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DOE/EIS-0138
Volume II B, 1 of 3
Numbers 0001.01 - 0700.04

FINAL
ENVIRONMENTAL IMPACT STATEMENT

SUPERCONDUCTING SUPER COLLIDER

Volume II
Comment/Response
B. Response

December 1988

U.S. Department of Energy

UNITED STATES
DEPARTMENT OF ENERGY
WASHINGTON, D.C. 20545
ER-65/GTN

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Washington D.C. 20585

0001.01

The information referred to in the comment was furnished by the State of Arizona in its site proposal. See Comment Response 710.01.

0002.01

These remarks correspond with the findings presented in EIS Volume IV, Appendix 15, Section 15.1.3.1. At the SSC site selected, evaluations would be completed of all recorded archaeological sites in order to identify cultural resources within the project area that may be eligible for listing on the National Register of Historic Places. Appropriate mitigation measures will be developed for impacts to cultural resources (see EIS Volume IV, Chapter 3, Section 3.6). A review of these site-specific mitigations will be provided in the Supplemental EIS.

0002.02

Table 3-7 was incorrect in the DEIS and has been corrected in the FEIS. Ten historic sites are located in the Arizona project areas based on surveys to date. These sites are described in EIS Volume I, Chapter 4 and in Volume IV, Appendix 5, Section 5.1.12 and Volume IV, Appendix 15, Section 5.1.3.1.

0002.03

Visitation data for the Northern Maricopa Mountains, Southern Maricopa Mountains, and Butterfield Stage Memorial Wilderness Study Areas (WSA's) are listed in Table 3-4 ("Existing and Projected Visitor Use"), Lower Gila South Final Wilderness Environmental Impact Statement, Phoenix District Office, 1987. Of the 12 WSA's in the Lower Gila South EIS Area, the Northern Maricopa Mountains WSA ranked first in visitor use, with the Butterfield Stage Memorial WSA tied for second. The Southern Maricopa Mountains WSA is one of the four least visited. The first two WSAs are considered by the BLM to be prime use areas for a local ORV organization, with vehicle ways into the Northern Maricopa Mountains showing signs of continuous use. In general, both the Northern and Southern Maricopa Mountains are rated by the BLM as outstanding in recreation opportunities.

EIS Volume IV, Appendix 5, Section 5.1.9.2 discusses the species of vegetation found within the area of the collider ring. Figure 5.1.9.2 shows the distribution of desert scrub at the Arizona site. About two-thirds of the land encircled by the collider ring is Arizona Upland, which is relatively diverse (several species of trees and cacti). One-third of the land is Lower Colorado association, which is dominated by creosote (including the land around the campus and injector).

A review of the Phoenix District Office inventories for the collider ring area indicates that the BLM has rated as highly sensitive the lands around the southern arc, half of the northern arc, and half of the far cluster. The campus and injector areas are rated low in sensitivity. The BLM ratings are similar to those ascribed using the approach outlined in Volume IV, Appendix 16. However, these lands would be viewed from highly sensitive mountain crests, and substantial adverse visual impacts there would have a potential for being significant.

0003.01

The observations presented correspond to the frequency of tornado occurrence data presented in Volume IV, Appendix 5 (Colorado), Section 5.2.3.6.

0003.02

The stated observations correspond well with the frequency of flooding as reported in the literature and presented in Volume IV, Appendix 5 (Colorado), Section 5.2.2.1.A.

0003.03

EIS Volume IV, Appendix 5 (Colorado), Section 5.2.3.6, notes that blizzards, although not unknown, are not a frequent problem. The precipitation and temperature data presented in Sections 5.2.3.2 and 5.2.3.3 list ranges that represent regional norms, and, as such, do not address microclimatic conditions as described in this comment.

0003.04

See discussion of flooding and potential flooding impacts in EIS Volume IV, Appendix 5, Section 5.2.2.1 and Appendix 7, Section 7.1.3.2.

0003.05

Comments noted.

0004.01

These comments are consistent with analyses provided in EIS Volume I, Chapter 5, Section 5.8 and in Volume IV, Appendix 14. See also Comment Response 1515.213.

