DOE/EA-1573

DRAFT ENVIRONMENTAL ASSESSMENT OF THREE SITE DEVELOPMENT PROJECTS AT THE NATIONAL RENEWABLE ENERGY LABORATORY SOUTH TABLE MOUNTAIN SITE

May 2007

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ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
APE	area of potential effects
BMP	best management practice
°C	degree Celsius
CCR	Code of Colorado Regulations
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
dBA	A-weighted decibel
DOE	U.S. Department of Energy
DWOP	Denver West Office Park
EA	environmental assessment
EERE	DOE's Office of Energy Efficiency and Renewable Energy
EPA	U.S. Environmental Protection Agency
°F	degree Fahrenheit
FTLB	Field Test Laboratory Building
I-70	Interstate 70
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
kW	kilowatt
LOS	level of service
$\mu g/m^3$	micrograms per cubic meter
MTPP	Mesa Top Photovoltaic Project
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NO_X	nitrogen oxides
NREL	National Renewable Energy Laboratory
OSHA	Occupational Safety and Health Administration
PM_{10}	particulate matter less than 10 microns
PV	photovoltaic
REL	recommended exposure limit
RFHP	Renewable Fuel Heating Plant
S&TF	Science and Technology Facility
SERF	Solar Energy Research Facility
SO_2	sulfur dioxide
SOTAC	Solar Technology Advancement Consortium
SolarTAC	SolarTAC Project (NREL Site)
SVOC	semivolatile organic compound
STM	South Table Mountain
TAP	toxic air pollutant
TLV	threshold limit value
TPY	tons per year
USFWS	U.S. Fish and Wildlife Service
V	volt
VOC	volatile organic compound

EXECUTIVE SUMMARY

Introduction

In accordance with the Department of Energy (DOE) National Environmental Policy Act (NEPA) implementing regulations, DOE is required to evaluate the potential environmental impacts of DOE facilities, operations, and related funding decisions. DOE proposes to construct and operate three site development projects at the National Renewable Energy Laboratory's (NREL) South Table Mountain (STM) site:

- A Renewable Fuel Heating Plant (RFHP) that would use woodwaste as its primary fuel;
- Various solar technology advancement installations, collectively called SolarTAC;
- A Mesa Top Photovoltaic Project (MTPP) that would generate about 1.0 megawatt (MW) of solar energy for use at the STM site.

The decision to use federal funds for these three site improvement projects requires that DOE address NEPA requirements and related environmental documentation and permitting requirements. In compliance with the NEPA (42 U.S.C. 4321) and with DOE's NEPA implementing regulations (10 CFR section 1021.330) and procedures, this environmental assessment (EA) examines the potential environmental impacts of DOE's decision to support this Proposed Action and also examines a No Action Alternative.

In 2003, DOE issued the *Final Site-Wide EA of the National Renewable Energy Laboratory's South Table Mountain Complex* (DOE/EA-1440). Each of the three proposed projects that are the topic of this EA would occur in areas that were analyzed in the site-wide EA. The site-wide EA provides the analytical structure to assess the potential environmental impacts of the specific Proposed Action that is the topic of this EA. The site-wide EA is incorporated in its entirety into this EA by reference, and this EA tiers off the descriptions of the affected environment and the potential environmental impact assessments presented in the site-wide EA. The site-wide EA is available at http://www.eere.energy.gov/golden/reading_room.html.

Purpose and Need

The proposed projects would substantially reduce NREL's use of natural gas and grid-provided electricity, while simultaneously advancing and contributing to commercialization of renewable energy technologies.

RFHP. The proposed RFHP would reduce NREL's current STM site natural gas consumption by an estimated 75 to 80 percent by using woodwaste to replace most natural gas usage in the primary site heating boiler. The project would also showcase the viability of woodwaste biomass fuels as an alternative to fossil fuel heating.

SolarTAC. SolarTAC would accelerate the introduction and recognition of pre-commercial and early-commercial solar energy technologies in the U.S. marketplace. It would support and promote the *commercial* acceptance of solar energy technologies. The SolarTAC Project would provide a launch pad for commercialization of solar-generating technologies in Colorado and elsewhere, such that solar technologies would become an increasingly important and ultimately indispensable contributor to the energy use profile in the United States and across the world.

MTPP. The proposed MTPP would generate about 1.0 MW of solar electric energy to offset NREL's growing energy demand. This is consistent with DOE's long-term site development plans and energy goals to increase on-site renewable energy generation at the laboratory

Proposed Action and Alternatives

RFHP. The RFHP would operate as the primary winter heat source for NREL's research and support facilities and would largely replace the site's current use of natural gas-fired boilers for heat. The *Challenger Combustion System*™ proposed for the plant is designed specifically for the combustion of solid waste fuels to optimize energy recovery and minimize air emissions. The RFHP fuel would consist of woodwaste such as construction waste, urban tree trimmings, pallets, and forest thinnings. Woodwaste acceptance criteria would be developed to ensure that contaminants and undesirable components were not combusted in the RFHP. At a minimum, woodwaste containing chemically treated, stained, painted, laminated, or otherwise altered wood products would be prohibited. Fuel would be delivered three to five times per week at 23 metric tons (25 tons) per load during the heating season. Total annual fuel consumption is estimated to be 2,722 metric tons (3,000 tons).

The burner would be housed in a new building approximately 21 meters (70 feet) long, 11 meters (35 feet) wide, and 9 meters (30 feet) high. It would be constructed at the edge of a natural drainage near the center of the STM main campus. The building would be constructed of architectural concrete block similar to the finish on the existing Field Test Laboratory Building. The stack would extend 3 meters (10 feet) above the roof. Construction is projected to take 6 to 7 months.

In addition to the new building, a driveway would be installed for trucks to access the building, and a turnaround area to facilitate delivery truck traffic flow may be installed. A wing wall would be installed at the end of the culvert to prevent flooding into the building's ground floor.

Pollution control equipment would consist of a multi-cyclone to control particulate matter. The combustion unit and associated equipment would be monitored and adjusted to maintain optimal efficiency of the pollution control equipment. The major RFHP components would have an estimated 10- to 30-year lifetime. At the end of its useful lifetime, the RFHP would be decommissioned, removed, and disposed of as solid waste or recycled in a manner consistent with NREL's facilities management and waste management policies applicable at that time.

SolarTAC. The SolarTAC center would showcase and test various solar energy generation, use, control, and communications equipment. The area would include residential photovoltaic (PV) systems, utility PV systems not requiring special safety precautions, stand-alone PV systems (e.g., bus-stop shelters, remote lighting), and similar systems. Solar arrays and communications equipment would be installed on various rooftops at NREL and at other locations not accessible to SolarTAC visitors. Plans include a small solar demonstration house of approximately 170 to 230 square meters (1,800 to 2,500 square feet) showing efficient insulation; a working PV system with inverter, batteries, and appliances; and information displays.

The SolarTAC center would be located primarily outdoors. It would be constructed on approximately 0.8 hectare (2 acres) of land east of a natural drainage that lies northeast of the NREL Visitors Center. The site would be graded, concrete pads would be poured to support solar panels, a foundation would be poured for the solar demonstration house, and gravel or road base material would be installed for a walkway and access road. Fencing would limit access to potentially dangerous equipment.

A 3.6-meter (12-foot) wide contractor access and service drive terminating at a 30-meter (100-foot) diameter turnaround area would be constructed immediately east of the proposed main SolarTAC facility arrays. A new pedestrian footbridge connecting the main SolarTAC displays to the NREL Visitors Center would cross the natural drainageway. Ultimately, the proposed SolarTAC could include construction of a new 54-space parking lot in the median area located south of the existing 39-space NREL Visitors Center parking lot.

MTPP. The MTPP would be a PV system located adjacent to the existing Solar Radiation Research Laboratory. It would convert approximately 2 hectares (5 acres) of open, undeveloped mesa-top land to a restricted access area used for the commercial generation of solar energy. It would be designed to generate approximately 1.0 MW of solar energy to be used on-site by DOE. The maximum allowable PV panel height would be 2.4 meters (8 feet) above the ground to minimize the visual impact of the PV system. Concrete pads would be poured to support solar panels, and possibly to support utility lines if poles were used.

The MTPP would be enclosed by a 2-meter (6-foot) chain link fence with three strands of barbed wire on top. Motion-activated lighting would provide safety for workers after dark and minimize night shine from the mesa top. Once installation was complete, the need for human presence would be rare (probably one visit per week for a short inspection). Interconnection to the STM site would likely be through an existing, spare 13.2-kilovolt/480-volt three-phase transformer with a 1-MW capacity, located near the middle of the proposed MTPP site.

No Action Alternative

The three proposed projects would not be implemented and the STM would remain in its current configuration. The No Action Alternative would not preclude other development projects from being proposed at such time as NREL determined them to be ripe for NEPA action.

Scoping

On April 2, 2007, a scoping/consultation letter was distributed to county, state, and federal agencies; organizations that may have information regarding potential environmental issues in the vicinity of the project site; and 1,470 Pleasant Ridge residential addresses. The only comments received were from the Colorado Historic Preservation Officer recommending continued coordination, an effort to which DOE is committed; the U.S. Fish & Wildlife Service, which expressed no concerns regarding the proposed actions and protected species; and the Colorado Department of Public Health and Environment, which acknowledged receipt of the air quality determination letter for the RFHP.

Environmental Consequences

The EA identified and assessed the following environmental resource areas:

- Land Use, Planning, Socioeconomics, and Public Policy
- Traffic and Circulation
- Air Quality
- Visual Quality/Aesthetics
- Water Resources
- Geology and Soils
- Biological Resources and Wetlands
- Cultural Resources

Noise
Waste Management
Public Facilities, Services, and Utilities
Energy and Sustainability
Intentional Destructive Acts

For many of the environmental resource areas assessed in the EA, the three site improvement projects that make up the Proposed Action would not result in either adverse or beneficial impacts because the project area and surrounding area lack sensitive receptors or resource areas that would be impacted (e.g., species of concern; on-site perennial creeks, streams, ponds, or floodplains; cultural resources; wetlands; low-income or minority populations; off-site noise receptors; agriculturally productive soils; or high commercial- or aesthetic-value geologic resources.) However, implementation of the three site improvement projects would result in some environmental impacts.

The proposed RFHP would result in emissions of criteria air pollutants and toxic air pollutants (TAPs). Based on a dispersion modeling analysis of the proposed RFHP, emissions of criteria air pollutants would not exceed National Ambient Air Quality Standards, nor would they pose a health risk based on the American Conference of Governmental Industrial Hygienists Threshold Limit Values or the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits. Although the proposed RFHP would substantially reduce the STM site's use of and reliance on natural gas (a limited and increasingly expensive fossil fuel) and would reduce emissions of geologically sequestered carbon dioxide (CO_2), it would also increase the site's net emissions of CO_2, a greenhouse gas.

Collectively, the three proposed projects would result in the loss of approximately 3 hectares (8 acres) of grassland and shrubland habitat. The RFHP and the SolarTAC Project would be constructed in or adjacent to natural drainages, which are among the site's most productive wildlife habitats and corridors. The drainages also support the site's richest vegetation. The MTPP would be an extension of DOE's existing mesa-top facilities. Although construction in this area was agreed to when the adjacent conservation easement was established in 1999, the mesa top is a sensitive environmental area where development is discouraged by local government and environmental interest groups.

Construction of the three proposed facilities would result in short-term (up to 1 year) increases in on-site traffic, noise, fugitive dust, auto and equipment emissions, and construction debris. Operationally, the proposed RFHP and the MTPP would have little impact on either on-site or off-site traffic. However, the proposed SolarTAC Project could attract up to 500 visitors a month. This influx could further strain already limited on-site parking and traffic flow. Until supplemental parking for the SolarTAC was constructed, there could be a need for NREL visitors to park off-site and walk to the site, or for the site to implement shuttle bus service to accommodate visitors.

The equipment and facilities that would be added to the STM site under the Proposed Action would not be unique to the site. The appearance of these facilities would in fact be similar to other buildings and PV panels that have been a part of the STM site for many years. As such, the addition of the RFHP, SolarTAC, and MTPP would add to, but would not substantially alter, the visual impact and character of the site. If the proposed facilities were noticed at all, the casual observer would likely note only that the added development resembled the structures already on the site

The proposed actions would not result in untreated operational discharges of pollutants to surface water or groundwater. Drains would be connected to the site's existing stormwater and sewage lines, and all discharges to the publicly owned treatment works would meet the requirements of the Metro Wastewater Reclamation District and the Pleasant View Water and Sanitation District.

The new construction would increase the impervious surface area, which could increase quantities of stormwater conveyed off-site. Management practices, including stormwater pollution prevention measures to minimize runoff, would be implemented to the fullest extent possible during construction to minimize degradation of surface water quality due to sediment and various chemicals associated with additional vehicles and construction equipment.

The Proposed Action would not increase the susceptibility of the STM site to intentional destructive acts.

The Proposed Action would be consistent with the overall objectives and mission of NREL and would occur within areas evaluated and committed to for further development in the 2003 site-wide EA.

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) proposes to construct and operate three site development projects at the National Renewable Energy Laboratory's (NREL) South Table Mountain (STM) site:

- A woodwaste-burning heating plant adjacent to the STM Field Test Laboratory Building (FTLB) that would use renewable fuel;
- Various solar technology advancement installations for research and demonstration at the STM complex, primarily northeast of the NREL Visitors Center;
- A solar power generation project on the STM mesa top.

In compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321 *et seq.*) and with DOE's NEPA implementing regulations (Title 10 Code of Federal Regulations [CFR] Part 1021) and procedures, this draft environmental assessment (EA) examines the potential environmental impacts, both individual and cumulative, of the Proposed Action. No other action alternatives are analyzed in this EA. For purposes of comparison, this EA also evaluates the impacts that would occur if DOE decided not to implement the Proposed Action (the No Action Alternative).

This draft EA has been prepared under DOE's regulations and guidelines for compliance with NEPA. It is being distributed to interested members of the public and to federal, state, and local agencies for review and comment prior to DOE's final decision on the Proposed Action.

1.1 The National Environmental Policy Act and Related Procedures

The Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508) and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021) require that DOE, as a federal agency:

- Assess the environmental impacts of its proposed actions;
- Identify any adverse environmental effects that cannot be avoided should a proposed action be implemented;
- Evaluate alternatives to the proposed action, including a no action alternative;
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterize any irreversible and irretrievable commitments of resources that would be involved should the proposed action be implemented.

These requirements must be met before a final decision is made to proceed with any proposed federal action that could cause significant impacts to human health or the environment. This draft EA is intended to meet DOE's regulatory requirements under NEPA and to provide DOE, the State of Colorado, and other agency decision-makers with the information they need to make informed decisions in connection with this Proposed Action.

1.2 Background

NREL History and Research Mission

NREL will mark its 30th anniversary in July 2007. In July 1977, DOE opened the Solar Energy Research Institute as a federal facility dedicated to harnessing solar power. In 1991, it achieved national laboratory status and was renamed the National Renewable Energy Laboratory (NREL). Today, NREL is one of 10 DOE national laboratories and is the nation's primary laboratory for renewable energy and energy efficiency research and development. NREL's mission is focused on advancing national energy policy and efficiency goals, particularly in the areas of renewable, wind, and solar energy research, development, demonstration, and deployment. NREL conducts research activities at the STM site in support of the following DOE research programs:

- Solar energy technologies
- Geothermal technologies
- Distributed energy, electrical infrastructure, and reliability
- Biomass
- Industrial technologies
- Freedom car and vehicle technology
- Hydrogen, fuel cells, and infrastructure technologies
- Buildings technologies
- Weatherization and intergovernmental grants
- Federal energy management
- Other DOE-sponsored programs
- Work for others supporting the DOE mission

NREL is operated for DOE through a partnership between Midwest Research Institute and the Battelle Memorial Institute. The laboratory comprises three main sites: STM, the adjacent Denver West Office Park (DWOP) in Golden, Colorado, and the National Wind Technology Center located just south of Boulder, Colorado. The STM and DWOP sites are collectively referred to as the STM complex. The three site development projects that make up the Proposed Action and are the subject of this EA would be implemented at the STM site. Figures 1-1 and 1-2 illustrate the regional location and local setting of the STM site and the Proposed Action.

1.3 Purpose and Need

The purpose of the Proposed Action is to support and advance DOE's mission in the research and development of energy efficiency and renewable energy technologies. DOE's Office of Energy Efficiency and Renewable Energy (EERE) leads the national research effort to develop clean, competitive, and reliable energy technologies for the 21st century. The goal of the EERE program is to improve the nation's overall economic strength and competitiveness, energy security, and environmental stewardship through the development, demonstration, and deployment of clean, competitive, and reliable power technologies. The three STM site development projects that make up the Proposed Action would contribute to achieving this goal.

Purpose of the EA

In 2003, DOE issued the *Final Site-Wide EA of the National Renewable Energy Laboratory's South Table Mountain Complex* (DOE/EA-1440) (DOE, 2003). That EA addressed future developments,

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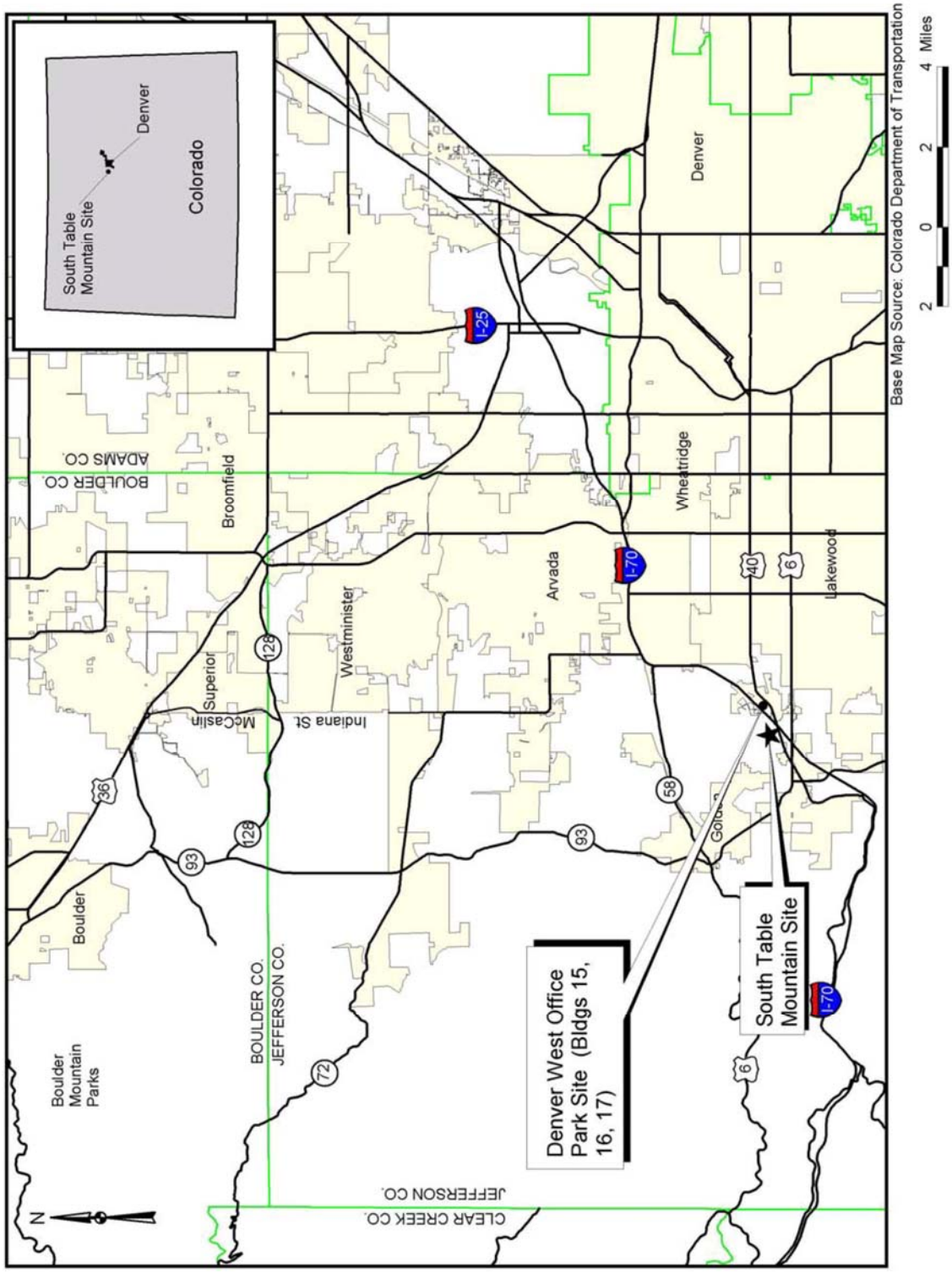

Figure 1-1. Regional Location of the STM Site

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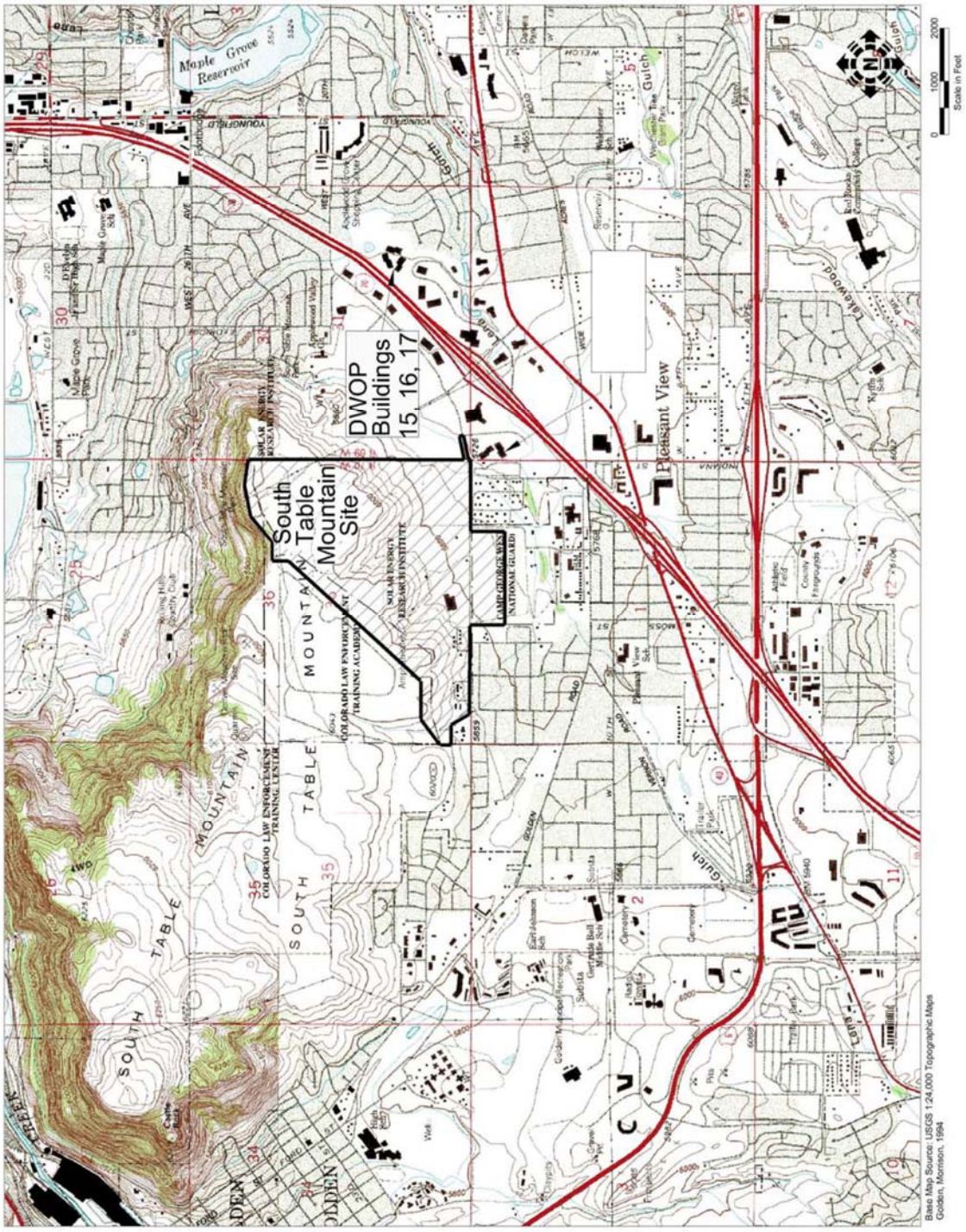

Figure 1-2. Local Setting of the STM Site

improvements, and on-site activities at the STM complex and future changes associated with changes to the STM site boundaries. The site-wide EA acknowledged that final designs and locations of some proposed or conceptual projects or facilities at the complex were uncertain and that various configurations were possible. The site-wide EA was prepared as a "bounding" analysis that would allow for future flexibility in implementing a range of potential activities. The bounding approach was used to evaluate potential environmental impacts resulting from an array of potential development options within a conceptually defined "buildout" scenario. The assessment considered a range of future site use and development options through 2008. In July 2003, DOE determined that the proposed or contemplated improvements assessed in the site-wide EA did not either individually or collectively constitute a major federal action significantly affecting the human environment within the meaning of NEPA.

