the atmosphere and changed its chemistry. In turn, these pollutants are removed from the atmosphere by deposition (as discussed earlier in Section 4.1.2.10), and impact the ***e***arth's ecosystems, where chemical changes also occur.

Direct human health effects may arise from the inhalation (a direct human exposure pathway) of acidic aerosols and their major precursors, ***sulfur dioxide (SO_2) and nitrogen dioxide (NO_2)***; and other criteria pollutants and air toxics. Direct inhalation health effects include effects on pulmonary function, morphology, biochemistry, and immunology. Interactions with the criteria pollutant ozone (O_3) can occur that are synergistic, additive, and antagonistic, particularly to potentially sensitive populations (e.g., asthmatics). In addition, health effects are associated with such exposures as through the food chain particularly whenever bioaccumulation can occur. In addition, there are indirect health effects such as those that might occur if acidic deposition increased the mobilization of metals in soils and waters, thus increasing oral exposure to metals in drinking water and foodstuffs (especially fish). ***Dermal contact with atmospheric pollutants at ambient concentrations is not included in the EPA's dermal exposure assessment methodology (EPA, 1992a) and would not be expected to affect human health.***

Pollution deposition affects sensitive forest, aquatic, and soil ecosystems. Basically, the reason is that stressors [such as ozone (O_3) and acidic deposition] can threaten their long-term structure, function, and productivity by changing their chemical composition and nutrient cycling. Material damage by acidic deposition and other pollutants [e.g., ozone (O_3) and particulates (PM_{10})] to surfaces such a stone, metals and woods can occur as a result of air pollution. Material effects present a wide range of options for evaluating damages; in physical terms (reduction of service life), in market terms (life cycle costing, shifts in materials selection and market share), and in nonmarket terms (heritage valuation of damage to monuments and historic structures).

An important side effect of the presence of pollutants, particularly acidic-related pollutants in the atmosphere, is the interference with the transmission of light. The main link is through sulfur dioxide (SO_2) emissions and the production of sulfate aerosols in the atmosphere. Sulfate aerosol is the dominant contributor to visibility reduction in North America, although that other gases and aerosols can also play an important role.

In addition, as discussed earlier in Section 4.1.2.10, the burning of fossil fuel such as coal contributes to global climate change as a consequence of the production of carbon dioxide (CO_2), one of the so-called "greenhouse gases."

The analysis of the proposed project's incremental contribution to cumulative effects on air quality and the associated environmental concerns described previously, have been considered for a geographic radius of approximately 55 km (34 miles) from the proposed project site (Figure 6.3-1). This distance is the extent of the area for which detailed air quality modeling was performed to satisfy the requirements of the PSD permit application filed for the proposed project, and is the extent to which a discernable incremental contribution to air quality impacts can be meaningfully described.

6.3.2 Past Effects

Historically, in early industrial society no consideration was given to pollution or the burning of fuels. Smoke and dirt, although unpleasant, were considered gratifying indicators of industry and resulting prosperity.

Prior to passage of the Clean Air Act (CAA) in 1970, the air of the United States was considered to be so degraded by human activity, that the health of the people and the environment were compromised. The first generation of air pollution controls successfully reduced emissions from sources such as factories, power plants, and transportation. The principal air pollutants regulated under the CAA are the six criteria pollutants: sulfur dioxide (SO_2), particulate matter (PM_{10}), carbon monoxide (CO), ozone (O_3), ***nitrogen dioxide (NO_2)***, and lead (Pb) for which ***NAAQS*** are established; and air toxics regulated

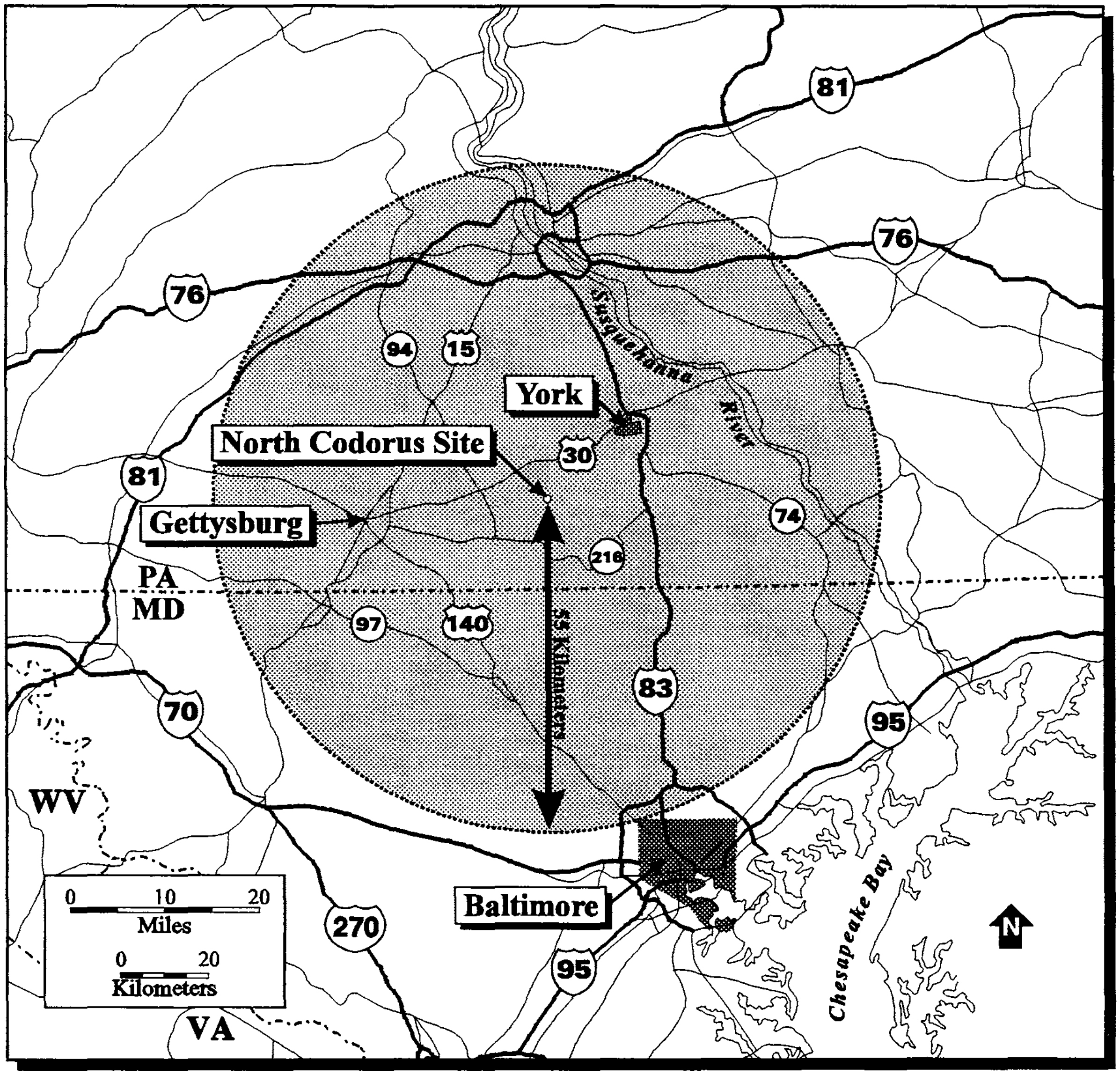

Figure 6.3-1. Geographic boundary for the cumulative effects on air quality.

under the air toxic provisions of the Act.

The underlying philosophy of the ***statute*** is based on:

1) the protection of the public health with an adequate margin of safety, and

2) the protection of public welfare from any adverse effect which might occur. This includes degradation to aquatic ecosystems, vegetation, soils, materials, and visibility.

This philosophy is based on the linkage of air pollution to such impacts; and over the last decade, public policy has increasingly focused on improving the environment, especially air quality, and Congress took a major step toward this goal on November 15, 1990, with the passage of the *CAA* Amendments of 1990. The CAA was designed to further reduce some persistent air pollution problems and may be viewed to have far-reaching environmental effects and economic impacts on all United States industry over the next decade and beyond as increasingly stringent regulations are promulgated.

Past impacts and trends of pollutant emissions within a regional spatial boundary such as Pennsylvania closely follow the trends in the national spatial boundary. This is largely due to the fact that a region such as the Commonwealth of Pennsylvania has a diversity of source categories which reflect the national diversity although some sources such as forest fires, wind erosion, and certain industries can produce significant deviations. Illustrative examples of past, present, and future broad-scale national trends are shown in Figure 6.3-2 for the pollutants sulfur dioxide (SO_2) and oxides of nitrogen (NO_x).

Since 1900, total national oxides of nitrogen (NO_x) emissions have increased by approximately 790 percent, sulfur dioxide (SO_2) emissions have increased approximately 130 percent, and volatile organic compounds (VOCs) — a precursor to ozone (O_3) formation — have ***also*** increased. However, from about 1970 (the date of the CAA), emissions of the criteria pollutants have generally decreased, the greatest decrease being lead (Pb), which has shown an decrease of approximately 98 percent, followed by particulate matter (PM_{10}), with a 51 percent decease, sulfur dioxide (SO_2), with a 27 percent decrease, and carbon monoxide (CO), with a 27 percent decrease. Oxides of nitrogen (NO_x) have increased by approximately 5 percent.

In the Commonwealth of Pennsylvania, between 1987 and 1991, data from the tenth full year of operation of Pennsylvania's 15-station precipitation monitoring network showed that the mean annual precipitation pH was higher (i.e., less acidic, a favorable trend) in 1991 (4.15) than in six of the previous nine years. Pennsylvania experts also reported that a statistically significant increase in the pH of precipitation (i.e., becoming less acidic) was evident in all regions of Pennsylvania (*Lynch, 1992*). This data is consistent with data from other areas of the country.

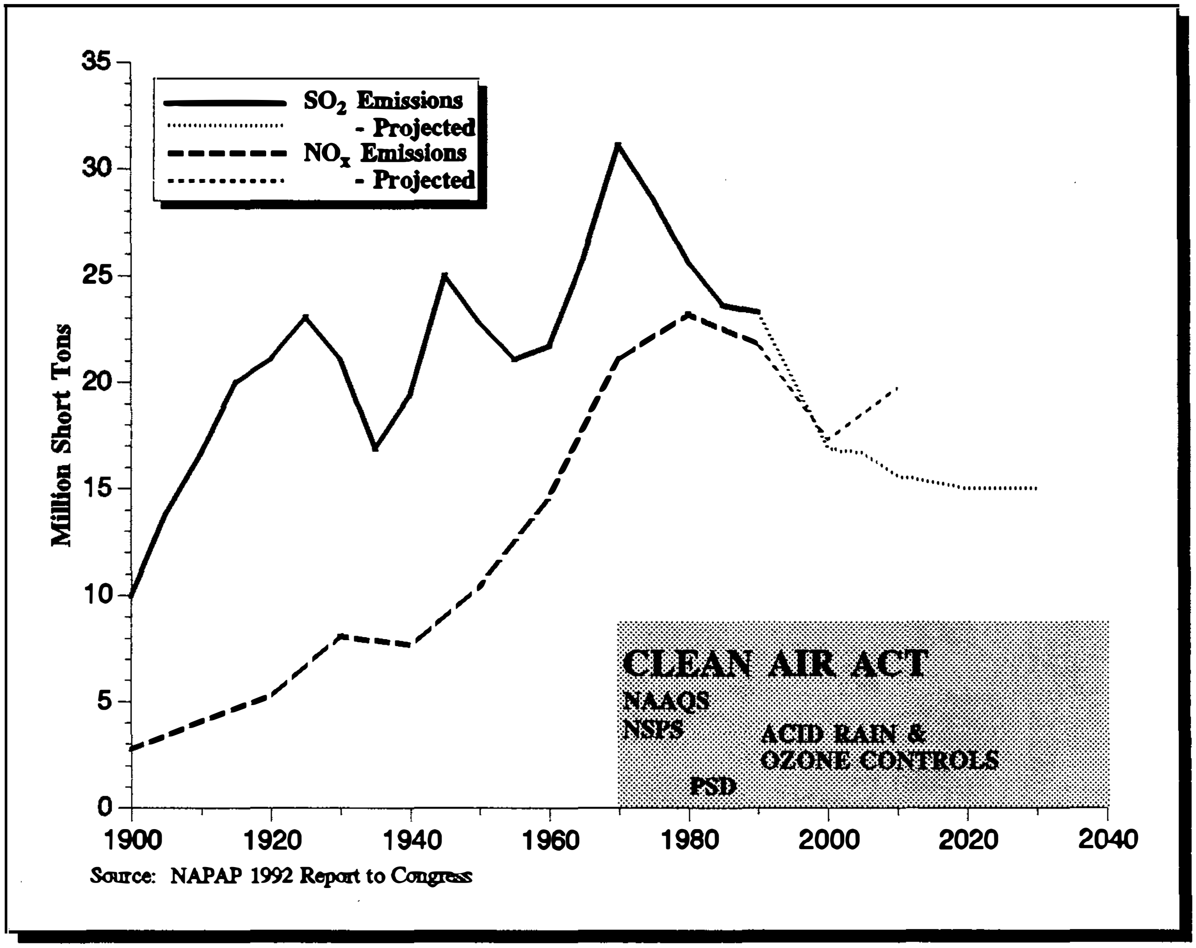

Figure 6.3-2. Annual emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) in the United States.

Pennsylvania Toxics Release Inventory (TRI) data are shown in Table 6.3-1. As can be seen, there was approximately a 30-percent reduction in air toxics between 1987 and 1991.

6.3.3 Present and Future Effects

Prevention of Significant Deterioration (PSD) regulations were promulgated pursuant to the CAA. The basic goals of the PSD regulations that apply in attainment areas are: (1) to ensure that economic growth will occur in harmony with the preservation of existing clean air resources to prevent the development of any new nonattainment problems; (2) to protect the public health and welfare from any adverse effect

Table 6.3-1. Pennsylvania TRI data base, 1987-1991, total emissions (*tons/yr*).

1987	1988	1989	1990	1991	Emissions	Percent
46,819	45,834	40,904	38,218	32,814	-14,005	-29.91

which might occur even at air pollution levels better than the ***NAAQS***; and (3) to preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. The primary provisions of the PSD regulations require that new major stationary sources and major modifications be carefully reviewed prior to construction to ensure compliance with the NAAQS, the applicable PSD air quality increments, and the requirement to apply the Best Available Control Technology (BACT) on the project's emissions of air pollutants. As was described in Section 4.1.2.2, such a review was performed for the proposed York County Energy Partners (YCEP) facility for nitrogen dioxide (NO_2), sulfur ***dioxide*** (SO_2) and particles (TSP/PM_{10}). In addition, the provisions of new source review (NSR) for ozone nonattainment were applied because the proposed facility lies within the Northeast Ozone Transport Region, and as such many of the elements and procedures for source applicability under the nonattainment area NSR applicability provisions were similar to those of PSD applicability. Major modification thresholds for nonattainment areas are those same significant emissions values used to determine if a modification is major for PSD.

Modeling for the proposed project evaluates the effects (cumulative as well as the proposed project's individual incremental effect) of all major sources within the defined impact area. Major sources selected for the modeling were based on the following criteria:

- All sources of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) greater than 50 ***tons/yr*** within 10 km ***(6 mi)***
- All sources of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) greater than 100 ***tons/yr*** within 10-20 km ***(6 - 12 mi)***
- All sources of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) greater than 250 ***tons/yr*** within 20-30 km ***(12 - 19 mi)***
- All sources of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) greater than 500 ***tons/yr*** within 30-50 km ***(19 - 31 mi)***

- All sources of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) greater than 1000 ***tons/yr*** within 50-55 km ***(31 - 34 mi)***

The emission inventory includes a total of 39 facilities and 102 individual stacks in the inventory of sulfur dioxide (SO_2) sources within 55 km (34 miles), and 19 facilities with 66 individual stacks for oxides of nitrogen (NO_x) sources within 55 km ***(34 miles)***. A complete listing of emission inventory for sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) sources are shown in Tables 6-8 and 6-9 of the YCEP PSD Permit Application available in the public reading rooms (Appendix A).

As discussed in Section 4.1.2.6, the analyses of air quality impacts demonstrated that for the principal emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x), the net result of constructing and operating the proposed project at the P. H. Glatfelter Company site in North Codorus Township would be a net decrease in ***permitted*** air emissions in York County. The analysis performed identified the following reductions in ***permitted*** emissions:

- sulfur dioxide (SO_2); 2,419 ***tons/yr***;
- oxides of nitrogen (NO_x); minimum 272 ***tons/yr***;
- particles (PM_{10}); 65 ***tons/yr***.

Under the provisions of Phase II of Title IV of the CAA, YCEP would be obligated to purchase or obtain sulfur dioxide (SO_2) "allowances." These "allowances" already exist and their procurement will not promote the creation of any more "allowances." Note that a reduction of 2,419 ***tons/yr*** of sulfur dioxide (SO_2) emissions would result from the reduced operation of Power Boiler No. 4 due to the operation of the new ***circulating fluidized bed*** (CFB) facility.

As discussed in Section 4.1.2.3, the actual operating scenarios for the proposed YCEP facility, and the P. H. Glatfelter Company Power Boiler No. 4, would likely result in lower than permitted emission rates. The expected emissions from the proposed YCEP facility under the actual anticipated operating conditions, including consideration of the curtailment of Power Boiler No. 4, reflect overall reductions in emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM_{10}), and increases in emission of carbon monoxide (CO), VOCs, and radionuclides.

The predicted air toxic impacts were shown in Section 4.1.2.7, Table 4.1-11. The very low concentrations shown in Table 4.1-11 when related to the TRI levels shown in Table 6.3-1 indicated that no additional cumulative impact can be differentiated. That is, any contribution resulting from the proposed action to the State's TRI (Table 6.3-1 shows TRIs to have declined) would not be discerned within an annual TRI, and hence no addition to cumulative impacts could be distinguished. The decline in TRI shown in Table 6.3-1, will continue due to the ongoing implementation of the provisions of Title III of the CAA which outlines a new regulatory approach for reducing air toxic emissions and for promoting a reduction in public exposure to air toxics.

The predicted impacts of chloroform emissions of 0.57 tons/yr were discussed in Section 4.1.2.11 (Table 4.1-23). The very low risks shown in Table 4.1-23 associated with a chloroform emission rate of 0.57 tons/yr, when viewed in relation to the 1994 emission rate of 115.5 tons/yr from the P. H. Glatfelter Company paper plant adjacent to the site of the proposed YCEP cooling tower (see Section 2.3), indicated that no cumulative impact could be differentiated.

As discussed in Section 4.1.2.10, Global Climate Change, the result of burning a net additional ***800,000*** tons of coal per year ***(approximate)*** would be the generation of carbon dioxide (CO_2) equal to approximately 0.0*5* percent of the amount produced from fossil fuel combustion in the United States and 0.***011*** percent of the amount from fossil fuel globally.

The CAA established "State Implementation Plans" (SIPs) as the mechanism by which states would provide for the implementation, maintenance, and enforcement of NAAQS for the six criteria pollutants. The SIPs' purpose is to eliminate or reduce the severity and number of violations of NAAQS and to expedite the attainment of these standards. The proposed YCEP project must comply with the SIP, which further reduces the chances that the proposed project would adversely effect existing air quality in the region.

6.3.4 Conclusion

In the context of the regional state toxic*s* release inventory there are no discernable air toxic increases, and thus it is not possible to define any incremental effect of the proposed YCEP project on an overall cumulative impact related to air toxics. In the global context of the cumulative effects of carbon dioxide (CO_2) emissions, the incremental effect of the proposed action is not significant when compared to baseline.