0004.02

See Comment Response 571.02 (especially the second paragraph). As noted in EIS Volume I, Chapter 5, Sections 5.2.10 and 5.2.12, Colorado has considerable local professional planning experience in managing rapid growth generated by large-scale projects. The State has made a commitment to provide the resources necessary to accommodate and minimize specific housing demand and public service impacts on such communities as Fort Morgan and Brush.

0004.03

Both Fort Morgan and Brush have experienced construction-induced growth effects on public services and housing during the Pawnee Power Plant development as was discussed in Volume I, Chapter 5, Section 5.2.12.2 of the EIS. However, development of the SSC would require accommodation of more construction workers over a longer period of time. Additionally, once fully operable, the SSC would employ more than 3,000 workers, as opposed to less than 150 workers required to operate the Pawnee plant. The local experience in dealing with growth is a useful indicator of how Fort Morgan and Brush would approach SSC-induced growth in the short term, but the communities have not recently experienced similar long-term growth of the magnitude expected to accompany the SSC.

0004.04

Potential population impacts were distributed according to a computer-based spatial allocation model that simultaneously considered travel times to each potential destination and its attractiveness -- the latter measured in terms of current population size (EIS Volume I, Chapter 5, Section 5.1 and Volume IV, Appendix 14, Section 14.1.2). For the Colorado region, 15 separate destination zones were considered in the model, including Greeley in Weld County. The results indicate that as many as three percent of the direct SSC workers and nearly seven percent of the indirect SSC workers would commute from the Greeley area.

0004.05

Comment noted. The transportation network existing in Colorado, and the additions proposed by Colorado in the Invitation for Site Proposals, are discussed in EIS Volume I, Chapter 4, Section 4.9.2, Table 4-29 and Chapter 5, Section 5.1.8.6.

0004.06

Comment noted. Population distribution assumptions have been re-examined. Travel times used in the model's application for the EIS are taken from information provided by the State of Colorado in response to Site Task Force requests in June 1988. Population data used in the model are from the Colorado Division of Local Governments, prepared February 1988. The average travel time of allocated workers, resulting from the model used in the EIS, is nearly 1.5 times the average travel times of Denver-Boulder SMSA workers (as reported in the 1980 Census of Population and Housing). The assumptions used in determining population distribution in the impact analysis appear to be realistic, given the use of the most accurate, up-to-date data available (see EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Sections 14.1.2.3 and 14.1.3.2.B).

0004.07

Comments noted.

0005.01

Comments noted.

0005.02

Comments noted

0005.03

Comments noted.

0006.01

Comments noted.

0006.02

Comments noted.

0006.03

Comments noted.

0007.01

Comment noted.

0007.02

A variety of map sources were used in the land use analyses and references are cited in the end of each appropriate section. Aerial photographs were also employed as a means to verify existing land uses. The aerial photographs consulted for the Fox River Valley area are based on imagery flown in 1986 and, in many areas, updated with new photography as recently as Spring 1988. See Comment Response 13.02.

0007.03

The statements in Volume I of the DEIS that a large number of water wells would need to be abandoned at several of the site alternatives were an error and the document has been revised. See final EIS sections as follow: Volume I, Chapter 1, Table 1-1; Volume I, Chapter 3, Table 3-7; Volume I, Chapter 5, Section 5.4 and Table 5.6-3; and Volume IV, Appendix 7, Sections 7.2.3.1.A.6 through 7.2.3.7.A.6. The figures showing the location of wells have been deleted from the EIS. The number of wells listed includes the total number of wells known (based on available records provided by the States) to exist within 1,000 ft of tunnel alignment. It is anticipated that only a small portion of the water wells listed would have to be abandoned due to the SSC. Because the location of SSC facilities may be changed slightly and because all well locations are not yet known, an exact count of wells which may have to be abandoned due to the project cannot be made at this time. Impacts to quantity and quality of well water supplies, which would be caused by the SSC, are discussed in EIS Volume I, Chapter 5, Section 5.1.2 and 5.2.3.3. For a more detailed discussion, see EIS Volume IV, Appendix 7, Section 7.2.3.