Solar Technology Advancement Consortium (SOTAC)
SOTAC is a collaboration among DOE, utilities, and universities. The goal of the consortium is to provide research, education, and demonstration opportunities to accelerate the deployment of pre-commercial and early commercial solar energy technologies to the marketplace.

The site-wide EA analyzed impacts that would occur if site development occurred in areas that DOE believed would minimize the overall environmental impacts associated with sustainable site development. Moreover, it identified areas that should be set aside and preserved in a natural or existing state. Each of the three proposed projects that are the topic of this EA would occur in areas that were analyzed in the site-wide EA. DOE concluded that development in these areas would not constitute a major federal action significantly affecting the quality of the human environment.

The site-wide EA provides the analytical structure to assess the potential environmental impacts of the specific Proposed Action that is the topic of this EA. While DOE is also considering several other site development projects at this time, based on the availability of funds and project-specific schedules, those projects are not ripe for NEPA review at this time and are not evaluated in this EA.

The site-wide EA is incorporated in its entirety into this EA by reference, and this EA tiers off the descriptions of the affected environment and the potential environmental impact assessments presented in the site-wide EA. The site-wide EA is available at http://www.eere.energy.gov/golden/reading_room.html. Within the framework of the site-wide EA, this EA assesses the impacts of implementing the following three proposed projects at the STM site:

- a Renewable Fuel Heating Plant (RFHP);
- a range of solar-generating installations advanced by the Solar Technology Advancement Consortium (SOTAC). SOTAC activities to be conducted at NREL are hereafter referred to as the SolarTAC Project. The proposed SolarTAC activities at the NREL site are the only SOTAC activities assessed in this EA; and
- a Mesa Top Photovoltaic Project (MTPP).

Purpose of the Proposed Projects

Collectively, the proposed projects would substantially reduce NREL's use of natural gas and grid-provided electricity, while simultaneously advancing and contributing to commercialization of renewable energy technologies.

Renewable Fuel Heating Plant. The proposed RFHP would reduce NREL's current STM site natural gas consumption by an estimated 75 to 80 percent and also provide some measure of insulation from the volatility of natural gas prices. The project would also showcase the viability of woodwaste biomass fuels as an alternative to fossil fuel heating.

SolarTAC Project. The SolarTAC Project would accelerate the introduction and recognition of pre-commercial and early-commercial solar energy technologies in the U.S. marketplace. It would support and promote the *commercial* acceptance of solar energy technologies. The SolarTAC Project would provide a launch pad for commercialization of solar-generating technologies in Colorado and elsewhere, such that solar technologies would become an increasingly important and ultimately indispensable contributor to the energy use profile in the United States and across the world.

Mesa Top Photovoltaic Project. The proposed MTPP would generate about 1.0 megawatt (MW) of solar electric energy to offset NREL's growing energy demand. This is consistent with DOE's long-term site development plans and energy goals to increase on-site renewable energy generation at the laboratory

1.4 Scoping

On November 13, 2006, DOE posted a Request for Public and Agency Comments on the Proposed RFHP to the DOE Golden Field Office electronic reading room. The announcement invited comments through January 5, 2007, and indicated that no formal public scoping meeting was planned for this project.

On April 2, 2007, DOE posted a Request for Public and Agency Comments on the three projects that are the subject of this draft EA to the DOE Golden Field Office electronic reading room. This announcement indicated that no formal public scoping meeting was planned for these projects. A copy of this scoping letter is provided in Appendix A. DOE also mailed the scoping letter to the business, agencies, and organizations shown in Appendix B and to all known addresses in a nearby residential area called Pleasant View; the Pleasant View residential mailing list consisted of 1,470 addresses. DOE received three comments on the scope of the EA from federal and state agencies, which are included in Appendix C.

2.0 PROPOSED ACTION AND ALTERNATIVES

Figure 2-1 illustrates the STM and the relative locations of the three proposed projects on the site.

2.1 Renewable Fuel Heating Plant

The RFHP would be installed in a new building approximately 21 meters (70 feet) long, 11 meters (35 feet) wide, and 9 meters (30 feet) high. The footprint would be approximately 185 to 230 square meters (2,000 to 2,500 square feet) in the area behind (north of) the FTLB. The proposed RFHP would be constructed at the edge of a natural drainage that provides habitat and corridor passage for wildlife and intermittently supports lush vegetation. Construction is projected to take 6 to 7 months. NREL policy stipulates that construction debris is to be recycled to the fullest extent possible in order to minimize impacts to local landfills.

The building would have two levels. The ground floor would be at the existing service drive. A wood combustor, cyclone, hot water pumps, fuel processing equipment, fuel area, and ash hopper would be located on the ground floor. A boiler, expansion tank, truck access, and control room would be located on the mezzanine level of the building. If necessary, an enclosed walk could be installed from the FTLB mechanical room door to the new building to allow for easier access. The project would include installation of hot water distribution lines interconnecting the new facility to the Solar Energy Research Facility (SERF) central plant and the FTLB central plant. Detailed physical descriptions, illustrations, operating parameters, and economics of the proposed plant are provided in the *Final Proposal, Renewable Fuel Heating Facility, National Renewable Energy Laboratory, Colorado (*Ameresco, 2007) and in the *On-site Impact Assessment of Proposed Renewable Fuel Heating Plant, Ameresco, NREL, Golden Colorado* (Trinity Consultants, 2006), both of which are incorporated into this EA by reference.

A fuel storage area would be designed to store approximately 160 cubic meters (215 cubic yards) (equivalent to 4 to 7 days' worth) of woodwaste. A railed walkway would be installed on one side of the area to allow for access to the fuel storage pit. Motors and augers would be accessible on the other side of the fuel area to minimize unnecessary entry to the pit.

Fuel would be delivered at the building's east side, where a large overhead door would allow trucks to back into the fuel storage area. A concrete structure would prevent trucks from encroaching on the building footprint. The door would open via an electronic keypad system to limit entrance to authorized site personnel. A man door would also be located on the east side of the building to allow access to the control room when necessary. This door would be locked to limit unauthorized or unnecessary access.

The building would be constructed of architectural concrete block. It would be finished with a moisture barrier and exterior insulation. The finish would be similar to the FTLB finish. The roof of the building would be a single-ply flat construction. The building would be insulated to meet American Society of Heating, Refrigerating and Air-Conditioning Engineers standards. A stack would extend 3 meters (10 feet) above the roof and would be approximately 56 centimeters (22 inches) in diameter.

In addition to the new building, a driveway would be installed for trucks to access the building, requiring the extension of an existing culvert by 17 to 20 linear meters (55 to 65 linear feet) using 3.6-meter (12-foot) by 1.2-meter (4-foot) concrete block. The proposed RFHP would be constructed at the edge of a natural drainage area that provides habitat and corridor passage for wildlife and intermittently supports lush vegetation. DOE may decide to install a turnaround area to facilitate delivery truck traffic flow.

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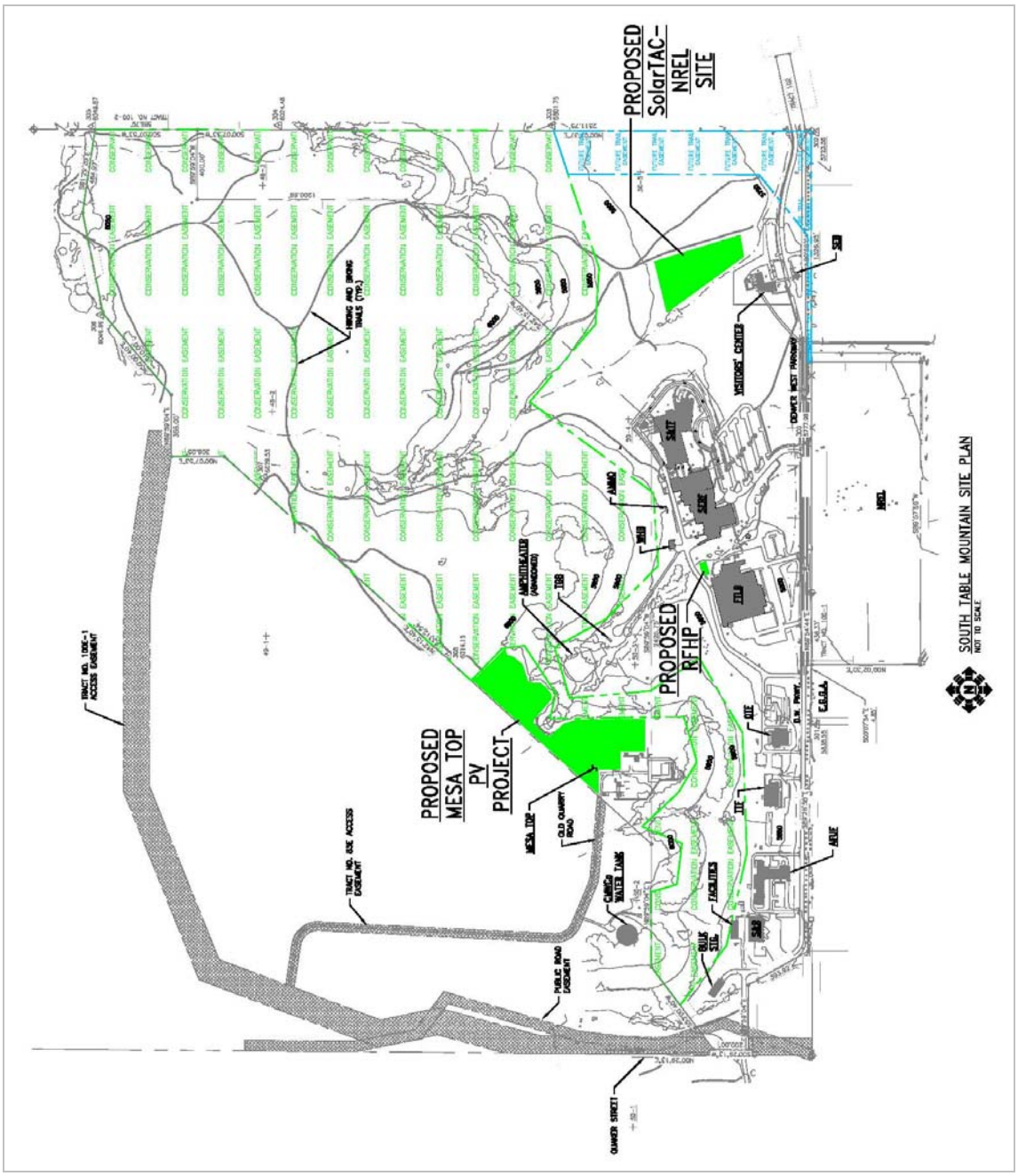

Figure 2-1. STM and the Relative Locations of the Three Proposed Projects on the Site

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However, the decision to install a turnaround area and the relative size, if one were installed, has not yet been finalized. A wing wall would be installed at the end of the culvert to prevent flooding into the building's ground floor. Approximately 1,650 meters (1,800 yards) of asphalt would be poured over the culvert for the driveway and the turnaround area. The area over the culvert would be regraded with 1.5 meters (5 feet) of fill for proper site drainage.

The RFHP would operate as the primary winter heat source to NREL's research and support facilities. Heating is currently supplied by natural-gas-fired boilers, and these boilers would remain available to supplement or replace RFHP demand as necessary. Fuel would consist of Rocky Mountain Front Range woodwaste such as construction waste, urban tree trimmings, pallets, and forest thinnings.

Equipment Description, Operation, and Specifications

The *Challenger Combustion System*™ proposed for use in the RFHP is designed specifically for the combustion of solid waste fuels to optimize energy recovery and minimize air emissions. The primary combustion zone would be lined with high-insulating cast refractory ceramics to minimize heat transfer to the unit exterior.

Woodwaste combustion would begin by directing three levels of air into the combustion zone. Primary air would be forced into the combustion zone from beneath the grates, where the fuel would be placed. Secondary air would be forced through side grates. Tertiary air would enter through the cast refractory located on the sides of the unit to prevent unburned fuel from exiting the unit.

A secondary ceramic chamber operating at 900 degrees Celsius (°C) (1,650 degrees Fahrenheit [°F]) would be included between the primary combustion zone and the boiler to allow for an extended combustion zone with a 1.3-second retention time. This design would reduce carbon monoxide and volatile carbon emissions by more than 70 percent. The appropriate combustion temperature would be maintained by adjusting fuel feed, fan speed, and air intake.

Once the fuel was combusted, the stack gas would be transitioned into a hot-water boiler. The boiler would be capable of producing up to 9 to 10 million British thermal units per hour of 30 pounds per square inch gauge hot water, or approximately 2,800 liters (750 gallons) per minute. Downstream of the boiler, exhaust gas would be directed through a multi-cyclone particulate separator. The exhaust gas would then pass through an insulated, single-skin flue and be vented to the atmosphere.

The combustor would be designed as a dual-fuel unit and could be operated on natural gas if woodwastes were unavailable. In the event that heating loads in excess of the RFHP output were required, or during down-time due to scheduled or unscheduled maintenance, the existing natural gas boilers would be brought on-line as needed to meet heating load demands. Natural gas would be utilized in the RHFP combustor during start-up, during shut-down, and during periods when the heating load dropped too low for woodwaste combustion.

Pollution control equipment would consist of a multi-cyclone to control particulate matter. The multi-cyclone would have a design capacity of 10,376 cubic feet per minute at 149°C (300°F). The combustion unit and associated equipment would be monitored and adjusted to maintain optimal efficiency of the pollution control equipment.

The multi-cyclone would be operated and maintained in accordance with the manufacturer's recommendations and incorporated into NREL's maintenance procedures. This would include periodic

measurement of the system pressure drop, tube cleaning, and visual inspections for plugging, holes, spinner damage, and unusual wear patterns.

Woodwaste fuel would be procured from commercial Front Range sources. Woodwaste acceptance criteria would be developed to ensure that contaminants and undesirable components were not combusted in the RFHP. At a minimum, woodwastes containing chemically treated, stained, painted, laminated, or otherwise altered wood products would be prohibited. Current plans call for approximately 160 cubic meters (215 cubic yards) of on-site fuel storage (approximately 59 metric tons [65 tons]). Fuel would be delivered three to five times per week at approximately 23 metric tons (25 tons) per load during the heating season. Total annual fuel consumption is estimated to be 2,722 metric tons (3,000 tons).

The major RFHP components would have an estimated 10- to 30-year lifetime. At the end of its useful lifetime, the RFHP would be decommissioned, removed, and disposed of as solid waste or recycled in a manner consistent with NREL's facilities management and waste management policies applicable at that time. Alternatively, equipment could be refurbished or replaced, as necessary, to continue with RFHP operation.

2.2 SolarTAC Project

The SolarTAC center would be located primarily outdoors. It would be constructed on approximately 0.8 hectare (2 acres) of land east of a natural drainage that lies northeast of the NREL Visitors Center. This area lies outside the site security area and would be provided by DOE through an agreement with the SOTAC.

Although buildout plans are not final, construction at the 0.8-hectare (2-acre) is estimated to take approximately 6 months. The site would be graded over a several-week period, concrete pads would be poured to support solar panels, a foundation would be poured for a solar demonstration house, and gravel or road base material would be installed for a walkway and access road. Management practices such as water spraying for dust suppression and storm water pollution prevention measures to minimize runoff would be identified and implemented during construction.

The SolarTAC center would showcase and test various solar energy generation, use, control, and communications equipment. The area would include residential photovoltaic (PV) systems, utility PV systems not requiring special safety precautions, stand-alone PV systems (e.g., bus-stop shelters, remote lighting), and similar systems. Solar arrays and communications equipment would be installed on various rooftops at NREL and at other locations not accessible to SolarTAC visitors. DOE expects that initial system sizes would range from 1 to 50 kilowatts (kW).

Plans include a small solar demonstration house of approximately 170 to 230 square meters (1,800 to 2,500 square feet) showing efficient insulation; a working PV system with inverter, batteries, and appliances; and information displays. A fenced-off area would control access to sensitive research equipment or equipment that could pose a hazard without proper training on its correct use.

A 3.6-meter (12-foot) wide contractor access and service drive terminating at a 30-meter (100-foot)-diameter turnaround area would be constructed immediately east of the proposed main SolarTAC facility arrays. This new driveway would cross a natural drainageway. The vehicle bridge would be strong enough to handle a fully loaded cement truck. The access would mainly be for the Fire Department, maintenance staff, and other service personnel. The driveway would be chained off to preclude people from using it for everyday access to the site.

A new pedestrian footbridge connecting the main SolarTAC displays to the NREL Visitors Center would also cross the natural drainageway. The footbridge would most likely be pre-engineered and constructed out of Corten steel, which gains strength as it oxidizes. The bridge would continuously gain a rusty patina as it aged, which would help the bridge blend more naturally with the environment.

Ultimately, the proposed SolarTAC could include construction of a new 54-space parking lot in the median area located south of the existing 39-space NREL Visitors Center parking lot. However, construction of this new parking area may be included in initial SolarTAC construction to alleviate the shortage of available parking.

2.3 Mesa Top Photovoltaic Project

The MTPP would be designed to generate approximately 1.0 MW of solar energy to be used on-site by DOE. The MTPP may be installed and operated by a contractor. If the project were contracted out, the anticipated length of the contract for operation of the system would be 20 years. If the equipment were still viable at the end of the 20-year period, it could continue to be used on-site.

If implemented, the system would probably be a "single-axis design" and/or "fixed-tilt design". For a single-axis design, dark-blue to black-colored panels would be installed parallel to the ground in a north-south alignment and would rotate east (morning) to west (afternoon). The maximum allowable PV panel height would be 2.4 meters (8 feet) above the ground to minimize the visual impact of the PV system. If a fixed-tilt design were implemented, the number of panels would increase by about 15 percent, and the panels would be installed in rows running east-west and sloped to the south at approximately 40 degrees.

The proposed installation would be located on approximately 2 hectares (5 acres) of flat land north and east of the existing Solar Radiation Research Laboratory and Solar Furnace buildings. Buildout plans are not final; however, construction at the site is estimated to take approximately 6 months. Although the site is generally flat, grading could be necessary. Concrete pads would be poured to support solar panels, and possibly to support utility lines if poles were used. The MTPP would be enclosed by a fence similar to the existing fence, which is a 2-meter (6-foot) chain link fence with three strands of barbed wire on top.

Although there is an existing road to the site, it is likely that a new service drive would be needed within the 2-hectare (5-acre) site. The surface of the drive would be permeable material such as road base or gravel. Management practices such as water spraying for dust suppression and storm water pollution prevention measures to minimize runoff would be identified and implemented during construction. Once installation was complete, the need for human presence would be rare (probably one visit per week for a short inspection).

Interconnection would likely be through an existing, spare 13.2-kilovolt (kV)/480-volt (V) three-phase transformer with a 1-MW capacity. This transformer is located in the middle of the proposed MTPP site, so minimal electrical infrastructure would be required between the PV system and the transformer. The transformer ties into the NREL 13.2-kV distribution system that feeds all STM site loads. New interconnection cables would be installed either on the ground surface, underground, or possibly on a limited number of new overhead utility poles and power lines.

Security lighting would be required. DOE NREL would install lighting similar to lights currently installed at DOE's existing mesa-top facilities. To minimize impacts to dark skies at night, a motion sensor would be installed on each light, with the timer set at a relatively short interval, such as the current interval of 5 minutes.

Solar PV panels have useful lives of up to 30 years. Consequently, the panels currently in place at NREL and those that would be installed as part of the Proposed Action would eventually be either removed and disposed of as waste or recycled. PV products are generally safe for landfills, because PV materials are usually encased in glass or plastic, and many are insoluble. Some modules, however, could be classified as hazardous waste, a situation that is prompting the PV industry to develop recycling processes for modules. Currently, most PV panels and cells collected from NREL research and testing are disposed of as hazardous waste due to arsenic, cadmium, or lead content (the lead is not present in the PV panel, but in the solder connecting the panel to an electrical junction box).

Because PV systems are widely dispersed, and because each system has small amounts of semiconductor material per cell, recycling PV materials would be a challenging task. The PV industry's effort to develop recycling processes is in response to this challenge. Because solar panel disposal is in its infancy, it is not possible to specify how or where the MTPP panels would ultimately be disposed of or recycled.

2.4 No Action Alternative

Under the No Action Alternative, the three proposed projects would not be implemented and the STM would remain in its current configuration. The No Action Alternative would not preclude other projects addressed or contemplated in the site-wide EA from being proposed at such time as NREL determined them to be ripe for NEPA action.

2.5 Alternatives Considered But Not Analyzed

DOE considered alternative locations for each of the projects that make up the Proposed Action. In general, these alternative locations were not further analyzed because the proposed locations evaluated in this EA were found to be the most consistent with the overall buildout vision articulated in the site-wide EA.