As was discussed in Section 4.1.2.3, the proposed action would result in the curtailment of Power Boiler No. 4 at the P. H. Glatfelter Company paper mill. The potential sulfur dioxide (SO_2) and particles (PM_{10}) emissions from the proposed facility would be less than the potential emissions from Power Boiler No. 4 that would be replaced. In addition, a 1.15 to 1 oxides of nitrogen (NO_x) emission reduction credits (ERCs) requirement for the operation of the CFB boiler would result in lower regional emissions of oxides of nitrogen (NO_x). The sulfur dioxide (SO_2) reduction would occur at the site, and the oxides of nitrogen (NO_x) reduction would occur over the local York County region. The local effect of oxides of nitrogen (NO_x) ERCs has not been established since the ERC requirements are based on a regional approach. Although the cumulative effect of the incremental decreases in oxides of nitrogen (NO_x) levels may not accrue in the immediate vicinity of the proposed facility, some improvements may be realized due to the 900 tons of oxides of nitrogen (NO_x) reductions from the Power Boiler No. 4 curtailment.

Rather than an increase, there ***would*** be a decrease ***both*** in ***permitted (maximum)*** emissions ***and estimated actual emissions of the criteria pollutants*** sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particles (PM_{10}) as a net result of the proposed action. Therefore, any cumulative effects associated with ***the emissions of these three criteria pollutants*** may be viewed as benign, if not beneficial, in the context of the regional impacts that have been described. ***The expected emissions from the proposed YCEP facility under the actual anticipated operating conditions reflect increases in emissions of carbon monoxide (CO), VOCs, and radionuclides. As discussed in Section 4.1.2.6.1, ground level concentrations of carbon monoxide (CO) that result from the proposed project would be far below EPA and PADER significance levels for Prevention of Significant Deterioration consideration. As discussed in Section 4.1.2.10, impacts due to the increase of VOC emissions as a result of the proposed YCEP project would not be expected. As discussed in Section 4.1.2.11, the radionuclide emissions from the proposed YCEP project were found to represent a small portion of the total human exposure experienced from normal background sources. The predicted impacts of chloroform emissions of 0.57 tons/yr were discussed in Section 4.1.2.11, Table 4.1-23. The very low risks associated with an estimated chloroform emission rate of 0.57 tons/yr from the proposed YCEP cooling tower when viewed in relation to the 1994 emission rate of 115.5 tons/yr from the adjacent P. H. Glatfelter Company paper plant, indicate that no cumulative impact can be differentiated.*** The cumulative impacts of the proposed action within the framework of these criteria (and which were regarded as being regulatory significant during new source review ***for criteria pollutants***) would not be anticipated to adversely affect any primary indicators, such as human health, or secondary indicators, such as aquatic ecosystems, vegetation, soils, materials, ***or*** visibility.

6.4 Water Quality and Quantity

6.4.1 Background

Since it has been recognized by the public in general, and by lawmakers in particular, that the quality of life is directly related to impacts to natural resources such as water, various actions have been taken to prevent future degradation of resources, and to improve the quality of natural resources where enhancement is possible and anthropogenic *(manmade)* impacts are well understood. The physio-chemical relationships among environmental resources, biota, and human activities influenced the enactment of measures to address the complex cause and effect relationships that affect the quality of those resources. Comprehensive laws such as the Clean Water Act *(CWA)* and the *CAA* reflect the consensus reached at the national ievel that protection of resources from human impacts is necessary. At the regional level, this same concern has resulted in agreements among states for clean up initiatives such as those undertaken for the Chesapeake Bay and its associated riparian resources.

Actions taken to protect water resources since the passage of the Clean Water Act in 1972 have positively impacted the quality of life in most areas of the country. Trend analyses reveals a general improvement in water resources. Human factors such as economic cycles, demographics, and technological innovations directly affect those trends. In Pennsylvania, for example, the decline of the steel industry, the movement of populations toward economic centers, a more service-oriented labor market, an increased reliance on personal auto transportation, and the increased frequency in wastewater discharge permitting are examples of factors that constantly affect change and the cause and effect relationships of human activities to the quality of water resources.

The proposed project lies in the drainage area of Codorus Creek (approximately 720 square kilometers = 278 square miles), a tributary to the Susquehanna River. The Susquehanna River has an approximate drainage area of 15,022 square kilometers (5,800 square miles). The P. H. Glatfelter Company, which would provide cooling water and process water for the proposed facility, and other industries and municipalities use Codorus Creek as a source of water and as a repository to their wastewater discharges. The analysis of cumulative impacts to the Codorus Creek and Susquehanna River drainage areas is based on incremental environmental impacts discernible from baseline conditions. The Codorus Creek watershed, as shown in Figure 6.4-1, is the geographic boundary of the cumulative effects analysis on water resources.

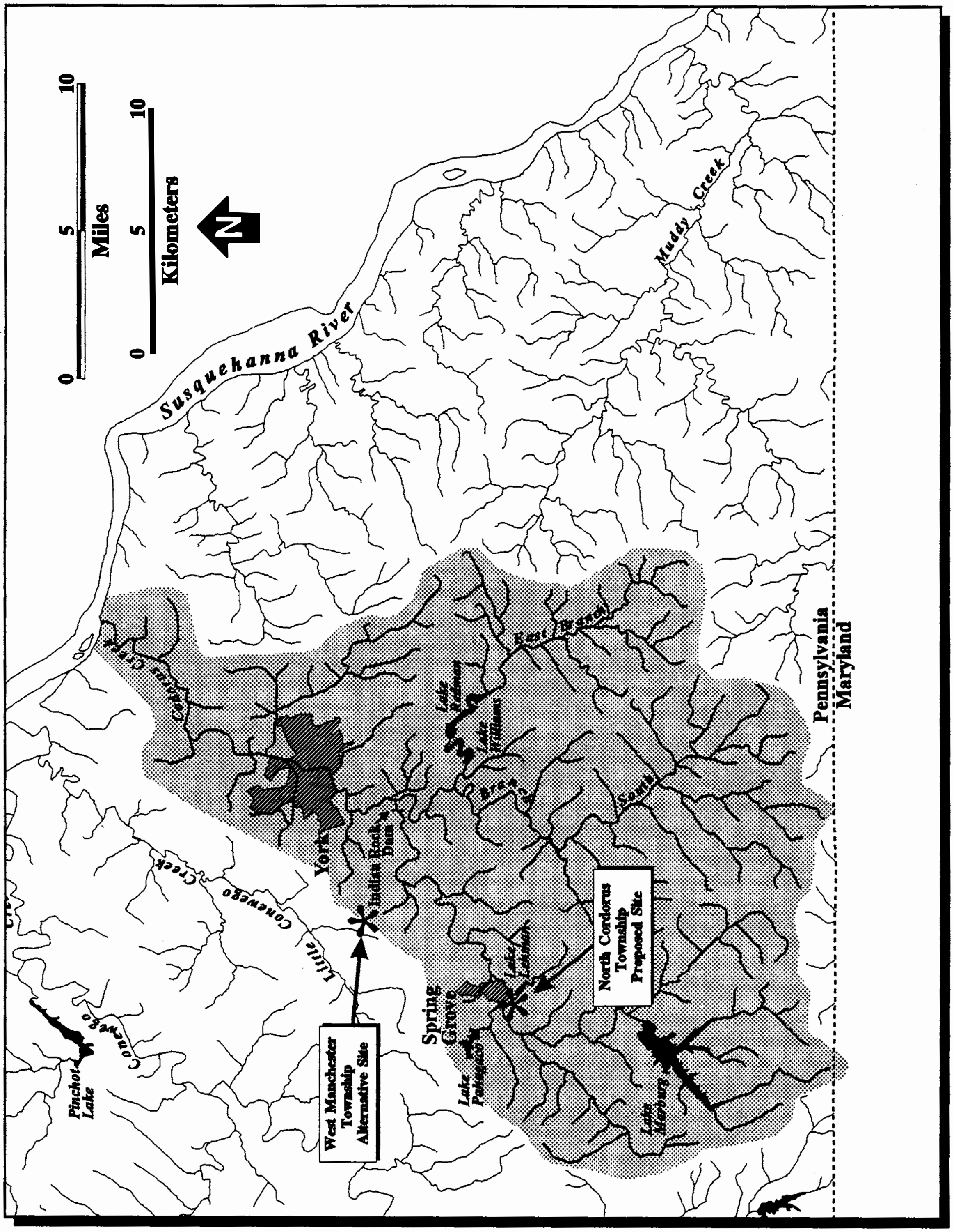

Figure 6.4-1. Geographic boundaries for cumulative effects analysis of water quality

6.4.2 Past Effects

Past actions that affected the Codorus Creek watershed are related to water supply projects. Lake Lehman (120 million gallons - 1942), Lake Pahagaco (1.3 billion gallons - 1955), and Lake Marburg (15.8 billion gallons - 1970) were constructed because historic stream flows during drought periods were not sufficient to satisfy water demands. As noted in Section 3.1.4.1, the P. H. Glatfelter Company and the Commonwealth of Pennsylvania established a cooperative agreement for the construction and operation of Lake Marburg for water use, recreation, and Codorus Creek low-flow augmentation. Since 1970, Codorus Creek average annual flows have been consistently higher. Available historic data indicates that Codorus Creek water quality was degraded by municipal and point source discharges, as well as by agricultural and other non-point sources runoff. However, water quality studies conducted from 1972 to 1991 have shown water quality improvements. These improvements were the result of upgraded municipal and industrial treatment facilities, and the low-flow augmentation practices. Regulatory constraints from the enactment of national and state laws, and local regulations are also likely reasons for observed water quality improvements. In 1991 the Susquehanna River Basin Commission published a report analyzing water quality trends in Codorus Creek (*SRBC, 1991a*). The report indicated that the stream has shown marked and steady improvement in water quality.

6.4.3 Present Effects

The baseline characteristics of the Codorus Creek water flow and quality are presented in Section 3.1.4.1. Drainage areas in square miles are as follows: Lake Marburg - 24.3; Spring Grove - 75.5; York - 222; Confluence with the Susquehanna River - 278. Numerous users draw water from Codorus Creek between its headwaters near the Maryland/Pennsylvania ***border*** and its confluence with the Susquehanna River. In Appendix D, Figure D-1 of this ***FEIS*** identifies major water users in the Codorus Creek ***b***asin. These users represent a ***contributing factor to*** the present cumulative effects on water quantity within the watershed.

The water quality in Codorus Creek is subject to water quality standards identified in Title 25 - Environmental Resources of the Pennsylvania Code. The water quality criteria applicable to warm water fishery designated reaches of Codorus Creek are presented in Table D-1 of Appendix D of this ***FEIS***. These are general criteria to which all permitted dischargers must conform. Within the watershed, there are numerous point and non-point source discharges contributing to the cumulative effects on water quality in Codorus Creek. Table 6.4-1 provides a list of the major point source dischargers along the main stem of Codorus Creek.

Figure D-2 in Appendix D, Major Wastewater Dischargers in the Codorus Creek Basin, shows the location of the NPDES outfalls along Codorus Creek. Further upstream on Oil Creek, at least five permitted discharges occur around ***the*** Borough ***of Hanover.*** Along the South Branch Codorus Creek at least six permitted discharges are allowed to discharge wastewater into the creek. In addition to the permitted wastewater discharges that constitute point sources, there are a multitude of non-point sources that are much more difficult to identify and control.

Forests comprise approximately 20 percent of the Codorus Creek watershed. Agricultural activities, mainly dairy farming and poultry raising, are the dominant land use (approximately 70 percent). Urban areas within the Codorus Creek watershed comprise approximately 10 percent. Moderate population growth is projected for the watershed (*PADER, 1987*). These various land uses account for numerous instances of non-point sources of contaminants to the Codorus Creek watershed.

Agricultural and urban stormwater runoff are potential sources of a variety of contaminants in the Codorus Creek watershed. Quantifying these potential sources and their constituent contaminants is an ongoing process that requires considerable investigation and commensurate fiscal resources. Non-point source runoff from roads, agricultural fields, residential lawns, and the deposition of air pollutants constitute potential sources of present cumulative impacts to water resources in the watershed. Agricultural waste input is especially important in the upstream region of the West Branch, Oil Creek, and South Branch tributaries (*PADER, 1987*).

6.4.4 Future Effects

The proposed project (described in Section 2.1) would have an incremental effect (described in Section 4.1.4.2.7) to the water resource baseline condition described in Section 3.1.4.1. The proposed project intends to use the P. H. Glatfelter Company's wastewater as the source of cooling water. With regard to water quantity usage, it is relevant to note that the water to be used for the proposed project would be drawn from wastewater that would be discharged and not an additional withdrawal from Codorus Creek. However, because use for the proposed project would result in large volumes of evaporation from ***the*** cooling towers, the quantity of water effluent returned to the P. H. Glatfelter Company for treatment and discharge into Codorus Creek would be less than the amount of effluent received for use in the proposed

Table 6.4-1. Major permitted discharges along the Main Branch, Codorus Creek.

Point Source	NPDES Permit #	River Mile
P.H. Glatfelter Co.	8869	24.5
BMY	9253	20.09
York International	8541	Seven outfalls 12.43 - 11.94
Stone Container Corp.	9962	11.79
York City STP	26231	9.40
Harley Davidson, Inc.	7765	9.32
Springettsbury Twp. STP	26808	4.95

project's cooling operations. The water balance under the proposed project is delineated in Section 4.1.4.2.1 (Figure 2.1-7). The incremental effect of the proposed project to the cumulative effect on water flows in Codorus Creek were conceptually determined by using mathematical modeling and historical mean annual flows at Spring Grove and York gage stations. Table 4.1-29 presents a summary of consumptive use effects related to the proposed project.

Reducing flow in Codorus Creek would indirectly affect its water quality due to lower dilution capacity. The proposed project would also directly affect the water quality in Codorus Creek by changing the effluent characteristics of the P. H. Glatfelter Company's wastewater discharge. Conclusions in Section 4.1.4.2.7 are that the proposed project would lower the ***biochemical oxygen demand*** (BOD) and temperature loads to the receiving stream, and mass loadings would not increase. An increasing population in the area, and its associated activities such as internal combustion engine powered automobile transportation, and more septic systems construction, are likely to add to the cumulative effects on water resources in the Codorus Creek watershed.

6.4.5 Conclusions

The trends in water quality improvement mentioned previously, and its associated root causes in environmental legislation, can reasonably be assumed to limit potential future impacts of human activities in the Codorus Creek watershed. Also, the size of the drainage area and the flow volumes near the proposed facility as compared to flow volumes in Codorus Creek downstream of York are comparatively small. In comparison to flow volumes in the Susquehanna River and Chesapeake Bay, the volume of water in Codorus Creek is minimal. Dilution of discharge flow between the proposed project site and the confluence of Codorus Creek with the Susquehanna River reduces contaminant concentrations to below values considered adverse to biota and consequently to human health. Other factors, such as the installation of the oxygen delignification process as part of the P. H. Glatfelter Company's ***Pulp Mill Modernization Project***, and flow augmentation from water impoundments and downstream drainage areas may reasonably be assumed to make the proposed project's incremental contribution to the cumulative environmental impacts to the water resources of the Codorus Creek watershed negligible.

6.5 Traffic Effects

6.5.1 Background

The cumulative effects of traffic are analyzed because of the incremental contribution the proposed project would have in the vicinity of the project site. There would be a direct cause and effect relationship between the number of workers and various materials delivery vehicles traveling to and from the site, and the amount of traffic congestion that would be expected. Traffic congestion can be anticipated at certain times, such as peak morning and evening rush hours, and within a certain proximity of the site. Traffic congestion is considered an adverse impact to travel, and can also increase the likelihood of traffic accidents.

The cumulative effects when considering future growth and development would likely be most acute in the immediate vicinity of the proposed project site, and would diminish with distance from the site. Consequently, focus of the analysis is on the York Road (Route 116) corridor approximately between the Borough of Hanover to the south and U.S. Route 30 to the north. The time frame for the analysis is roughly the life of the proposed YCEP Cogeneration Facility, but focusing on a fixed point in the future does not add to the accuracy of the analysis because data for the analysis is based on extrapolating of growth projections, which are limitless temporally. It is anticipated that at the projected growth rates, the entirety of roadway systems would change to accommodate transportation demands and the traffic management plans of the Pennsylvania Department of Transportation (PennDOT).

6.5.2 Past Effects

In the vicinity of the proposed project (Codorus Township), a 2.9 percent ***annual*** growth in traffic was experienced between 1970 and 1990. It is anticipated that this trend for increased growth would continue, though the rate may slow somewhat. More recently, between 1983 and 1989, daily vehicle-miles of travel increased 27.3 percent. The trend toward increased growth has been accompanied by various traffic problems including declining levels of service for area roadways and a number of traffic accidents. Between 1987 and 1992, on York Road (Route 116), in the immediate vicinity of the proposed project site (between Lehman Road and Colonial Valley Road) there were 32 accidents, 16 involved injuries and 3 were fatal. Although no proportionality between accidents and number of vehicles has been derived for this analysis, intuitively, an increase in the number of vehicles increases the number of vehicles that could potentially be involved in accidents. With no improvement in the level of service for area roadways, some increase in accidents would be expected to accompany the anticipated increase in the growth of traffic.

6.5.3 Present Effects

York County's road system consists of regional, inter-county, and intra-county routes. The regional system of highways includes Interstate 83, Interstate 76 (Pennsylvania Turnpike), U.S. Route 30, and U.S. Route 15. Inter-county routes include Routes 94, 74, and 462. Examples of intra-county routes include Routes 116, 181, and 382. York County has more than ***5,474 km*** *(*3,400 miles*)* of state and local roads, and is ranked fourth in the state for total road milage.

York Road (Route 116) is designated under the Pennsylvania Department of Transportation's priority network system as a Priority Commercial Network. This designation is given to the system of highways providing primary access to economic centers in Pennsylvania and to surrounding states. The criteria for inclusion in this designation is a through route generally with a minimum of 500 heavy trucks per day using the roadway. York Road (Route 116) has between 600 and 700 heavy trucks traveling on it per day. Average daily traffic volumes range between 7,000 and 9,000 vehicles per day.

Jefferson Road (Route 516) is designated under the state's priority network system as an Agricultural Access Network. This designation signifies a road that provides primary access from agricultural areas to a Priority Commercial Network. This designation of road consists of roadways which are vital to agricultural areas for the rapid and efficient movement of agricultural products from the farm to markets and processing centers. No minimum number of trucks is required for inclusion in this designation because some products (e.g., milk and eggs) require pickups at least every other day. Average daily traffic volume is abov.. ',600 vehicles per day on Jefferson Road

Traffic operations are described in terms of Level of Service (LOS) which is defined as a quantitative measure of the effect of a number of factors, which include speed and travel time, traffic interruption, freedom to maneuver, safety, driving comfort and convenience, and operating cost. As described in Section 3.1.8 of this ***FEIS***, a LOS A is a condition of very low traffic delay, while a LOS F represents an over-saturated condition deemed unacceptable. A LOS E is considered the limit of acceptable delays.

Using the criteria established by the Transportation Research Board, an analysis was performed to determine the LOS at several key intersections within the area included in this cumulative effects analysis. The detailed studies performed are described and available in the Environmental Information Volumes for the proposed YCEP project, which are available in the ***public reading rooms (Appendix A)***. The analysis indicates that at the intersection of U.S. Route 30 (W. Market Street) and state Route 116 (Hanover Road), northbound (116) traffic turning left or right is rated as LOS F for both A.M. and P.M. peak traffic. Westbound (30) traffic turning left is rated LOS D in the A.M. peak and LOS E in P.M. peak. As described in Section 3.1.8 of this ***FEIS***, LOS E and F are also currently experienced at the intersections of Route 116/Jefferson Road (Route 516)/Lehman Road, and at Route 116 and the ***a***ccess ***r***oad to the P. H. Glatfelter Company Roundwood Facility. This access road would also be the entrance to the proposed project site. In the traffic analysis conducted for the proposed project, peak A.M. hours are defined as being between 7 and 9, while P.M. peak is between the hours of 4 and 6. As currently exists, peak traffic at Route 116 intersections with Jefferson/Lehman Roads, the Roundwood Facility access road, and U.S. Route 30 is rated as unacceptable using the LOS criteria. In terms of the current cumulative effects of traffic along the Route 116 corridor between U.S. Route 30 and just south of the proposed project site, flow along Route 116 is operating below its capacity during peak traffic hours, but at several intersections, traffic attempting to turn is experiencing significant adverse effects (delays considered unacceptable under the criteria established by the Transportation Research Board).