The quantity of water used by the SSC on-site and by the resulting population growth, during both construction and operations, is small compared to current water use in the vicinity of the proposed Illinois site. Since on-site water needed by the SSC would be obtained from the deeper aquifers, negligible impacts are expected on shallow wells. Although SSC on-site and related off-site water use would contribute to the current overdraft of the deeper aquifers, the incremental regional drawdown to be attributed to the SSC has been estimated to be small. With the overdraft condition, future reliance on surface water sources, such as the Fox River or Lake Michigan will be likely due not to any single water use but because of general population and economic growth of the area. Importation of Lake Michigan water is already planned by some of the communities in the vicinity of the proposed SSC site.

0007.04

Comments noted.

0008.01

Comments noted.

0009.01

Comments noted.

0010.01

The EIS has been revised to include the most current information on wetland type, location, and quality (see EIS Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.4.3). The revised wetland impact assessment was based on the amount of wetland habitat that could be disturbed directly by construction and operations (i.e., those wetlands in areas A, B, E, F, J, and K). These figures are reflected in the revised Table 1-1 of Volume I, Chapter 1.

0010.02

EIS Volume I, Chapter 1, Table 1-1 has been revised based on a post-DEIS wetlands survey and reassessment. The table provides information for comparative purposes. The wetland acreages presented are based on no mitigation (an overly conservative value), and so noted in the footnote. Mitigation of potential wetlands impacts would be required. General mitigation plans for wetland impacts are described in EIS Volume I, Chapter 3, Section 3.6 and Chapter 5, Section 5.1.5 for all states and in Appendix 11, Section 11.3.4.3 for Michigan. Detail wetland mitigation will be evaluated in the Supplemental EIS for the selected site.

0010.03

The wetlands assessment presented in the DEIS has been revised to include a reevaluation of wetlands location, type, and quality (see EIS Volume I, Chapter 5, Section 5.1.5.3 and Volume IV, Appendix 11, Section 11.3.4.3). A conservative estimate of the amount of wetlands that may be impacted by construction of the proposed collider facilities at the SSC in Michigan is now placed at approximately 190 acres. If future expansion areas are developed, the potential exists for about another 320 acres of wetlands impacts. These acreages are a conservative estimate that do not include mitigation, and provide a relative comparison among sites. It is DOE policy to avoid wetlands impacts where practicable in accordance with requirements of Section 404 of the Clean Water Act and Executive Order 11990, Protection of Wetlands. As a result the actual impact to wetlands would be much lower than the conservative estimate presented above. Detailed plans to mitigate to the extent practicable any anticipated wetlands impacts at the selected site would be developed in consultation with the U.S. Army Corps of Engineers (or delegated state authority) and analyzed in detail in the Supplemental EIS. Mitigation is discussed in general in the EIS sections mentioned above and in Volume I, Chapter 3, Section 3.6. Volume I, Chapter 5, Section 5.1.5.3 explains the difference in wetlands acreages reported between the DEIS and the FEIS.

0010.04

Comments noted.

0011.01

Comment noted.

0011.02

The SSC staff (e.g., scientific, technical, technicians, administrative, clerical, etc.) will represent a cross section of incomes and lifestyles.

As the most readily accessible community to the proposed SSC campus, Stockbridge would likely attract a sizeable portion of the SSC-related population impact (see EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Table 14.1.3.4-5). This would result in a population increase of individuals with diverse economic and educational backgrounds, none of whom would be categorized as lower class. Associated housing demand might result in new housing construction in the Stockbridge area. See also Comment Response 18.08.

0011.03

Comment noted.

0011.04

The State proposer is responsible for meeting the requirements of the SSC in the Invitation to Site Proposals. The proposers have certified that they have proper authority to meet their obligations in the proposals. Questions concerning the State proposal's strategies and commitments should be directed to the appropriate State authorities (see EIS Volume III, Chapter 1).

0011.05

Comment noted.

0012.01

Based on a post-DEIS reassessment of potential wetland impacts, approximately 190 acre of wetlands could be impacted at the Michigan site from surface facility construction (see Volume I, Chapter 5, Sections 5.1.5.4 and 5.2.7). This is an overly conservative estimate that assumes no mitigation, and does not include an additional 129 acres of wetlands located in areas where future construction may occur (e.g., area C and the J areas) or areas where ancillary facilities would be located. A number of alternatives exist for mitigating possible impacts to wetlands at the Michigan site. These are discussed in EIS Volume I, Chapter 3, Section 3.6 and Volume IV, Appendix 11, Section 11.3.4.3. More detailed information relative to wetlands mitigation would be included within the site-specific Supplemental EIS for the selected site.