The proposed location for the MTPP would be much closer to the road, the spare transformer, and the existing utility lines than alternative locations, thereby keeping the need for new support infrastructure to a minimum. An alternative location for MTPP northeast of a new Science and Technology Facility (S&TF) was not further evaluated due to the smaller available area and the possibility of future shading from buildings that might be built to the south. An alternative location for the RFHP north of the roadway was considered. However, the proposed location for the RFHP was considered better because it is closer to the FTLB and SERF. Alternative locations were also considered for the SolarTAC Project; however, because those locations had competing proposed uses and because they were all behind the security fence, they were not considered further.

3.0 EXISTING ENVIRONMENT AND ENVIRONMENTAL IMPACTS

General Site Description

The 132-hectare (327-acre) STM site is located on the southeast side of STM, north of Interstate 70 (I-70) and west of the I-70 and Denver West Boulevard interchange in unincorporated Jefferson County near Golden, Colorado. The DWOP is located in the city of Lakewood. The areas surrounding the STM and DWOP sites are within portions of unincorporated Jefferson County, as well as the Cities of Golden and Lakewood in Jefferson County. The Pleasant View Metropolitan District, within unincorporated Jefferson County, overlies portions of each of these jurisdictions. These jurisdictions are described and illustrated in detail in the site-wide EA (DOE, 2003).

Of the 132 hectares (327 acres) at the STM site, 55 hectares (136 acres) are available for development. A total of 72 hectares (177 acres) is protected by a conservation easement, and development on 5.7 hectares (14 acres) is restricted by utility easements. There are currently seven laboratory facilities, a few small test facilities, and several support buildings on the site. The site includes acreage on the STM mesa top, slope, and toe and was formerly part of the Colorado National Guard facility, established between 1903 and 1924, at Camp George West. Figure 2-1 illustrates the STM site and the locations of the three proposed improvement projects that are the subject of this EA.

The following descriptions of the existing environment and potential environmental impacts tier off and generally follow the structure of the site-wide EA (DOE, 2003). The descriptions of the existing environment in this EA summarize the descriptions found in the site-wide EA when they remain current; otherwise, this EA describes relevant changes since the site-wide EA was issued. Many of the impacts expected from the three development projects proposed in this EA are bounded by the impacts reported in the site-wide EA. In cases where impacts from any of the three development projects are not bounded by the site-wide EA (for example, air quality impacts from RFHP emissions), more detailed discussions are provided.

3.1 Environmental Impacts of the Proposed Action

3.1.1 Land Use, Planning, Socioeconomics, and Public Policy

3.1.1.1 Existing Environment

The descriptions of land use, planning, socioeconomics, and public policy found in the site-wide EA remain current and are summarized below.

Current land use at the site includes research and development facilities, office space, support buildings, and testing areas. The STM complex (including the DWOP space that is leased to DOE) provides 48,000 square meters (516,000 square feet) of facilities and workspace for approximately 1,200 workers (employees, temporary personnel, and contract workers).

A 72-hectare (177-acre) conservation easement was established in 1999 in exchange for 10 hectares (25 acres) of developable land that is included in the 55 developable hectares (136 developable acres) on the southernmost portion of the site. Jefferson County is designated as the “beneficiary” of this conservation easement. The goals of the conservation easement are to:

- Retain, preserve and protect natural, scenic, ecological, and historical aspects of the conservation easement property;

- Protect the ecosystem of the STM area and the sustainable habitat for biodiverse vegetation, birds, and terrestrial animals;
- Ensure the scenic and biological integration with adjoining open-space land;
- Prevent further industrial, commercial, or residential development of the conservation easement property; and
- Preserve the conservation easement property as natural open space.

As described in the site-wide EA, DOE has established seven zones on the STM site for the management of ongoing and future site land use and development. The zones are illustrated in Figure 3-1.

The RFHP would be located in Zone 4, the NREL Central Campus. This 22-hectare (55-acre) zone includes major DOE facilities such as SERF, FTLB, and the recently completed two-story, approximately 6,600-square-meter (71,000-square-foot) S&TF. It also includes wet laboratories and space for research such as experiments with hydrogen, toxic gases, PV, biofuels, and industrial technology. This portion of the site is considered suitable for project demonstration and is considered the center of the STM complex. The proposed SolarTAC Project would be constructed partly in Zone 4 and partly in Zone 5, which is designated as an area where general research, development, demonstration, and support facilities could be located. The MTPP would be located in Zone 1, the top of the Mesa Buildable Area. This 5.3-hectare (13-acre) zone includes land designated for specialized research such as solar collection and solar radiation. Additional facilities, if any, would be of minimal size, low occupancy, and designed for minimal disruption to views of the mesa. There are approximately 42 hectares (105 acres) of mesa-top land within the STM site. Approximately 37 hectares (92 acres) of mesa-top land are within the conservation easement area, leaving 5 hectares (13 acres) of mesa-top land available for development.

The mesa top is subject to various local government policies and agreements intended to limit development. Previous plans to develop these areas for non-DOE activities have met substantial public criticism, have generated broad community controversy, and/or have been denied by local government. As a federal agency, DOE is generally exempt from local government regulation; however, DOE is sensitive to local community and state concerns. It is DOE's intent to minimize its developments on the mesa top, while still fulfilling its mission of research, development, and technology transfer of renewable energy and energy efficiency technologies.

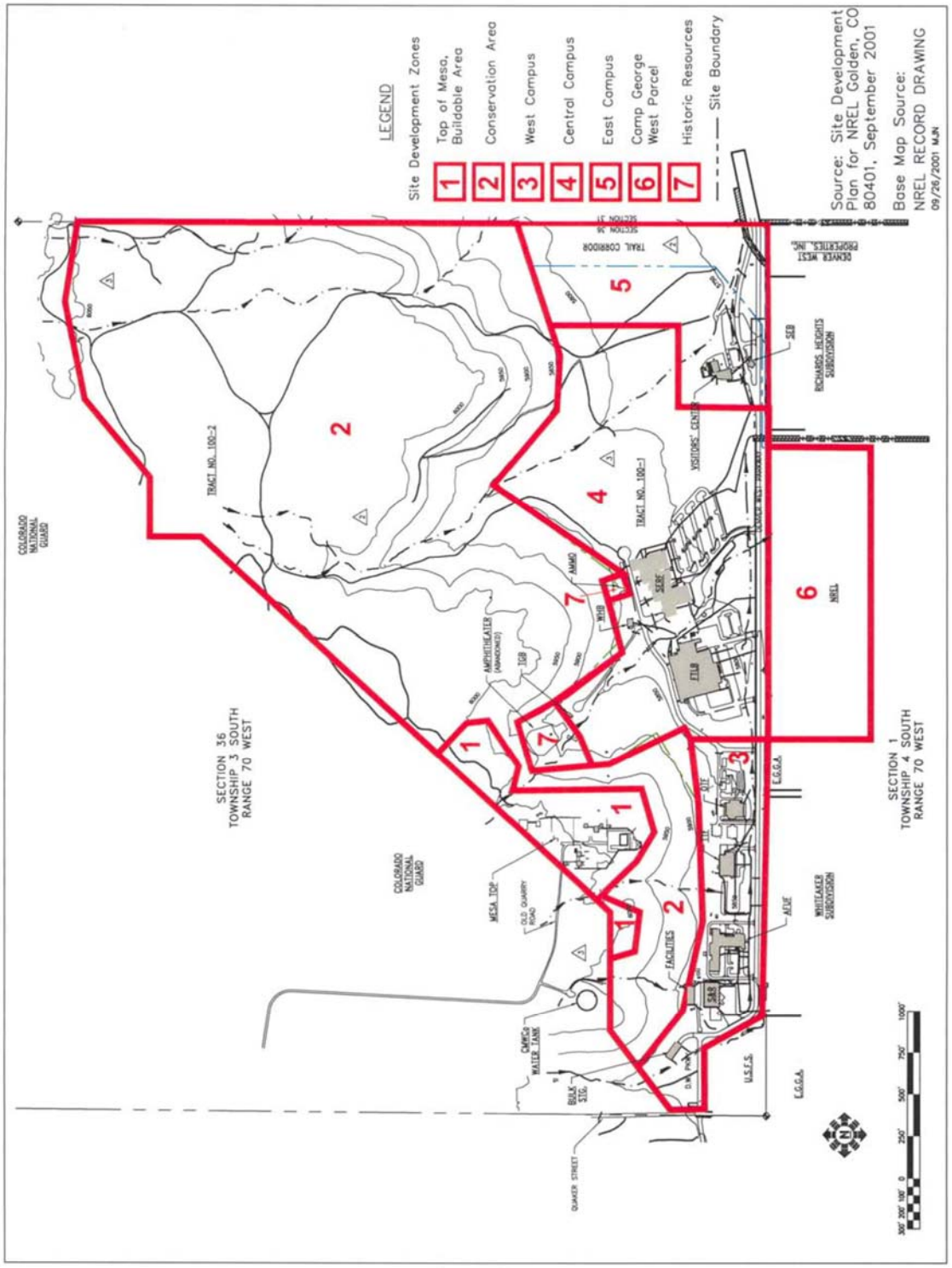
3.1.1.2 Impacts of the Proposed Action

The land use, planning, socioeconomics, and public policy impacts of the three proposed site development projects are bounded by the discussion of impacts presented in the site-wide EA (DOE, 2003) and are summarized below.

Renewable Fuel Heating Plant

The proposed RFHP would be a de-facto, free-standing annex to the existing FTLB and SERF physical plants. It would be situated near the center of the NREL Development Zone 4 (Central Campus), where it would be generally consistent with and compatible with the current land use pattern and ongoing NREL operations. Its construction would convert approximately 0.2 hectare (0.5 acre) of undeveloped hillside and drainageway land between the FTLB and the SERF to site infrastructure use. The RFHP would be built adjacent to the FTLB. The major land use issues at the STM (exclusive of mesa-top issues)

1



Source: DOE, 2003, Figure 2-1

Figure 3-1. Site Development Zones and Proposed Improvements at the STM Site

2

primarily relate to development in close proximity to residential areas located south of Zone 3 (West Campus); residential areas east and west of Zone 6; a planned park located south of Zone 6; and the Camden Denver West condominiums located east of Zone 5. The proposed RFHP would not impact land use in these areas.

SolarTAC Project

The proposed SolarTAC Project would be built in NREL Development Zone 5 (East Campus), with some overlap into Zone 4, an area that is undeveloped except for the NREL Visitors Center and east entrance. However, Zone 5 is designated as an area where general research, development, demonstration, and support facilities could be located. The new installations would allow for increased research, development, and demonstration activities that would be consistent with existing and planned uses of NREL Development Zones 4 and 5. The major land use issues at the STM (exclusive of mesa-top issues) primarily relate to development in close proximity to residential areas located south of Zone 3 (West Campus); residential areas east and west of Zone 6; a planned park located south of Zone 6; and the Camden Denver West condominiums located east of Zone 5. SolarTAC would not impact land use in these sensitive areas.

Mesa Top Photovoltaic Project

The proposed MTPP would be located adjacent to the existing Solar Radiation Research Laboratory. It would convert approximately 2 hectares (5 acres) of open, undeveloped mesa-top land to a restricted access area used for the commercial generation of solar energy. Development of mesa-top areas for non-DOE purposes is discouraged by local government policy and has been the subject of community controversy. However, controversies over previous commercial proposals to develop portions of the mesa top for activities not related to DOE operations were in part the basis for the land transfer that resulted in the formation of the approximately 72-hectare (177-acre) Zone 2 conservation area and the decision to prevent development in Zone 7 (Non-contiguous Historic Resource Areas). For these reasons, and because the only new development proposed on the 5 hectares (13 acres) of Zone 1 is the MTPP, the land use impact on the mesa top would not be major. All of the areas that would be developed for the MTPP are areas that were agreed could be developed when the conservation easement was established in 1999.

The site-wide EA determined that development within the bounding conditions of the EA would have no direct impacts on minority populations because no off-site human health or environmental effects of the Proposed Action were anticipated, and because no concentrations of minority populations were located in the vicinity of the site. The site-wide EA also determined that the Proposed Action would have positive direct and indirect economic impacts because it would create jobs and involve substantial construction expenditures. The socioeconomic, environmental justice, policy, and planning impacts of the three development projects that are the subject of this EA are bounded by the impacts described in the site-wide EA.

3.1.2 Traffic and Circulation

3.1.2.1 Existing Environment

The description of existing traffic and circulation at the STM complex reported in the site-wide EA was based on consultation with local governments and the information and findings presented in a traffic impact study prepared by Felsburg Holt & Ullevig for the STM site in November of 2002 (NREL, 2002a). Recently, Felsburg Holt & Ullevig have prepared a draft update of the 2002 traffic impact study

(NREL, 2007a). Both the 2002 traffic impact study and the 2007 update are incorporated into this EA by reference and are summarized below.

Using methods documented in the *Highway Capacity Manual* (TRB, 2000), existing peak-hour traffic volumes were analyzed to determine existing operational conditions. The *Highway Capacity Manual* describes traffic operational conditions with a level of service (LOS), a qualitative measure based on the average delay per vehicle at a controlled intersection. LOSs are described by a letter designation of either A, B, C, D, E or F. An LOS "A" represents conditions with minimal delay, while a LOS "F" represents conditions with much longer delays. Typically, a LOS of "D" or better is considered to be acceptable. The results of the analyses indicated that all of the study intersections currently operate at acceptable levels of service ranging from LOS A to LOS C during the peak hours.

3.1.2.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

During RFHP construction, there would be a temporary increase in vehicles and increased demand for limited on-site parking to accommodate the construction workforce, which DOE estimates would be 2 to 3 dozen workers for 6 to 7 months. Construction-related traffic impacts are anticipated to be similar in nature to, although less severe than, those recently experienced at the site during construction of the S&TF. Temporary disruptions of on-site traffic flows and access could occur. DOE does not anticipate that construction of the RFHP would impact off-site traffic or parking.

Operationally, there would be no traffic impacts because no additional personnel would be hired to operate the RFHP; the existing boiler plant operators would operate the RFHP as part of their work responsibilities. Currently, about 30 trucks per week enter the site for various deliveries. Delivery of woodwaste fuel and pick-up of ash would require three to five new truck trips per week during the October through May operating season. This would not represent a major increase over the current on-site truck traffic. However, the 27- to 31-metric ton (30- to 35-ton) capacity trucks that would be used to deliver approximately 23 metric tons (25 tons) of biomass per trip would be large. The trucks would unload directly into an interior pit within the RFHP structure. Truck deliveries would be arranged to be made Monday through Friday. The large delivery trucks could have difficulty negotiating on-site roads, especially when accumulated snow further constricted the roads. DOE is considering a turnaround area to expedite woodwaste deliveries at the RFHP. Installation of a large turnaround area would minimize any traffic impact such deliveries would have on on-site traffic flow. If no turnaround were installed, woodwaste deliveries could temporarily impede on-site traffic flow.

SolarTAC Project

Construction of SolarTAC would result in a short-term increase in on-site traffic caused by commuting construction workers. In the long term, DOE estimates that the SolarTAC Project could attract approximately 500 visitors per month. This could be in addition to the approximately 1,500 individual who currently visit the NREL Visitors Center each month. In a later phase of its implementation, the proposed SolarTAC would include construction of a new 54-space parking lot in the median area located south of the existing 39-space NREL Visitors Center parking lot. However, unless and until construction of the new parking area lot was complete, the increased number of visitors would probably result in the existing parking area often being filled to capacity. Some visitors might have to park off-site, then walk up the road to reach the Visitors Center or the SolarTAC. In areas where sidewalks are lacking, this could pose a safety risk to pedestrians. Depending on traffic and the distance to the nearest parking, the use of a shuttle bus to transport visitors may be required.

Mesa Top Photovoltaic Project

Construction of the MTPP would result in a short-term increase in on-site traffic caused by commuting construction workers. In the long term, there would be a slight increase in traffic at the mesa top due to the need for weekly inspections and system maintenance.

3.1.3 Air Quality

3.1.3.1 Existing Environment

Detailed descriptions of the existing air quality at the STM are provided in the site-wide EA. These descriptions address climate (Section (3.3.1), air quality regulatory authorities (Section 3.3.2), emissions sources (Section 3.3.3), and STM site permit status (Section 3.3.4). They remain current and are summarized or updated below.

Air Quality

National Ambient Air Quality Standards (NAAQS) set the absolute upper limits for specific air pollutant concentrations in order to protect human health. These pollutants are called criteria pollutants and consist of carbon monoxide (CO), nitrogen oxides (NO_X), sulfur dioxide (SO_2), ozone, particulate matter less than 10 microns (PM_{10}), lead, and volatile organic compounds (VOCs). A geographic area that meets or exceeds the limit for a particular criteria pollutant is called a nonattainment area. Areas where pollutants are measured below the limits are called attainment areas. The Denver metropolitan area was in attainment for all criteria pollutants as of April 2007.

An air emissions inventory dated July 2001 indicates that the STM site lists numerous stationary sources of air emissions. The sources consist of boilers, water heaters, back-up generators, building heaters, and a thermochemical process development unit (or thermal oxidizer) used for research activities. Emissions from the 2001 inventory are listed in Table 3-1. These emissions are reasonable estimates of current site-wide emissions at the STM because no major additional emitting sources have been added since the site-wide EA.

Table 3-1. Estimated Annual Emissions at the STM Site, 2001

Type of Air Emission	Particulates	SO_2	NOx	CO	TOC
	Tons per Year (TPY)				
Potential Emissions	2.86	5.18	46.41	23.21	3.63
Estimated Emissions	0.39	0.13	5.33	3.87	0.55

TOC = total organic carbon.
Source: NREL, 2001.

With respect to hazardous air pollutants, the STM site emits extremely small quantities of materials from laboratory hoods. Examples of the source of these hazardous air pollutants include acetone, cyclohexane, toluene, xylene, phosphoric acid, and sulfuric acid. The emission quantities are well below notification and permit thresholds. Fugitive dust is also emitted from the STM and DWOP sites in the form of unplanned emissions that escape from a process by a route other than a stack, chimney, or vent. These emissions are minor. Another source of fugitive dust is windblown soil. Construction activities at the STM site have the potential to increase fugitive dust levels by disturbing soil.

For State of Colorado permitting requirements, a major stationary source is one that has the potential to emit, when operated at maximum load for 8,760 hours per year, more than 100 tons per year (TPY) of any criteria pollutant, or more than 5 TPY of any hazardous air pollutant. NREL is not a major source, and the major source permitting requirements do not apply. Operating permits may be issued for sources with thresholds under 100 TPY; these are called minor sources. NREL currently is not required to obtain a minor source operating permit.

3.1.3.2 Impacts of the Proposed Action

RFHP Air Quality Impacts

The proposed RFHP would result in emissions of the following criteria air pollutants: PM_{10}, NO_X, sulfur oxides, carbon monoxide (CO), and VOCs.

The RFHP would also emit both organic and trace element toxic air pollutants (TAPs). In addition, the two to five woodwaste delivery trucks per week and one ash removal truck per month during the RFHP operating season would result in a small incremental increase in vehicle exhaust emissions at the STM site compared to existing emissions.

A dispersion modeling analysis of the proposed RFHP emissions was conducted in 2006 (Trinity Consultants, 2006). The analysis was based on available emission factors provided by the U.S. Environmental Protection Agency (EPA) and vendor control data and is incorporated into this EA by reference. The screening dispersion modeling analysis was conducted in accordance with EPA's *Guideline on Air Quality Models* (40 CFR 51, Appendix W) and *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised.* The modeling analysis used 22 receptors located at the S&TF, the SERF, and the FTLB at distances ranging from 13 to 274 meters (42 to 900 feet) from the RFHP emission source. TAP emissions were quantified using emission factors from AP-42 for uncontrolled wood combustion. Although the increased residence time from the secondary combustion chamber would destroy most of the organic emissions, and the multi-cyclone would capture some of the TAP emissions, no control was assumed in the analysis. Consequently, the analysis conservatively overestimates the TAP emissions.

DOE filed an Air Pollution Emission Notice and permit application package for the proposed RFHP with the Colorado Department of Public Health and Environment (CDPHE) on March 16, 2007 (NREL, 2007b). In response, CDPHE has issued an initial approval for construction of the proposed RFHP as a minor source at a minor facility. The initial approval, shown in Appendix D, lists all applicable air permitting requirements for construction of the proposed RFHP and conditions that must be met for operation.

As shown in Table 3-2, the predicted RFHP criteria air pollutant emissions would not exceed NAAQS.

The dispersion modeling analysis indicated that emissions of TAPs from the RFHP would not pose a health risk based on the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs). Specifically, the analysis of emissions from the RFHP as shown in Table 3-3 demonstrates that the quantities of pollutants emitted would all be below, and most would be several orders of magnitude below, the 8-hour health-based standards. Therefore, there would be no impacts to the health of either on-site workers or the off-site public from RFHP emissions.

Table 3-2. Predicted Emissions Compared to NAAQS

Pollutant	Averaging Period	RFHP Emissions [a] ($\mu g/m^3$)	NAAQS [b] ($\mu g/m^3$)
NO_2	Annual	39	100
SO_2	Annual	4	80
	24-hour	22	365
	3-hour	50	1300
PM_{10}	Annual	26	50
	24-hour	129	150
CO	8-hour	280	10,000
	1-hour	100	40,000

a. Source: Trinity Consultants, 2006.
b. Source: CFR, Title 40, Part 50.
Note: $\mu g/m^3$ = micrograms per cubic meter.

Odor information provided by the vendor (Ameresco, 2007) indicates that noticeable levels of odors would be present during start-up and shut-down, corresponding to periods when the operating temperature is anticipated to be below 315ºC (600ºF) to 371ºC (700ºF). However, odors would be minimized by the planned firing of the equipment with natural gas during those periods in order to quickly bring the unit up to operating temperature. If for any reason natural gas were not available during start-up and shut down periods, odors could be noticeable for 40 to 60 minutes. The woodwaste fuel supply would be contained in an enclosed building with an auger live-bottom delivery system. This design would prevent the woodwaste from sitting dormant and decomposing.

Opacity information provided by the equipment manufacturer indicates that exhaust gases exiting the stack would not result in a visible plume at temperatures of 371ºC (700ºF) and above. It is anticipated that opacity would be less than 5 percent. Data collected by the manufacturer on a similar but smaller combustion unit indicated opacity at less than 2 percent. Opacity impacts would be minimized by firing the equipment with natural gas and quickly heating the system above 371ºC (700ºF). If for any reason natural gas were not available during start-up and shut down periods, opacity impacts could occur for 40 to 60 minutes.

Comparison of Greenhouse Gas Emissions

The current NREL heating plant uses natural gas; the RFHP would predominantly use a biomass fuel (woodwastes), with some continued use of natural gas during start-up and shut-downs and during periods of low demand. Both the existing natural-gas-fired plant and the RFHP would emit the greenhouse gas carbon dioxide (CO_2). The Third and Fourth Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC, 2001; IPCC, 2007) provide an overview of the global effects of greenhouse gases that tend to warm the earth surface by absorbing some of the infrared radiation it emits.