6.5.5 Future Effects

An analysis of the incremental impact of the proposed project on future traffic volumes was prepared by Herbert, Rowland & Grubic Inc., in 1993 (available in Appendix H of the Environmental Information Volume for the proposed project). Future traffic volume projections used in the analysis ***were*** based on a growth factor of 2.9 percent per year. This factor was determined by taking an average growth rate for the twenty year period between 1970 and 1990 for North Codorus Township and the neighboring townships of Heidelberg, Jackson, Codorus, and Springfield. This is a conservative growth factor when compared to the Pennsylvania DOT annual growth rate of 1.75 percent. The 2.9 percent growth factor (2.9 percent per year or 15.4 percent for five years) accounts for potential traffic ***that could be*** generated from other land uses in the vicinity of the proposed project site and thereby considers cumulative effects of off-site traffic. To determine the incremental contribution of the proposed project to the overall cumulative impacts for traffic, projected conditions without the proposed project were combined with the projections for traffic from the proposed project. Both the long-term operation of the proposed project, and the short-term peak period of construction were analyzed.

During the construction phase of the proposed action, the number of additional workers is expected to vary from a low of 7 persons to a high of 974 persons. The daily average work force is expected to be 307. The peak construction phase is expected to last for a total of one month, for five days per week. On an average weekday during the peak of construction, approximately 712 employee vehicles are expected to be added to the area roadway network. Assumptions for this figure include staggered starting and finishing times for 15 percent of the workforce, and some ride sharing (1.15 occupants per vehicle). Peak construction traffic would occur just prior to 7:00 A.M. and just after 4:00 P.M. as workers come and go from the job site. Parking, staging, and laydown areas for workers vehicles, construction equipment, and materials would be available on-site during the construction phase.

During the construction phase, some delivery (by rail) of large equipment such as the turbine and boiler steel is anticipated. The YorkRail track crossing of Route 116 and Colonial Valley Road south of the site would be affected for about five seconds, on a one-time basis, per additional rail car needed for this delivery.

Following construction, and for the long-term operation of the proposed project, the total volume of additional vehicle trips expected per day is 250 (125 vehicles including workers and trucks for deliveries such as limestone and the emergency delivery of coal). Of these new trips, 68 vehicles per hour would occur in the A.M. peak period (39 entering and 29 exiting) and 68 vehicles per hour would occur in the P.M. peak period (29 entering and 39 leaving).

The long-term incremental effect of the proposed project on cumulative effects would vary at different intersections in the vicinity of the proposed project. At the intersection of Route 116 and Colonial Valley

Road, the proposed project is expected to generate 38 additional A.M. and P.M. peak trips, which is 5 percent of the projected cumulative peak volume. At the intersection of Route 116 and the Roundwood Facility Access Drive, 68 additional A.M. and P.M. peak hour trips would be expected as a result of the proposed project. This represents an increase in total intersection traffic of 8 percent and 8.5 percent for A.M. and P.M. peak traffic, respectively. At the intersection of Route 116/Jefferson/Lehman Roads, the proposed project is expected to add 53 A.M. peak hour trips and 54 P.M. peak hour trips. This represents a 5 percent increase in total intersection traffic during both the A.M. and P.M. peak hours.

According to the Township and York County Planning Commission, there are no major land development projects planned for the immediate area which would impact the roadways in the vicinity of the proposed project site.

Several projects with the potential to improve conditions along the Route 116 corridor have been planned. For example, York Road (Route 116) is currently being widened. The project will provide 12 foot lanes with 10 foot shoulders along both sides of the travelway. Also, the P. H. Glatfelter Company Roundwood Facility has planned an expansion of the on-site truck staging/parking area to alleviate the truck overflow onto Route 116 that occurs when too many trucks arrive in the morning for the existing facility to accommodate.

The state has also developed some long range plans that take into consideration the needs of the county's road system and coordinates with the state Department of Transportation's Twelve Year Transportation Program (1990-2002). The following projects are included in the 1990-2002 Program for York County within the boundaries of this cumulative effects analysis:

- U.S. Route 30 Widening - Greater York area, currently in engineering design phase

- U.S. Route 30 Study (York, Adams, and Franklin Counties) - PA 116 and west, design location currently under study

- Hanover Truck Relief Route - Design location study was to begin in 1992

Preliminary candidate projects within the cumulative effects analysis boundary that the state may implement between 1992-2004 include the following:

- Hanover Bypass South - PA Route 116 south to a connecting point to be determined, designate/construct a truck relief route

- PA Route 116 - U.S. Route 30 to ***Borough of Hanover***, improve parallel roads as an alternate route

The extent to which these proposed and candidate projects would affect conditions following implementation of the proposed YCEP project are not known, but it is assumed that some incremental, though possibly very small, benefit to the cumulative effects of traffic in the vicinity of the YCEP project would accrue.

6.5.4 Conclusions

Although Route 116 has the capacity to accommodate the additional traffic, the proposed construction and future operation traffic (turning into and out of the project site, and at nearby intersections along Route 116) would realize significant (***LOS*** F) cumulative impacts from the incremental effects of both construction and operation of the proposed YCEP project.

The greatest concerns regarding cumulative effects of increased traffic are at the intersections along Route 116. At the intersection of Route 116 and the Roundwood Facility Access Drive, traffic is currently operating at a ***LOS*** E for outbound vehicles during A.M. peak, and would degrade to ***LOS*** F during the construction and operation of the proposed project. At the intersection of Route 116, Jefferson, and Lehman Roads existing traffic operates at an unacceptable ***LOS (F)*** during peak hours, and conditions would deteriorate with the construction and operation of the proposed project. Without improvements these intersections would continue to degrade with projected increasing traffic volumes with or without the incremental effects of the proposed YCEP project.

6.5.6 Mitigation

Mitigating the cumulative impacts on traffic from the incremental increase in traffic related to peak construction at the proposed project site would require several measures: 1) signalization and the addition of middle turn lanes at the 116/516/Lehman Road intersection; 2) additional queuing space for the P. H. Glatfelter Company's Roundwood Facility truck traffic; 3) traffic direction (flagman) or signalization at the access driveway and Route 116; 4) scheduling of rail car deliveries to avoid peak congestion periods; and 5) shuttling workers from a remote staging area to reduce the number of vehicles on area roadways.

An analysis was conducted to determine if the intersection of Route 116/Route 516/Lehman Road satisfied the PennDOT requirements for signalization. During peak construction traffic signalization is justified. Consequently, ***with PennDOT's recent approval***, YCEP proposes to install a signal at this intersection before the peak of construction activity.

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The construction and operation of the proposed ***York County Energy Partners, L.P.*** (YCEP) Cogeneration Facility would have an impact on the environment for at least as long as the plant is in operation and the land taken for the project (plant and auxiliary facilities) would be lost from current uses during the period that the land is used as a Cogeneration Facility. The short-term impacts and use of resources for the proposed Cogeneration Facility also would be consistent with the maintenance and enhancement of long-term productivity for York County.

The production of electricity at the proposed YCEP facility would assist ***Metropolitan Edison Company*** (Met-Ed) in meeting its projected need for an additional 500 to 550 ***megawatts*** of power by the year 2000. In addition, the proposed facility would supply steam to the P. H. Glatfelter Company.

The proposed facility would also be consistent with the Subdivision and Land Development Code of Pennsylvania. Because the site is unzoned, a completed application for subdivision and land development approval has been submitted to the North Codorus Township Board of Supervisors. The proposed use of the land is as an expansion of the existing P. H. Glatfelter Company industrial facility, therefore no waivers to the Subdivision and Land Development Code are required.

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8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION

This section describes the extent to which the proposed project would irreversibly or irretrievably commit resources so that these resources would not be recoverable for subsequent use and could not be altered at some later time to restore their original value. In general, the types of resources with the potential to be affected in this manner are:

- natural resources permanently altered for the construction and operation of the proposed facility;
- material resources consumed in the construction and operation of the proposed facility;
- human resources utilized in the construction and operation of the proposed facility; and
- fiscal resources committed in the construction and operation of the proposed facility.

Implementation of the proposed ***Cogeneration Facility*** would involve a commitment of natural, material, human, and fiscal resources.

The construction of the proposed ***York County Energy Partners (YCEP) Cogeneration Facility*** would result in the commitment of approximately 38 acres (15.2 hectares) of land. This commitment would continue throughout the time period that the land is used as a cogeneration facility, which is estimated to be approximately 25 years. Should the facility no longer be necessary, or a greater need arise for the use of the land, the land could be converted to another use. At present, there is no reason to believe such a conversion would be necessary or desirable.

Large amounts of labor and natural resources would be used in the land preparation, plant operation, and fabrication and preparation of construction materials. Construction and operation of the proposed ***Cogeneration*** Facility also would result in the expenditure of considerable amounts of coal (at a consumption rate of 2,500 tons per day for approximately 25 years), limestone (at a consumption rate of 552 tons per day for approximately 25 years), propane (at an average consumption rate of ***300,000*** gallons per year for approximately 25 years), labor, and construction materials. These resources are generally not retrievable, however, they are not known to be in short supply. Consequently, use of these resources would not be anticipated to have an adverse effect. Further, the resultant ash byproduct formed by burning coal in the presence of limestone would produce a byproduct suitable for use in coal mine reclamation. Operation of the facility's cooling tower would result in the consumptive use of an average of 2.5 ***million gallons per day*** (mgd) of water. During years in which basin-wide precipitation approaches or exceeds normal levels, an adequate supply of water would be readily available. Under severe drought conditions, minimum downstream release requirements, in conjunction with the existing low-flow augmentation program from Lake Marburg, would prevent significant adverse impacts to water availability.

Construction of the proposed ***Cogeneration Facility*** would require a substantial one-time expenditure of Federal funds as part of the Clean Coal Technology Demonstration Program. These funds, approximately $75 million, are ***potentially*** retrievable by the ***Department of Energy*** (DOE) through a repayment plan that is based on future licensing and commercialization of the demonstrated technologies (see Section 5.1).

The commitment of these resources is premised on the concept that businesses, residents of the service area, commercial users of power, and the Federal government would benefit from the quality of service associated with the ***proposed*** new Cogeneration Facility. These benefits would include an additional energy source for meeting projected electricity demands, process steam for the steam host, and the results of the demonstration phase for burning coal cleanly. The benefits realized from the proposed ***Cogeneration Facility*** are anticipated by DOE to justify the commitment of these resources.

9. REGULATORY COMPLIANCE AND PERMIT REQUIREMENTS

9.0 Summary of Major Changes Since the DEIS

The major changes to this chapter are the Statement of Findings — Floodplains and inclusion of Table 9-4 which discusses the exceedances of environmental regulations and guidelines, especially for water quality parameters in Codorus Creek under baseline conditions. Parameters investigated include copper, chloride, free cyanide, total dissolved solids, phenolics, chloroform, dissolved oxygen, temperature, and color. In addition, information pertaining to regulatory and permit requirements for the utility corridors is included.

9.1 Introduction

This chapter discusses Federal and State regulatory compliance and permit requirements for the proposed York County Energy Partners, L.P. (YCEP) project. It is important to distinguish between ***the National Environmental Policy Act*** (NEPA) and permitting requirements. NEPA is not a permitting process but instead involves examining perceived or potential environmental impacts. Conversely, environmental laws such as the Clean Air Act ***(CAA)***, the Clean Water Act ***(CWA)***, and the Resource Conservation and Recovery Act ***(RCRA)*** require proponents of proposed actions to make application to appropriate Federal, state, and local agencies to fulfill specific permit requirements. Construction and operation of the proposed project would be in compliance with environmental health and safety regulations and permit conditions. The required environmental permits for the proposed project are listed in Table 9-1. The following sections provide a narrative discussion of specific regulatory requirements.

9.2 Setting

There are no specific policies or guidelines regarding aesthetic resources in York County, other than those associated with land use and zoning.

9.3 Air Quality

The proposed project, ***including the utility pipeline and electrical interconnection,*** would be constructed and operated in compliance with the CAA, the ***CAA*** Amendments of 1990, and the Pennsylvania Air Pollution Control Act (APCA) to ensure that air quality is maintained. The CAA provides the foundation for regulating emissions of air pollutants into the environment. The Commonwealth of Pennsylvania has adopted the National Ambient Air Quality Standards (NAAQS), the Prevention of Significant Deterioration (PSD) regulations, and the New Source Performance Standards (NSPS) in their entirety. The regulatory review for the proposed project would be performed by the Commonwealth of Pennsylvania Department of Environmental Resources (PADER) prior to start-up of the proposed facility.

Under Federal New Source Review (NSR) policy, the proposed YCEP project would meet the regulatory definition of a major stationary source. A "major stationary source" ***[40 CFR 51.166(b)(1)]*** is defined as any of the 28 specified source categories [40 CFR 52.21(i)] that has the potential to emit 100 tons/***yr*** or more, or any other stationary source that has the potential to emit 250 ***tons/yr*** or more of any air pollutant regulated under the CAA. The term "potential to emit" is defined as the capability, at maximum design capacity, to emit a pollutant after the application of control equipment ***[40 CFR 52.21(i)].*** The proposed YCEP project would be a fossil-fuel fired steam electric plant with more than 250 MMBtu/hr input, satisfying one of the 28 specified source categories, and would emit more than 100 ***tons/yr*** of regulated air pollutants.

Construction and operation of a new major stationary source of air pollution in the Commonwealth of Pennsylvania requires an Air Quality Plan Approval and an Air Quality Operating Permit. For the proposed project, applications for these permits would be coordinated through the PADER regional office in Harrisburg, PA.

The NAAQS, promulgated by the Administrator of EPA under the CAA, are incorporated by reference in 25 PA Code 131.2. The CAA established ambient ceilings for certain criteria pollutants based upon the latest scientific information regarding all identifiable effects a pollutant may have on public health or welfare. EPA has promulgated NAAQS for sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM_{10}), nitrogen dioxide (NO_2), photochemical oxidants (O_3), and lead (Pb). These regulations ***(40 CFR 50.2)*** establish two classes of standards that must be achieved. Primary standards establish ambient concentration levels above which public health is believed to be threatened. Secondary standards set concentration levels above which the environment (e.g., crops, livestock, wildlife) is considered to be negatively affected. The NAAQS are identified in Table 9-2. In addition, 25 PA Code 131.3 includes ambient air quality standards for settled particulate matter, beryllium (Be), sulfates (as H_2SO_4), fluorides, and hydrogen sulfide (H_2S), as shown in Table 9-3.

Although the CAA of 1970 provided a plan to address emissions in areas of the country where pollution levels exceeded the NAAQS, the CAA did not contain explicit provisions addressing potential deterioration of ambient air quality in those areas where pollutant levels were below the NAAQS. In 1977, Congress established provisions requiring states with areas in compliance with the NAAQS to adopt a permit program for the preconstruction review of new stationary sources and modification of existing stationary sources to prevent significant deterioration of existing air quality levels.

The PSD program mandated by Congress is required to balance three primary goals, as specified by Section 160 of the CAA. The first of these goals is to protect public health and welfare through the protection of existing air quality in all areas where ambient pollutant concentrations required by the NAAQS are currently being achieved or have not been classified. The second goal emphasizes the protection of air quality in national parks, wilderness areas, and similar areas of special concern where the protection of air quality is considered particularly important. The third goal is to assure that economic growth in clean air areas occurs only after careful deliberation of the impacts of growth on air quality by the State and local communities, and only when such growth would be consistent with the preservation of clean air resources.

The principal air quality protection mechanism under the PSD program involves a system of increments and area classifications that effectively define "significant deterioration" for individual pollutants. The CAA divides PSD areas into three classes and applies increments of different stringency to each class ***[40 CFR 52.21(e),(g)]***. Class I areas include international parks, national wilderness areas, memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres. Less restrictive increments apply in areas designated as Class II. The Class III area designation allows a state to permit increased air quality deterioration in specific areas that the state targets for higher levels of industrial development and consequent increases in pollution (to date, no state has established a Class III area). The control technology review requirements of the PSD regulations require that all applicable Federal and State emission limiting standards be met and that Best Available Control Technology (BACT) be applied to control emissions from the source. PSD regulations also require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of a proposed source. Areas not in

Table 9-1. List of applicable regulations and permit requirements.

Permit/Reviews/Approval	Responsible Agency*	Responsible Party
Air Quality Permits		
PSD Air Quality "Authority to Construct" including Offset Plan Approval	PADER Bureau of Air Quality	YCEP
PSD Air Quality Operating Permit	PADER Bureau of Air Quality	YCEP
Permit to Install Air Contaminant Source	PADER Bureau of Air Quality	YCEP
Air Permit Modification for Power Boiler No. 4	PADER Bureau of Air Quality	P. H. Glatfelter Company
Water Permits		
NPDES Permit Additions/Modifications	PADER Bureau of Water Quality Management	P. H. Glatfelter Company
NPDES Stormwater Permit	PADER Bureau of Water Quality Management	YCEP
Planning Approval Under the Sewage Facilities Act (Planning Module Component)	PADER Bureau of Water Quality Management; North Codorus Township	YCEP
SRBC Consumptive Use Approval	SRBC	YCEP
Solid/Hazardous Wastes		
Hazardous Waste Identification Number: Small Quantity Generator Notification	EPA	YCEP
Ash Disposal/Beneficial Use Approval	PADER Bureau of Mining and Reclamation; PADER Bureau of Waste Management Protocols	YCEP
Approval/Reviews/Permits Needed for Construction		
Approval to Construct Stack and Use Construction Cranes	FAA; PennDOT Bureau of Aviation	YCEP
Floodplain Management (Executive Order 11988)	***DOE; Federal Emergency Management Agency***	***DOE; YCEP***

Table 9-1. List of applicable regulations and permit requirements. (continued)

Permit/Reviews/Approval	Responsible Agency*	Responsible Party
Wetlands Review/Nationwide Permit and PADER Review/Permit	ACOE; PADER Bureau of Dams and Waterways Management	YCEP
401 Water Quality Certification	PADER Bureau of Dams and Waterways Management	YCEP
Water Obstruction and Encroachment Permit for Stream Crossings; ***Section 10 Waterway Crossing***	PADER Bureau of Dams and Waterway Management; ***ACOE***	YCEP
Erosion and Sediment Control Plan/Earth Disturbance Permit/Stormwater Discharge Permit for Construction Activities	PADER Bureau of Soil and Water Conservation; York County Conservation District; PADER Bureau of Water Quality Management	YCEP
Road and Highway Occupancy Permits (Crossing of SR 116)	PennDOT; North Codorus Township	YCEP
Flammable and Combustible Liquid Equipment Installation Approval	PA State Police Fire Marshall Division	YCEP
Oversized/Overweight Special Hauling Permits	PennDOT	Boiler Supplier
Boiler Installation Plan Approval	PA Department of Labor and Industry Boiler Section Registered by National Board of Boiler and Pressure Vessel Inspectors	YCEP
Easement to Cross ACOE Flood Control Property	***ACOE***	***YCEP***
Registration/Approval for Aboveground or Underground Storage Tanks	PADER; PA State Police Fire Marshall Division; local fire department	YCEP
Building Energy Conservation Act Compliance	PA Department of Labor and Industry	YCEP
Endangered Species Analysis	PADER and PA Game Commission; USFWS***; PA Fish and Boat Commission***	YCEP
Archeological, Historical, and Cultural Surveys	PA Historical and Museum Commission	YCEP

Table 9-1. List of applicable regulations and permit requirements. (continued)

Permit/Reviews/Approval	Responsible Agency*	Responsible Party
Consultation in Accordance with Section 106 of the National Historic Preservation Act.	*Bureau for Historic Preservation PA Historical and Museum Commission; Advisory Council on Historic Preservation*	*DOE*
Land Development/Subdivision Approval	North Codorus Township; *West Manchester Township;* York County	YCEP/P. H. Glatfelter Company
Building Permits	North Codorus Township; *West Manchester Township;* York County	YCEP
Construction Permits and Approvals	North Codorus Township; *West Manchester Township;* York County	YCEP
Railroad Crossing Permits, Sidetrack Agreement, Occupancy	Conrail; Yorkrail	YCEP
Coordination with Pennsylvania Game Commission: Wildlife Conservation	PA Game Commission	YCEP
Authorization under Nationwide Permit Number 12, Backfilling & Bedding for Utility Lines and/or Nationwide Permit #26, Headwaters and Isolated Water Discharges	*ACOE*	YCEP
Other Operating Permits/Approvals/Requirements		
Certification of "Qualifying Cogenerating Facility" Status	Federal Energy Regulatory Commission	YCEP
Right-to-Know Act	EPA; PA Department of Labor and Industry	YCEP
Hazard Communication Program	OSHA	YCEP
Fire and Panic Act Approval	PA Department of Labor and Industry Industrial Board	YCEP
SPCC Plan	EPA; PADER	YCEP
PPC Plan	PADER Bureau of Water Quality Management	YCEP

**Regional staff from PADER's Air Quality, Water Management, and Waste Management Programs would be involved in the required permit application reviews, as appropriate. PADER's Regional Permit Coordinator would also be involved in the overall coordination process.*

Table 9-2. National Ambient Air Quality Standards (NAAQS).