Potential impacts on sensitive species and habitats (including wetlands and other natural areas), and on hunting, fishing, and trapping of wildlife, would depend on final design considerations and placement of specific facilities, and would be evaluated during preconstruction phases. Surveys for protected species and habitats would be initiated if Michigan is selected for further investigation. If such species are present and could be affected by the SSC, consultation with the U.S. Fish and Wildlife Service and with State agencies regarding sensitive species and habitats will take place through site investigation and design phases (see Volume IV, Appendix 11, Section 11.3.5.2) in compliance with Section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1543).

Hunting and fishing as recreational activities would be restricted during construction, and would continue to be controlled within fenced fee simple areas for the operational life of the SSC. These restrictions could be necessary for a number of reasons, for example, controls on access in fee simple areas due to safety or security requirements, and disturbances such as noise during construction, which would temporarily impact the SSC site and vicinity. Based on impact analyses in the Supplemental EIS for the selected site, efforts would be made to eliminate adverse impacts to the environment or to reduce them to the lowest achievable level if they cannot be eliminated.

Regarding the potential for contamination of groundwater, see Comment Response 284.02.

0012.02

The 125 archaeological sites described in the EIS (see Volume IV, Appendix 5, Section 5.4.12.1) refer to sites located within the general Michigan SSC project vicinity. Forty-four of these sites are located within 1 mi of proposed SSC project facilities of which only seven sites have been previously recorded within project boundaries.

If the Michigan SSC site is selected, additional surveys and evaluations would be completed in a site-specific Supplemental EIS in order to identify cultural resources including prehistoric archaeological sites eligible for listing on the National Register of Historic Places. In accordance with a Memorandum of Agreement between the DOE and the Michigan State Historic Preservation Officer, mitigation measures would be developed to appropriately mitigate impacts on significant cultural resources, including prehistoric archaeological sites as discussed in EIS Volume I, Chapter 3, Section 3.6.

0012.03

Comment noted.

0012.04

The 25-yr life expectancy for the operating phase of the SSC, used in the cost analysis and other sections of the EIS, is the estimate used for the purposes of the environmental analysis. Other accelerators have had operating periods of 35 years and beyond.

Should SSC operations cease, the jobs of the operational work force would be lost; however, jobs would be created for the decommissioning work force for a period of approximately one year. After decommissioning, surface facilities of the SSC that are released might be used for business, service, or educational purposes that could create employment opportunities. Additional information on decommissioning can be found in Volume IV, Appendix 3.

0012.05

SSC-related effects on the quality of life in local communities is presented in EIS Volume I, Chapter 5, Section 5.1.8.5 and Volume IV, Appendix 14, Section 14.1.3.4.E. Given the Village of Stockbridge's central location to the SSC, the potential for the community to experience rapid growth is real. Such growth would build on current economic revitalization programs implemented by the Ingham County Department of Development and other State and local planning agencies.

It is important to note that "boomtowns" are characterized by rapid population growth and population decline. It is this boom-bust cycle that characterizes boomtowns. Boomtown-like conditions may characterize the growth part of the cycle in some communities in proximity to the SSC; however, no "bust" or rapid decline in economic activity and population is expected since SSC operations would continue for many years. In small towns in proximity to the SSC, it is probable that some community disruption will occur as communities adapt to larger populations, increased traffic, new construction, and other project-related changes. The capacity of communities to adapt effectively varies with their ability to plan and finance needed facilities and services and with their past experience with development. Social disruption will vary depending on the rate of population growth that a particular community experiences and the differences between "newcomers" and current residents in terms of values, education, income, etc. The "boomtown phenomenon" may not disrupt informal ties among people currently living in the community, but may disrupt the effectiveness of things that support informal ties, such as friendliness and community spirit. Many negative conditions associated with rapid growth can be minimized through careful planning.

0012.06

It has not been fully determined who will finance public services needed as a result of the SSC. The DOE does not directly finance nor does it provide special funding allowances for such services. Data on impacts to local public services, such as public education, and public finance are provided in Volume I, Chapter 3, Table 3-6. Detailed assessments for Michigan are provided in Volume IV, Appendix 14, Sections 14.1.3.4.C and 14.1.3.4.D.