> "The principal anthropogenic [man-made] greenhouse gas is carbon dioxide (CO_2), whose concentration has increased by 31% since 1750 to a level which is likely to have not been exceeded for 20 million years. This increase is predominantly due to fossil fuel burning, but also to land-use change, especially deforestation. The other significant anthropogenic greenhouse gases are methane (CH_4) (151% increase since 1750, 1/3 of CO_2's radiative forcing), halocarbons such as CFCs and their substitutes (100% anthropogenic, 1/4 of CO_2's radiative forcing) and nitrous oxide (N_2O) (17% increase since 1750, 1/10 of CO_2's radiative forcing)."

Table 3-3. Comparison of Maximum Predicted Impact to Health-Based Standards

Pollutant	RFHP Emission 8-Hr Average (µg/m^3)	8-Hr Health-Based Standard (µg/m^3)	Would this Concentration Present a Health Hazard? (Yes/No)
Carbon monoxide	280	40,000	No
Sulfur dioxide	39	5,000	No
Nitrogen oxide	340	30,000	No
VOC	7.9	29,000	No
Carbon dioxide	240,000	9,000,000	No
Nitrous oxide	20	46,000	No
Acetone	0.3	1,187,730	No
Acetophenone	0.000005	49,141	No
Acrolein	6.2	250	No
Benzene	6.5	1,597	No
bis(2-ethylhexyl) phthalate	0.000073	5,000	No
Methyl bromide (bromomethane)	0.023	3,883	No
2-Butanone (MEK)	0.0084	589,829	No
Carbon tetrachloride	0.07	31,456	No
Chlorine	1.2	1,450	No
Chlorobenzene	0.051	46,037	No
Chloroform	0.044	48,826	No
Chloromethane (methyl chloride)	0.036	103,247	No
Crotonaldehyde	0.015	6,000	No
1,2-Dichloroethane	0.045	4,000	No
Dichloromethane	0.45	173,681	No
1,2-Dichloropropane	0.051	350,000	No
Ethylbenzene	0.048	434,233	No
Formaldehyde	6.8	20	No
Methane	33	656,033	No
Naphthalene	0.15	52,429	No
Pentachlorophenol	0.000008	500	No
Phenol	0.079	19,245	No
Styrene	3	85,202	No
Tetrachloroethylene	0.059	169,564	No
Toluene	1.4	188,446	No
1,1,1-Trichloroethane	0.048	1,900,000	No
Trichloroethylene	0.047	268,689	No
Vinyl Chloride	0.028	2,556	No
o-Xylene	0.039	435,000	No
Antimony	0.012	500	No
Arsenic	0.034	10	No
Barium	0.26	500	No
Beryllium	0.0017	2	No
Cadmium	0.0064	2	No
Chromium	0.033	500	No
Chromium (VI)	0.0054	50	No
Cobalt	0.01	20	No
Copper	0.14	200	No
Lead	0.075	50	No
Manganese	2.5	200	No
Mercury	0.0054	25	No
Molybdenum	0.0033	10,000	No
Nickel	0.051	1,500	No
Phosphorus	0.042	100	No
Selenium	0.0044	200	No
Silver	2.6	10	No
Tin	0.036	2,000	No
Yttrium	0.00047	1,000	No

Source: Trinity Consultants, 2006.

The IPCC (2007) attributes about three-quarters of the anthropogenic emissions of CO_2 to the atmosphere during the past 20 years to fossil fuel burning. The rest is attributed predominantly to land-use change, especially deforestation.

Table 3-4 shows that the proposed RFHP would emit more CO_2, from an absolute quantity perspective, than is being currently emitted with natural gas firing. Therefore, a technical review of the available literature (Droppo and Yu, 2007) was prepared to address (1) whether, despite an increase in absolute CO_2 emissions, the RFHP would be considered reasonable and justifiable in terms of greenhouse gas emissions and climate change, and (2) how the proposed RFHP combustion process emissions would compare with other means of disposing of or using wood chips.

Table 3-4 compares emissions under the No Action Alternative (i.e., continued operation of the current natural gas heating plant), emissions from the proposed RFHP, and emissions from open burning of an equivalent mass of wood.

While the available literature suggests that CO_2 emissions from the RFHP would be similar to those that would occur from open burning of wood, it also finds that the higher combustion temperatures and secondary combustion systems of the RFHP would not emit the greenhouse gas methane (CH_4). Furthermore, when compared to open burning, the proposed plant would also be desirable in terms of the emission of other pollutants. The comparisons in Table 3-4 indicate that open burning would significantly increase the emissions of CO, total particulate matter, and VOCs over the RFHP, all of which are criteria air pollutants.

In terms of net CO_2 in the atmosphere, the argument has been advanced, based on current scientific understanding on climate change processes, that burning wood chips is much more desirable than burning a fuel that contains carbon that has been sequestered underground. The CO_2 from wood chip combustion has a "net zero" emission rate based on factors in EPA's AP-42 (EPA, 2007). The "net zero" emission

Table 3-4. Comparison of Emissions: Current Plant, Proposed Plant, and Open Burning

Emission Gas	No Action (natural gas)	Proposed RFHP			Emission Rate Computed for the Combustion of an Equivalent Mass of Wood			
		Total from Wood and Natural Gas	Wood Portion	Natural Gas portion	Rocky Mountain wildfire forest burning AP-42 emission factors (a)	Forest wastes burning AP-42 emission factors (b)	Sundance Fire emission factors from Ward and Hardy (1991)	Modeled Emissions From Eight Major California Forest Fires (Clinton et al., 2006)
	TPY							
CO	2.06	1.93	1.40	0.53	270	176-380	590	340 - 381
SO_2	0.015	0.586	0.583	0.004	Not listed	Not listed	Not listed	3.3 -3.6
NOx	2.45	5.75	5.13	0.63	7.9	Not listed	27	10 - 12
PM	0.186	5.17	5.13	0.048	33	7.8 – 33	74	Not listed
PM_{10}	0.047	4.67	4.66	0.012	Not listed	Not listed	Not listed	35 - 39
VOC	0.135	0.074	0.040	0.035	47	7.8 - 37	Not listed	24 - 25
CO_2	2,941	5,297	4,544	753	Not listed	Not listed	6,030	4,450 – 4,910
CH_4	(c)	(c)	(c)	(c)	Not listed	Not listed	2.5 - 6.4	14 - 15

a. Estimated based on Rocky Mountain wildfire forest burning emission factors (AP-42, Table 13.1-3) [EPA, 2007].
b. Estimated based on forest wastes burning emission factors (AP-42, Table 2.5-5) [EPA, 2007].
c. No value listed; expected to be negligible.

rate is based on an assumption that CO_2 from burning wood from forests represents no increase in the net amount of CO_2 in the atmosphere. A cycling of carbon between the atmosphere and forests results in no net gain or loss of airborne CO_2. On the other hand, CO_2 from burning natural gas represents an increase in the net amount of atmospheric CO_2 from the introduction of "new" carbon that has been sequestered underground for millennia or longer. Thus, the primary argument supporting the proposed RFHP is to reduce the introduction of new carbon into the current atmospheric carbon cycle.

It should be noted, however, that based on a recent Supreme Court ruling, the EPA's decision basis for not regulating CO_2 and other greenhouse gases may change [*Massachusetts v. U.S. Environmental Protection Agency*, 549 U.S. __ (2007) (slip opinion dated April 2, 2007)]. According to the ruling, EPA's action not to regulate greenhouse gas emissions was "arbitrary, capricious, or otherwise not in accordance with law". Under the ruling, EPA must reconsider its decision and ground its reasons for action or inaction in the Clean Air Act statute. The ruling states that unless EPA can show that CO_2 is not involved in the global warming seen around the world, the EPA should regulate it. Given the timing of this decision and the fact that the ruling was made in the context of regulating greenhouse gases from new motor vehicles, at this time it is too speculative to estimate what actions EPA may take, or what regulations might be promulgated, that might affect the RFHP.

From the viewpoint of minimizing impacts on global climate change, the burning of wood chips also tends to be more desirable than the common alterative use of wood chips in composting activities and land filling. Although there is great variability and uncertainty in the published emission rates, the gaseous emission from open burning, composting, and landfilling tend to have much larger emissions of greenhouse gases, and specifically larger fractions of gases such as methane and ammonia, than the proposed process for burning woodwastes. The published source terms for open burning show the RFHP option to be preferable from the viewpoint of having lower emissions. Of particular importance are mixes of combustion products from these activities. For example, because methane is currently thought to be many times more effective for inducing climate changes than CO_2, the potentially higher methane levels from open burning, composting, and landfilling make these activities less desirable from the viewpoint of minimizing the potential impact of greenhouse gas emissions (Droppo and Yu, 2007).

SolarTAC Air Quality Impacts

Construction of the SolarTAC may involve scraping and grading up to 0.8 hectare (2 acres) of land, which would result in intermittent fugitive dust emissions for up to 6 months. NREL's standard procedures require that construction dust be controlled by spraying or other means to minimize on-site and off-site dust. There would also be short-term or intermittent vehicle emissions from construction, visitors, and routine maintenance visits. Operations at the proposed SolarTAC would not result in emissions of regulated air pollutants.

MTPP Air Quality Impacts

Construction of the MTPP may involve scraping and grading up to 2 hectares (5 acres) of land, which would result in intermittent fugitive dust emissions for up to 6 months. Dust would be controlled or reduced by spraying and other techniques. There would also be short-term or intermittent vehicle emissions from construction, visitors, and routine maintenance visits. Operations at the proposed MTPP would not result in emissions of regulated air pollutants.

3.1.4 Visual Quality/Aesthetics

3.1.4.1 Existing Environment

With the exception of the recently constructed S&TF, the narrative descriptions and figures illustrating the visual and aesthetic environment of the STM presented in the site-wide EA remain current and are summarized below. Figures 3-2 and 3-3 illustrate the overall visual environment at the STM complex in 2007.

The dominant visual characteristics of the existing STM site include the prominent slope and mesa top associated with STM; the DOE facilities located on top of STM; and the SERF, FTLB, S&TF, and Visitors Center located at the toe of the slope. The STM site buildings are prominent against the landscape of STM. Other less prominent buildings occur at the western end of the site.

The STM site facilities are designed to reflect the laboratory activities related to modern energy concepts. Three of the larger buildings—the SERF, FTLB, and S&TF—are terraced and set against the south slope of STM. In addition to the buildings at the STM central campus, DOE has constructed a variety of solar testing and measurement structures such as the High Flux Solar Furnace, Solar Radiation Research Laboratory, and numerous PV panels situated throughout the site.

The facilities located on top of STM cover only a small proportion of the overall STM mesa top. The remainder of the mesa top is almost entirely undeveloped and is part of the conservation easement delineated by Zone 2. DOE's solar furnace and the surrounding buildings in Zone 1 are visible from off-site locations. A Colorado State Patrol driver training track is also located on top of the mesa, but it is not visible from most off-site locations. Other natural areas on the mesa top are within designated Jefferson County open space areas or NREL's on-site conservation area (Zone 2).

View looking northwest toward STM (telephoto).

Figure 3-2. View of the Visitors Center, SERF, and Mesa-Top Facilities

View from the 6th Avenue frontage road (telephoto).

Figure 3-3. View of Mesa-Top Facilities, FTLB, and SERF

3.1.4.2 Impacts of the Proposed Action

The equipment and facilities that would be added to the STM site under the Proposed Action would not be unique to the site. The appearance of these facilities would in fact be similar to other buildings and PV panels that have been a part of the STM site for many years. As such, the addition of the RFHP, SolarTAC, and MTPP would not alter the current visual character of the site. If the proposed facilities were noticed at all, the casual observer would likely note only that the added development resembled the structures already on the site. Figures 3-4 through 3-6 provide simulated views of the proposed facilities.

Renewable Fuel Heating Plant

The RFHP would be similar in height to the FTLB and, from most off-site observation points, would be partially blocked from view by the FTLB. Constructed of the same architectural concrete block as the FTLB, its color and texture would blend into the overall view. Figure 3-4 is a simulation of the view looking north from the south side of the STM site with the RFHP added. From this vantage point, without artificial magnification, the RFHP would be almost indiscernible. As described in Section 3.1.3, at normal operating temperatures, no visible plume would exit the RFHP stack.

SolarTAC Project

SolarTAC would alter the near-field existing view by installing arrays of PV panels over 0.8 hectare (2 acres) of undeveloped area adjacent to and behind the current Visitors Center and converting the median in front of the Visitors Center into a parking area (Figure 3-5). Arranged in rows ascending the gradual slope of the SolarTAC site, the PV panels would be somewhat consistent in form to the terraced appearance of the SERF located nearby and would be similar in appearance to PV panels located elsewhere on the STM site. Viewed from a distance, SolarTAC would blend with the overall appearance of the STM site and would not represent a unique addition to the site's overall visual impression.

Figure 3-4. Simulated View of the Proposed RFHP, with the Proposed MTPP in the Distance

Figure 3-5. Simulated View of the Proposed SolarTAC Project and Parking Area

Figure 3-6. Simulated View of the Proposed MTPP from I-70

Mesa Top Photovoltaic Project

The MTPP would be located atop the mesa at about 6,000 feet above sea level. Due to the steepness of the mesa's slope, the MTPP would be almost undetectable by anyone viewing the site from any location lower than the mesa top. The terrain within 3 kilometers (2 miles) of the STM site is less than 6,000 feet in elevation; therefore, anyone within that area would not see the MTPP.

As shown in the simulation on Figure 3-4, the MTPP, although remote, would be viewed by residents south of the STM site as a dark thin linear feature along the edge of the mesa top adjacent to the already existing solar radiation research facilities. Extending approximately 300 to 600 meters (1,000 to 2,000 feet) along the edge of the mesa top, the MTPP would be visually unique among the miles of undeveloped mesa edge atop STM. As viewed by drivers traveling east on I-70 (Figure 3-6), the MTPP would be virtually indistinguishable on the horizon.

3.1.5 Water Resources

3.1.5.1 Existing Environment

The descriptions of water resources found in the site-wide EA remain current and are summarized below.

Surface Water

There are no perennial creeks, streams, ponds, or floodplains on the STM site. Surface water, when present, is not used by NREL. There may be seasonal seeps on the STM site after small amounts of surface water percolate through the soil or the fractured basalt that caps STM. Intermittent storms and other seasonal precipitation events may cause water to temporarily collect in topographic lows and drainages. Surface water may briefly collect in depressions formed in the basalt on the top of the mesa.

Groundwater

Groundwater monitoring is not required of NREL by a regulatory agency; however, monitoring wells were installed at the STM site, and groundwater baseline data were accumulated beginning in 1990. The monitoring wells have since been capped. The most recent groundwater monitoring data were obtained in 1997. That year, groundwater beneath the site was analyzed for VOCs, semivolatile organic compounds (SVOCs), total metals, pesticides, and herbicides. Results of the analysis indicated that the groundwater beneath STM is uncontaminated for VOCs, SVOCs, pesticides, and herbicides. Although the samples indicated that concentrations of manganese and iron were elevated, the concentrations were within naturally occurring variations and no constituent concentrations exceeded national primary drinking water standards.

3.1.5.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

The RFHP would not result in untreated operational discharges of pollutants to surface water or groundwater. The RFHP drains would be connected to the site's existing stormwater and sewage lines, and all discharges to the publicly owned treatment works would meet the requirements of the Metro Wastewater Reclamation District and the Pleasant View Water and Sanitation District.

The RFHP would increase the impervious surface area, which could increase quantities of stormwater conveyed off-site, increase runoff rates, and incrementally degrade surface water quality. Increased turbidity and quantities of various chemicals associated with additional vehicles and construction equipment would occur.

Changes in the quantity of stormwater and runoff rates could incrementally impact localized on-site flooding; however, implementation of stormwater pollution prevention measures would minimize off-site drainage impacts. During the design process, drainage structures would be designed on-site to minimize the increase in the flow rate of stormwater conveyed off-site. Stormwater impacts would be minimized by complying with the provisions of NREL's EPA-issued National Pollutant Discharge Elimination System general construction permit. If groundwater were encountered during excavations for the plant, it would be pumped from the excavation to a vegetated area rather than into drainage. The vegetated areas would act as filters to trap sediment and reduce impacts associated with groundwater disposal.

SolarTAC Project

The description of surface water resource impacts provided above for the RFHP are applicable to SolarTAC. There would be no impacts to groundwater. The SolarTAC installation and operations would result in an increased number of visitor automobiles entering the site. Traces of petroleum products originating from leaking vehicles could be transported from the pavement off-site via stormwater. These contaminants could contribute to water quality degradation.

Mesa Top Photovoltaic Project

The description of surface water resource impacts provided for SolarTAC are also applicable to the MTPP. There would be no impacts to groundwater.

3.1.6 Geology and Soils

3.1.6.1 Existing Environment

The detailed descriptions of the site geology and soils found in the site-wide EA remain current and are summarized below.

The STM is located on the gently sloping terrain of the Foothills Province of the Rocky Mountain Front Range between the Southern Rocky Mountain Province to the west and Great Plains Province to the east. Denver clay loam and Denver cobbly clay loam dominate the soils at STM site where the RFHP and SolarTAC installations would be constructed; Lavina loam dominates on the mesa top. Slopes are generally less than 9 percent. The STM site is classified as being in Seismic Zone 1, an area of low seismic risk. Structures to be built on the STM site would meet the most current Uniform Building Code standards appropriate for its designated seismic zone.

3.1.6.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

Potential geological impacts would closely resemble the geological impacts presented in the site-wide EA, which specifically considered construction of the nearby S&TF and other comparable site developments. The RFHP would be constructed into a hillside. An area of approximately 185 to 230 square meters (2,000 to 2,500 square feet) would be disturbed. A geotechnical survey and soil sampling were performed on the proposed RFHP site during the planning phase. The report findings were used to develop structural designs and determine site preparation and construction requirements. Prior to building installation, the site would be excavated as needed for building construction. Resources such as concrete aggregate and crushed rock would be required during construction of the RFHP. These materials would be obtained from off-site commercial sources or may involve use of material from on-site excavations. Excavation may occur below the alluvial surface. Excavation could conceivably go below the alluvium if reaching bedrock for stability were necessary. It is unlikely that RFHP construction would increase landslide potential at the construction site or elsewhere at the STM site in the future because there is no evidence of recent landslides on the south side of STM, and no on-site or off-site construction in the immediate vicinity of the STM site has caused slope instability. The necessary excavation into the hillside would apply the most current engineering design specifications to avoid slope-stability impacts. The RFHP design would include drainage features to ensure stability of the structure, prevent flooding, and facilitate installation of an entrance drive.

SolarTAC Project

Construction activities associated with the SolarTAC installations would be primarily aboveground, surface, or shallow below-ground installations and would not impact existing geologic resources. Installation of new SolarTAC facilities, a driveway, and a parking area would disturb approximately 2 hectares (5 acres) of topsoil. Where installations required removal of topsoil, it would be stockpiled for reuse, removed, or redistributed on the site by the contractor. Some soils would be lost due to the physical alteration of the existing soil profile. However, the site's soil is nonproductive from an agricultural

standpoint; therefore, the loss of these soils would not represent a major impact. DOE would import fill and/or topsoil, if necessary.

Mesa Top Photovoltaic Project

Construction activities on the mesa top could disturb the basalt layer that underlies the thin (approximately 13-centimeter [5-inch]) Lavina loam soil layer. Electrical interconnection would be through an existing, spare transformer. This transformer is located in the middle of the proposed MTPP site, so only minimal excavation, or blasting if new utility poles were erected, would be required. Approximately 2 hectares (5 acres) of Lavina loam on the mesa top could be disturbed during installation of the MTPP panels. Disturbing the soil as a result of construction activities could increase the potential for soil particles to be scattered by the wind. Erosion caused by water on mesa-top construction sites would be very minor because the mesa top is relatively flat.

3.1.7 Biological Resources and Wetlands

3.1.7.1 Existing Environment

The descriptions of biological resources and wetlands found in the site-wide EA remain current and are summarized below. These descriptions relied upon previous reporting and fieldwork performed by various consultants at the STM site over the past 16 years, as well as fieldwork conducted in May 2002. Additional biological resource information is available in the following reports.

- *Wildlife Survey (Including Migratory Birds and Raptors) at the National Renewable Energy Laboratory South Table Mountain Site, Golden, Colorado* (NREL, 2005);
- *Vegetation Survey, NREL South Table Mountain Site* (NREL, 2002b);
- *National Renewable Energy Laboratory (NREL) Site Conservation Easement Baseline Inventory* (NREL, 1999);
- *South Table Mountain Conservation Easement Baseline Inventory* (NREL, 1998).

Located at the base of the foothills to the Rocky Mountains, the STM site occurs at elevations ranging from 1,762 meters (5,780 feet) to 1,838 meters (6,030 feet) above mean sea level. This coincides with the interface between two ecological provinces: the Great Plains-Palouse Dry Steppe Province to the east, and the Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest – Alpine Meadow Province to the west.

Three primary plant communities occur within the proposed project areas at the STM site: grasslands, shrublands, and one very small wetland. Table 3-4 in the site-wide EA lists the vegetation types and their areal extent; Figure 3.8 in the site-wide EA depicts the locations of these different vegetation types. Noxious weeds occur in all vegetation types. The RFHP would be built on previously disturbed and ravine shrub habitat, SolarTAC would be installed on mixed grass habitat, and the MTPP would be installed on disturbed mesa top land and short grass habitat. Table 3-5 shows variations of these three primary types of vegetation and their approximate distributions at the site.

As shown in Figure 3-9 of the site-wide EA, there are no wetlands in development Zone 1 (top of mesa buildable area) and none in the vicinity of the proposed SolarTAC installations. There is one very small 14-square-meter ([150-square-foot]) palustrine emergent wetland (STM-6) immediately behind

Table 3-5. Vegetation Types at NREL, STM Site, Golden, Colorado

Vegetation Type	Area (Acres)	Percent of Site
Short grass grassland	124	37.9
Mixed grass grassland	103	31.4
Tall shrubland	19	5.8
Short shrubland	16	4.9
Ravine shrubland	5	1.5
Wetland	<1	0.1
Disturbed/reclaimed	32	9.8
Developed	28	8.6
TOTAL	327	100

Source: NREL, 2002b.

Note: To convert acres to hectares, multiply by 0.4.

(northwest of) the SERF and several hundred feet east of and on the opposite side of the ravine from the proposed RFHP site.

Wildlife habitat at the STM site is almost exclusively grassland and shrubland. The Colorado Division of Wildlife (CDOW) has estimated that these habitats may support up to 14 reptile species, 36 mammal species, 82 bird species, and 4 amphibian species.

A wildlife study of the STM was conducted in 1987. The demographics of the area surrounding the STM site have changed since that study, and additional development of the STM site has since occurred. At the request of NREL, Science Applications International Corporation (SAIC) began a four-season wildlife survey of the STM site in the spring of 2004 to update the 1987 data. The 2005 wildlife survey (NREL, 2005) is incorporated into this EA by reference; the findings are summarized below. The wildlife survey also includes recommendations for consideration during normal site operations and future construction projects to minimize adverse impacts to wildlife. These recommendations would be reviewed and implemented to the fullest extent possible before and during implementation of the Proposed Action.