Pollutant	Averaging Period	Primary[e]	Secondary[e]
Carbon Monoxide (CO)	8-Hour[a] 1-Hour[a]	10,000 $\mu g/m^3$ (9 ppm) 40,000 $\mu g/m^3$ (35 ppm)	NA NA
Lead (Pb)	Calendar Quarter[b]	1.5 $\mu g/m^3$ (0.177 ppt)	NA
Nitrogen Dioxide (NO_2)	Annual[b]	100 $\mu g/m^3$ (0.053 ppm)	100 $\mu g/m^3$ (0.053 ppm)
Ozone (O_3)	1-Hour[c]	235 $\mu g/m^3$ (0.12 ppm)	235 $\mu g/m^3$ (0.12 ppm)
Particulate Matter (PM_{10})	Annual[d] 24-Hour[c]	50 $\mu g/m^3$ 150 $\mu g/m^3$	50 $\mu g/m^3$ 150 $\mu g/m^3$
Sulfur Dioxide (SO_2)	Annual[b] 24-Hour[a] 3-Hour[a]	80 $\mu g/m^3$ (0.03 ppm) 365 $\mu g/m^3$ (0.14 ppm) NA	NA NA 1,300 $\mu g/m^3$ (0.5 ppm)

a Not to be exceeded more than once per year.
b Never to be exceeded.
c Standard is attained when the expected number of exceedances is less than or equal to 1.
d Standard is attained when the expected annual arithmetic mean is less than or equal to 50 $\mu g/m^3$.
e ppm values based on standard air pressure (1 atmosphere) and temperature of 25°C (77°F).
NA Not applicable.

compliance with the NAAQS are termed "nonattainment." 25 PA Code 127.63 addresses sources subject to special permit condition because they are located in designated nonattainment areas for criteria pollutants. The Air Quality Control Region (AQCR) that includes the North Codorus Township site is classified as a marginal nonattainment area for ozone. Pennsylvania's inclusion within the Northeast Ozone Transport Region requires that the AQCR, which includes all of York County, must be regulated as if the region were classified as a moderate nonattainment area for ozone. The York air basin is designated as an attainment area for all criteria pollutants other than ozone. The permit requirements identified in 25 PA Code 127.65 include the following:

1) Lowest Achievable Emission Rate (LAER) technology is required.

Table 9-3. Pennsylvania Ambient Air Quality Standards.

Contaminants	Averaging Period			
	1-Year	30-Days	24-Hours	1-Hour
Settled Particulates (total)	0.8 mg/cm^2/month	1.5mg/cm^2/month	---	---
Beryllium (Be)	---	0.01 $\mu g/m^3$	---	---
Sulfates (as H_2SO_4)	---	10 $\mu g/m^3$	30 $\mu g/m^3$	---
Fluorides (total soluble, as HF)	---	---	5.0 $\mu g/m^3$	---
Hydrogen Sulfide (H_2S)	---	---	0.005 ppm	0.1 ppm

Source: 25 PA Code 131.3.

2) Existing sources with potential emissions greater than 100 ***tons/yr*** must be in compliance with or on a schedule approved by PADER for compliance with all applicable emission limitations and standards.

3) The maximum allowable emissions from a new source must be offset by emission reductions from existing resources or from emission offset credits banked in accordance with 25 PA Code 127.67 that are from sources in the nonattainment area or sources impacting the nonattainment area.

The CAA ***Amendments*** of 1990 require Federal actions to conform to any State Implementation Plan (SIP). An SIP provides for the implementation, maintenance, and enforcement of NAAQS for criteria pollutants [i.e., sulfur dioxide (SO_2), particulates (PM_{10}), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb)]. Its purpose is to eliminate or reduce the severity and number of NAAQS violations and to achieve the expeditious attainment of such standards. The final rule for "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" was promulgated by EPA on November 30, 1993 (58 FR 63214), and became effective on January 31, 1994 (40 CFR Parts 6, 51, and 93). EPA, has, for now, limited the applicability to only those areas classified as nonattainment, or classified after

1990 as maintenance areas. In addition, a conformity determination is not required for any portion of an action that requires a permit under NSR or the PSD.

The NSPS (40 CFR Part 60) apply to new, modified, and reconstructed sources of emissions listed among those source categories for which EPA has promulgated standards. EPA promulgated NSPS for fossil fuel-fired steam generators with a heat input greater than 250 MMBtu/hr (Subpart D). Subpart D is applicable to the proposed YCEP facility which is designed to be powered by an approximately 250-MW gross electrical capacity coal-fired ***circulating fluidized bed*** (CFB) boiler and would supply 227 MW (net) of electricity to Metropolitan Edison Company. The 227 MW of electricity is more than one-third of the thermal input into the facility, which is approximately 2,624 MMBtu/hr, or 771 MW.

Compliance Provisions [40 CFR 60.46a(c)] require particulate (PM_{10}), oxides of nitrogen (NO_x), and sulfur dioxide (SO_2) standards ***to*** apply at all times, except during periods of start-up, shutdown, malfunction, or when emergency conditions exist (subject to certain constraints on sulfur dioxide (SO_2) exceedances even during emergencies). Continuous ***E***missions ***M***onitoring ***S***ystem (CEMS) requirements for this regulated source category are specified in 40 CFR 60.47a. CEMS are required for monitoring opacity, sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and either ***ozone*** (O_3) or carbon monoxide (CO). Reporting requirements are contained in 40 CFR 60.49a.

Subpart Y (coal preparation) defines particulate matter and opacity standards for coal processing and thermal coal drying plants. The coal storage, transfer, or processing systems emission standard is expressed as no greater than 20 percent opacity. In addition, Subpart Y requires monitoring of coal thermal dryer exhaust gas temperature, monitored to within -16°C (3°F) annual calibrations of the monitoring system, and performance testing of the coal dryer for particulate matter and opacity (using EPA reference methods 1, 2, 3, 4, 5 and 9) is required.

The CAA ***Amendments*** of 1990 expanded the list of hazardous air pollutants (HAP***s***) to 189. Regulations have been proposed to implement HAP provisions of the CAA ***Amendments***, including the "Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990" (57 FR 31576). However, Section 112(n)(1) of the CAA ***Amendments*** requires EPA to perform a study of the hazards to public health from electric utility steam generating units prior to listing them as a category of sources subject to HAP standards. Consequently, electric utility steam generating units are not on the initial list of categories and will not be listed until the results of EPA's study (which is currently underway) are known.

Under the Pennsylvania Air Contaminant Source Regulations (***Pennsylvania Code*** Title 25, Subpart C), Section 127.14, Exemptions, the PADER has stated that approval is not required for the construction, modification, reactivation, or installation of specific minor sources meeting certain design or operating characteristics. These exemptions would be applicable to the following minor sources located within the proposed YCEP facility: the thaw shed, the diesel-powered firewater pump, the diesel-powered electric generator, and the liquid propane vaporizer.

On November 15, 1993, the Pennsylvania Environmental Quality Board (EQB) adopted as ***a*** final rule Reasonably Available Control Technology (RACT) requirements applicable to major stationary sources of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x). The promulgation of the RACT regulations responds to requirements imposed by Section 182 of the CAA on all states and by Section 184 on states included in the Northeast Ozone Transport Region. In addition, the EQB adopted amendments to Pennsylvania's NSR regulations. The new NSR regulations also respond to mandates in Sections 182 and 184 of the CAA ***Amendments***. The NSR regulations will require that oxides of nitrogen (NO_x) be regulated as a nonattainment area pollutant [as an ozone (O_3) precursor] in addition to its treatment as an attainment area pollutant for oxides of nitrogen (NO_x) for PSD review purposes. The proposed YCEP facility would be classified as a major stationary source of oxides of nitrogen (NO_x) (> 100 ***tons/yr)*** but not of VOCs (<50 ***tons/yr***). Major provisions of the NSR regulations that may impact the proposed facility include:

- New emissions of oxides of nitrogen (NO_x) would be required to be offset at a 1.15:1 ratio with emission reduction credits (ERCs) obtained from a newly established registry system. Various constraints regarding use of ERCs will be imposed (***e.g.***, distance limits from the proposed transferee of the ERCs, ambient impact equivalence requirements, etc).

- A new major stationary source of nonattainment pollutants ***[***including oxides of nitrogen (NO_x)***]*** would be required to implement technology which achieves the Lowest Achievable Emission Rates (LAER).

- Procurement of sufficient ERCs to satisfy emission offset requirements will be necessary before a plan approval application can be approved and construction can commence.

- The proposed regulations would apply to electric utility steam generating units except as modified by applicable requirements of 40 CFR Parts 51, 52, and 60.

The establishment of Good Engineering Practice (GEP) for stack heights is intended to assure the prevention of adverse aerodynamic effects in the immediate vicinity of a source. Section 123 of the Federal CAA defines GEP with respect to stack heights as "the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes which may be created by the source itself, nearby structures, or nearby terrain obstacles." The GEP regulation (40 CFR 51.100) defines stack height as the greater of:

- 65 meters (213.25 feet) measured from the ground level elevation at the base of the stack;

- For stacks in existence after January 12, 1979,

  $$Hg = H + 1.5L$$

  Where Hg = GEP stack height
  H = height of nearby structure(s) measured from the ground level elevation at the base of the stack
  L = lesser of height or projected width of nearby structures; or

- The height demonstration by fluid model or field study that satisfies the definition of GEP in Section 123 of the CAA.

If a proposed source selects a stack height that is equal to the GEP calculated height, the potential aerodynamic effects resulting from building structures is expected to be eliminated. Disrupted flows could enhance the vertical dispersion of emissions from the source and reduce the effective height of emissions from the source. If a proposed source selects a stack height that is less than the GEP calculated height, the aerodynamic effects must be evaluated as part of air quality modeling.

Title IV of the CAA ***Amendments*** of 1990 directs EPA to establish an acid rain program to reduce the adverse effects of acidic deposition. EPA is required to establish a national emissions cap of 8.95 million

tons/yr on electric utility sulfur dioxide (SO_2) emissions and an Acid Rain Program to be implemented in two phases. Phase I (beginning in 1995) requires the 110 highest-emitting utility plants to meet an immediate sulfur dioxide (SO_2) emissions limitation. By the year 2000 (in which Phase II begins), virtually all utility units will be required to meet stringent emissions limitations. Total annual sulfur dioxide (SO_2) emissions will be reduced by 10 million tons below the 1980 levels beginning in the year 2000; a reduction in total sulfur dioxide (SO_2) emissions of approximately 40 percent. Section 407 of the CAA ***Amendments*** of 1990 requires EPA to establish oxides of nitrogen (NO_x) emission limitations for certain coal-fired units, and other requirements and procedures for all coal-fired utility units subject to ***oxides of nitrogen*** (NO_x) emission limitation requirements under Phase I or Phase II of the Acid Rain Program.

The centerpiece of the Acid Rain Program is a unique trading system in which allowances *[*each authorizing the emission of up to one ton of sulfur dioxide *(*SO_2*)]* are bought and sold at prices determined in a free market. Existing utility units are allocated allowances based on their historic fuel use and the emissions limitations specified in the CAA ***Amendments***. Utility units are required to limit sulfur dioxide (SO_2) emissions to the number of allowances they hold, but since allowances are fully transferrable, utilities may meet their emissions control requirements in the most cost effective manner. Phase II requirements specify that new utility units constructed after passage of the CAA must obtain sulfur dioxide (SO_2) allowances from existing allowance holders or through auction and sales programs that are being implemented by EPA pursuant to Section 416 of the CAA ***Amendments***. Certain independent power producers may obtain written guarantees of the availability of allowances and may exercise priority in purchasing them. Oxides of nitrogen (NO_x) will not be regulated by means of an allowances program, instead fees would be charged for emissions in excess of imposed limits.

Title V of the CAA ***Amendments*** requires states to develop operating permit programs and submit them to EPA (40 CFR Part 170). The Title V permit will be more comprehensive than current operation permits and will include emission limits, compliance schedules, monitoring requirements, reporting and record keeping requirements, and certification of compliance responsibilities. On July 9, 1992, the Pennsylvania APCA was amended to address requirements mandated by the CAA ***Amendments*** of 1990 including a new operating permit program and the imposition of air emissions fees for sulfur dioxide (SO_2), oxides of nitrogen (NO_x), particulates (PM_{10}), and VOCs. The details concerning implementation will become available as regulations are promulgated.

Radionuclide emissions from coal-fired boilers are currently not regulated. Title III of the CAA ***Amendments*** established a list of 189 hazardous pollutants (HAPs), including radionuclides. However, electric utility boilers are currently exempt from Title III requirements pending further studies.

9.4 Water Resources and Water Quality

Wastewater or process water discharges to groundwater and surface water resources, as well as construction and operation of treatment works, are subject to both Federal and state permitting regulations. Industrial discharge of process wastewater or stormwater into surface waters in Pennsylvania requires a ***National Pollutant Discharge Elimination System*** (NPDES) permit from PADER. This permit establishes discharge limitations, monitoring requirements, and compliance schedules applicable to the discharge facility. Although the proposed YCEP project would plan to discharge to the P. H. Glatfelter Company secondary treatment system, which utilizes P. H. Glatfelter Company's existing permitted outfall, a permit modification would likely be necessary to ensure that any changes in volume and effluent quality of the P. H. Glatfelter Company's treated effluent would meet permitted standards. Approval is also required for the discharge of stormwater from the project site. The proposed YCEP facility plans to utilize the existing P. H. Glatfelter Company stormwater retention pond.

In compliance with the Pennsylvania Sewage Facilities Act for New Land Development, construction of a sewage facility (on-lot or sewage collection, conveyance, treatment, or discharge) must be approved by the municipality in which the activity will take place. Plan approval would be completed by YCEP through the submission of the Planning Module Component which establishes the municipality's official sewage plan. Before additional approvals can be issued by the municipality, PADER must review the Planning Module Component and approve any revision to the plan. This approval would be required for the proposed package sanitary treatment plant and conveyance of the facility's sanitary sewage to the P. H. Glatfelter Company treatment facility.

Approval is required from the Susquehanna River Basin Commission (SRBC) for any consumptive water use within the Susquehanna River Basin. SRBC approval requires demonstration of water use minimization strategies, as well as provisions for backup water supply for use when drought conditions may be experienced in the basin. The proposed YCEP facility would be required to have a backup plan to cover consumptive water use during periods where the SRBC declares a drought condition.

Under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, the Army Corps of Engineers (ACOE) regulates the dredging and filling of wetlands and waterways and the construction of structures within navigable waterways. For the proposed YCEP project, wetland impact would be avoided during site construction. Some utility line interconnections may require ACOE consideration during site construction. *This* type of activity would fall within the "nationwide" provisions of the ACOE regulations and does not require specific permits, but instead represents categories of work that have been defined as acceptable because of minimal environmental impacts.

Water Quality

Water quality is governed by both Federal and state laws. Applicable Federal laws include the CWA for surface water and the Safe Drinking Water Act (SDWA) for groundwater at locations of community water-supply wells. For some constituents, the Maximum Contaminant Levels (MCLs) under the SDWA are applied as benchmarks for groundwater contamination and as clean-up goals for remediation (under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), but are not actually enforceable except at a water-supply well.

Federally licensed or permitted projects having the potential to cause water quality impacts (or related environmental/ecological impacts) in surface water or wetlands during construction or operation are required to obtain a 401 Water Quality Certification from the state. Certification is a prerequisite for obtaining a NPDES permit or permit from the ACOE. For the proposed YCEP project, it is anticipated that certification may be required for utility line interconnections and for stormwater discharge permits.

PADER regulations promulgated under the Dam Safety and Encroachments Act (25 PA Code Chapters 105 and 106) require a Water Obstruction and Encroachment Permit for activities such as stream crossings, aerial crossings, and construction of outfalls and pipelines in relation to the regulated waters of the Commonwealth of Pennsylvania. For the proposed YCEP project, a Water Obstruction and Encroachment Permit may be required due to the potential need for utility line infrastructure to include stream crossings during construction. Two divisions of PADER provide guidance through the permitting process: engineering issues are handled by the Bureau of Dams and Waterway Management, Division of Waterways and Storm Water Management, while wetland issues are addressed by the Bureau of Resources Management, Division of Rivers and Wetlands Conservation, in conjunction with the ACOE.

PADER regulations require that all earthmoving activities disturbing 5 or more acres ***(2 or more hectares)*** of land obtain an Erosion and Sediment Control Plan/Earth Disturbance Permit/Stormwater Discharge Permit. An erosion and sedimentation plan must be developed in accordance with 25 PA Code 102.5, as authorized under the Pennsylvania Clean Streams Law, and must be available at all times at the project site. Stormwater discharge from a site during the construction phase must also be addressed in this plan to ensure that all proposed erosion and sedimentation control measures adequately protect nearby water resources. A plan has been prepared for the proposed YCEP project and filed with the appropriate agencies.

Floodplains and Wetlands

The DOE regulation (10 CFR ***Part*** 1022) for implementing Executive Order 11988 -- Floodplain Management, and Executive Order 11990 -- Protection of Wetlands, requires DOE to avoid direct and indirect support of development in floodplains and wetlands wherever there is a practicable alternative. Where there is no practicable alternative, DOE is required to prepare a "Floodplain/Wetlands Assessment" discussing the effects on the floodplain/wetlands, and consideration of alternatives. DOE is also required to provide opportunity for public review of any plans or proposals for actions in floodplains (and new construction in wetlands). The "Floodplains/Wetlands Assessment," discussing the effects on floodplains and wetlands anticipated from the proposed project, was prepared and included in the "Floodplains" and "Wetlands" sections of the DEIS, as provided by DOE regulation [10 CFR 1022.12(b)]. Opportunity for public review of the proposed action affecting floodplains/wetlands ***was*** provided through Public Notice in the Federal Register ***and*** through public hearings for the DEIS. ***Responses to public comments on wetlands and floodplains issues have been provided in*** this FEIS.

Under Section 404 of the Clean Water Act, the ACOE regulates the discharge of dredge or fill material into "waters of the United States, including wetlands." In addition, Chapter 105 of the Pennsylvania Dam Safety and Encroachments Act regulates, among other activities, water obstructions and encroachments in, along, across, or projecting into waters of the Commonwealth, which can be defined as a water course, floodway, or body of water, whether temporary or permanent, including wetlands. The ACOE and PADER have been notified of the proposed activities to determine the necessary permit submittal requirements.