Migratory Birds and Raptors

Many species of migratory birds occur on the STM site, with many of these species potentially nesting on-site. In addition, the STM site may provide important migration and winter habitat for migratory birds. Habitat for migrating birds is important, as some of these species may migrate as far south as Central and South America.

Several species of raptors were observed at the STM site, and two species were observed during both wildlife surveys (1987 and 2004-2005) nesting on-site: the red-tailed hawk and the American kestrel. Both of these species were observed hunting on-site during the 2004-2005 surveys, in addition to the Cooper's hawk. The NREL STM site provides habitat and a prey base of small birds and small mammals for these raptor species. Species such as the Swainson's hawk migrate thousands of miles each year, wintering as far south as Argentina and returning to the western United States and Canada to breed. Areas such as the STM site may provide a prey source for the Swainson's hawk and other species during migration.

Large Mammals

Mule deer at the STM site have been observed in all habitat types. Mule deer were often observed in the amphitheater drainage or in the tall shrubland on slopes.

Predators

Coyotes are one of the most widespread and adaptable carnivores in North America. They occur at all elevation levels and in all ecosystems in Colorado. Rabbits and rodents are an important part of the coyote's diet, both of which are abundant on the STM site. Evidence of predation on cottontail rabbits (i.e., entrails and fur) was observed during site visits. Coyotes may breed on the STM site, as two potential dens were observed on-site in drainage areas.

Small Mammals

The deer mouse is the most common small mammal on the NREL STM site. Deer mice can occur wherever cover occurs and were observed in the vegetation types sampled on the STM site. This species is a generalist and is known to exploit disturbed habitats. Mexican woodrats and prairie voles were more restricted than the deer mouse in the habitats they occupied on the STM site. Mexican woodrats are associated with rocky slopes and do not build dens away from rocky areas. This species is therefore limited as to where it can occur on the STM site. Prairie voles are adapted to the grasslands, constructing burrows and runway systems throughout the grassland, essentially limiting this species to the short grass and mixed grass vegetation types on the STM site. All of these species are active throughout the year.

Reptiles/Amphibians

Several rattlesnakes were observed on the STM site, more often in rocky areas, but also in the grassland. A rattlesnake den may be present in the rocks near the top of the mesa slope north of the Visitors Center; four rattlesnakes were observed within a few feet of each other, one in the open and three in a rock crevice. Hibernation generally occurs in rock outcrops, with this species usually active from mid-April through late-September. Although only three species of reptiles and one species of amphibian were observed on the STM site, no specific survey methods were employed to identify or count these groups of wildlife at STM.

Species of Concern

For this EA, a species of concern is defined as those species protected under federal statute, including the Endangered Species Act of 1973, as amended; the Bald Eagle Protection Act of 1940, as amended; and the CDOW list of endangered, threatened, and wildlife species of concern. Federal agencies are also required to abide by the Migratory Bird Treaty Act of 1918, as amended.

The 2005 survey included a review of the U.S. Fish and Wildlife Service (USFWS) proposed, endangered, threatened, experimental, and candidate species and habitat list (USFWS, 2004) and the CDOW listing of endangered, threatened and wildlife species of special concern list (CDOW, 2003) for species observed on the STM site. No species observed on the STM site during the 1987 or the 2004-2005 wildlife surveys were present on either agency's list. However, golden eagles were incidentally observed on the STM site (outside of raptor surveys) and are protected under the Bald Eagle Protection Act. Golden eagles were observed flying over the site and may use the site for hunting. No golden eagle nests or nesting activities were observed on the STM site.

3.1.7.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

The RFHP would be located on previously disturbed land adjacent to a major site road and between the FTLB and the SERF. Land clearing, excavation, and construction staging areas would degrade the habitat value of the adjacent drainageway. Four standing trees would be destroyed or relocated. The disturbed area that is not permanently lost as habitat due to new construction would probably have an increased susceptibility to noxious weed invasion (discussed further under impacts from the SolarTAC installations and MTPP below). If a truck turnaround area were added, there would be a small increase (less than an acre) of additional habitat loss. The small wetland area behind the SERF would not be impacted by construction or operation of the RFHP.

SolarTAC Project

The SolarTAC Project would result in direct, permanent loss of up to 0.8 hectare (2 acres) of mixed grass and shrub habitat in Zones 4 and 5. This loss would adversely impact wildlife that currently use the habitat. Wildlife impacts from habitat losses would not be major because (1) substantial wildlife habitat has been protected on-site and off-site in the project vicinity, and (2) no species of concern have been documented within the habitat that would be lost. Secondary impacts due to the loss of this habitat would reduce the overall size of local hunting areas of resident mammalian and avian predators such as coyotes, fox, red-tailed hawks, and owls. In addition, loss of habitat in Zones 4 and 5 would reduce habitat connectivity for land-based animals between the conservation easement in Zone 2 and Lena Gulch, located just south of the site at Camp George West. Local populations of mule deer, coyotes, and other species that have relatively large foraging areas may be adversely affected by this loss.

Land clearing and the installation of SolarTAC and MTPP facilities could disturb some existing vegetation, making the areas more susceptible to noxious weed invasion. Noxious weeds such as Canada thistle, diffuse knapweed, musk thistle, houndstongue, field bindweed, common teasel, jointed goatgrass, and dalmatian toadflax occur on the site and are found on either the list of the 10 most widespread noxious weeds in the State of Colorado or on Jefferson County's list of noxious weeds of concern. The potential spread of these species, as well as cheatgrass and the other 12 noxious weed species found at the STM site, into disturbed areas represents secondary impacts as a result of the Proposed Action. DOE has made efforts to combat noxious weed invasion. These efforts include implementation of a noxious weed management plan which, among other strategies, calls for the use of a native grassland seed mix to be used in restoration areas after construction.

Mesa Top Photovoltaic Project

The MTPP would result in direct, permanent loss of up to 2 hectares (5 acres) of mixed grass and shrub habitat in Zone 1. This would adversely impact wildlife that currently uses the habitat. Wildlife impacts from habitat losses would not be major because (1) substantial wildlife habitat has been protected on-site and off-site in the project vicinity, and (2) no species of concern have been documented within the habitat that would be lost. Secondary impacts due to the loss of this grassland habitat would reduce the overall size of local hunting areas of resident mammalian and avian predators such as coyotes, fox, red-tailed hawks, and owls.

Land clearing and the installation of MTPP facilities could disturb some existing vegetation, making the areas more susceptible to noxious weed invasion. Noxious weeds such as Canada thistle, diffuse knapweed, musk thistle, houndstongue, field bindweed, common teasel, jointed goatgrass, and dalmatian

toadflax occur on the site and are found on either the list of the 10 most widespread noxious weeds in the State of Colorado or on Jefferson County's list of noxious weeds of concern. The potential spread of these species, as well as cheatgrass and the other 12 noxious weed species found at the STM site, into disturbed areas represents secondary impacts as a result of the Proposed Action. DOE has made efforts to combat noxious weed invasion. These efforts include implementation of a noxious weed management plan, which calls for the use of a native grassland seed mix to be used in restoration areas after construction.

3.1.8 Cultural Resources

3.1.8.1 Existing Environment

There are no known significant prehistoric archaeological resources within or adjacent to the NREL STM property. There are no known significant traditional cultural resources within or adjacent to the STM site. Should any evidence of archaeological or cultural resources be discovered at any time during any ground-disturbing activities at the STM site, all work would stop in the vicinity until a qualified archaeologist completely evaluated the significance of the find according to criteria established by the National Register of Historic Places.

DOE completed a file search for the entire STM site in June 2005. As a result, eight previously recorded features were identified in the STM vicinity (Nelson, 1980). A Class III intensive survey conducted in April 2007 identified no other cultural resources in the Proposed Action areas (Rhodes, 2007).

There are four significant or contributing historic structures on the STM property. Two of these resources, the amphitheater and associated footbridge (5JF842) and the ammunition igloo (5JF843), are located in Zone 7 (Non-contiguous Historic Resource Areas) and are individually listed on the National Register. The remaining resources are within the Camp George West Historic District and contribute to the District's eligibility. These resources are located in Zone 6 and were recorded to the Level II Historic American Building Survey/Historic American Engineering Record standards in January 2006 (Rhodes, 2006) (see Figure 3-1).

The historic amphitheater is an ovate stone structure built into the natural slope of the hillside with a stone projection booth located at the base of the structure. A concrete center aisle separates the theater's concrete and stone seating areas. Some of the associated rock walls and seats have collapsed, and much of the area is overgrown with native vegetation. A small stone footbridge leads to the amphitheater. The bridge is in good condition. Outside groups have expressed an interest in restoring both of these historic structures, but no formal proposal has been submitted. The ammunition igloo dates from World War II.

3.1.8.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

The RFHP would be constructed in a drainage setting between the existing FTLB and the existing SERF. The ammunition igloo is the nearest historic property to this proposed development site but is well beyond the proposed area of potential effects (APE). The igloo is located approximately 60 meters (180 feet) to the northeast, on the other side of the road. The amphitheater is located up the drainage northwest of the proposed RFHP, but none of the recorded features associated with the amphitheater are within 100 meters (300 feet) of the proposed facility. Neither the ammunition igloo nor the amphitheater would be impacted by the Proposed Action.

SolarTAC Project

The SolarTAC Center would be located just northeast of the Visitors Center. The SolarTAC is not within 100 meters (300 feet) of any historic property. One feature was identified in the vicinity by Nelson (1980). This feature, consisting of check dams, is located more than 100 meters (300 feet) from the proposed development site, in a drainage to the east. This feature would not be impacted by the Proposed Action.

Mesa Top Photovoltaic Project

The MTPP would occupy a portion of the mesa top above the amphitheater. At the closest point, the proposed project area boundary is approximately 40 meters (130 feet) above the historic property. At the farthest point, the boundary is over 100 meters (300 feet) away. The mesa top and the amphitheater are visually separated by a significant drop in elevation of at least 40 feet at the closest point. The amphitheater is well beyond the APE of this Proposed Action and would not be impacted.

Based on the results of the recent literature search and Class III intensive survey, as well as previous surveys and consultations, DOE has determined that the Proposed Action would have no effect on cultural resources. DOE has initiated consultation with the Colorado State Historic Preservation Office (SHPO) and has requested concurrence with a finding of No Effect.

3.1.9 Noise

3.1.9.1 Existing Environment

Detailed descriptions of the existing noise environments at the STM are provided in the site-wide EA. These descriptions address sensitive noise receptors (Section 3.4.1), existing noise levels (Section 3.4.2) and noise regulations and guidelines (Section 3.4.3). They remain current and are summarized or updated below.

Noise receptors located in the immediate vicinity of the STM site include STM personnel, inhabitants of residences to the east and south of the site boundary, and wildlife. With respect to NREL personnel, DOE has accepted the Occupational Safety and Health Administration (OSHA) noise regulations and guidelines for worker exposure and manages compliance with them. These regulations and guidelines focus on noise from machinery, equipment, and tools. DOE maintains compliance with all regulations related to worker health and safety.

Other sensitive receptors in the vicinity include multi-family residences located approximately 15 meters (50 feet) east of the site boundary. Two subdivisions composed of single-family residences are located south of the STM site. The nearest residence to the site's southwestern boundary is located approximately 15 meters (50 feet) away. The nearest residence to the site's southeastern boundary is located approximately 30 meters (100 feet) away. The nearest school, church, or day-care center is about a half mile from the site, near 20th and Denver West Parkway. A ball field was recently completed in the open area immediately south of the STM site.

Although noise measurements were not taken for the site-wide EA and noise modeling was not performed, site observations indicate that the acoustic environment within the boundaries of the southeastern portion of the site can be considered similar to that of an urban location. I-70 is a significant noise source throughout the day and during sensitive late-night and early-morning periods. Noise levels on the mesa top are typical of a rural location but can be elevated substantially when an adjacent State

Highway Patrol driver-training track is being used. It is estimated that 24-hour day-night average sound levels on the site typically range from 40 to 60 A-weighted decibels (dBA). Most activity and mechanical operations at the STM site are conducted within buildings. Construction activity and routine maintenance occasionally generate noise. The proposed new park will become another source of noise in the vicinity.

The State of Colorado Noise Statute (Code of Colorado Regulations [CCR] 25-12-101 through CCR 25-12-109) has established state-wide standards for noise level limits for various time periods and areas. The standards exclude federal entities such as NREL; however, they can be used as guidelines in order to evaluate impacts. The most stringent permissible noise levels apply to residential zones, where the maximum permissible daytime (7 a.m. to 7 p.m.) noise level is 55 dBA and the noise level is measured at a distance of 8 meters (25 feet) from the property line. In addition, construction projects are limited to permit conditions or 80 dBA for the period within which the construction is to be completed or a reasonable amount of time.

The City of Denver has promulgated a noise ordinance, Revised Municipal Code, City and County of Denver, Colorado, Ordinance No. 628-97, 22 September 1997, Supplement No. 55 (City and County of Denver, 1997) that can provide another basis for evaluating noise levels. The type of premises on which the noise is generated determines allowable noise levels. In the case of the STM site, the most conservative approach is to consider it "industrial premises." The maximum allowable sound pressure level under the Denver ordinance is 80 dBA measured at the site property line between the hours of 7 a.m. and 10 p.m.

3.1.9.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

The RFHP would be installed inside a building, so operational noise impacts to the surrounding area would be partially attenuated. Table 3-6 shows the major equipment involved in the operation of the RFHP that would be heard in the building and approximate decibel levels associated with the equipment.

Table 3-6. RFHP Equipment Noise Levels

RFHP Equipment	Estimated Indoor Noise Level
Grinder	85 dBa maximum
Hot Water Pumps	< 49 dBa
Fans and Ventilation System	< 48 dBa
Augers	Minimal
Screener	Minimal

Source: Ameresco, 2007.

Operation of the proposed RFHP would incrementally increase the ambient nose at the STM site. Compliance with OSHA requirements for noise exposure is a site mandate. Noise impacts to RFHP operators would be reduced by the use of hearing protection equipment as required by OSHA standards or as requested by RFHP operators.

Levels of ambient or intrusive outdoor noise vary extensively at distances greater than about 100 meters (330 feet) from the source. This variation is caused by changes in weather and by topographical features such as ground cover, hills, trees, structures, and other obstacles between the noise source and the

receptor. A rule of thumb (the "Rule of 6") is that under ideal conditions (no background sound or interference), a sound level drops 6 dBa for every doubling of the distance from the source (AEUB, 2007). The nearest off-site noise receptors to the proposed RFHP noise source would be homes in the northeast corner of the Whiteaker subdivision and the northwest corner of the Richards Heights subdivision. Both of these off-site receptor areas lie approximately 300 meters (1,000 feet) from the proposed location of the RFHP. There are structures between the noise source and the receptors, and the receptors are on the other side of the Denver West Parkway. These factors make it difficult to quantify the noise impact from the proposed RFHP at these locations. However, applying the Rule of 6 and assuming the wood grinder, the loudest source of noise at the RFHP, could generate 85 dBa at a distance of 10 meters (30 feet), the noise level at the nearest off-site receptors would be approximately 45 dBa. This is a conservative (probably high) estimate of off-site noise because the grinder would be housed in a building, which would attenuate the noise perceived by off-site receptors. For comparison, 45 dBA is approximately the ambient noise level in quiet agricultural areas (EPA, 1978). The noise from the RFHP grinder, which would be intermittent, would probably not be noticeable over ambient residential neighborhood, street, and highway noise.

SolarTAC and MTPP Noise Impacts

Noise impacts due to construction of the SolarTac and MTPP would be similar to those described in detail in the site-wide EA (DOE, 2003). Construction-related noise would be expected to occur intermittently for the approximately 6 months that the facilities would be under construction. Operation of the proposed SolarTAC and MTPP facilities would not result in major increases to existing ambient noise at the STM.

3.1.10 Waste Management

3.1.10.1 Existing Environment

The descriptions of the existing waste management environment found in the site-wide EA remain generally current and are summarized or updated below.

The STM generates a variety of hazardous and non-hazardous wastes from laboratory and mission support activities. All waste-handling and disposal activities at both sites comply with the requirements and regulations of OSHA, the Resource Conservation and Recovery Act, DOE, and the CDPHE. All hazardous wastes are packaged and disposed of through contracted off-site commercial treatment, disposal, and recycling firms. Many of the hazardous wastes generated on-site are recycled in accordance with CDPHE regulations, including such items as batteries, fluorescent bulbs, and computer monitors. As a best management practice (BMP) in order to ensure maximal protection of the environment, many of the non-hazardous waste materials (non-regulated waste) generated at the sites are treated in the same manner as the hazardous wastes. These materials, although not classified as hazardous, are also recycled or disposed of at off-site commercial treatment, storage, disposal, and recycling facilities.

The STM site is a small-quantity generator, which means that the facility generates more than 100 kilograms (220.5 pounds) but less than 1,000 kilograms (2,205 pounds) of hazardous waste per month. The STM site does not maintain an on-site waste disposal facility. The amount of hazardous and non-regulated waste generated by the STM site in recent years is shown in Table 3-7.

Table 3-7. Waste Generation at the STM Site, 2003-2006

Category of Waste	Amount Generated (gross weight in pounds)			
	2003	2004	2005	2006
Hazardous waste	21,725	19,631	33,370	31,539
Non-regulated waste	5,469	1,645	11,345	7,492

Note: To convert pounds to kilograms, multiply by 0.45.

3.1.10.2 Impacts of the Proposed Action

Renewable Fuel Heating Plant

RFHP construction would be short-term (approximately 6 to 7 months) and would not substantially increase the amounts or types of hazardous materials generated or maintained at the site. In the case of a spill or release of chemicals or hydrocarbons during construction activities, existing BMPs and procedures associated with spill response and materials handling would minimize impacts to surface water. These procedures are defined in the NREL *Spill Prevention Control and Countermeasures (SPCC) Plan* for the STM (NREL, 2006) (Procedure 6.2-10). Any construction debris that could not be recycled would temporarily increase the weight and volume of non-regulated waste generated at the site.

RFHP operations would not generate hazardous waste or non-regulated waste. The ash generated by the RFHP would be considered recycled waste, a separate waste category from either hazardous or non-regulated waste. Based on vendor-provided data (Ameresco, 2007), the biomass fuel would be 2 percent to 3 percent ash, and the total quantity of RFHP ash generated during an average heating season would be 83 to 136 metric tons (92 to 150 tons). The ash would be picked up weekly during the peak winter months and two to three times a month during non-peak operating months. The ash would be recycled for use in mulching mixes or shipped for use in concrete manufacturing. If the ash could not be recycled, it would be disposed of off-site at a commercial landfill. Because the STM is located near a very large metropolitan area, this increase in landfill waste would not represent a significant impact to regional waste management (storage and disposal) operations or capacities.

SolarTAC Project

Neither the construction nor the operation of SolarTAC would result in the generation of significant quantities of hazardous or non-regulated waste. Any construction debris that could not be recycled would temporarily increase the weight and volume of non-regulated waste generated at the site.

Mesa Top Photovoltaic Project

Neither the construction nor the operation of the MTPP would result in the generation of significant quantities of hazardous or non-regulated waste. Any construction debris that could not be recycled would temporarily increase the weight and volume of non-regulated waste generated at the site.

3.1.11 Public Facilities, Services, and Utilities

3.1.11.1 Existing Environment

The detailed descriptions of public facilities, services, and utilities found in the site-wide EA remain current.

3.1.11.2 Impacts of the Proposed Action

The following discussion addresses the impacts of the Proposed Action on the capacity of public infrastructure and service providers. Any requisite utility interconnection interruptions during construction or operation would be temporary and would be coordinated in advance with the cognizant utilities.

The RFHP and MTPP would have a substantial net positive impact on electric and gas utility infrastructure because they would reduce the overall current and projected future demand the STM site places on local and regional public utility infrastructures for delivery of natural gas (RFHP) and grid-generated electricity (MTPP) to the STM site. The RFHP and SolarTAC installations would result in a small overall increase in the STM site's net electric power usage, but this increase would be more than offset by the overall decrease in demand for grid-generated power.

Collectively, the three proposed improvement projects would represent a very minor increase in demand for telecommunications, domestic water, or sewage service due to the very low number of additional employees and other personnel at the STM site.

The new facilities and additional staff associated with the Proposed Action would incrementally increase demand for police, fire, and ambulance services, but the increases would be considered minor given site use, on-site security, and anticipated needs for emergency service providers.

Because the RFHP would be a wood-burning boiler, it would slightly increase the risk of wildfire on the site. The NREL Fire Protection Program currently addresses this and other fire risks. The RFHP proposal includes a dry pipe fire suppression system and an alarm system. The potential for particulate emissions would be mitigated by a multi-cyclone system. The plant would automatically shut down if the induced draft fan serving the cyclone were to fail.

3.1.12 Energy and Sustainability

The discussion of energy and sustainability found in the site-wide EA remains current and is applicable to the SolarTAC and MTPP projects, which are intended to make a substantial contribution to energy efficiency and renewable (sustainable) energy technology. The magnitude of these beneficial impacts could range from minor to globally significant, depending on the technology achievements resulting from the projects. These direct benefits would also result in indirect and/or secondary beneficial impacts to the environment, including, but not limited to, reduced air pollution as compared to emissions generated with conventional energy technologies. The RFHP would use renewable biomass in place of a fossil fuel whose availability is finite.

3.1.13 Intentional Destructive Acts

In December 2006, the DOE Office of General Counsel (formerly the Office of NEPA Policy and Compliance) issued interim guidance stipulating that each DOE EIS and EA should explicitly consider intentional destructive acts (i.e., acts of sabotage or terrorism). DOE applied a sliding scale in considering the potential impacts of intentional destructive acts within the context of the Proposed Action.

None of the three proposed site improvement projects that are the subject of this EA would involve the transportation, storage, or use of radioactive, explosive, or toxic materials. Consequently, it is highly unlikely that the projects making up the Proposed Action would be viewed as a potential target by saboteurs or terrorists. The wood that would fuel the proposed RFHP is necessarily combustible but it is

neither explosive nor highly flammable. The limited quantities of wood that would be stockpiled, the facility's fire suppression and alarm system, and the limited access to the fuel storage pit would limit the attractiveness of the facility to saboteurs or terrorists.

Vandalism of the MTPP PV panels on the mesa top by so-called "eco-terrorists" is a more credible intentionally destructive act scenario. However, such vandalism, while potentially disruptive of NREL operations, would not pose a risk of adverse impacts to human life, health, or safety. Moreover, the mesa-top facilities would be protected by a security fence and motion-sensitive night lighting. In summary, the Proposed Action does not appear to offer any targets of opportunity for terrorists or saboteurs to inflict significant adverse impacts to human life, heath, or safety.

3.2 Environmental Consequences of the No Action Alternative

The environmental consequences of the No Action Alternative would be very similar, and in some instances identical, to the Environmental Consequences of the No Action Alternative presented in the site-wide EA. These are summarized or updated below.

Under the No Action Alternative:

- Existing on-site land uses, site development density, and operations would not change. Fewer beneficial economic impacts would result because RFHP, SolarTAC , and MTPP construction would not occur, and related job growth and NREL development would be limited.