For actions which will be located in a floodplain, the DOE regulation requires a brief "Statement of Findings" describing the proposed action, location, alternatives considered, a statement as to whether ***or***

not the action conforms to applicable State or local floodplain protection standards, and a brief description of steps to be taken to minimize potential harm to or within the floodplain. The ***information in support of the*** "Statement of Findings," for this proposed action ***has been*** incorporated in the FEIS, ***in Sections 4.1 4.5 and 4.1 14.4. The actual statement is provided in the following discussion.***

9.5 Statement of Findings -- Floodplains

Proposed Federal Action. The proposed Federal action is to provide cost-shared funding of approximately $75 million (approximately 20 percent of the project cost) to York County Energy Partners, L.P. for the design, construction, and operation of a nominal 250-megawatt, coal-fired, Cogeneration Facility and attendant electrical interconnection facilities in North Codorus and West Manchester Townships, York County, Pennsylvania. This project was selected to demonstrate atmospheric circulating fluidized bed (CFB) technology, under the auspices of the U.S. Department of Energy's (DOE) Clean Coal Technology Demonstration Program. The proposed facility would be designed to operate continuously (24 hours a day, 365 days per year), with the exception of outages for maintenance purposes. The proposed facility operation would include a 24-month demonstration period, followed by approximately 23 years of commercial operation, for a total operation life of 25 years. The proposed project would require the construction of a new 115-kilovolt interconnection powerline, and an electric switchyard adjacent to a Metropolitan Edison Company (Met-Ed) owned substation, located approximately 6.1 kilometers (3.8 miles) northeast of the proposed Cogeneration Facility in West Manchester Township, York County, Pennsylvania.

Alternatives Considered. The DEIS considered environmental impacts of the proposed project at the North Codorus Township site, the proposed project at an alternative site location (West Manchester Township Site), and a no-action alternative. Within the no-action alternative (which included three electric power generation or purchasing scenarios that might take place in lieu of the proposed project going forward), analytical impacts comparisons were made for the following: a 227-megawatt Natural Gas-Fired Combined-Cycle Facility, a 227 megawatt Coal-Fired CFB Facility (two boilers), and interconnection to the Pennsylvania-New Jersey-Maryland (PJM) Interconnection Power Pool.

Environmental impact analysis for the proposed action at the North Codorus site is provided in Section 4.1 (including all of its subsections) of the FEIS. Environmental impact analysis for the proposed project at the alternative site is provided in Section 4.2 (including all of its subsections) of the FEIS.

Environmental impact analysis for the no-action alternative (including the three plausible electric power generation or purchasing scenarios) is provided in Section 4.3 (including all of its subsections) of the FEIS.

Four alternative routes for the electrical interconnection were originally considered and reviewed by DOE. These routes were considered based on guidance received from Met-Ed requiring that the powerline from the proposed Cogeneration Facility interconnect with either the existing substation located in Bair, Pennsylvania, or the existing substation located on East Berlin Road in Jackson Township, Pennsylvania. Preliminary discussions with the ACOE and the Pennsylvania Game Commission (lessee of lands under ACOE jurisdiction) resulted in three additional variations to one of the four routes. This increased the number of electrical interconnection (powerline) routes considered in the FEIS to a total of seven.

Four major factors were considered in determining the preferred alternative for the electrical interconnect route: 1) achieving Met-Ed's siting guidelines for new electrical lines; 2) satisfying certain land use objectives; 3) minimizing environmental impacts; and 4) providing accessibility for construction and maintenance. For each of these four factors, evaluation criteria were identified and determined to be of either primary or secondary concern. Analysis of the electrical interconnect alternatives is discussed in Section 2.2.5.1 of the FEIS. Based on the analysis of the electrical interconnect alternatives and site visits to the various electrical interconnect routes, DOE determined that the preferred alternative (FCP) route would produce the least environmental and socioeconomic impacts.

Conformity With State and Local Floodplain Protection Standards. The ACOE determined that, "While portions of the proposed facilities are located within the 100-year floodplain there is no significant impact on the floodplain. The alternatives presented would have no impact on the floodplain" (correspondence from J. Johnson to S. Van Ooteghem, dated March 13, 1995 – see Appendix E of the FEIS). In that same determination, the ACOE also stated that, "results of these [floodplain] evaluations should be documented and coordinated with Federal, state, and local water resource agencies before the final design of the proposed facilities is selected." Contingent on proposed project approval through the Record of Decision, YCEP would begin final project design and coordinate with the Pennsylvania Bureau of Dams and Waterways Management, PADER, to complete floodplain evaluations and submittals for the necessary permit(s) under their authority. Through this established *coordination schedule, the proposed action would conform to State standards for activities and encroachment in floodplains.*

Steps Taken To Minimize Potential Harm To Or Within The Floodplain. The only proposed project structures that would be located within the 100-year floodplain of Codorus Creek would be 14 to 22 wood or steel powerline utility poles. Approximately 0.013 acres (0.005 hectares) of the 100-year floodplain would be occupied by new electric utility poles. Only temporary access ways would be developed to allow for personnel and equipment ingress and egress to place the proposed poles and string conductor lines. Initial clearing would be accomplished by hand cutting to the greatest extent practicable, and by mechanical equipment when absolutely necessary. Placement of the poles would require some access by heavy equipment. Construction activities would be scheduled to avoid wetter periods of the year, in order to minimize damage to vegetation and soil resources.

Any earth disturbing activities resulting in exposed soils would be restored through seeding and revegetation. Silt fencing would also be installed prior to construction to prevent sediment washing in Codorus Creek or its tributaries.

9.6 Biological Resources and Biodiversity

The Fish and Wildlife Coordination Act (FWCA) ***(16 U.S.C. 661 et seq.)*** was enacted to ensure that fish and wildlife resources receive consideration during the planning of development projects that affect water resources. The FWCA requires Federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and the state agency administering wildlife resources concerning wildlife protection measures.

Section 3 of the Endangered Species Act (Pub. L. 93-205, as amended) defines an "endangered species" as any species, including subspecies, in "danger of extinction throughout all or a significant portion of its range." The section further defines "threatened species" as any species "likely to become an endangered species within the foreseeable future throughout all or a portion of its range."

Proposed endangered and threatened species are those species for which a proposed regulation has been published in the Federal Register, while candidate species are taxa that the USFWS is considering for listing as endangered or threatened species. Category 1 candidates are taxa for which the USFWS has substantial information on biological vulnerability and threats to support the appropriateness of proposing listing. Category 2 candidates are taxa for which USFWS information indicates that proposing listing as endangered or threatened may be appropriate; however, substantial data on biological vulnerability and threats are not known or on file to support the immediate preparation of rules. In addition to these two categories for candidate species, Category 3 taxa constitute species which were previously considered candidates. These candidates are grouped into three subcategories: extinct (3A), taxonomically invalid (3B), or too widespread or not threatened at this time (3C).

Under section 7(c) of the Endangered Species Act, DOE must consult with USFWS to ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of the critical habit of such species.

50 CFR Subpart I, Section 17.94 requires that an activity or project will not result in the destruction or adverse modification of constituent elements essential to the conservation of listed species within the defined critical habitat. The USFWS determines if the proposed project will in any way impact listed plant or animal species. Appropriate mitigation measures must be developed if necessary.

Information concerning the proposed project ***has been reviewed by the Pennsylvania Fish Commission, the Pennsylvania Game Commission, the Pennsylvania Natural Diversity Inventory, and the USFWS, and, except for transient species, no federally or state-listed endangered or threatened species are known to occur within the proposed project site.***

9.7 Land Use

Approval of proposed development plans from the county and from North Codorus Township Board of Supervisors is required involving review to ensure compatibility with local development goals and standards. The local building inspector must approve the details of construction to ensure that local codes are met and that appropriate permits have been obtained. ***Furthermore, because the property on which the proposed electric switchyard addition would be built is currently zoned for agricultural use, YCEP would have to obtain a "special exception use" for public utilities, as set forth in § 150-15 of the West Manchester Township Zoning Code. For utility pipelines or electrical interconnection lines that extend beyond the jurisdiction of North Cordorus Township, building permits and other local approval would be obtained from the applicable local jurisdiction. YCEP would be required to obtain an easement***

from ACOE because the utility corridor electrical interconnection would traverse ACOE flood control property.

9.8 Cultural Resources

Section 106 of the National Historic Preservation Act *(NHPA)* of 1966, Pub. L. 89-655 as amended, requires Federal agencies to take into account the effects of agency undertakings on historic properties, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. *The* NHPA established the Council for the purpose of being a major policy advisor to the Federal government in the field of historic preservation. The Council reviews and comments upon Federal and *f*ederally assisted and licensed projects that could affect properties listed *on* or eligible for the National Register of Historic Places. The National Register is a list of properties in the United States and its territories that the Secretary of the Interior has determined to have historical, architectural, archeological, engineering, or cultural significance.

If a Federal agency determines that its undertakings would not adversely affect historic properties, the agency must obtain the concurrence of the State Historic Preservation Officer (SHPO) and submit its findings with necessary documentation to the Council *[*36 CFR 800.5(d)*]*. This documentation must include the views of affected local governments, if available. If an undertaking will have an adverse effect on a historic property, the agency, SHPO, and other interested parties are required to consider ways to avoid or reduce such effects. The opinion of the SHPO pertaining to impacts from the proposed YCEP project is provided in Appendix E.

A review would be performed by the ***Bureau for Historic Preservation,*** Pennsylvania Historical and Museum Commission ***(Pennsylvania SHPO),*** in which any known historical structures or cultural resources are identified. An assessment may be requested if the proposed activity is thought to pose a potential impact. In addition, the characteristics of the proposed development site are reviewed. ***(For this proposed project, such an assessment has been requested, with Historic York, Inc. conducting the study.)*** If an area is typical of areas that may include archeological resources, further study would be specified.

In addition to the NHPA, existing cultural resource management laws and their implementing regulations address the identification, evaluation, protection, and mitigation of cultural resources affected by proposed government action. The Antiquities Act of 1906, Pub. L. 89-655, provides for the protection of historic and prehistoric ruins and objects of antiquity on Federal lands; the Archaeological Resources and Historic Preservation Act of 1974, Pub. L. 93-291, directed Federal agencies to notify the Secretary of the Interior if any Federal construction project or federally licensed activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archeological data; and the Archaeological Resources Protection Act of 1979, Pub. L. 96-95, contains requirements pertaining to increasing public awareness, planning, and scheduling archeological surveys, and reporting suspected violations.

9.9 Health and Safety

The proposed YCEP facility would be subject to U.S. Occupational Safety and Health Administration (OSHA) General Industry standards (29 CFR Part 1910). During construction, YCEP would comply with OSHA Construction Industry standards (29 CFR Part 1926). These standards establish practices, chemical and physical exposure limits, and equipment specifications to preserve employee health and safety. A program requiring Boiler Installation Plan Approval registers boilers in the state and requires that appropriate design standards are met.

To obtain State approval under the Fire and Panic Act, the proposed YCEP facility would include an advanced fire protection system. In addition, emergency response measures would be developed to ensure appropriate action under such circumstances. Approval of these measures must be obtained through the Pennsylvania Department of Labor and Industrial Board. Flammable and Combustible Equipment Installation Approval involving certification and registration with the Pennsylvania State Police Fire Marshal Division must be obtained.

Federal and State community right-to-know statutes require coordination with the local emergency planning committee to ensure that information with regard to public safety is readily available to concerned parties. The proposed facility must provide specified information regarding the presence or release of hazardous substances at or from the facility. The Hazard Communication Program ensures that Material Safety Data Sheets are available and appropriate labels are visible to employees for all products to which they might be exposed in the course of their work day.

YCEP will develop both a Spill Prevention Control and Countermeasure Plan (SPCC) and Preparedness Prevention and Contingency Plan satisfying Federal and State requirements. Because these requirements are similar, they will be combined into one document that will be available at the project site. This plan would outline engineering design measures, such as containment devices, incorporated into the proposed facility to ensure that the potential for oil and chemical spills is minimized. In addition, measures to be implemented in the event of an accidental release must be outlined. Under Pennsylvania's Storage Tank and Spill Prevention Act, any regulated tank must comply with applicable standards or obtain a permit, as necessary. No new tank may be installed unless the tank meets the applicable technical standards of the specific type and class of tank as set forth in the applicable Underwriters Laboratory Standards No. 142 and by the American Petroleum Institute. The proposed YCEP project would incorporate appropriate measures into the design of the facility to satisfy these standards and develop appropriate response measures to address accidental spills.

Hazardous wastes associated with the operation of the ***proposed*** project would be transported and disposed of in accordance with Subtitle C of RCRA. YCEP would be required to register with EPA as a generator of waste material and obtain a hazardous waste identification number. It is anticipated that the proposed facility would qualify as a small quantity generator of hazardous waste (less than 1,000 kg per month) and would satisfy applicable State and Federal requirements for small quantity generators.

Prior to disposal or beneficial reuse of facility ash, approval would be required from the PADER Bureau of Mining and the PADER Bureau of Waste Management. Approval would require that acceptable disposal/reuse practices be employed, given the volume and quality of ash generated.

9.10 Transportation and Traffic

Approval from the ***Pennsylvania Department of Transportation*** (PennDOT) is required for proposed alterations to Commonwealth roadways. These include curb cuts and placements of utilities within state road rights-of-way. Details of the proposed construction (including design drawings and transportation management plans) must be submitted as part as part of the permit application. A sidetrack agreement would be required with Yorkrail in order to access the main rail line with the proposed on-site spur. Depending upon the utility line infrastructure routes selected, railroad crossing permits and rail right-of-way occupancy permits may also be required from the appropriate rail company.

An Oversized/Overweight Special Hauling Permit would be required during construction for the transportation of the boiler to the site. The boiler supplier would be responsible for application to the PennDOT for the permit.

Federal Aviation Administration (FAA) regulations (14 CFR 77.13) require that a Notice of Proposed Construction or Alteration (FAA Form 7460-1) be filed for all construction or alterations that are more than 60.96 meters (200 feet) in height above the ground level of the site; greater in height than any of a number of imaginary surfaces defining safe aircraft operation at runways of local airports; or in an instrument approach area (i.e., that area within which interference or obstruction of the transmission of signals from the tower and approaching aircraft could occur).

9.11 Exceedances of Environmental Regulations and Guidelines

Most environmental regulations relating to coal-fired power or steam plants are state regulations. Many of these, however, are rooted in Federal statutes. Regulations are enforced by regulatory agencies. Guidelines, unlike regulations, do not carry the force of law; nevertheless, these represent the wisdom of groups having a recognized expertise.

Regulations may be exceeded in two ways. First, regulatory constraints, limits, or requirements may be exceeded in accordance with an exception or consent agreement. These are legal grants of a right to exceed the limits normally imposed by regulations. Second, regulatory constraints, limits, or requirements may be exceeded without a legal grant of the right to do so. These exceedances are subject to penalty.

Table 9-4 explains the issues that have been identified in the Environmental Impact Statement or source documents as exceedances, apparent exceedances, or possible exceedances. The "exceedance" can relate either to regulations, which are enforceable, or to guidelines, which are unenforceable. Please note that guidelines are not usually called "guidelines;" for example, EPA water quality criteria are guidelines, which Pennsylvania may or may not choose to adopt as a regulation.

Table 9-4 lists those parameters for which there was documentation, public concern, or analysis to suggest that exceedances or near-exceedances of regulations/guidelines were possible, either for baseline conditions or for future conditions including the operation of the proposed project.

Table 9-4. Exceedances[1] of environmental regulations and guidelines.

Issue	Regulations or Guidelines	Situation
Copper (Cu) in Codorus Creek	To prevent objectionable tastes in drinking water, PA adopted a "human health" criterion (25 Pa. Code § 16, App. A) of 1,000 μg/L for copper in water supplies. To protect the environment, PA adopted a fish and aquatic life criteria (25 Pa. Code § 16, App. A). For fresh-water organisms and their uses, the chronic exposure limit to total recoverable copper is: $\mu g/L = \exp(0.8545 [\ln(\text{hardness})] -1.465)$ And the acute exposure limit is: $\mu g/L = \exp(0.9422 [\ln(\text{hardness})]-1.464)$ where hardness is in mg/L. For a water hardness of 100 mg/L, the chronic and acute exposure limits are 12 and 18 μg/L, respectively.	The SRBC (*1991a*) made 15 instantaneous in-stream measurements of copper concentrations at a time when flow was below average (70.1 cfs below PHG's outfall; 130 and 79.1 cfs at the York gage). They also made instantaneous measurements in several industrial and municipal outfalls. At all but one sample site, concentrations of copper in Codorus Creek were within the PA water quality criteria for chronic exposure of aquatic organisms. The one exceedance occurred downstream of York. This exceedance resulted from a local source (see also *PADER, 1987*). Immediately upstream of PHG's outfall, water contained 9.04 μg/L and was close to the limit, 9.6 μg/L. The small difference between the measured concentration and the limit at this site suggests that exceedances might occur during low-flow conditions. Downstream of PHG's outfall (15.7 μg/L), the in-stream concentration was 11.3 μg/L, but the water hardness increased the chronic exposure limit to 23.5 μg/L. ERM (*1994*) reports that the copper concentration below PHG's outfall during low-flow (45 cfs) should be about 14.74 μg/L and is expected to increase to 16.29 μg/L with operation of the proposed YCEP plant. Near the York gaging station, ERM predicts low-flow copper concentrations would increase from 5.78 μg/L to 6.01 μg/L. ERM did not evaluate the effects of the proposed YCEP facility on water hardness and, therefore, could not calculate exact water quality criteria. However, the water quality criteria for chronic and acute exposure estimated from the SRBC (*1991a*) measurements at these sites are 23 and 17 μg/L, respectively – both above the expected copper concentrations at low-flow. Although these limits do not account for the effects of the PHG Pulp Mill Modernization Project and the proposed YCEP project, these two projects must reduce water hardness below 146 mg/L before the chronic exposure limit would be exceeded at low-flow. Available information establishes that no copper would be added to Codorus Creek from wastewater released from YCEP. Increased concentrations would result only from a reduction in the dilution capacity of the Creek. The effect at the downstream point of exceedance should be negligible (*ERM, 1994*).

Table 9-4. ***Exceedances[1] of environmental regulations and guidelines. (continued)***

Issue	Regulations or Guidelines	Situation
Lead (Pb) in Codorus Creek	To protect human health, PA adopted a human health criterion (25 Pa. Code § 16, App. A) of 50 μg/L for lead in drinking water. To protect the environment, PA adopted a fish and aquatic life criterion (25 Pa. Code § 16, App. A). For fresh-water organisms and their uses, the chronic exposure limit to total recoverable lead is: μg/L = exp(1.266 [ln(hardness)] - 4.661) And the acute exposure limit is: μg/L = exp(1.266 [ln(hardness)] - 1.416) where hardness is in mg/L. For a water hardness of 100 mg/L, the chronic and acute exposure limits are 3.2 and 82 μg/L, respectively.	The SRBC (*1991a*) made 15 instantaneous in-stream measurements of lead concentrations at a time when flow was below average (70.1 cfs below PHG's outfall; 130 and 79.1 cfs at the York gage). They also made instantaneous measurements in several industrial and municipal outfalls. At all but two sample sites, concentrations of lead in Codorus Creek were below the PA water quality criterion for chronic exposure of aquatic organisms. Both exceedances occurred downstream of York. Both exceedances result from local sources (see also *PADER, 1987*). Immediately upstream of PHG's outfall, water contained 1.88 μg/L and was 80% of the limit, 2.35 μg/L. Whether exceedances might occur here during low-flow conditions is uncertain. Downstream of PHG's outfall (2.15 μg/L), the in-stream concentration was 4.00 μg/L, but the water hardness increased the chronic exposure limit to 8.94 μg/L. ERM (*1994*) reports that the lead concentration below PHG's outfall during low-flow (45 cfs) should be about 2.53 μg/L and is expected to increase to 2.79 μg/L with operation of the proposed YCEP plant. Near the York gaging station, ERM predicts low-flow lead concentrations would increase from 1.85 μg/L to 1.93 μg/L. ERM did not evaluate the effects of the proposed YCEP facility on water hardness and, therefore, could not calculate exact water quality criteria. However, the water quality criteria for chronic exposure estimated from the SRBC (*1991a*) measurements at these sites are 8.8 and 5.7 μg/L, respectively – both above the expected lead concentrations. Although these limits do not account for the effects of the PHG Pulp Mill Modernization Project and the proposed YCEP project, these two projects must reduce water hardness below 89 mg/L before the chronic exposure limit would be exceeded at low-flow. Available information establishes that the proposed facility would not release any additonal lead to the PHG wastewater for discharge to Codorus Creek. Increased concentrations would result only from a reduction in the dilution capacity of the Creek. The effect at the downstream points of exceedance should be negligible (*ERM, 1994*). Total lead was measured in April and June of 1988 at three sample sites near PHG's outfall by PADER (*1989*). At two sites upstream of PHG's outfall, concentrations ranged from less than 4 μg/L (the detection limit) in June to 13 μg/L in April. Downstream, the concentrations were 6.8 μg/L in June. Please note that the lead analyses in April (including the 13 μg/L measurement) appear inaccurate.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Chloride (Cl) in Codorus Creek	PA water quality regulations do not set a limit for chloride in Codorus Creek. Nor has a Federal primary maximum contaminant level (40 CFR Part 141) been set. The Federal secondary maximum contaminant level established for public drinking water is 250 mg/L (40 CFR Part 143). Environ (*1994a*, Table 4, referencing EPA, 1991) listed EPA's ambient water quality criteria for chloride as 860 mg/L and 230 mg/L for acute and chronic exposure, respectively, of aquatic life.	ENSR (*1994*, Table 6.3-2) reports that the in-stream chloride concentration on West Branch of Codorus Creek (far upstream of PHG's intake) is about 42 mg/L. However, PHG and the intervening dischargers add a substantial chloride load. Downstream from PHG's outfall, according to ENSR (*1994*, Table 7.3-2,-3), Codorus Creek concentrations prior to the Pulp Mill Modernization Project were 379 mg/L at low-flow and 319 mg/L at mean flow. Post-modernization concentrations are projected to be 223 mg/L at low-flow and 191 mg/L at mean flow. Concentrations after YCEP becomes operational are expected to increase to about 246 mg/L and 207 mg/L, respectively, because of the reduction in the dilution capacity of the creek. Chlorides were measured in April, May, and June of 1988 at three sample sites near PHG's outfall by PADER (*1989*). Concentrations ranged from 14 to 23 mg/L at two sites upstream of PHG's discharge. Downstream, the concentrations ranged from 124 to 395 mg/L. PADER (*1989*) did not report stream flow rates for these sample events. Environ (*1994a*, p. 15-17) believes that the EPA's criteria for the protection of fish and aquatic life are highly conservative because they are based in part on sensitive cold water species and because the chronic maximum acceptable toxicant concentrations for the species tested are greater than EPA's chronic exposure limit by a factor of at least 1.6. Environ (*1994a*) predicts no effects on biodiversity in Codorus Creek downstream of PHG.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Free Cyanide (CN) in Codorus Creek	To protect human health, PA adopted a human health criterion (25 Pa. Code § 16, Table 1) of 700 μg/L for free cyanide in water supplies. To protect the environment, PA also adopted fish and aquatic life criteria (25 Pa. Code § 16, Table 1). For aquatic organisms and their uses, the chronic exposure limit to free cyanide is 5 μg/L, and the acute exposure limit is 22 μg/L.	The SRBC (*1991a*) made 15 instantaneous in-stream measurements of free cyanide concentrations at a time when flow was below average (70.1 cfs below PHG's outfall; 130 and 79.1 cfs at the York gage). They also made instantaneous measurements in several industrial and municipal outfalls. At all sample sites, concentrations of cyanide in Codorus Creek were below the PA water quality criterion for chronic exposure of aquatic organisms. In-stream measurements upstream from PHG's outfall were less than 1 μg/L (the detection limit). PHG effluent contained 3.0 μg/L, and downstream water in Codorus Creek contained 1.0 μg/L. In 1986, PADER (*1987*) made 19 instantaneous in-stream measurements of free cyanide at a time when flow was far below average (42.3 cfs below PHG's outfall; 69.1 cfs near the York gage). Like the SRBC, they also made instantaneous measurements in several industrial and municipal outfalls. At all stream sample sites, concentrations of free cyanide in Codorus Creek were at or below the PA water quality criterion for chronic exposure of aquatic organisms. Upstream from PHG's outfall, in-stream concentrations were less than or equal to 4 μg/L; most were 1 μg/L. PHG's effluent contained 7.0 μg/L, and the first sample site downstream contained 4.0 μg/L. Environ (1994a) suggests a current exceedance for in-stream water quality below PHG's outfall. Based on measured concentrations in PHG's effluent and experimental simulations of the proposed project's cooling tower effluent, Environ (Table 3) calculated current (pre-Pulp Mill Modernization Project) in-stream low-flow concentrations of 10 μg/L (to one significant digit) and expected in-stream low-flow concentrations of 10 μg/L (to one significant digit) with operation of the proposed facility. Environ, however, did not provide measurements to confirm their calculated current in-stream values; and their estimates are not in accord with previous measurements. Environ (*1994a*, p. 15-16) argues that the chronic water quality criterion (5 μg/L) is based on highly sensitive cold water species not found in this section of Codorus Creek and that a more appropriate criterion based on the tolerance of warm water species is 11 μg/L [PADER may approve site-specific changes in water quality criteria; see 25 Pa. Code § 16.22(4), §16.41, §93.8a(j)].

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Total Dissolved Solids in Codorus Creek	To protect water supplies, PA has set the statewide specific water quality criteria for total dissolved solids (25 Pa. Code § 93.7) at 500 mg/L as a monthly average, 750 mg/L maximum, applied to the point of withdrawal or the point of planned future withdrawal [see 25 Pa. Code § 93.5(e)]. PA's specific criterion for the protection of aquatic life (1,500 mg/L maximum) has not been applied to Codorus Creek.	Based on the measured concentrations of total dissolved solids in PHG's secondary treatment plant effluent, the expected effects from pulp mill modernization and the proposed YCEP cooling tower evaporative losses, ENSR (*1994*, Table 7.3-2) calculated in-stream concentrations of total dissolved solids at low-flow as 1,096 mg/L prior to pulp mill modernization, 908 mg/L after pulp mill modernization and 1001 mg/L after start-up of the proposed YCEP project. Under conditions of average flow (*ENSR, 1994*, Table 7.3-3), in-stream concentrations would be 936 mg/L, 782 mg/L and 850 mg/L, respectively. ENSR (*1994*, Table 6.3-2) reports that the in-stream concentrations of total dissolved solids on West Branch of Codorus Creek (far upstream of PHG's intake) is about 200 mg/L. Neither the SRBC in 1990 nor PADER in 1986 measured total dissolved solids in Codorus Creek. However, total dissolved solids were measured in April and May of 1988 at three sample sites near PHG's outfall by PADER (*1989*). Concentrations ranged from 120 to 180 mg/L at two sites upstream of PHG's discharge. Downstream, the concentrations ranged from 898 mg/L in April to 456 mg/L in May. PADER (*1989*) did not report stream flow rates for these sample events. Because there are no points of water withdrawal immediately downstream where concentrations are above 750 mg/L (industrial withdrawals occur at York and near the Susquehanna River), there is no exceedance of the PA water quality criteria for protection of water supplies. However, an exceedance might occur in the future if a withdrawal point would be established immediately downstream.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Phenolics (except Section 307(a)(1) (33 U.S.C.A. § 1317(a)(1)), Priority Pollutants) in Codorus Creek	To protect water supplies, PA established the statewide specific water quality criterion for phenolics (25 Pa. Code § 93.7) at 5 µg/L, maximum, applied to the point of withdrawal or the point of planned future withdrawal [see 25 Pa. Code § 93.5(e)]. PA's specific criteria for the protection of aquatic life is 20 µg/L as a 4-day average and 100 µg/L as a 1-hour average.	The SRBC (*1991a*) did not measure phenolics as a part of their study. Phenols were most recently measured in April of 1988 at three sample sites near PHG's outfall by PADER (*1989*). Concentrations were less than 3 µg/L at two sites upstream of PHG's discharge. Downstream the concentration was 17.5 µg/L. PADER (*1989*) did not report stream flow rates for these samples. In 1986, PADER (*1987*) measured phenolics in instantaneous grab samples at several of their 19 study sites. No phenolics were reported in the single site upstream of PHG. Downstream from PHG's outfall, which contained 25.0 µg/L, in-stream concentrations were 12.5 µg/L at the first site and 15.0 µg/L at the second. Concentrations remained equally high downstream to York where the concentration dropped to 5.0 µg/L. At two sample stations between York and the Susquehanna River, concentrations were again high, 7.5 µg/L. The high concentrations downstream of York come from sources in that area. Because there are no points of water withdrawal immediately downstream of PHG where concentrations are above 5 µg/L (industrial withdrawals occur at York and near the Susquehanna River), there is no exceedance of the PA water quality criteria for protection of water supplies in the section of the creek near PHG. However, an exceedance might occur in the future if a withdrawal point were to be established immediately downstream.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Chloroform in Codorus Creek	Chloroform is a volatile organic compound that has been identified as a possible carcinogen. To protect human health, PA adopted a human health criterion (25 Pa. Code § 16, Table 1) of 6 µg/L for chloroform in water supplies. To protect the environment, PA also adopted fish and aquatic life criteria (25 Pa. Code § 16, Table 1). For aquatic organisms and their uses, the chronic exposure limit to chloroform is 389 µg/L, and the acute exposure limit is 1,945 µg/L.	Neither the SRBC's 1991 survey nor PADER's 1988 survey included measurements of chloroform. The most recent survey of chloroform concentrations in Codorus Creek were made in 1986 by PADER (*1987*). PADER made 15 instantaneous in-stream measurements of chloroform at a time when flow was far below average (42.3 cfs below PHG's outfall; 69.1 cfs near the York gage). They also made instantaneous measurements in several industrial and municipal outfalls. PADER (*1987*) reported a concentration of 1.3 µg/L upstream of PHG's outfall, probably coming from a sewage treatment plant. Downstream from PHG's outfall, which contained 25.0 µg/L, in-stream concentrations were 9.0 µg/L at the first site and 7.0 µg/L at the second site. Concentrations continued to decline gradually downstream toward the other side of York, where concentrations were as low as 3.3 µg/L before several waste dischargers locally augmented the load of chloroform. Other waste effluents that were sampled contained 0 to 9.5 µg/L, the highest coming from a sewage treatment plant. Based on measured concentrations in PHG's effluent and experimental simulations of the proposed project's cooling tower effluent, Environ (*1994a*, Table 3) calculated current (pre- pulp mill modernization) in-stream low-flow concentrations of 20 µg/L (to one significant digit) and expected in-stream concentrations of 10 µg/L (to one significant digit) with operation of the proposed facility following pulp mill modernization.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Dissolved Oxygen in Codorus Creek	To protect aquatic life, PA established a specific water quality criteria for dissolved oxygen at 5.0 mg/L as a minimum daily average, 4.0 mg/L as a minimum.	The SRBC (*1991a*) made fifteen instantaneous in-stream measurements of dissolved oxygen at a time when flow was below average (70.1 cfs below PHG's outfall; 130 and 79.1 cfs at the York gage). They also made instantaneous measurements in several industrial and municipal outfalls. At all sample sites, concentrations of dissolved oxygen in Codorus Creek were above the minimum daily average required for protection of aquatic organisms (5.0 mg/L). In-stream measurements made just upstream from PHG's outfall were 7.3 mg/L. PHG effluent contained 5.3 mg/L, and downstream water in Codorus Creek contained 6.3 mg/L or more. Dissolved oxygen was measured in April, May, and June of 1988 at three sample sites near PHG's outfall by PADER (*1989*). Concentrations ranged from 10.8 to 7.8 mg/L at two sites upstream of PHG's discharge. Downstream, the concentrations ranged from 5.4 to 7.1 mg/L. Stream flow rates were not reported for these 1988 measurement sites. In 1986, PADER (*1987*) made 19 instantaneous in-stream measurements of dissolved-oxygen at a time when flow was far below average (42.3 cfs below PHG's outfall; 69.1 cfs near the York gage). Like the SRBC, they also made instantaneous measurements in several industrial and municipal outfalls. For all but one stream sample site, concentrations of dissolved oxygen in Codorus Creek were equal to or above the minimum daily average for chronic exposure of aquatic organisms. The instantaneous minimum was met at all sites. The dissolved oxygen concentrations immediately upstream from PHG's outfall were 8.6 mg/L and were depressed compared to dissolved oxygen concentrations further upstream. PHG's effluent contained 6.2 mg/L; and the first sample site downstream contained 5.1 mg/L while the second sample site contained 4.8 mg/L, the lowest dissolved oxygen concentration measured in the creek. Dissolved oxygen concentrations recovered further downstream near York, but levels were again depressed near waste outfalls downstream from York. For several miles downstream from PHG, dissolved oxygen levels may become critically low, especially for benthic fauna, during summer low-flow periods (*PADER, 1989*).

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Temperature of water in Codorus Creek	The specified PA water quality criteria for Codorus Creek are listed in 25 Pa. Code 93.7(c) on a monthly or semi-monthly basis. Limits (maximum allowable) range from 17.8°C (40°F) for the period between January 1 and February 29 to 30.5°C (87°F) for the period between July 1 and August 31. However, PHG used a statutory exception in the Federal Water Pollution Control Act [§ 316(a); 33 U.S.C. § 1326(a)] to demonstrate to the satisfaction of the state that its discharge did not increase the temperature sufficiently to alter the indigenous populations of shellfish, fish, or wildlife. The state then granted a new limit based on the in-stream temperatures caused by the outfall. The new permit limits are increased for the winter months [e.g., January = 15.5°C (60°F), July = 30.5°C (87°F)]. Monthly limits are presented in Appendix D.	The proposed YCEP plant is expected to lower the temperature of the wastewater and thereby slightly reduce the thermal impact of PHG's discharge. ENSR (1994, Table 6.3-2), claims that the average summer water temperature in West Branch of Codorus Creek (above the PHG intake) is 21.2°C (70°F), and the average winter temperature is 17.8°C (42° F). ENSR (Table 7.3-1) also claims that PHG's effluent would decrease in temperature as a result of the proposed YCEP project. In the summer, effluent temperature would decrease from 36.1° to 35.5°C (97° to 96°F). In the winter, effluent temperature would decrease from 25.5° to 23.9°C (78° to 75°F). The in-stream temperatures below the PHG outfall are reported by ENSR (Table 7.3-2) as 27.2°C (81°F), summer average, and 13.9°C (57°F), winter average, at low-flow. The proposed YCEP facility is expected (ENSR, Table 7.3-2) to reduce these temperatures to 26.6°C (80°F), summer average, and 12.8°C (55°F), winter average, during low-flow. ENSR (Table 7.3-3) projects mean flow temperatures of 25°C (77°F), summer average, and 10.5°C (51°F), winter average. The permit limits should not be exceeded. Temperatures measured for the SRBC (*1991a*) survey exceeded neither the current permit limits nor the PA water quality criteria. However, several exceedances of the current PA water quality criteria [not to be confused with PHG's permit limits under § 316(a)] were observed in the 1988 survey by PADER (*1989*) and in the 1986 survey by PADER (*1987*). Most of these exceedances (3 of 4) occurred when upstream water temperatures were above the limits.

Table 9-4. Exceedances[1] of environmental regulations and guidelines. (continued)

Issue	Regulations or Guidelines	Situation
Color of water in Codorus Creek	The specified PA water quality criteria for Codorus Creek is 50 units on the platinum-cobalt scale. However, PHG entered into a consent agreement with PADER that allows color up to the following limits (as of 7-1-94): limit not to be exceeded = 375 color units; monthly average limit = 225 color units; annual average limit = 200 color units.	Upstream color is usually around 30-50 color units (Bob Callahan, PHG). Prior to pulp mill modernization, the downstream color averaged around 220 color units (DEIS, Table 4.1-28). Post-modernization, downstream color at low-flow conditions has averaged 150 to 160 color units (Bob Callahan, PHG). After YCEP becomes operational, color is expected to average around 165 color units at low-flow. Whether or not color would continue to have as great an impact on primary productivity as it had prior to the Pulp Mill Modernization Project is undetermined. On three different occasions, PADER (*1989*) measured water color at three sites near PHG's outfall. Upstream colors ranged from fewer than 5 color units to 40 color units. Downstream color was 320, 140 and 200 color units. Stream flow was not reported.
Noise	There are no applicable Federal, state, or local regulations for noise emissions from power plant construction or operation. However, the EPA (1974, 1978, as cited in ENSR, 1994) suggests that day-night equivalent constant noise levels (L_{dn}) below 55 dBA are desirable. Railroad noise is regulated by the EPA (40 CFR Part 201) under an exclusive grant of authority (42 U.S.C. § 4916).	Presently, noise levels at the site of the proposed YCEP plant are 48 to 65 L_{eq} (*ENSR, 1994*, Table 6.8-1). Much of this noise comes from PHG and traffic on Rt. 116. Noise levels were also measured over 20-minute intervals at seven representative receptor sites, including two sites (sites 6 and 7) located more than 2,000 ft from the proposed YCEP facility. At site 6, the L_{eq} was 46 dBA during the day and 40 dBA at night (*ENSR, 1994*, Appendix I). At site 7, the L_{eq} was 51 dBA during the day and 43 dBA at night (ibid.). At these two sites, L_{eq} is expected to increase by 1 to 2 dBA as a result of normal construction activities (*ENSR, 1994*, Table 7.8-1). Most of the time, noise (L_{eq}) is not expected to increase by more than 3 dBA at any location off-site due to normal construction activities (*ENSR, 1994*). The expected increases from normal operation of the proposed YCEP facility presented in the EIS (Table 4.1-36), and, based on modeling, are expected to increase L_{eq} noise levels by 0 to 3 dBA, depending on the offsite location of the receptor. The most significant noise from routine operations may come from train coupling. At site 7, for example, train coupling noises are expected to be 60 dBA (locally perceived to be twice as loud as normal daytime noise levels). Noise emissions would vary with time, and the impact would vary with location and sensitivity of the receptor.

[1] Exceedances refers not only to non-conformity with regulations and guidelines but also to variances, exceptions, etc. An exceedance does not necessarily mean that a law has been broken.

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10. REFERENCES

10.0 Summary of Major Changes Since the DEIS

The list of references has been updated to reflect additional references used.

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11. LIST OF PREPARERS

11.0 Summary of Major Changes Since the DEIS

The List of Preparers has been updated to incorporate new preparers.