- The minor incremental impacts to traffic and parking from site construction and increased visitors to SolarTAC installations associated with the Proposed Action would be avoided. An additional three to five weekly RFHP fuel-delivery trucks and ash pick-up trucks would not traverse the site from October through April.

- Emissions of criteria air pollutants and TAPs from RFHP operations would not occur. Existing emissions from on-site operations would remain at current levels.

- A new ambient noise source (the RFHP) would not be added to the STM site. Off-site noise levels in the area would continue to be dominated by vehicle traffic on I-70.

- There would be no impacts to surface water, stormwater, or groundwater resources.

- The loss of approximately 3 hectares (7 acres) of grassland habitat on the mesa top and north of the NREL Visitors Center would not occur.

- The site would not generate 83 to 136 metric tons (92 to 150 tons) of non-regulated RFHP ash as a waste stream. The quantities and types of hazardous materials and hazardous wastes associated with the site would remain consistent with current amounts.

- The No Action Alternative would limit demand growth for public services and utilities by retaining existing employment levels and operational activity at current levels. New facilities and modification and expansion of existing facilities would not occur. Incremental capacity impacts on existing service providers resulting from the Proposed Action and the impacts of associated infrastructure improvements would be avoided.

- The STM site's energy production capacity and energy consumption would remain at current levels. The site would not benefit from replacement of up to 80 percent of its natural gas with renewable biomass fuel for winter heating, nor would it augment its current electric power demand with up to 1 megawatt of solar power.

- There would be no improvements made to the middle drainageway.

4.0 CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions. Secondary impacts are those that are caused by a proposed action, but may occur later in time or farther removed in distance, relative to the primary impacts of the proposed action (40 CFR Section 1508.7).

The 2003 site-wide EA considered cumulative and secondary impacts of various pending and conceptual site development projects and concluded that the incremental contribution to these cumulative and secondary impact areas would be insignificant. That EA also concluded that the No Action Alternative would not contribute to these impacts. The most important examples of cumulative and secondary impacts associated with the site-wide EA Proposed Action were as follows:

- Traffic congestion at the intersections along Denver West Marriott Boulevard;
- Regional and local air pollutant emissions;
- Noise impacts on Pleasant View neighborhoods;
- Development intensification;
- Increases in Lena Gulch stormwater flows;
- Habitat losses from development of natural areas;
- Demand for energy; and
- Beneficial impacts from improved alternative energy sources.

The three proposed site improvement projects that are the subject of this EA were not sufficiently far along in their conceptualization to be explicitly discussed in the site-wide EA. However, with the exception of visual impacts, the preceding list of cumulative and secondary impact areas bounds those that would be associated with these three proposed projects. The following discussions describe the potential for the Proposed Action in this EA to result in cumulative and secondary impacts.

Visual impacts. Construction and operation of the three projects described as the Proposed Action in this EA would slightly modify the overall visual impression of the STM by adding facilities on 3 hectares (7 acres) of land that is planned for development but is not yet developed. The new development would be visually compatible with the STM site. Additionally, commercial development continues to occur adjacent to the STM site, altering the visual landscape from open space to offices and residential buildings.

Traffic congestion at the intersections along Denver West Marriott Boulevard. The estimated construction workforce for the proposed projects would not be large, nor would the proposed construction be long-term. Construction of the RFHP would only require an estimated 2 to 3 dozen workers for 6 to 7 months. No new workers would be hired to operate the RFHP. The proposed SolarTAC could increase the number of visitors to the STM site by an estimated 500 per month, or on average about 20 visitors a day. However, some visitors to the SolarTAC would car pool, and visitors would not necessarily arrive and leave during rush hour. DOE does not expect the three proposed projects to change the current LOS at the intersections along Denver West Marriott Boulevard. However, if additional parking were not included in Phase I of the SolarTAC Project, vistors could be required to park off-site, ride shuttle buses, or walk in the street, which could pose a pedestrian hazard.

Regional and local air pollutant emissions. Air quality in the Denver metropolitan area has been poor in the past but has improved in recent years to the point where the metropolitan area has been redesignated as an attainment area. The RFHP's emissions would not be expected to have any meaningful impact on

the metropolitan area's air quality or attainment designation. However, air pollutant concentrations in the metro area are relatively close to the standard for ozone and other pollutants, so every source is scrutinized. Given the potential air quality benefits of renewable energy and energy efficiency research to be performed at the site, the overall net impact of the three projects on cumulative air quality in the region and locally would probably be neutral. The MTPP and SolarTAC would provide a net advantage to air quality by harnessing non-polluting solar power, while the RFHP would result in an increase in some emissions of criteria air pollutants and hazardous air pollutants.

Noise impacts on Pleasant View neighborhoods. Noise generated during construction, from vehicle use on the site, and from RFHP operations is not expected to cause noise levels that would exceed any cumulative noise impact standard.

Development intensification. The Proposed Action includes new development and improvements on the mesa, but it does not create unplanned development or present the potential to open up new off-site areas for development. It does not create improved access to real estate, reduce development restrictions, or substantially induce new development in unanticipated areas.

Increases in Lena Gulch stormwater flows, Stormwater flooding in Lena Gulch is created by an off-site channel constriction in Camp George West Park. The proposed projects would increase the impervious surface area on the STM site. However, DOE does not anticipate this would have any impact on stormwater flow in Lena Gulch because a new stormwater retention pond has recently been added at Camp George West Park. Improvements to the middle drainage stormwater management infrastructure that would be installed as part of the proposed RFHP construction would further reduce the potential for increases in Lena Gulch stormwater flows.

Habitat losses from development of natural areas. The Proposed Action would not have direct impacts on protected species or habitats (wetlands) that are the subject of regulations approved to address cumulative impacts on biological resources. However, the projects could impact migratory bird species.

Demand for energy and beneficial impacts from improved alternative energy sources. All projects requiring energy have incremental impacts related to energy, but very few offer the possibility of making a positive contribution toward renewable energy and energy efficiency. The MTPP and the SolarTAC Project are specifically intended to advance the use and acceptance of renewable energy and to enhance energy efficiency.

5.0 COMMITMENT OF RESOURCES AND SHORT-TERM USES

The discussions in Sections 5.1 and 5.2 below were presented in the site-wide EA and are directly applicable to the Proposed Action that is the subject of this EA.

5.1 Irreversible/Irretrievable Commitment of Resources

An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of use of nonrenewable resources such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long periods. It could also apply to the loss of an experience as an indirect effect of a "permanent" change in the nature or character of the land. An irretrievable commitment of resources is defined as the loss of production, harvest, or use of natural resources. The amount of production forgone is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume production.

The Proposed Action would not have irreversible impacts because future options for using this site would remain possible. A future decommissioning process could restore the site for alternative uses, ranging from natural open space to urban development. No loss of future options would occur.

The primary irretrievable impacts of the Proposed Action would involve the use of energy, labor, materials, and funds, and the conversion of some lands from a natural condition through the construction of buildings and facilities. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

5.2 The Relationship between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

This section addresses the commitment of resources associated with the Proposed Action relative to the loss of long-term productivity associated with these commitments.

The Proposed Action would commit resources in the form of energy, labor, materials, funds, and land over 20 years or more. The justification for these commitments at this time is described in Section 1.3, Purpose and Need. Long-term productivity associated with the site relates to biological value as habitat and open-space values associated with aesthetic quality and recreation. The Proposed Action would be implemented at a site where substantial portions of the land are specifically reserved and preserved for these purposes. For these reasons, the incremental loss of biological and open-space values is balanced by the protections afforded to the long-term productivity of the site. Improved efficiency and increased reliance on renewable energy resources could substantially reduce reliance on coal, oil, and nuclear fuels and reduce resource productivity losses in off-site resource extraction areas. The Proposed Action would create no long-term risks to public health and safety.

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APPENDIX A SCOPING LETTERS

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3305

April 2, 2007

DISTRIBUTION LIST

SUBJECT: Revised Request for Public and Agency Comments on the Proposed Renewable Fuel Heating Plant and Proposed Solar Energy Development Projects at The National Renewable Energy Laboratory's South Table Mountain Site

The U.S. Department of Energy (DOE), Golden Field Office, issued a Notice of Scoping on November 13, 2006 regarding our intent to prepare an Environmental Assessment (EA) for the proposed Renewable Fuel Heating Plant at the National Renewable Energy Laboratory's (NREL) South Table Mountain site near Golden, Colorado. Based on NREL's current site planning information, DOE has decided to expand the scope of the EA to include two solar energy projects at the South Table Mountain Site. Detailed descriptions of the site, the proposed Renewable Fuel Heating Plant, and the proposed solar energy development activities are included in the attachment to this letter.

NREL is a federally owned, contractor-operated research facility that supports renewable energy and energy efficiency technologies. DOE is the lead agency for this EA, and other federal, state, and local agencies are invited to participate in the environmental assessment process. DOE is requesting public input on the proposed NEPA process, proposed actions and alternatives, and the environmental issues to be addressed in the EA.

Pursuant to the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft EA to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.

- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

DOE plans to complete the draft EA public review in June 2007. This letter and the draft EA, when it is available, will be posted in the DOE Golden Field Office electronic reading room: http://www.eere.energy.gov/golden/reading_room.aspx.

The DOE Golden Field Office welcomes your input throughout our NEPA process. Please direct your comments to:

Steve Blazek
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We look forward to hearing from you.

Sincerely,

for Jeffrey M. Baker
Assistant Manager

Enclosure

cc: Steve Blazek
NEPA Compliance Officer
DOE/Golden Field Office

Maureen Jordan
Senior Environmental Scientist
NREL

Attachment

PROPOSED RENEWABLE FUEL HEATING PLANT, SOLAR TECHNOLOGY ADVANCEMENT CENTER, AND SOLAR-ELECTRIC GENERATION PROJECT NATIONAL RENEWABLE ENERGY LABORATORY SOUTH TABLE MOUNTAIN SITE

SITE BACKGROUND AND DESCRIPTION

The National Renewable Energy Laboratory (NREL) is one of twelve Department of Energy (DOE) national laboratories and is dedicated to the research, development, and deployment of renewable energy and energy efficiency technologies. The DOE Solar Energy Research Institute, founded in 1977, achieved national laboratory status and became NREL in 1991. The Midwest Research Institute operates NREL for DOE. The laboratory is comprised of three main sites: 1) South Table Mountain (STM); 2) Denver West Office Park (DWOP) and 3) The National Wind Technology Center (NWTC). The proposed Renewable Fuel Heating Plant (RFHP), Solar Technology Advancement Center, and Solar-Electric Generation Project at the STM site are the subjects of this scoping notice.

NREL conducts research activities at the STM site in support of the following DOE research programs:

- Solar Energy Technologies
- Geothermal Technologies
- Distributed Energy, Electrical Infrastructure and Reliability
- Biomass
- Industrial Technologies
- Freedom Car and Vehicle Technology
- Hydrogen, Fuel Cells and Infrastructure Technologies
- Buildings Technologies
- Weatherization and Intergovernmental Grants
- Federal Energy Management
- Other DOE Sponsored Programs
- Work for Others Supporting the DOE Mission

The 327-acre STM site is located on the southeast side of South Table Mountain, north of Interstate 70 and west of the Interstate 70 and Denver West Boulevard interchange in unincorporated Jefferson County, near Golden, Colorado (Legal description: Township 3 S, Range 70 W, Section 36, and Township 4 S, Range 70 W, Section 1) (See Figure 1). Only a portion of the site, 136 acres, is available for development. A total of 177 acres is protected by a conservation easement, and development on the remaining 14 acres is restricted by utility easements. The community of Pleasant View is adjacent to the southern border of the STM site. The STM site includes acreage on the South Table Mountain mesa top, slope, and toe, and was formerly part of the Colorado National

Guard facility at Camp George West. There are currently seven laboratory buildings, a few small test facilities, and several support buildings on the site.

The DWOP site also is in the vicinity of the Interstate 70-Denver West Boulevard interchange near Golden, Colorado. DOE and NREL occupy DWOP Buildings 15, 16, 17 and a small portion of 7 located at the eastern end of the office complex. The DWOP provides administrative offices and space for limited laboratory activity.

PURPOSE AND NEED

A Site-Wide Environmental Assessment (EA) for the STM and the DWOP was prepared in 2003 that evaluated the existing and proposed facilities as well as the operation of the site. The 2003 Site-Wide EA provides an analytical superstructure under which the potential environmental impacts of the Proposed Action will be evaluated. While NREL is considering several other site development projects at this time, based on the availability of funds and project specific schedules, these projects are not ripe for NEPA review at this time and will not be evaluated in this EA.

This EA will provide an opportunity to review the collective potential effects of constructing and operating three new facilities: a Renewable Fuel Heating Plant (RFHP), a solar energy demonstration facility, and a solar-electric generation installation. The purpose and need for the Proposed Action is to 1) reduce NREL's use of natural gas by constructing and operating a facility that uses a renewable biomass fuel source (local wood waste) to produce hot water for NREL facilities, and 2) reduce NREL's demand for grid-provided electricity by installing facilities that demonstrate the effectiveness of on-site solar energy demonstration and electricity generation.

The proposed RFHP project is anticipated to reduce NREL's STM site natural gas consumption by up to 80% and provide NREL and DOE some measure of insulation from the volatility of natural gas prices. The project is also intended to be a showcase project to demonstrate the viability of wood-waste biomass fuels as an alternative to fossil fuel heating.

The proposed Solar Technology Advancement Center would provide a standardized test bed where laboratory and university research projects could be conducted, and would showcase solar technologies for residential, commercial, utility, and industrial applications.

The proposed Solar-Electric Generation Project would provide electricity for on-site laboratory use through the installation of an up to 1.2 Megawatt photovoltaic system on the STM mesa top. This is consistent with NREL's long-term site development plans and energy goals to increase on-site renewable energy generation at the laboratory

PROPOSED ACTION AND ALTERNATIVES

The following presents a summary of the Proposed Action and the No Action alternative descriptions.

Proposed Action

Renewable Fuel Heating Plant

The Proposed Action is to construct and operate a Renewable Fuel Heating Plant (RFHP) at the South Table Mountain Site. The RFHP would use biomass as a fuel source for a new combustor and a heat recovery boiler to supply hot water for building heat to several facilities on the NREL Campus. The project would also include the installation of hot water distribution lines interconnecting the new facility to the Solar Energy Research Facility (SERF) central plant and the Field Test Laboratory Building (FTLB) central plant.

The proposed plant would be located behind (north of) the existing FTLB and adjacent to the existing service road. The new building would be approximately 2500 square feet and would be constructed of architectural cement block with a finish to match the existing FTLB. The building would be rectangular with a flat roof and would contain three rooms: the fuel storage area, the combustion area, and a small control room. The fuel storage area would provide enough space to hold 4 – 7 days of fuel. The RFHP would require the construction of a new driveway and turnaround to service the facility.

The proposed RFHP would use biomass (wood chips) to fuel a specialized combustor and a heat recovery boiler to supply hot water to the NREL Campus. The system would have the capacity to generate 9-10 MBtu/hr of energy, or approximately 750 gallons per minute of hot water to the buildings. The new boiler would serve as the primary source of heating water to the existing FTLB, SERF, Science and Technology Facility (S&TF), smaller existing facilities, and potentially other facilities to be constructed in the future, during the heating months. The existing boilers would be utilized to provide additional heat as required to either supplement the RFHP load or to provide backup if the combustor is off line.

The fuel would come from a local supplier. The supplier would provide fuel composed of local wood waste such as construction waste, yard trimmings, pallets and also local forest thinning waste. The fuel would be delivered to the site using trucks. On average, one truck delivery would be required per weekday during the heating months. Ash produced from the unit would be transferred to a storage bin for offsite disposal.

Solar Technology Advancement Center (SolarTAC)

The SolarTAC Center would be an outdoor area showcasing and testing solar equipment. This area would include residential photovoltaic (PV) systems, utility PV systems not requiring special safety precautions, stand-alone PV systems (e.g., bus-stop shelters, remote lighting), and similar systems. The equipment would be provided by a solar company or developer or purchased by SolarTAC.

The SolarTAC Center at NREL would require:

- An outdoor area of about 2 acres located east of the NREL Visitor Center on DOE property outside the NREL security boundary (Figure 2)
- Suitable ground surfaces for installing PV systems
- Walkways (wheelchair accessible)
- Electrical, data, telecomm lines, water, and sewer

3

- Demarcation fencing, signage, security camera, security lighting
- Expanded parking capacity at the Visitor's Center

The scope of equipment to be researched, tested, or showcased through SolarTAC includes solar panels, components, and systems of all types. These could include flat-panel photovoltaic (PV), concentrating PV, flat- panel solar thermal, and concentrating solar thermal. Initially, it is expected that there would be a variety of system sizes from 1kW up to 50kW and include inverters and related system components.

Solar-Electric Generation Project

DOE/NREL propose to use a third-party developer for the design and installation of a PV system that would generate electrical energy that would be used on-site by NREL. The PV system would generate electricity, measured in kilowatt-hours (kWh) and renewable energy certificates (RECs). NREL would purchase the electricity only, and Xcel Energy would likely be purchasing the RECs. The anticipated length of the contract for operation of the system is 20 years. If the equipment is still viable at the end of that 20-year period, it may continue to be used on-site.

The system is anticipated to be a single axis tracking and/or fixed tilt PV system design. The maximum allowable PV panel height is eight (8) feet above the ground to minimize visual impact of the PV system. Two-Axis tracking and concentrating designs are not expected to be used for this project.

The PV system would be procured, financed, installed, owned, operated and maintained by a third-party developer. The Contractor would be provided use of the DOE land through a long-term use arrangement.

The proposed location for the system would be on the South Table Mountain mesa top (Figure 2). It would be enclosed by a fence similar to the existing fence surrounding NREL mesa top facilities: six-foot chain link fence with three strands of barbed wire on top. The proposed installation would be located on approximately five acres of flat land north of the existing Solar Radiation Research Laboratory and Solar Furnace buildings. There is existing road access, and it is likely that a service drive will be needed within the 5-acre site. The surface of the drive would be permeable material, such as road base or gravel.

Interconnection would be through an existing, spare 13.2 kV/480V three-phase transformer with a 1 MW capacity. This transformer is in the middle of the proposed PV site so there will be minimal electrical infrastructure required between the PV system and the transformer. The transformer ties into the NREL 13.2 kV distribution system that feeds all NREL STM loads. Cables are expected to be installed either on the ground surface or underground. No overhead lines or utility poles are anticipated.

Security lighting is expected to be required. NREL would install lighting similar to lights currently installed at NREL's existing mesa top facilities: a motion sensor would be installed on each light, with the timer set at a relatively short interval, such as the current interval of five minutes.

No Action

The No Action Alternative would leave the site in its current configuration, add no new facilities, and maintain current levels of research, operation and management activities. Therefore, the existing site and activities provide the baseline condition for the environmental impact analysis.

ENVIRONMENTAL TOPICS TO BE ADDRESSED

The draft EA will address direct, indirect, and cumulative impacts of the Proposed Action and alternatives. Beneficial and adverse, on-site and off-site, construction, demolition, and operation and maintenance impacts will be discussed, as appropriate. The environmental topics to be addressed in the EA include:

Land Use, Planning, Socioeconomics and Public Policy
Traffic and Circulation
Air Quality and Noise
Visual Quality/Aesthetics
Water Resources
Soils and Geology
Biological Resources
Cultural Resources
Waste Management
Public Facilities, Services and Utilities
Energy
Sustainability

SCHEDULE

DOE anticipates public distribution of the Draft EA in June 2007. Comments are welcome throughout the EA process. No formal public scoping meeting is currently planned for this project. This letter and the draft EA, when available, will be posted in the Golden Field Office electronic reading room: http://www.eere.energy.gov/golden/reading_room.aspx.