M. Baker

Title:	Environmental Protection Specialist, Army Corps of Engineers
Technical Responsibility:	Technical Review
Education:	B.A., History/Political Science, Linfield College
Years of Experience:	10

C. Bernstein

Title:	Ecologist, Army Corps of Engineers
Technical Responsibility:	Technical Review
Education:	M.S., Environmental Studies, The Johns Hopkins University
	B.S., Renewable Natural Resources, Wildlife Ecology, University of Arizona
Years of Experience:	8
Certification:	Habitat Evaluation Procedures, Certified HEP (U.S. FWS)

C. Caperton

Title:	Senior Planner/NEPA Practice Area Leader, Dynamac Corporation
Technical Responsibility:	EIS Project Manager, Technical Writing, Reviews
Education:	M.U.R.P., Texas A&M University
	B.A., Public Administration, Stephen F. Austin State University
Years of Experience:	13
Total Publications:	15+
Certification:	American Institute of Certified Planners

T. Cowen

Title:	***Task Manager, Dynamac Corporation***
Technical Responsibility:	***Technical Writing, Reviews***
Education:	***B.S., Psychology (minor: Biology), Syracuse University***
	Forest Biology course work (2 years), SUNY, College of Environmental Science and Forestry, Syracuse
Years of Experience:	***15***

C. Cooper

Title:	Staff Scientist, Dynamac Corporation
Technical Responsibility:	Technical Writing, Reviews
Education:	B.S., Biology, Alma College
Years of Experience:	7

J. Dinne

Title:	Community Planner, Army Corps of Engineers
Technical Responsibility:	ACOE YCEP Cogeneration Facility EIS Project Manager
Education:	M.S., Environmental Studies, University of Oregon
	M.U.P., Urban & Regional Planning, University of Oregon
	B.S., Environmental Studies, Stockton State College
Years of Experience:	5
Total Publications:	9

J. Garland

Title:	Senior Scientist, EG & G
Technical Responsibility:	Technical Writing and Reviews
Education:	M.S., Range & Wildlife Ecology, University of Wyoming
	B.S., Range & Wildlife Science, Abilene Christian University
Years of Experience:	20
Total Publications:	4

T. Gillard, PE

Title:	Program Manager, Kansas City Office, Dynamac Corporation
Technical Responsibility:	Reviews (Air Quality)
Education:	M.S., Environmental Health Management, University of Kansas
	B.S., Civil Engineering, University of Pennsylvania
Years of Experience:	15
Certification:	Registered Professional Engineer, State of MO

E. Gutshall

Title:	Staff Scientist, Dynamac Corporation
Technical Responsibility:	***EIS Deputy Project Manager,*** Technical Writing, Reviews
Education:	M.A., Environmental Resource Policy, George Washington University
	B.S., Political Science, James Madison University
Years of Experience:	1

P. Hall

Title:	*Deputy Project Manager, Dynamac Corporation*
Technical Responsibility:	*Technical Writing and Reviews*
Education:	*M.S., Environmental Engineering Sciences, University of Florida*
	B.A., Biology, Marine Science, Jacksonville University
Years of Experience:	*10*
Total Publications:	*8*
Certification:	*Hazardous Waste and Small Spill Certification, 1991*

M. Hanover

Title:	Biologist, Army Corps of Engineers
Technical Responsibility:	Technical Review
Education:	M.S., Biology, Old Dominion University
	B.S., Biology, Longwood College
Years of Experience:	3
Total Publications:	4

T. Holderman

Title:	Staff Scientist, Dynamac Corporation
Technical Responsibility:	Technical Writing, Reviews
Education:	B.S., Biology, Virginia Polytechnic Institute & State University
Years of Experience:	10
Total Publications:	6

S. Houldsworth

Title:	Policy Analyst, Dynamac Corporation
Technical Responsibility:	Technical Writing, Reviews
Education:	B.A., Political Science, Dickinson College
Years of Experience:	6

N. Jedziniak

Title:	Geographer, Army Corps of Engineers
Technical Responsibility:	Technical Review
Education:	B.A., Geography & Environmental Planning, Towson State University
Years of Experience:	2

E. Johnson

Title:	Geographer, Army Corps of Engineers
Technical Responsibility:	Technical Review
Education:	M.A., Geography, Bowling Green State University
	B.A., Sociology, University of Pittsburgh
Years of Experience:	4

C. Kaluanda

Title:	Senior Environmental Scientist, ***Energetics Incorporated***
Technical Responsibility:	Technical Support, Cumulative Effects Analysis
Education:	B.S., Environmental Sciences, University of Massachusetts
Years of Experience:	8
Total Publications:	4

A. King

Title:	Administrative Director/Project Manager, Dynamac Corporation
Technical Responsibility:	Technical Writing, Reviews
Education:	M.L.S., Library Science, University of Maryland
	B.A., Political Science, Western Maryland College
Years of Experience:	16
Total Publications:	8
Certification:	Lifetime Librarian Certificate, State of VA

A. Leslie

Title:	Senior Scientist, ***Energetics Incorporated***
Technical Responsibility:	Technical Support, Cumulative Effects Analysis
Education:	Ph.D., Chemistry, Glasgow University, U.K.
	B.A., Physics and Chemistry, Keele University, U.K.
Years of Experience:	27
Total Publications:	31

J. Markusic

Title:	Staff Scientist, Dynamac Corporation
Technical Responsibility:	Project Management, Technical Writing, Reviews
Education:	B.S., Biology, Youngstown State University
Years of Experience:	12
Total Publications:	12

D. Marshall

Title:	Staff Engineer, Dynamac Corporation
Technical Responsibility:	Reviews (Geology, Soils, Groundwater)
Education:	B.S., Civil Engineering, Virginia Polytechnic Institute & State University
Years of Experience:	2

M. McKoy

Title:	***Senior Geologist, EG&G***
Technical Responsibility:	***Technical Review and Writing***
Education:	***J.D., West Virginia University***
	M.S., Geology, Dartmouth College
	B.S., Geology, Georgia Southwestern College
Years of Experience:	***12***

M. McMillen

Title:	Senior Environmental Scientist, ***Energetics Incorporated***
Technical Responsibility:	Technical Support, Cumulative Effects Analysis
Education:	M.S., Resource Development/Planning, Michigan State University
	B.S., Natural Resources and Environmental Science, Michigan State University
Years of Experience:	13
Total Publications:	10+

M. Mendelsohn

Title: Biologist, Army Corps of Engineers

Technical Responsibility: Technical Review

Education: M.S., Interdisciplinary Science Studies (Ecology), The Johns Hopkins University
M.S., Technology Management, University of Maryland
B.A., Biology/Philosophy, Old Dominion University

Years of Experience: 6

Total Publications: 2

R. Moore

Title: Senior Geologist, EG & G

Technical Responsibility: Technical Writing and Reviews

Education: B.S., Geology, West Virginia University

Years of Experience: 18

J. Penny

Title: Deputy Regional Manager, Atlanta Office, Dynamac Corporation

Technical Responsibility: Reviews (Socioeconomics, Transportation, Land Use)

Education: M.S., Environmental Engineering, University of Illinois
B.S., Civil Engineering, University of Illinois

Years of Experience: 14

Certification: Registered Professional Engineer: State of IL, State of GA

S. Petrocelli

Title: Vice President, Chief Scientist, Dynamac Corporation

Technical Responsibility: Technical Review

Education: Ph. D., Biology/Ecotoxicology, Texas A&M University
M.S., Marine Science, Long Island University
B.A., Biology/Pre-Med, Queens College, City University of New York

Years of Experience: 25

Total Publications: 20+

M. Phillips

Title:	Manager, Air Programs, Dynamac Corporation
Technical Responsibility:	Reviews (Air Quality)
Education:	M.S., Biology, Colorado State University
	B.S., Aeronautical Engineering, USAF Academy
Years of Experience:	28
Certification:	EPA-Certified Visible Emissions Evaluator

N. Robell

Title:	Environmental Scientist, Dynamac Corporation
Technical Responsibility:	Technical Writing, Reviews (Cultural and Historical Areas)
Education:	B.A., Neuroscience (minor: archaeology), Oberlin College
Years of Experience:	4

L. Schelter

Title:	Work Assignment Manager, Engineering Division, Dynamac Corporation
Technical Responsibility:	Reviews (Regulatory Compliance)
Education:	M.S.L., 1991, Environmental Law, Vermont Law School
	B.S., Earth Science, Bloomsburg University of Pennsylvania
Years of Experience:	4
Total Publications:	6

M. Southerland

Title:	Technical Director/Project Manager, Dynamac Corporation
Technical Responsibility:	Reviews (Biological Resources)
Education:	Ph.D., Biology (Ecology), University of North Carolina at Chapel Hill
	B.A., Zoology, Pamona College
Years of Experience:	12
Total Publications:	27

A. Steiner

Title:	Senior Scientist, Dynamac Corporation
Technical Responsibility:	Technical Reviews
Education:	Ph.D., Wildlife Biology, University of Massachusetts
	M.S., Wildlife Biology, University of Massachusetts
	B.S., Forest Biology, SUNY College of Environmental Science and Forestry
	B.S., Forestry, Syracuse University
Years of Experience:	12
Total Publications:	12

S. Van Ooteghem

Title:	Environmental Protection Manager, Environmental Safety and Health Program Support Division, Morgantown Energy Technology Center
Technical Responsibility:	NEPA Documentation Coordination and Development; Overall QA/QC
Education:	Ph.D., Biology/Chemistry, University of Michigan
	M.S., Biology/Chemistry, University of Michigan
	B.S., Biology/Chemistry, University of Michigan
Years of Experience:	25
Total Publications:	18

M. Vuotto

Title:	Staff Scientist, Water and Ecological Programs Department, Dynamac Corporation
Technical Responsibility:	Technical Writing
Education:	B.S., Biology, University of Maryland, 1988
Years of Experience:	4

J. Wachter

Title:	Director, Environmental Safety and Health Program Support Division, Morgantown Energy Technology Center
Technical Responsibility:	METC NEPA Overall Coordination; QA/QC
Education:	Sc.D., Environmental Health (Water Chemistry)
	MBA, Business Administration
	M.S., Water Supply and Pollution Control Engineering
	B.S., Biology/Chemistry
Years of Experience:	20
Certification:	Certified Industrial Hygienist

12. LIST OF AGENCIES AND INDIVIDUALS CONTACTED

12.0 Summary of Major Changes Since the DEIS

The list of agencies and individuals contacted has been updated to reflect consultations that took place since the DEIS.

Name and Title	Affiliation
Archer, Hugh V. Regional Director	Commonwealth of Pennsylvania Department of Environmental Resources Southcentral Region Field Operations One Ararat Boulevard Harrisburg, PA 17110
Arway, John	***Commonwealth of Pennsylvania*** ***Pennsylvania Fish and Boat Commission*** ***Division of Environmental Services*** ***450 Robinson Lane*** ***Bellefonte, PA 16823-9616***
Barrett, Brenda ***Director***	***Bureau for Historic Preservation*** ***Pennsylvania Historical and Museum Commission*** ***P.O. Box 1026*** ***Harrisburg, PA 17108-1026***
Belanger, William ***Air Toxics Specialist***	***U.S. Environmental Protection Agency*** ***Region 3*** ***841 Chestnut Building*** ***Philadelphia, PA 19107-4431***
Bergner, Roland	***Pennsylvania Game Commission*** ***2001 Elmerton Avenue*** ***Harrisburg, PA 17110-9797***
Botzin, Judith	***Metropolitan Edison Company*** ***P.O. Box 16001*** ***Reading, PA 19640***
Brown, Cori Outdoor Recreation Planner	United States Army Corps of Engineers Baltimore District P.O. Box 1715 Baltimore, MD 21203-1715

Name and Title	Affiliation
Browne, William G. *Environmental Engineer*	*U.S. Environmental Protection Agency* *Region 3* *841 Chestnut Building* *Philadelphia, PA 19107-4431*
Carr, Kurt W. Chief of Archaeology and Protection	Pennsylvania Historical & Museum Commission Bureau for Historic Preservation P.O. Box 1026 Harrisburg, PA 17108-1026
Claggett, Peter	U.S. Environmental Protection Agency Region 3 Environmental Planning and Assessment Section 841 Chestnut Building Philadelphia, PA 19107-4431
Cowan, Catherine W.	Department of Environmental Resources Commonwealth of Pennsylvania P.O. Box 2063 Harrisburg, PA 17105-2063
Davis, Ronald M. *Air Pollution Control Engineer*	*Pennsylvania Department of Environmental Resources* *Southcentral Regional Office* *One Ararat Boulevard* *Harrisburg, PA 17110-9720*
Denmark, Roy E., Jr. NEPA Coordinator	U.S. Environmental Protection Agency Region 3 841 Chestnut Building Philadelphia, PA 19107-4431
Dix, Edward T. Botanist	Commonwealth of Pennsylvania Department of Environmental Resources Division of Forest Advisory Services Bureau of Forestry P.O. Box 8552 Harrisburg, PA 17104
Edwards, Joe *Region Senior Forester*	*Metropolitan Edison Company* *501 Parkway Boulevard* *York, PA 17404-2699*

Name and Title	Affiliation
Esher, Diana Chief, Environmental Planning and Assessment Section	U.S. Environmental Protection Agency Region 3 841 Chestnut Building Philadelphia, PA 19107-4431
Fickes, Roger Director, Bureau of State Parks	Commonwealth of Pennsylvania Department of Environmental Resources P.O. Box 8551 Harrisburg, PA 17105-8551
Frederick, Maria	***Metropolitan Edison Company*** ***P.O. Box 16001*** ***Reading, PA 19640***
Fulton, Timothy C. ***Chairman,***	***York County Rail Trail Authority*** ***400 Mundis Race Road*** ***York, PA 17402***
Gibble, John Ecologist	United States Army Corps of Engineers Baltimore District P.O. Box 1715 Baltimore, MD 21203-1715
Gift, Robert Regional Environmental Coordinator	U.S. Department of the Interior National Park Service Mid-Atlantic Region 143 South Third Street Philadelphia, PA 19106
Glass, Brent Pennsylvania Historical Preservation Officer	Pennsylvania Historical Museum Commission P. O. Box 1026 Harrisburg, PA 17108-1026
Goodger, Timothy E. Assistant Coordinator	United States Department of Commerce National Oceanic & Atmospheric Coordinator National Marine Fisheries Service Habitat and Protected Resources Division Oxford Laboratory Oxford, MD 21654
Gordon, Jeanette B. Staff Assistant to the Commissioner	Susquehanna River Basin Commission Interior Building Washington, DC 20240

Name and Title	Affiliation
Grabowicz, Gregory J. Director	Bureau of Land Management Pennsylvania Game Commission 2001 Elmerton Avenue Harrisburg, PA 17110
Hall, Caroline	*Pennsylvania Historical & Museum Commission* *Bureau for Historic Preservation* *Box 1026* *Harrisburg, PA 17108-1026*
Harvey, Heather Ecosystems Management Team Leader	U.S. Department of Agriculture Forest Service Allegheny National Forest P.O. Box 847 Warren, PA 16365
Hoffman, Barry G.	Commonwealth of Pennsylvania Department of Transportation Engineering District 8-0 2140 Herr Street Harrisburg, PA 17103-1699
Huber, Cindy Air Quality Specialist	U.S. Department of Agriculture Forest Service George Washington National Forest Harrison Plaza P.O. Box 233 Harrisonburg, VA 22801
Johnson, James F. Chief, Planning Division	U.S. Army Corps of Engineers Baltimore District P.O. Box 1715 Baltimore, MD 21203-1715
Kelch, Kelly *Zoning and Codes Enforcement Officer*	*West Manchester Township* *2501 Catherine Street* *York, PA 17404-4798*

Name and Title	Affiliation
Kelley, George W. Forest Supervisor	U.S. Department of Agriculture Forest Service George Washington National Forest Harrison Plaza P.O. Box 233 Harrisonburg, VA 22801
Kostmayer, Peter H. *Regional Administrator*	*U.S. Environmental Protection Agency* *Region 3* *841 Chestnut Building* *Philadelphia, PA 19107-4431*
Kulp, Charles Supervisor	U.S. Department of the Interior Fish & Wildlife Service 315 S. Allen Street Suite 322 State College, PA 16801
Lehman, Roger L. *Chief, Game Land Planning and Development Division*	*Pennsylvania Game Commission* *2001 Elmerton Avenue* *Harrisburg, PA 17110-9797*
McDowell, Denver Chief, Division of Environmental Planning and Habitat Protection	Bureau of Land Management Pennsylvania Game Commission 2011 Elmerton Avenue Harrisburg, PA 17110
Perry, Edward W. Acting Supervisor	U.S. Department of the Interior Fish & Wildlife Service 315 South Allen Street Suite 322 State College, PA 16801
Rhodes, Cathy Air Quality Specialist	U.S. Department of the Interior Air Quality Division National Park Service P.O. Box 25287 Denver, Colorado 80225-0287

Name and Title	Affiliation
Rugiel, Thaddeus J. Acting Chief, River Basin Permits Section	U.S. Army Corps of Engineers Baltimore District P.O. Box 1715 Baltimore, MD 21203
Scharadin, William R. *Chairman, EMF Team*	*Metropolitan Edison Company* *P.O. Box 16001* *Reading, PA 19640*
Schott, Robert *Regional Water Quality Management Division*	*Pennsylvania Department of Environmental Resources* *One Ararat Blvd.* *Harrisburg, PA 17110*
Schultz, Carl Assistant Counsel	Commonwealth of Pennsylvania Pennsylvania Department of Environmental Resources Office of Chief Counsel P.O. Box 8464 Harrisburg, PA 17105-8464
Seltzer, Alan Michael	*Ryan, Russell, Ogden, & Seltzer* *Law Offices* *1100 Berkshire Boulevard* *Reading, PA, 19610-0219*
Shiels, Andrew L. Herpetology, Endangered Species and Triploid Grass Carp Coordinator	Commonwealth of Pennsylvania Fish and Boat Commission Division of Fisheries Management 450 Robinson Lane Bellefonte, PA 16823-9620
Shiffer, Clark N. Herpetology & Endangered Species Coordinator	Commonwealth of Pennsylvania Pennsylvania Fish & Boat Commission Division of Fisheries Management 450 Robinson Lane Bellefonte, PA 16823-9685
Sitlinger, Jacob	Bureau of Land Management Pennsylvania Game Commission 2001 Elmerton Avenue Harrisburg, PA 17110-9797

Name and Title	Affiliation
Snyder, Richard A. Chief, Division of Fisheries Management	Commonwealth of Pennsylvania Pennsylvania Fish & Boat Commission Division of Fisheries Management 450 Robinson Lane Bellefonte, PA 16823
Stone, Lillian K., P.E. Chief, Office of Environmental Policy and Compliance	U.S. Department of the Interior Office of The Secretary Energy Facilities Division Washington, D.C. 20240
Swartz, Kenneth D. District Forester	Commonwealth of Pennsylvania Department of Environmental Resources 10099 Lincoln Way East Fayetteville, PA 17222-9609
Swartz, Paul O. Executive Director	Susquehanna River Basin Commission 1721 North Front Street Harrisburg, PA 17102
Topsale, Jim Environmental Specialist	U.S. Environmental Protection Agency Region 3 841 Chestnut Building Philadelphia, PA 19107-4431
Webber, Harold S. ***Manager, Cogeneration and Technical Services***	***Metropolitan Edison Company*** ***P.O. Box 16001*** ***Reading, PA 19640***
Wood, R. S. Vice President	Spring Grove Water Company Spring Grove, PA 17362
Young, Leroy M. Fisheries Biologist	Commonwealth of Pennsylvania Pennsylvania Fish and Boat Commission Division of Environmental Services 450 Robinson Lane Bellefonte, PA 16823-9616
Zich, Hilary	***U.S. Department of the Interior*** ***Fish & Wildlife Service*** ***315 S. Allen Street*** ***Suite 322*** ***State College, PA 16801***

Name and Title	Affiliation
Zomak, Raymond	*Pennsylvania Department of Environmental Resources* *One Ararat Boulevard* *Harrisburg, PA 17110-9720*

13. LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

13.0 Summary of Major Changes Since the DEIS

The list has been updated to reflect actual distribution of the DEIS and requests received for copies of the FEIS. All individuals on the revised list will receive a copy of the FEIS.

FEDERAL GOVERNMENT AGENCIES

Advisory Council on Historic Preservation
Federal Emergency Management Agency
U.S. Army Corps of Engineers; Philadelphia and Baltimore Districts
U.S. Department of Agriculture
- Soil Conservation Service
- Forest Service
  - Allegheny National Forest
  - George Washington National Forest

U.S. Department of Energy
- Office of Fossil Energy
- Office of NEPA Oversight
- Office of General Counsel
- Morgantown Energy Technology Center

U.S. Department of Housing and Urban Development
U.S. Department of the Interior
- National Park Service
- Office of Environmental ***Policy and Compliance***
- Susquehanna River Basin Commission
- U.S. Geological Survey
- U.S. Fish and Wildlife Service

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National Marine Fisheries Service

National Oceanic and Atmospheric Administration

U.S. Department of Labor

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    Bureau of Community Environmental Control
    Bureau of Forestry
    Bureau of Mining and Reclamation
    Bureau of Soil and Water Conservation
    Bureau of Soil and Water Management
    Bureau of State Parks
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    Division of Assessment and Standards
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Soils and Waterways Section

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Bureau of Rail Freight, Waterways

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Pennsylvania Energy Office

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Pennsylvania Fish Commission

Division of Fisheries Management

Pennsylvania Fish and Boat Commission

Division of Environmental Services

Pennsylvania Game Commission

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Spring Grove Borough
Spring Grove Borough Council
Springettsbury Township
West Manchester Township
West York Borough
West York Borough Council
York City
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York Township

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Clean Stream Technologies, Inc.
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Commonwealth Supply Company
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Environmental Law Institute
Environmental Policy Institute
EPRI
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Gettysburg Times
Gilbert/Commonwealth
GPU Service Corporation
Hanover Area Chamber of Commerce
Hanover Cyclers
Hanover Evening Sun
Jaycees of Dover
J.E. Baker Company
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Historical Society of York County
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Izaak Walton League, York Chapter 67
KBS Inc.
Keystone Cogeneration Systems, Inc.
Lancaster Newspapers Inc.
League of Women Voters, Washington, DC
League of Women Voters of Greater York
Lioness Club of Manchester Township
Lions Club of Jefferson
Lions Club of Manchester Township

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Nassaux-Helmsley
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SFA Pacific, Inc.
SFRA
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Sierra Club
SPEAC
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Springettsbury Incinerator Task Force
Stop Targeting Our People (STOP)
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Tetra Tech
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VS Software Inc.
Washington & Jowling Contractors
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York County Action Group to Save the Bay
York County Agricultural Land Preservation
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York County Board of Commissioners
York County Board of Parks and Recreation
York County Center for Highway Safety
York County Chamber of Commerce
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York County Emergency Management Agency
York County Energy Partners (YCEP)
***York County Environmental Information
Council***
York County Industrial Development Authority
York County Industrial Development
Corporation
York County Library
York County Medical & Osteopath Society,
York Hospital
York County Osteopathic Medical Society
York County Planning Commission
York County Private Industry Council
York County Rail Trail Authority

York County Solid Waste & Refuse Authority
York County Transportation Authority
York Daily Record/York Dispatch
York Environmental Alliance
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York Hospital, Thomas M. Hart Center
York-White Rose Wanderers Volksmarch Club
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U.S. Department of Energy; Morgantown Energy Technology Center
Glatfelter Memorial Library
York County Courthouse
York County Library

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14. GLOSSARY

14.0 Summary of Major Changes Since the DEIS

The glossary has been amended to add new terms used and to clarify definitions.