Please direct your comments to:

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NEPA Compliance Officer
DOE Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393
(303) 275-4723
(303) 275- 4790 (fax)
Steve.Blazek@go.doe.gov

FIGURES:
Figure 1 Regional Location Map, South Table Mountain Site
Figure 2 Proposed Project Site Locations

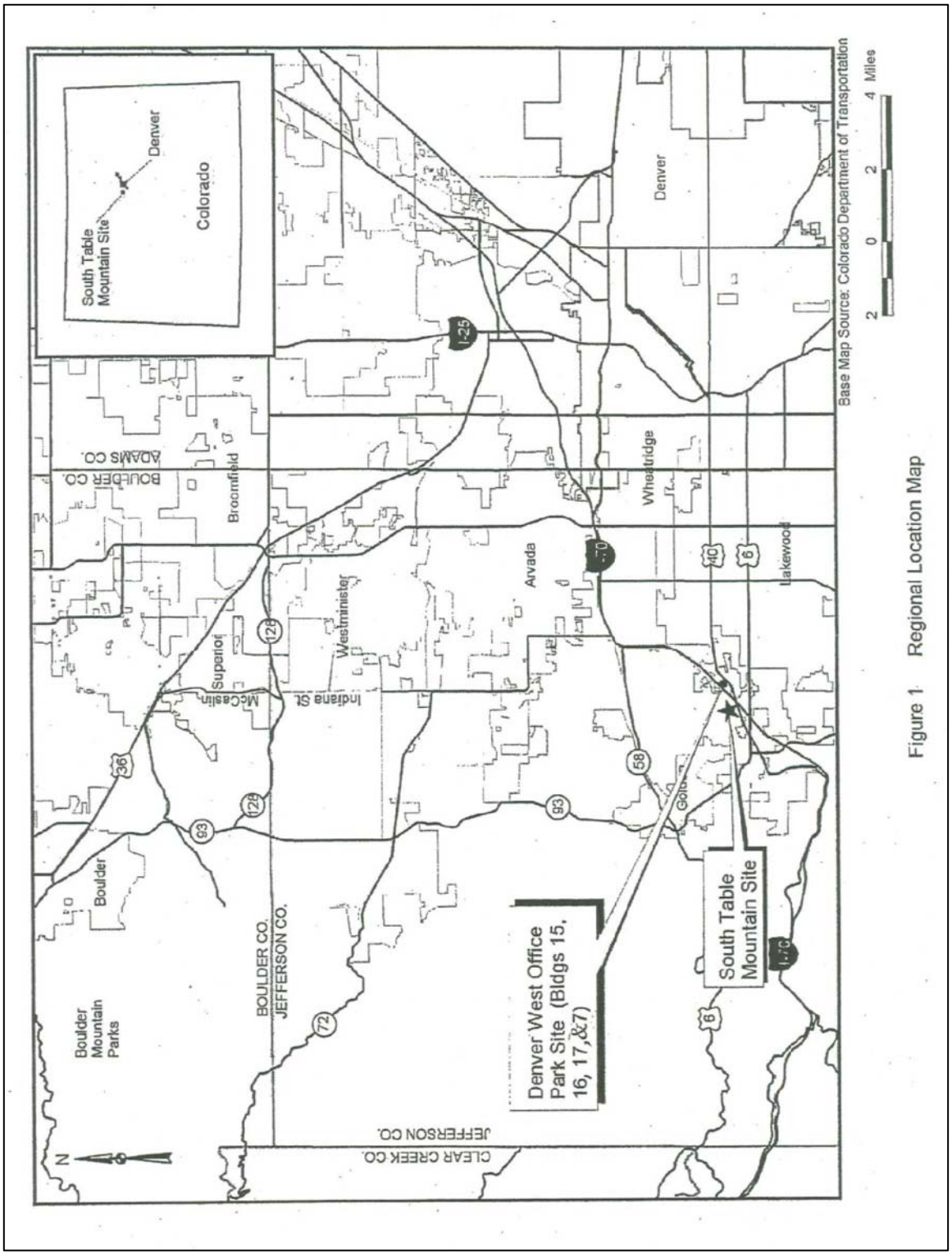

Figure 1 Regional Location Map

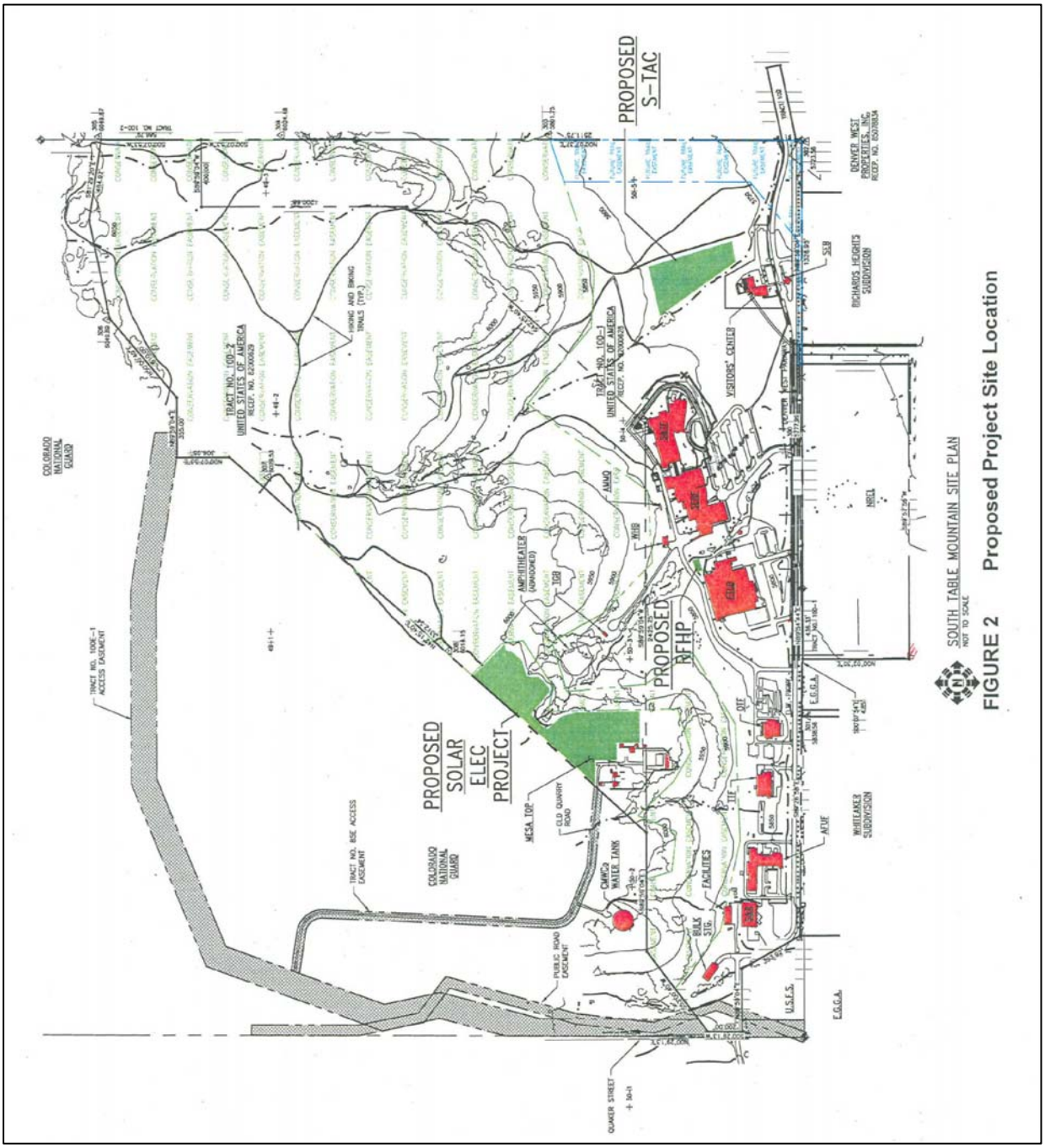

FIGURE 2 Proposed Project Site Location

APPENDIX B SCOPING LETTER DISTRIBUTION LISTS

DOE mailed the scoping letter shown in Appendix A to the businesses, agencies, and organizations shown in the following mailing list. In addition, DOE mailed the scoping letter to all known Pleasant View residential addresses. The residential mailing list consisted of 1,470 addresses.

4-U Mini Mart
15750 S. Golden Rd.
Golden, CO 80401

7-Eleven
16400 S. Golden Rd.
Golden, CO 80401

Absolute Tatoo
15750 S. Golden Rd.
Golden, CO 80401

AC Transmission
15435 W. Colfax Ave
Golden, CO 80401

Ace Liquor Store
16265 S. Golden Rd.
Golden, CO 80401

Adolph Coors Company
1819 Denver West Drive
Golden, CO 80401

Advantage Appraisals Inc.
795 McIntyre St.
Golden, CO 80401

AMS
10433 Denver West Parkway
Golden, CO 80401

Anderson Services
1125 Quaker St.
Golden, CO 80401

Back Talk System
14998 W. 6th Ave., 500
Golden, CO 80401

Barnes & Noble
14371 W. Colfax Ave.
Golden, CO 80401

Bed Bath & Beyond
14275 W. Colfax Ave.
Golden, CO 80401

Bilg's Delicatessen
16400 S. Golden Rd.
Golden, CO 80401

Bldg. 3
15850 W. 6th Ave
Golden, CO 80401

Bobcat of the Rockies
15680 W. 6th Ave.
Golden, CO 80401

Boston Market, Inc.
14103 Denver West Parkway
Golden, CO 80401

Environmental Compliance
Office Bureau of Land
Management
2850 Younfield Street
Lakewood, CO 80215

Calvary Baptist Church
17050 S. Golden Rd.
Golden, CO 80401

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Office of Environmental Programs
4300 Cherry Creek Drive, South
Denver, CO 80246

Margie Perkins, Division
Director CDPHE
Air Pollution Control Division
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Steve Gunderson, Division
Director CDPHE
Water Quality Control Division
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Centennial Equipment Co.
15760 W. 6th Ave
Golden, CO 80401

Christy Sports
14371 W. Colfax Ave.
Golden, CO 80401

Mr. Vince Auriemma City of
Golden
Golden Public Works Office
1445 10th Street
Golden, CO 80401

Ms. Katie Fendel City of Golden
Golden Public Works Office
911 10th Street
Golden, CO 80401

Ms. Pamela Sheldon City of
Lakewood Planning Department
455 S. Allison Parkway
Lakewood, CO 80226

Classic Log Homes
15740 W 6th Ave.
Golden, CO 80401

CMC Challenge-Mfg-Consult
15744 W 6th Ave
Golden, CO 80401

Coleman Coporation
Dept. 586 (Real Estate)
PO Box 2931
Wichita, KS 67201

Colorado Business Bank
15710 W. Colfax Ave.
Golden, CO 80401

Colorado Concrete & Pottery
16601 S. Golden Rd.
Golden, CO 80401

Dr. Dana L. Winkelman, Director
Colorado Coop Fish & Wildlife
Research Unit
201 JVK Wagar Building
CSU Campus Delivery 1484
Fort Collins, CO 80523-148

Mr. Jim Miller Colorado
Department of Agriculture
Dir. Of Policy &
Communication
700 Kipling Street, Suite 4000
Lakewood, CO 80215

Ms. Linda Coulter Colorado
Department of Agriculture
700 Kipling Street, Suite 4000
Lakewood, CO 80215

Mr. Curt Eckhart Colorado
Department of Transportation,
Region 6 Office
2000 South Holly Street
Denver, CO 80222

Colorado Dept. of Natural
Resources
Executive Director's Office
1313 Sherman Street,
Room 718
Denver, CO 80203

Colorado Dept. of Public Health &
Environment
Haz. Materials & Waste Mgmt Div.
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Mr. Gerald Craig Colorado
Division of Wildlife
State Raptor Biologist
317 Prospect Road
Fort Collins, CO 80526

Mr. Perry Olson Colorado
Division of Wildlife
6060 Broadway
Denver, CO 80216

Colorado Environmental Coalition,
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1536 Wynkoop
Denver, CO 80202

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Geological Survey
1313 Sherman Street, Rm 715
Denver, CO 80203

Management and Conservation
Colorado Office of Energy
225 E. 16th Ave, Suite 650
Denver, CO 80203

Colorado State Board of Land
Communication
1313 Sherman Street, Rm 620
Denver, CO 80203

Mr. Bruce Colter Colorado State
Forest Service
Golden District Office
1504 Quaker Street
Golden, CO 80401-2956

Colorado State Patrol
1096 McIntyre St.
Golden, CO 80401

Ms. Rebecca Vickers Colorado
Transporation Dept. Empire Park
Environmental Services
4201 E. Arkansas Ave.
Denver, CO 80222

Columbine Café
15630 S. Golden Rd.
Golden, CO 80401

Communication Industries, Ind
785 McIntyre St.
Golden, CO 80401

Mr. Walter S. Welton, President
Consolidated Mutual Water
Company
12700 W. 27th Ave.
Lakewood, CO 80215

CSI Hobby Greenhouses
15850 W. Colfax Ave.
Golden, CO 80401

Custer & Steinmates
622 Gardenia Ct.
Golden, CO 80401

DAVCO Motors
795 McIntyre St.
Golden, CO 80401

Day's Inn Motel
15059 W. Colfax Ave.
Golden, CO 80401

DDRC Maintenance Terminal
16611 S. Golden Rd.
Golden, CO 80401

Delux Towing
16305 S. Golden Rd.
Golden, CO 80401

Denver Biomaterials Inc
14998 W. 6th Ave., 700
Golden, CO 80401

Mr. Greg Stevinson Denver West Ltd.
1546 Cole Blvd
Golden, CO 80401

Ms. Valerie Farnham Denver West Ltd.
1546 Cole Blvd
Golden, CO 80401

Mr. Terry McKee, Omaha District Dept. of Army, Corps of Engineers
9307 State Highway 121
Littleon, CO 80123

Mr. Hal Simpson Division of Water Resources
1313 Sherman St., Rm 818
Denver, CO 80203

DOC
15000 W. 6th Ave., 102
Golden, CO 80401

Dolls Anonymous
16399 S. Golden Rd., Unit C
Golden, CO 80401

EAP Glass
616 Moss St.
Golden, CO 80401

Eggers Lapidary
16950 S. Golden Rd.
Golden, CO 80401

Einstein Bagel Company
14103 Denver West Parkway
#100
Golden, CO 80401

Einstein Bros. Bagels
14401 W. Colfax Ave.
Golden, CO 80401

El Amigo Restaurant
16399 S. Golden Rd., Unit D
Golden, CO 80401

El Senor Sol
15900 W. Colfax Ave.
Golden, CO 80401

Energy West Controls
14828 W. 6th Ave.
Golden, CO 80401

Enstroms Candies
14415 W. Colfax Ave.
Golden, CO 80401

Enterprise Car Rental
885 Lupine St. A
Golden, CO 80401

Ms. Christine Shaver
Environmental Defense Fund, Inc.
Rocky Mountain Office
2334 North Broadway
Boulder, CO 80304

Mr. Wes Wilson EPA Region VII
NEPA Compliance, 8WMEA
999 18th Street
Denver, CO 80202-2466

Evergreen Appraisals
622 Gardenia Ct.
Golden, CO 80401

Northwest Mountain Office
Federal Aviation Administration
1601 Lind Avenue SW
Renton, WA 98055-4056

Five R Repair
15590 W. Colfax Ave.
Golden, CO 80401

Foothills Chiropractic Health Center
16135 S. Golden Rd.
Golden, CO 80401

Foreign Car Service
16289 W. Colfax Ave.
Golden, CO 80401

Francis Veterinary
16199 S. Golden Rd.
Golden, CO 80401

Ms. Doris DePenning Friends of the Foothills
9285 Blue Mountain Dr.
Golden, CO 80403

Ms. Nancy Hollinger Friends of the Foothills
9184 Fern Way
Golden, CO 80402

Glasscraft, Inc.
626 Moss St.
Golden, CO 80401

God's Place
16399 S. Golden Rd., Unit G
Golden, CO 80401

Golden Auto Parts
16948 S. Golden Rd.
Golden, CO 80401

Mr. Allen Gallamore Golden
District Forester
Golden District Office
1504 Quaker Street
Golden, CO 80401-2956

Golden Gate Parts
15990 S. Golden Rd.
Golden, CO 80401

Mr. Steve Glueck, Director
Golden Planning &
Development Department
1455 10th Street
Golden, CO 80401

Gram's Foods
15710 W. 6th Ave., 710
Golden, CO 80401

Holiday Inn West Village
14707 W. Colfax Ave.
Golden, CO 80401

Hops
14285 W. Colfax Ave.
Golden, CO 80401

Horizon Foods
16305 S. Golden Rd.
Golden, CO 80401

Intermountain Marketing
15000 W. 6th Ave., 200
Golden, CO 80401

Islamic Center of Golden
16199 S. Golden Rd.
Golden, CO 80401

J. F. Hurlbut Co.
622 Gardenia Ct.
Golden, CO 80401

Jamba Juice
14237 W. Colfax Ave.
Golden, CO 80401

Jeffco Open Space Foundation,
Inc.
5855 Wadsworth Bypass
Building A, Suite 100
Arvada, CO 80003

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County Public Works Div.
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Golden, CO 80419

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Colorado Citzens for Planned
Growth and Open Space
11010 W. 29th Avenue
Lakewood, CO 80215-7120

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Special Projects Coordinator
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Golden, CO 80419-3500

Randy B. Holman Jefferson County
Assessor's Office
100 Jefferson County Parkway,
Suite 3550
Golden, CO 80419

Jefferson County
Highways and Transporation
100 Jefferson County Pkwy, Ste.
3500
Golden, CO 80419

Jefferson County Department of
Health
Environmental Health Division
260 South Kipling Street
Lakewood, CO 80226

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Emergency Preparedness
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Suite 4570
Golden, CO 80419

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Open Space
Acquisitions Specialist
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Golden, CO 80419

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100
Golden, CO 80419

Jefferson County Open Space
Assistant County Attorney
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Golden, CO 80419

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Ste. 3550
Golden, CO 80419

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Jefferson County Planning &
Zoning Office
Planning and Engineering Mgr
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Suite. 3550
Golden, CO 80419

Ms. Karen Hellner Jefferson County
Planning & Zoning Office
7000 Jefferson County Pkwy
Suite 3550
Golden, CO 80419

Jefferson County Public Schools
1829 Denver West Drive
Golden, CO 80401

Mr. Ronald Beckham Jefferson
County Sheriff
17900 W. 10th Ave.
Golden, CO 80401-2679

JGS Contractors, Inc.
855 Lupine St.
Golden, CO 80401

Junction Texaco
15065 W. Colfax Ave.
Golden, CO 80401

K&P Inc.
777 Nile St.
Golden, CO 80401

K.E.M. Printing
16250 S. Golden Rd.
Golden, CO 80401

Key Bank
14417 W. Colfax Ave.
Golden, CO 80401

Mr. Eric Blank Land & Water Fund of the Rockies
2260 Baseline Road, Suite 200
Boulder, CO 80302

Lawson Pain and Body
910 McIntyre St.
Golden, CO 80401

Le Peep
14401 W. Colfax Ave.
Golden, CO 80401

Leep'in Lizard SAAB
605 Lupine St.
Golden, CO 80401

Mac Vik Plumbing & Heating
16190 S. Golden Rd.
Golden, CO 80401

Macaroni Grill
14245 W. Colfax Ave.
Golden, CO 80401

Majestic Ventures
16500 S. Golden Rd.
Golden, CO 80401

Mannie and Bo's Pizzeria
16399 S. Golden Rd., Unit E
Golden, CO 80401

McKee Construction Co.
795 McIntyre St.
Golden, CO 80401

Method Machine Tools, Inc.
14998 W. 6th Ave.
Golden, CO 80401

Mr. Dale Lauer, Board of Directors
Metro Sanitation District
952 Moss Street
Golden, CO 80401

Rue Eich Metro Wastewater Reclamation District
6450 York Street
Denver, CO

Mier's Deli
15750 S. Golden Rd.
Golden, CO 80401

Mile Hi Chem Dry
15970 S. Golden Rd.
Golden, CO 80401

Mimi's Café
14265 W. Colfax Ave.
Golden, CO 80401

MLL General Contractors
665 Moss St.
Golden, CO 80401

Mobile Mechanic at the Shop
15810 W. Colfax Ave.
Golden, CO 80401

Mountain View Laundromat & Dry Cleaner
15940 S Golden Rd.
Golden, CO 80401

Mountain View Motel
14825 W. Colfax Ave.
Golden, CO 80401

Mountain View Trailer Village
16100 S. Golden Rd.
Golden, CO 80401

Mr. Handyman
622 Gardenia Ct.
Golden, CO 80401

National Wildlife Federation
2260 Baseline Road
Boulder, CO 80302

Nationwide Storage
16845 Mt. Vernon Rd.
Golden, CO 80401

Native Nursery - Tom Gillian
17025 S. Golden Rd.
Golden, CO 80401

Ronald Wopsock & Roland McCook Northern Ute Indian Tribe
PO Box 190
Ft. Duchesene, UT 84026

Oasis Denver West Apt Homes
1910 Denver West Drive
Golden, CO 80401

Office Max
14275 W. Colfax Ave.
Golden, CO 80401

Office of Representative Bob Beauprez
4251 Kipling St., Ste. 370
Wheat Ridge, CO 80033

Office of Representative Mark Udall
8601 Turnpike Drive #206
Westminster, CO 80031

Office of Senator Ken Salazar
2300 15th St., Ste. 450
Denver, CO 80202

Ms. Kristine Pollard Office of Senator Wayne Allard
7340 E. Caley, Suite 215
Englewood, CO 80111

Old Golden Discount Liquors
15750 S. Golden Rd.
Golden, CO 80401

Old Navy
14367 W. Colfax Ave.
Golden, CO 80401

On the Border
14225 W. Colfax Ave.
Golden, CO 80401

Outback Steakhouse
14295 W. Colfax Ave.
Golden, CO 80401

Peregrine Communications Inc.
14818 W. 6th Ave., 15A
Golden, CO 80401

Perfection Tool Repair
16200 S. Golden Rd.
Golden, CO 80401

Performance Plus Auto Care
16099 S. Golden Rd.
Golden, CO 80401

Planet Honda
15601 W. Colfax Ave.
Golden, CO 80401

Pleasant View Beauty Salon
15940 S Golden Rd.
Golden, CO 80401

Mr. Branden Baalman, Chief
Pleasant View Fire Department
955 Moss Street
Golden, CO 80401

Stewart McCallister, District Coordinator
Pleasant View Metro District
955 Moss Street
Golden, CO 80401

Mr. David Councilman
Pleasant View Water & Sanitation District
955 Moss Street
Golden, CO 80401

Pompoms & Whiskers Grooming
940 McIntyre St.
Golden, CO 80401

Porter Design
15750 S. Golden Rd., Unit G
Golden, CO 80401

Procard, Inc.
1819 Denver West Drive
Golden, CO 80401

Puttin Parts
16185 S. Golden Rd.
Golden, CO 80401

Quiznos
14413 W. Colfax Ave.
Golden, CO 80401

Ramstetter Excavating
16599 S. Golden Rd.
Golden, CO 80401

Ranniger Systems, Inc.
795 McIntyre St.
Golden, CO 80401

Reasonable Auto Service
15735 S. Golden Rd.
Golden, CO 80401

Regal Mortgage
795 McIntyre St.
Golden, CO 80401

Richards Agency
622 Gardenia Ct.
Golden, CO 80401

Rock Rest
16005 Mt. Vernon Rd.
Golden, CO 80401

Mr. David Abelson
Rocky Flats Coalition of Local Government
8461 Turnpike Dr.
Westminster, CO 80031

Roofing Services
15985 S. Golden Rd., Unit F
Golden, CO 80401

Rose Cleaners
14407 W. Colfax Ave.
Golden, CO 80401

Save the Mesas/Citzens Involved
in the NW Quadrant
PO Box 16551
Golden, CO 80402-6009

Secor
14998 W. 6th Ave., 800
Golden, CO 80401

Sid's Auto Service
16305 S. Golden Rd.
Golden, CO 80401

Ms. Maggie Fox, Southwest Office Sierra Club
2260 Baseline Road, Suite 105
Boulder, CO 80302

Simplex
14998 W. 6th Ave., 600
Golden, CO 80401

Sinclair Service Station
15495 W. Colfax Ave.
Golden, CO 80401

Ecological Science Dept. Soil Conservation Service
655 Parfet Street, Rm E20C
Lakewood, CO 80215

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Southern Ute Tribe
PO Box 737
Ingacio, CO 81137

Edna Frost, Director Southern Ute Tribe
Tribal Information Services
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Ingacio, CO 81137

Mr. & Mrs Alden Naranjo
Southern Ute Tribe
Ute Language & Culture Committee
PO Box 737
Ingacio, CO 81137

Mr. Leonard C. Burch, Chairman
Southern Ute Tribe
Ute Language & Culture Committee
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Ingacio, CO 81137

Mr. Neil Cloud Southern Ute Tribe
NAGPRA Coordinator
PO Box 737
Igacio, CO 81137

Sports Rack Vehicle Outfitter
15600 W. Colfax Ave.
Golden, CO 80401

Mr. Jim Green State Historic Pres. Office
1300 Broadway
Denver, CO 80203

Govenor Bill Owens State of Colorado
136 State Capital
Denver, CO 80203

Stevinson Chevrolet
14700 W. Colfax Ave.
Golden, CO 80401

Stevinson Lexus
801 Indiana Street
Golden, CO 80401

Stevinson Toyota
15000 W. Colfax Ave.
Golden, CO 80401

Table Mountain Conservation Fund
PO Box 16201
Golden, CO 80402-6004

Telecommunications Products, Inc.
795 McIntyre St.
Golden, CO 80401

Telescope Engineering
15730 W. 6th Ave.
Golden, CO 80401

The Salon
14235 W. Colfax Ave.
Golden, CO 80401

Tokyo Joes
14227 W. Colfax Ave.
Golden, CO 80401

Dr. Kenneth R. Wilson U.S. Department Interior Fish & Wildlife Service
Colorado Field Supervisor
755 Parfet St., Rm 361
Lakewood, CO 80215

Eugene H. Backhaus U.S. Department of Agriculture
District Conservationist
655 Parfet Street, Room E-300
Lakewood, CO 80215-5517

Mr. Gary Finstad
U.S. Department of Agriculture
Natural Resource Conservation Service - Metro Office
655 Parfet Street, Rm E-300
Lakewood, CO 80215-5517

Mr. Andrew Archuleta U.S. Fish and Wildlife Service
Colorado Field Office
PO Box 25486-DFC
Denver, CO 80225-0207

UA
14225 W. Colfax Ave.
Golden, CO 80401

U-Haul
15500 W. Colfax Ave.
Golden, CO 80401

Betsy Chapoose Uinta and Ouray Ute Tribal Business Council
PO Box 190
Ft. Duchesene, UT 84026

Ultimate Electronics
14275 W. Colfax Ave.
Golden, CO 80401

Mr. Randy Christiansen United Power
5 Grouse Dam Rd.
Golden, CO 80403

Universal Surface Counter Tops
15866 W. 7th Ave., C&D
Golden, CO 80401

Mr. Gregory Davis US EPA
Mailcode: EPR-EP
999 18th Street, Suite 500
Denver, CO 80202

Ms. Carol Campbell US EPA - Region VIII
Director Ecosystem Protection
999 18th Street, Suite 500
Denver, CO 80202-2405

Mr. Grady Towns US Fish and Wildlife Service
Denver Regional Office
PO Box 25486
Denver, CO 80225

Mr. Terry Knight, Spiritual Coordinator Ute Mountain Life Tribe
PO Box 53
Towaoc, CO 81334

Ms. Judy Knight-Frank, Chairperson Ute Mountain Ute Tribal Council
General Delivery
Towaoc, CO 81334

VFW Post # 4171
15625 W. 10th Ave.
Golden, CO 80401

Videotronix
15000 W. 6th Ave., 102A
Golden, CO 80401

Wa La Hair Studio
15750 S. Golden Rd.
Golden, CO 80401

Walts Tire Store
15990 S. Golden Rd.
Golden, CO 80401

West Metro Fire Protection District
447 S. Allison Parkway
Lakewood, CO 80226-3128

West Side Auto Sales
676 Moss St.
Golden, CO 80401

Western Roofing
15810 W. 6th Ave
Golden, CO 80401

Ms. Belinda Boiko Yenter Companies
20300 W. Highway 72
Arvada, CO 80007

Carl Eiberger
14330 Fairview Lane
Golden, CO 80401

Craig Cox
2900 Vance Street
Denver, CO 80215

Wilbur between Lodges
Oglala Sious Tribe
Pine Ridge, SD 57770

APPENDIX C RESPONSES RECEIVED TO SCOPING LETTER

STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

APR 3 0 REC'D

April 26, 2007

Steve Blazek
Dept. of Energy
Golden Field Office
1617 Cole Blvd.
Golden, CO 80401-3305

Re: NREL Renewable Fuel Heating Plant and Solar Energy Development Projects

Dear Mr. Blazek,

On April 2, 2007, the Colorado Air Pollution Control Division received a request for an air quality determination concerning NREL Renewable Fuel Heating Plant and Solar Energy Development Projects. Thank you for taking the time to inquire about air quality requirements in this area. The following information pertains to air quality issues only.