Acidic deposition:	A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either a wet or dry form. The wet form, popularly called "acid rain", can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.
Acid rain:	Precipitation with a pH less than 5.6. "Acid rain" is primarily a result of sulfuric acid and nitric acid produced in the atmosphere by the oxidation and hydrolysis of precursor sulfur dioxide and oxides of nitrogen that have been released during the combustion of fossil fuels. Other anthropogenic and natural chemical sources play a lesser role. Acid rain is considered to be detrimental to plant and aquatic life, and materials.
Acidification:	A process in which a water body or substrate becomes increasingly acidic because of additions of pollutants or naturally occurring chemical compounds.
Acre-foot (AF):	A volume of water one foot deep and one acre in area, or 43,560 cubic feet. One acre-foot is equal to 325,850 gallons.
Air contaminant:	Any particulate matter, gas, or combination thereof, other than water vapor or natural air, capable of being airborne.
Alkaline:	Having a pH greater than 7.
Ammonia (NH_3):	A colorless, gaseous alkaline compound, with a characteristic pungent odor, formed as the result of the decomposition of most nitrogenous organic material.
Ammonia slip:	The portion of ammonia that exists unreacted from NO_x control devices, which utilize ammonia injection (into flue streams) to reduce the amount of thermal NO_x generated.
Aquifers:	An underground geological formation or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Archaeology:	The scientific study of the life and culture of ancient peoples as by excavation of ancient cities, relics, and artifacts.
Ash:	All mineral matter left after the complete combustion of fuel.
Atmospheric dispersion model:	Computer program that simulates the effect or spread of pollutants into the atmosphere from a source such as a power plant.
Atmospheric pressure:	The pressure at any point in an atmosphere due solely to the weight of the atmospheric gases above the point concerned (also known as barometric pressure).
Atmospheric stability:	The atmosphere's tendency to either promote or suppress vertical air motion (i.e., mixing).
Attainment area:	An area considered to have air quality as good as or better than the National Ambient Air Quality Standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment for others.
Baghouse:	A fabric filter collection system used to remove particulate matter from flue-gas in accordance with PSD permit requirements. It is designed to remove fine particles from the boiler exhaust steam prior to release of the exhaust gas into the atmosphere.
Best Available Control Technology (BACT):	An emission limitation based on the maximum degree of emission reduction which (considering energy, environmental, and economic impacts, and other costs) is achievable through application of production processes and available methods, systems, and techniques. BACT does not permit emissions in excess of those allowed under any applicable Clean Air Act provisions.
Baseline conditions:	Existing conditions used to establish a baseline from which to evaluate potential impacts.
Benthic macroinvertebrates:	A form of animal life, large enough to be seen with the naked eye, that is found on or near the bottom of a stream, lake, or ocean.
Biochemical Oxygen Demand (BOD):	The measured amount of oxygen required by acclimated microorganisms to biologically degrade organic matter in wastewater.
Biocide:	A chemical substance that has potential to kill living organisms, especially microorganisms; a disinfectant.

Biodiversity:	The sum total of all the plants, animals, fungi, and microorganisms in an area and all the interactions between them.
Bloodborne pathogens:	Pathogenic microorganisms that are present in human blood and can cause disease in humans.
Blowdown:	The planned process of removing a portion of the circulating water from a process system (e.g., a boiler or evaporation cooling tower) to allow fresh make-up water to take its place.
Blowdown water:	A portion of circulating water removed from the process system, allowing fresh make-up water to take its place to maintain acceptable chemical concentrations in the circulating water.
Boiler:	Equipment (vessel) in which water is converted to steam.
British thermal unit (Btu):	A unit of heat energy that will warm one pound of water one degree Fahrenheit at sea level pressure.
Capacity:	The maximum load a generator, turbine, power plant, transmission circuit, or power system can supply under specified conditions for a given period of time without exceeding approved limits of temperature and stress.
Carbon dioxide (CO_2):	A colorless, odorless, non-poisonous gas which results from fossil fuel combustion and is part of ambient air.
Carbon monoxide (CO):	A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.
Circulating Fluidized Bed (CFB):	A type of combustion technology in which coal and limestone are fed into a bed of hot particles (1,400°F to 1,600°F) that are kept in suspension by the action of upflowing air that is forced through the mixture at velocities as high as 30 feet per second.
Class I air basins:	Classification of attainment areas that include international parks, national wildlife areas, memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres.
Class II air basins:	Classification of attainment areas that are designated for moderate well-controlled industrial growth.
Class III air basins:	Classification of areas that allows states to permit increased deterioration in air quality in specific areas that may be targeted for higher levels of industrial development and consequent growth in pollution (to date, no state has established a Class III area).

Clean Coal Technology (CCT):	A program of DOE to promote advanced coal utilization technologies that are environmentally cleaner, more efficient, and less costly than conventional coal-using processes.
Cogeneration:	The production of two useful sources of energy (i.e. steam and electricity) from one fuel source.
Cold Water Fishery:	State protected waters used for the maintenance and/or propagation of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.
Combined-cycle:	The type of generating plant that burns fuel to generate electricity in one generator and recovers waste heat to produce steam which powers another generator.
Conditioned ash:	Ash dampened with water.
Conformity:	Conformity with the State Implementation Plan to evidence compliance with the goal of eliminating the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of such standards. In addition, no activity will cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any interim emission reductions or other milestones in any area. Applies to federally funded projects.
Consumptive use:	Water consumed by a user, and therefore not available for other uses.
Continuous emissions monitoring (CEM) system:	System used to monitor the regulated emission components of the flue gas and verify compliance with PSD air permits.
Cooling water:	Water that is heated as a result of being used to cool the boiler.
Criteria pollutants:	Pollutants for which national primary or national primary and secondary ambient air quality standards have been defined under Section 109 of the Clean Air Act to protect public health and welfare. They include sulfur oxides (measured as sulfur dioxide); PM_{10} (particulate matter with an aerodynamic diameter equal to or less than 10 microns); carbon monoxide; ozone; nitrogen dioxide; and lead.

Curie:	***Unit quantity of any radioactive nuclide in which 3.7×10^{10} disintegrations occur per second.***
Demand:	The instantaneous rate at which electric energy is delivered to or used by a system.
Demand-side:	A term referencing a utility's plans to reduce customer consumption (e.g., energy-savings techniques).
Design coal:	The specific type of coal around which the components of the York ***County Energy Partners*** Cogeneration Facility CFB boiler project gasifier are sized and specified.
Dispersion model:	A computer program that incorporates a series of mathematical equations used to predict ground-level concentrations resulting from emissions of a pollutant to the air.
Diversion:	Taking water from a stream or other body of water into a canal, pipeline, or other conduit.
Drift:	Water lost in a cooling tower as mist or droplets entrained by the circulating air, not including the evaporative loss.
Dry deposition:	The process that occurs when pollutants in the form of gases or particulates are transported to the ground level are absorbed or adsorbed by materials without first being dissolved in atmospheric water droplets.
Ecosystem:	The interacting system of a biological community and its nonliving surroundings.
Effluent:	Refers to wastewater discharged into surface waters.
Electromagnetic Field (EMF):	An electric or magnetic field, or a combination of both.
Emission:	Uncontrolled discharges into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys, and from motor vehicle, locomotive, or aircraft exhausts.
Endangered species:	Animals, birds, fish, plants, or other living organisms threatened with extinction by manmade or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Enrichment Factor:	***A measure of a radionuclide's occurence in greater concentration for a specific ash stream or particle size than for the ash as a whole.***
Environmental Information Volume (EIV):	A collection of data provided by the Industrial Participant (YCEP) prior to preparation of an Environmental Impact Statement.
Environmental justice:	The potential impacts to minority populations or economically disadvantaged groups in the surrounding areas of a proposed project.
Erosion:	The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, or timber-cutting.
Exempt Wholesale Generator (EWG):	A non-utility owned power generation project that has no associated steam heat.
Fabric filter:	A device that removes dust and other finely divided particles by conveying the gas stream through porous fabric material and trapping the particles on the fabric surface.
Feed hopper:	Equipment that provides continuous feed of coal and limestone to the gasifier through the coal feeder.
Fish and Wildlife Coordination Act (FWCA):	A Federal act enacted to ensure that fish and wildlife resources receive consideration during the planning of development projects that affect water resources.
Floodplains:	***The relatively flat area or lowlands adjoining a river, stream, ocean, lake, or other body of water that is susceptible to being inundated by floodwaters.***
Fluidized bed:	A combustion technology design in which a mixture of crushed coal and limestone are fed into a bed of hot particles and kept in suspension by the action of gases (i.e., air) forced through the mixture.
Fly ash:	Airborne particles of unburnable ash.
Fossil fuels:	Coal, oil, natural gas, and other fuels derived from fossilized geologic deposits.
Fugitive emissions:	Material such as coal dust that escapes from conveyors and handling equipment.

Geology:	The scientific study of the origin, history, structure, and processes of the earth.
Global warming:	Concept of a worldwide increase in climatic temperatures due to various human- or environment-induced occurrences that increase greenhouse gases (e.g., carbon dioxide) in the atmosphere. It is believed by many that the increase in greenhouse gases allows light from the sun's rays to heat the earth but prevents a counterbalancing loss of heat.
Greenhouse gases:	Gases such as carbon dioxide, nitrous oxide, methane, and chlorofluorocarbons whose elevated levels in the atmosphere may be contributing to the warming of the atmosphere.
Habitat:	The sum of environmental conditions in a specific place that is occupied by an organism, population, or community.
Hazardous air pollutants:	Air pollutants which are not covered by ambient air quality standards but which, as defined by the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death.
Hazard Index (HI):	A nominal measure of the overall potential for adverse health effects associated with a simultaneous exposure to multiple hazardous substances.
Hazard Quotient (HQ):	A nominal measure of the potential for adverse noncancer health effects associated with a pathway-specific exposure to a specific hazardous substance.
Hectare:	A unit of area in the metric system equal to 10,000 square meters (2.471 acres).
Hilsenhoff's Biotic Index (HBI):	An index that assigns numeric values to benthic macroinvertebrate species on the basis of their individual pollution tolerance. The pollution tolerance values range from one (1), indicating the most pollution-sensitive species, to ten (10), indicating the most pollution-tolerant species.
Hydrocarbons:	One of a very large group of chemical compounds composed only of carbon and hydrogen; the largest source is from petroleum crude oil.
Hydrogeology:	The geology of groundwater with particular emphasis on the chemistry and movement of water.
Index of Biological Integrity (IBI):	An index that assesses habitat conditions by observing number and diversity of individual species, stress sensitivity, and trophic structure; and assigns a range of numerical values on the basis of these factors.

Kilowatt (kW):	A measure of electrical power equal to 1,000 watts.
Kilowatt-hour (kWh):	A common unit of electric energy consumption. Power (measured in kilowatts) multiplied by the time of operation (measured in hours) equals kilowatt-hours. Ten 100-watt light bulbs burning for 1 hour use 1 kWh.
Lead (Pb):	A heavy metal that is hazardous to health if inhaled or swallowed.
Limestone:	A sedimentary rock composed of more than 95 percent calcium carbonate; used in the removal of sulfur from coal gases before the gas reaches the atmosphere.
Load forecast:	The predicted demand for electric power and energy for planning purposes.
Macroinfauna:	***Large aquatic animals that live in the substrate of a body of water.***
Major stationary source:	Any of the 28 specified source categories that has a potential to emit 100 tons per year (tons/yr) or more, or any other stationary source that has the potential to emit 250 tons/yr or more of any air pollutant regulated under the Clean Air Act.
Make-up water:	Water added to a process system (e.g., a boiler or an evaporative cooling tower) to replace water removed during blowdown.
Megawatt (MW):	A measure of electrical power equal to one million watts.
Megawatt-hour (MWh):	A measure of electric energy equal to 1 megawatt of power supplied from an electric circuit for 1 hour.
Mitigation:	Minimizing or eliminating.
Mixing height:	The distance above the surface at which vertical air motion (i.e., mixing) occurs.
National Ambient Air Quality Standards (NAAQS):	Air quality concentration standards established by EPA, under the Clean Air Act, to protect public health and welfare.
New Source Performance Standards (NSPS):	A set of air quality standards promulgated by the EPA that are applicable to new, modified, and reconstructed sources of emissions.

New Source Review (NSR):	Air quality regulations adopted by the Pennsylvania Environmental Quality Board pursuant to mandates contained in the Clean Air Act (CAA) as amended in 1990 which, among other things, requires offsets of 1.15 to 1 for new stationary sources which will emit oxides of nitrogen (NO_x) in an area which is in nonattainment for oxides of nitrogen (NO_x)
Nominal:	The expected value associated with normal operations.
Nonattainment area:	A geographic area which does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.
Oxides of nitrogen (NO_x):	Product of combustion of fossil fuels whose production increases with the temperature of the process. It is a major contributor to acid deposition and the formation of groundlevel ozone in the troposphere. Expressed as NO_x, where the "x" represents the varying number of oxygen atoms that will combine with one atom of nitrogen.
Ozone (O_3):	Unstable blue gas with pungent odor; an allotropic form of oxygen. Ozone is found in the stratosphere and the troposphere. In the stratosphere [the atmospheric layer beginning ***16 to 40 km*** (10 to 25 miles) above the earth's surface], ozone is a form of oxygen formed naturally which provides a protective layer shielding the earth from ultraviolet radiation's harmful health effects on humans and the environment. In the troposphere [11.2 to 16 km (7 to 10 mi) above the earth's surface], ozone is a chemical oxidant and a major component of photochemical smog. Ozone can seriously effect the human respiratory system and is one of the most prevalent and widespread of all the criteria pollutants. Ozone in the troposphere is produced through complex chemical reactions of oxides of nitrogen, hydrocarbons, and sunlight.
Particulates:	Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog found in air contaminants.
Peak:	The greatest amount of demand occurring during a specified period of time.
pH:	A measure of acidity or alkalinity of a liquid or solid material.
Phytotoxic:	***Having or causing a poisonous effect on plants.***
Plume:	A visible or measurable discharge of a contaminant from a given point of origin; for example, a plume of smoke.

Pneumatically:	Air-blown.
Point source:	A stationary location or fixed facility from which pollutants are discharged or emitted.
Potable water:	Water that does not contain objectionable pollution, contamination minerals, or infective agents and is considered satisfactory for domestic consumption.
Pounds per square inch absolute (psia):	The absolute thermodynamic pressure resulting from a force of 1 pound applied uniformly over an area of 1 square inch.
Prevention of Significant Deterioration (PSD):	EPA program in which state and/or Federal permits are required that are intended to restrict emissions for new and modified sources in areas where air quality is in compliance with National Ambient Air Quality Standards.
Preventive Maintenance Program:	Procedures for reducing the potential of equipment failures that could result in releases would be maintained at the proposed facility.
PSD increments:	The maximum increases to ambient pollution levels that may be incurred as a result of increased emissions from new or modified sources; applied to three different types of areas.
Q_{7-10}:	The actual or estimated lowest 7 consecutive-day average stream flow that occurs once very ten years; i.e., the average flow of a stream during its lowest week of a decade; the stream flow rate during drought conditions used in establishing limits for regulating wastewater discharges and determining the assimilative capacity of receiving waters.
Reservoir System Analysis for Conservation (HEC-3 Program):	A FORTRAN program developed by the U.S. Army Corps of Engineers, Hydrologic Engineering Center to evaluate the potential effects of the consumptive water use on water elevations.
Retrofitting:	The process of installing new equipment at an existing power plant or industrial facility to improve efficiency or pollution control without replacing the basic unit.
Secular Equilibrium:	***A state within a radioactive decay series in which all members of the series disintegrate equal numbers of atoms per unit time.***

Selective Non-Catalytic Reduction (SNCR):	An aqueous ammonia injection technology designed to minimize emissions of oxides of nitrogen.
Significant impact levels:	Under PSD regulations, the emission concentrations used to define the area potentially affected by the pollutant emissions from a new source and to determine the level of air quality analysis required.
Sodium hypochlorite (NaClO):	A chemical additive used in the cooling unit as a disinfectant to prevent biofouling.
Solid waste:	All putrescible and non-putrescible refuse in solid or semi-solid form including but not limited to garbage, junk vehicles, ashes, incinerator waste, commercial or industrial waste (as defined by county ordinance).
Solvents:	Usually a liquid substance capable of dissolving or dispersing one or more other substances.
Sorbent:	A material, such as limestone, that will remove most sulfur remaining in the hot gas produced during combustion in the CFB boiler.
Specific Activity:	***Radioactivity measure of radionuclides in terms of disintegrations per unit time per unit mass.***
Standards:	Prescriptive norms which govern action and actual limits on the amount of pollutants or emissions produced.
Start-up heater:	A natural gas-fired or propane-fired heater.
Stream flow:	Measured in terms of average annual flow; the average seven consecutive day low-flow measured once every 10 years (Q_{7-10}).
Sulfur dioxide (SO_2):	A heavy, pungent, gaseous air pollutant formed primarily by industrial fossil fuel combustion processes.
Sulfuric acid: (H_2SO_4)	A chemical additive used in the cooling unit to maintain acceptable pH in discharge and to control corrosion.
Topography:	The physical features of a surface area including relative elevations and the position of natural and man-made features.
Total dissolved solids (TDS):	Disintegrated organic and inorganic material contained in water. Excessive amounts make water unfit to drink or use in industrial processes.

Total suspended solids (TSS):	A measure of the suspended solids (small particles of solid pollutants that float on the surface of, or are suspended in sewage or other liquids that resist removal by conventional means) in wastewater, effluent, or water bodies.
μmhos/cm:	A standard unit of measure for conductivity.
Vent silencer:	Open-ended vessels containing baffles designed to reduce the velocity of steam, and acoustical material to dampen the sound.
Watershed:	The surface drainage area and subsurface soils and geologic formations that drain to a particular body of water.
Waterwalls:	A collection of water-filled tubes that line the CFB boiler walls. Heat is removed from the CFB boiler combustion chamber by these waterwalls. The water in the waterwalls is subsequently converted to high pressure steam.
Watt (W):	A basic unit of electric power. One watt is equal to 0.00134 horsepower or 0.73756 foot-pounds per second (the energy necessary to move 1 pound the distance of 0.73756 feet in 1 second).
Wet deposition:	The process that occurs when pollutants such as sulfates or nitrates are dissolved in rain, snow, clouds, or fog, and impact the ground or any surface on the ground.
Wetland:	An area that is regularly saturated by surface or groundwater and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions.
Wind rose:	A pictorial representation of the frequency and direction of wind speeds at a site; the total length of the bar at each major compass heading is proportional to the frequency with which the wind blows from each direction; bar divisions indicate the amount of time the wind blows at the various velocity references categories.

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