All sources of air emissions in Colorado are required to obtain a construction permit unless thaey are specifically exempted by the provision of Regulation No. 3. The first phase of air permitting involves submission of an Application for Construction Permit for each facility and one Air Pollution Emission Notices (APEN) for each emission source. For purposes of Air Pollution Emission Notice reporting, a source can be an individual emission point or group of similar emission points (Ref: Regulation No. 3, Part A) Both APEN reporting and permit requiremints are triggered by uncontrolled actual emission rates. Uncontrolled actual emissions are calculated based on the the requested production/operating rate Assuming no control equipment is used. In general, an APEN is required for an emission point with uncontrolled actual emissions of any criteria pollutant equal to or greater than the quantity listed in the table below:

AREA	UNCONTROLLED ACTUAL EMISSIONS
Attainment Areas	2 Tons Per Year
Non-attainment Areas	1 Ton Per Year
All Areas	Lead Emissions: 100 pounds per year

Please consult http://www/cdphe.state.co.us/ap/attainmemaintain.asp to determine if your project will be located within an an attainment or non-attainment area. Othere exemptions may be found in Regulation

No. 3., Part A, Section II.D.1, however a source may not be exempted if the source would otherwise be subject to any specific federally applicable requirement.

Sources of non-criteria reportable pollutants have different reporting levels depending on on the pollutant, release point height, and distance to property line. Please see Appendix A and Appendix C of Regulation Nop. 3 for determining the appropriate reporting level for each pollutant and for the list of non-criteria reportable air pollutants. However, none of the exemptions from Air Pollution Emission Notice filing requirements described above shall apply if a source would otherwise be subject to any specific federal or state applicable requirement. Information concerning submittal of revised Air Pollution Emission Notices is also given in Regulation No. 3, Part A. An Air Pollutant Emission Notice is valid for a period of five years. The five-year period recommences when a revised Air Pollutant Emission Notice is received by the Division.

If you have any questions regarding your reporting and permitting obligations please call the Small Business Assistance Program at (303)-69203148 or (303) 692-3175.

Land development (earth moving) activities that are greater than 25 acres or more than 6 months in duration will most likely be required to submit an APEN to the Division and may be required to obtain an air permit. In addition a startup notice must be submitted 30 days prior to commencement of the land development project. Please refer to the following link for additional information: http://www.cdphe.state.co.us/ap/down/land develop.pdf.

If you have any questions or feel as though you need more information on possible air pollution permits or notice requirements, please contact me directly at (303) 692-3127 or the Colorado Air Pollution Control Division's Stationary Source Program at (303) 692-3150. I can also be reached via email at jim.dileo@state.co.us.

Again, thank you for taking the time to contact the Division about this upcoming project.

Sincerely,

James A DiLeo
Air Quality Planner
Colorado Air Pollution Control Division

2007-04-18 08:52 >> 3032754790 P 1/2

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES

COLORADO FIELD OFFICE
P.O. BOX 25486, DFC (MS65412)
DENVER, COLORADO 80225-0486

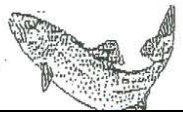
PHONE: 303-236-4773 FAX: 303-236-4005

SEND TO: Steve Blazek PHONE: 3-275-4723
FROM: _____ FAX: 3-275-4790

PAGES (INCLUDING COVER SHEET) 1
SUBJECT: Renewable Fuel

COMMENTS:
Response.

MAILING ADDRESS:
134 UNION BLVD., STE. 670
LAKEWOOD, CO 80228



2007-04-18 08:53 >> 3032754790 P 2/2

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3305

APR 13 2007

April 2, 2007

U.S. FISH AND WILDLIFE SERVICE
☐ CONCUR NO EFFECT
☐ CONCUR NOT LIKELY TO ADVERSELY AFFECT
☐ NO COMMENT
4/18/07
COLORADO FIELD SUPERVISOR (DATE)
Susan C. Linner

DISTRIBUTION LIST

SUBJECT: Revised Request for Public and Agency Comments on the Proposed Renewable Fuel Heating Plant and Proposed Solar Energy Development Projects at The National Renewable Energy Laboratory's South Table Mountain Site

The U.S. Department of Energy (DOE), Golden Field Office, issued a Notice of Scoping on November 13, 2006 regarding our intent to prepare an Environmental Assessment (EA) for the proposed Renewable Fuel Heating Plant at the National Renewable Energy Laboratory's (NREL) South Table Mountain site near Golden, Colorado. Based on NREL's current site planning information, DOE has decided to expand the scope of the EA to include two solar energy projects at the South Table Mountain Site. Detailed descriptions of the site, the proposed Renewable Fuel Heating Plant, and the proposed solar energy development activities are included in the attachment to this letter.

NREL is a federally owned, contractor-operated research facility that supports renewable energy and energy efficiency technologies. DOE is the lead agency for this EA, and other federal, state, and local agencies are invited to participate in the environmental assessment process. DOE is requesting public input on the proposed NEPA process, proposed actions and alternatives, and the environmental issues to be addressed in the EA.

Pursuant to the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft EA to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.

Federal Recycling Program Printed on Recycled Paper

COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

April 12, 2007

Steve Blazek
NEPA Compliance Office
DOE Golden Field Office
1617 Cole Blvd.
Golden, CO 80401-3393

Re: Revised Request for Public and Agency Comments on Proposed renewable Fuel Heating Plant and Proposed Solar Energy Development Projects at the NREL South Table Mountain Site (CHS #49170)

Dear Mr. Blazek,

Thank you for your correspondence dated April 2, 2007 (received by our office on April 4) regarding the above-mentioned project.

We recommend that you coordinate your National Environmental Policy Act (NEPA) studies with the studies required under Section 106 of the National Historic Preservation Act. According to 36 CFR 800.8 of Section 106, "Federal agencies are encouraged to coordinate compliance with Section 106 and the procedures in this part with any steps taken to meet the requirements of the National Environmental Policy Act." Also, Section 110 of the National Historic Preservation Act states that Federal agencies should "coordinate with the earliest phases of any environmental review carried out under the National Environmental Policy Act."

The findings from the Section 106 studies can inform the NEPA studies, such as including mitigation measures identified under Section 106 into the NEPA decision document. Once we receive the Section 106 studies, we will be able to fully complete our reviews under both Section 106 and NEPA. We have enclosed a flow chart that explains the coordination between Section 106 and NEPA.

While a cultural resource survey has previously been conducted in the vicinity of the proposed projects, your correspondence does not clearly indicate the area of potential effect (APE) of the proposed projects. Also, please note that two historic properties listed on the National Register are located in close proximity to the proposed projects. These properties (5JF842, the Colorado Amphitheater and 5JF843, the Ammunition Igloo) contribute to the significance of the Camp George West Historic District (5JF145), also listed on the National Register.

Re: Revised Request for Public and Agency Comments on Proposed renewable Fuel Heating Plant and Proposed Solar Energy Development Projects at the NREL South Table Mountain Site (CHS #49170)

We look forward to consultation regarding the effect of the proposed projects on these resources. If we may be of further assistance, please contact Amy Pallante, Section 106 Compliance Coordinator, at (303) 866-4678, or Greg Wolff, Section 106 Compliance Coordinator, at (303) 866-4674.

Sincerely,

Georgianna Contiguglia
State Historic Preservation Officer
GC/GAW

Re: Revised Request for Public and Agency Comments on Proposed renewable Fuel Heating Plant and Proposed Solar Energy Development Projects at the NREL South Table Mountain Site (CHS #49170)

APPENDIX D DRAFT RFHP CONSTRUCTION PERMIT

DRAFT
PERMIT

PERMIT NO: **07JE0277**

INITIAL APPROVAL

DATE ISSUED:

ISSUED TO: **U. S. Department of Energy**
National Renewable Energy Laboratory

THE SOURCE TO WHICH THIS PERMIT APPLIES IS DESCRIBED AND LOCATED AS FOLLOWS:

Fuel heating plant for Research and Development facility for Renewable Energy and Energy Efficiency, located at 15003 Denver West Parkway, Golden, Jefferson County, Colorado.

THE SPECIFIC EQUIPMENT OR ACTIVITY SUBJECT TO THIS PERMIT INCLUDES THE FOLLOWING:

One (1) Challenger Advanced Recycling Equipment, Model: CCUE411-W, Serial Number: to be provided, woodwaste fired boiler, heat input rated at 11,500,000 BTU per hour. This boiler is equipped with a multistage combustion system and an extended combustion chamber for minimizing emissions of Nitrogen Oxides, Carbon Monoxide, and Volatile Organic Compounds. Particulate Matter emissions are controlled by a set of cyclones (multicyclone system).

THIS PERMIT IS GRANTED SUBJECT TO ALL RULES AND REGULATIONS OF THE COLORADO AIR QUALITY CONTROL COMMISSION AND THE COLORADO AIR POLLUTION PREVENTION AND CONTROL ACT C.R.S. (25-7-101 et seq), TO THOSE GENERAL TERMS AND CONDITIONS INCLUDED IN THIS DOCUMENT AND THE FOLLOWING SPECIFIC TERMS AND CONDITIONS:

1. This permit shall expire if the owner or operator of the source for which this permit was issued: (i) does not commence construction/modification or operation of this source within 18 months after either the date of issuance of this initial approval permit or the date on which such construction or activity was scheduled to commence as set forth in the permit application associated with this permit; (ii) discontinues construction for a period of eighteen months or more; or (iii) does not complete construction within a reasonable time of the estimated completion date (See General Condition No. 6., Item 1.). Upon a showing of good cause by the permittee, the Division may grant extensions of the permit. (Reference: Regulation No. 3, Part B, Section III.F.4.)

AIRS Point ID: 059/0097/007 Page 1 of 6

2. Within one hundred and eighty days (180) after commencement of operation, compliance with the conditions contained on this permit shall be demonstrated to the Division. It is the permittee's responsibility to self certify compliance with the conditions. Failure to demonstrate compliance within 180 days may result in revocation of the permit. (Information on how to certify compliance was mailed with the permit.)

3. The permit number shall be marked on the subject equipment for ease of identification. (Reference: Regulation No. 3, Part B, Section III.E.) (State only enforceable)

4. The manufacturer, model number and serial number of the subject equipment shall be provided to the Division within one hundred and eighty days (180) after commencement of operation. (Reference: Regulation No. 3, Part B, Section III.E.)

5. Visible emissions shall not exceed twenty percent (20%) opacity during normal operation of the source. During periods of startup, process modification, or adjustment of control equipment visible emissions shall not exceed 30% opacity for more than six minutes in any sixty consecutive minutes. Opacity shall be measured by EPA Method 9. (Reference: Regulation No. 1, Section II.A.1. & 4.)

6. This source is subject to the odor requirements of Regulation No. 2. (State only enforceable)

7. Emission control devices / systems shall be inspected, monitored, maintained / renewed, and operated as per the recommendations of the manufacturers to ensure ongoing satisfactory performance.

8. This source shall be limited to a fuel use rate as listed below and all other activities, operational rates and numbers of equipment as stated in the application. Annual records of the actual consumption rate shall be maintained by the applicant and made available to the Division for inspection upon request. (Reference: Regulation No. 3, Part B, Section II.A.4.)

   Consumption of woodwaste for combustion in the boiler shall not exceed 3,900 tons per year. This is based on a High Heat Value of 5,975 BTU per pound.

9. Emissions of air pollutants shall not exceed the following limitations (as calculated in the Division's preliminary analysis): (Reference: Regulation No. 3, Part B, Section II.A.4.)

Particulate Matter:	5.1 tons per year.
PM10 (Particulate Matter<10 μm):	4.7 tons per year.
Nitrogen Oxides:	5.1 tons per year.
Carbon Monoxide:	1.4 tons per year.

10. This source is subject to Regulation No. 6, Part A, Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, including, but not limited to, the following:

    § 60.48c Reporting and recordkeeping requirements.

    In addition, the following requirements of Regulation No. 6, Part A, Subpart A, General Provisions, apply.

    a. At all times, including periods of start-up, shutdown, and malfunction, the facility and control equipment shall, to the extent practicable, be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether or not acceptable operating and maintenance procedures are being used will be based on information available to the Division, which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. (Reference: Regulation No. 6, Part A. General Provisions from 40 CFR 60.11

    b. No article, machine, equipment or process shall be used to conceal an emission that would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard that is based on the concentration of a pollutant in the gases discharged to the atmosphere. (§ 60.12)

    c. Written notification of construction and initial startup dates shall be submitted to the Division as required under § 60.7.

    d. Records of startups, shutdowns, and malfunctions shall be maintained, as required under § 60.7.

    e. Performance tests shall be conducted as required under § 60.8.

11. This source is subject to Regulation No. 6, Part B, II – Standards of Performance for New Fuel-Burning Equipment, C – Standard for Particulate Matter:

    Emissions of Particulate Matter shall not be in excess of the rate calculated by:

    $PE = 0.5 (FI)^{-0.26}$ PE is allowable emissions, pound per million BTU heat input
    FI is the fuel input in million BTU per hour.

    Discharge into the atmosphere shall not exhibit greater than 20 % opacity.

12. A Revised Air Pollutant Emission Notice (APEN) shall be filed: (Reference: Regulation No. 3, Part A, Section II.C.)

a. Annually whenever a significant increase in emissions occurs as follows:

For any criteria pollutant:

For sources emitting **less than 100 tons per year**, a change in actual emissions of five tons per year or more, above the level reported on the last APEN submitted.

For any non-criteria reportable pollutant:

If the emissions increase by 50% or five (5) tons per year, whichever is less, above the level reported on the last APEN submitted to the Division.

b. Whenever there is a change in the owner or operator of any facility, process, or activity; or

c. Whenever new control equipment is installed, or whenever a different type of control equipment replaces an existing type of control equipment; or

d. Whenever a permit limitation must be modified; or

e. No later than 30 days before the existing APEN expires. APEN/s expires five (5) years from the date/s of submittal.

Ram N. Seetharam
Permit Review Engineer

R K Hancock III, P.E.
Construction Permits Unit Supervisor

Permit History:

Date	Action	Description
This issuance	IA	Initial Approval.

APEN Submittal Log (to be maintained further by the permittee):

APEN Submittal Date	APEN Expiry Date	Renewal APEN to be submitted by	Remarks
March 21, 2007	March 21, 2012	February 19, 2012	

Colorado Department of Public Health and Environment
Air Pollution Control Division

U. S. Department of Energy - National Renewable Energy Laboratory
Permit No. 07JE0277
Initial Approval

DRAFT PERMIT

Notes to Permit Holder:

1) The fuel use rate and emission limits contained in this permit are based on those requested in the permit application. These limits may be revised upon request of the permittee providing there is no exceedance of any specific emission control regulation or any ambient air quality standard. A revised air pollution emission notice (APEN) and application form must be submitted with a request for a permit revision.

2) This source is subject to the Common Provisions Regulation Part II, Subpart E, Upset Conditions and Breakdowns. The permittee shall notify the Division of any upset condition which causes a violation of any emission limit or limits stated in this permit as soon as possible, but no later than two (2) hours after the start of the next working day, followed by written notice to the Division explaining the cause of the occurrence and that proper action has been or is being taken to correct the conditions causing said violation and to prevent such excess emission in the future.

3) This source is classified as a:
Minor Source
At a: Minor Facility

4) The following emissions of non-criteria reportable air pollutants are established based upon the fuel use rate indicated in this permit. This information is listed to inform the operator of the Division's analysis of the specific compounds. This information is listed on the Division's emission inventory system.

C.A.S.#	SUBSTANCE	EMISSIONS [LB/YR]
107-02-81	Acrolein	186
71-43-2	Benzene	296
50-00-0	Formaldehyde	205
7647-01-0	Hydrochloric acid	885

5) The emission levels contained in this permit are based on the following emission factors (pounds per million BTU heat input):

Pollutant	EmiFactor	Emission Controls	Cont.Eff. %
Particulate Matter	0.57700	Multicyclone	62.08
PM10	0.51700	Multicyclone	61.00
Nitrogen Oxides	0.49000	Multistage combustion	55.34
Carbon Monoxide	0.60000	Extended combustion	90.00
Acrolein	0.00400		
Benzene	0.00420		
Formaldehyde	0.00440		
Hydrochloric Acid	0.01900		

AIRS Point ID: 059/0097/007 Page 5 of 6

Colorado Department of Public Health and Environment
Air Pollution Control Division

U. S. Department of Energy - National Renewable Energy Laboratory
Permit No. 07JE0277
Initial Approval

DRAFT PERMIT

GENERAL TERMS AND CONDITIONS: (IMPORTANT! READ ITEMS 5,6,7 AND 8)

1. This permit is issued in reliance upon the accuracy and completeness of information supplied by the applicant and is conditioned upon conduct of the activity, or construction, installation and operation of the source, in accordance with this information and with representations made by the applicant or applicant's agents. It is valid only for the equipment and operations or activity specifically identified on the permit.

2. Unless specifically stated otherwise, the general and specific conditions contained in this permit have been determined by the APCD to be necessary to assure compliance with the provisions of Section 25-7-114.5(7)(a), C.R.S.

3. Each and every condition of this permit is a material part hereof and is not severable. Any challenge to or appeal of, a condition hereof shall constitute a rejection of the entire permit and upon such occurrence, this permit shall be deemed denied *ab initio*. This permit may be revoked at any time prior to final approval by the Air Pollution Control Division (APCD) on grounds set forth in the Colorado Air Quality Control Act and regulations of the Air Quality Control Commission (AQCC), including failure to meet any express term or condition of the permit. If the Division denies a permit, conditions imposed upon a permit are contested by the applicant, or the Division revokes a permit, the applicant or owner or operator of a source may request a hearing before the AQCC for review of the Division's action.

4. This permit and any required attachments must be retained and made available for inspection upon request at the location set forth herein. With respect to a portable source that is moved to a new location, a copy of the Relocation Notice (required by law to be submitted to the APCD whenever a portable source is relocated) should be attached to this permit. The permit may be reissued to a new owner by the APCD as provided in AQCC Regulation No. 3, Part B, Section II.B. upon a request for transfer of ownership and the submittal of a revised APEN and the required fee.

5. Issuance (initial approval) of an emission permit does not provide "final" authority for this activity or operation of this source. Final approval of the permit must be secured from the APCD in writing in accordance with the provisions of 25-7-114.5(12)(a) C.R.S. and AQCC Regulation No. 3, Part B, Section III.G. Final approval cannot be granted until the operation or activity commences and has been verified by the APCD as conforming in all respects with the conditions of the permit. If the APCD so determines, it will provide written documentation of such final approval, which does constitute "final" authority to operate. ***Compliance with the permit conditions must be demonstrated within 180 days after commencement of operation.***

6. **THIS PERMIT AUTOMATICALLY EXPIRES IF** you (1) do not commence construction or operation within 18 months after either the date of issuance of this permit or the date on which such construction or activity was scheduled to commence as set forth in the permit, whichever is later; (2) discontinue construction for a period of 18 months or more; or (3) do not complete construction within a reasonable time of the estimated completion date. Extensions of the expiration date may be granted by the APCD upon a showing of good cause by the permittee prior to the expiration date.

7. **YOU MUST notify the APCD at least thirty days (fifteen days for portable sources) prior to commencement of the permitted operation or activity.** Failure to do so is a violation of Section 25-7-114.5(12)(a), C.R.S. and AQCC Regulation No. 3, Part B, Section III.G.1., and can result in the revocation of the permit. *You must demonstrate compliance with the permit conditions within 180 days after commencement of operation as stated in condition 5.*

8. Section 25-7-114.7(2)(a), C.R.S. requires that all sources required to file an Air Pollution Emission Notice (APEN) must **pay an annual fee** to cover the costs of inspections and administration. If a source or activity is to be discontinued, the owner must notify the Division in writing requesting a cancellation of the permit. Upon notification, annual fee billing will terminate.

9. Violation of the terms of a permit or of the provisions of the Colorado Air Pollution Prevention and control Act or the regulations of the AQCC may result in administrative, civil or criminal enforcement actions under Sections 25-7-115 (enforcement), -121 (injunctions), -122 (civil penalties), -122.1 (criminal penalties), C.R.S.

AIRS Point ID: 059/0097/007 Page 6 of 6