0012.07

Comment noted.

0012.08

Comments noted.

0012.09

Comment noted.

0013.01

Comments given to the DOE during scoping were used to establish priorities for assessment in the preparation of the DEIS. The DOE EIS Implementation Plan (July 1988) documents the detailed use of the comments and summarizes comments by site among the topics to be analyzed in the EIS. Socioeconomic issues and water resources issues received the most comments at all sites.

In regard to the number of relocations reported by the proposer, see Comment Responses 13.02 and 710.01.

0013.02

The DEIS was based on the State-submitted information and publicly available information. Publicly available information includes Federal, State, regional, and local agency reports and publications and published university research project reports and theses. Comments given to the DOE during scoping were used to establish priorities for assessment in the preparation of the DEIS. All information submitted to the DOE following the scoping meetings was reviewed by technical staff and used as appropriate in preparation of the DEIS. Every attempt was made to use the most current information that could be provided and verified as being accurate. Between the DEIS and the Final EIS, additional efforts were made by the DOE to verify the data included in the EIS and to correct or update these data as appropriate. When substantial errors have been detected in the EIS, they have been corrected in the Final EIS. In cases where more current data are available, they have been incorporated in the text.

0013.03

Comment noted.

0014.01

Comments noted.

0015.01

Intensive cultural resource surveys have not yet been undertaken at the North Carolina SSC project site. The information provided in the EIS (see Volume IV, Appendix 5, Section 5.5.12.1) summarizes the results of the literature and records review only.

If the North Carolina SSC site is selected, additional surveys and evaluations would be completed in order to identify cultural resources within the project area which are eligible for listing on the National Register. Such studies would include interviews with appropriate researchers and local informants. Cultural resource management procedures would be completed in accordance with a Memorandum of Agreement

(MOA) between the DOE and the North Carolina State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation. Mitigation measures would be developed to appropriately mitigate impacts on significant cultural resources. Qualified archaeologists, historians, and architectural historians, as specified by the MOA, would complete the surveys, evaluations, and data recovery and monitor the programs.

Construction personnel would be trained to recognize cultural resources that could be discovered during construction, and which contingency procedures would be followed by construction and project management personnel to properly handle such circumstances. Development of these procedures would involve qualified archaeologists and historians and appropriate Native American groups. The MOA would also address the proper means of relocating graves and Native American burials that are uncovered during construction. A more detailed review of this will be discussed in the Supplemental EIS. Also, a discussion of all mitigation plans will be in the Supplemental EIS.

0016.01

Comments noted.

0017.01

The statement in Volume I of the DEIS that a large number of water wells would need to be abandoned at several of the site alternatives was an error and the document has been revised, (please note that abandonment in this context was not meant to imply that these wells would "go dry"). The number of wells listed are the total number of wells known (based on available records provided by the States) to exist within the total area defined by the 1,000-ft restricted zone along the tunnel alignment, the campus, injector, and far cluster areas, and the buffer and buried beam zone areas. It is anticipated that only a small portion, if any, of the water wells within the 1,000 ft restricted zone, but outside the 150-ft primary shield zone, may have to be abandoned due to proximity to the tunnel. Other wells, while not requiring total abandonment, probably would not be available for private use because they would be on fee simple lands to be acquired by the government. Because the location of SSC facilities at each site may be changed slightly and because well location data are preliminary, an exact count of wells which may have to be abandoned due to the project cannot be made at this time. This information will be gathered when a site is selected and SSC design and facility locations are finalized.

For the proposed Tennessee site, surface water is the major source proposed for SSC on-site use and for SSC-related increased water use in surrounding communities, both during construction and operations. Groundwater use would be small, providing supply for two of the SSC service areas (40 acre-ft/yr each during operations) and, potentially, for some limited amount of population growth in rural areas. With this limited pumping, the impact of groundwater use by the project on existing wells is expected to be negligible. See discussions in EIS Volume I, Chapter 5, Section 5.1.2 and Volume IV, Appendix 7, Section 7.2.3.6.

0017.02

See Comment Response 17.01.

0017.03

See Comment Response 17.01.

0018.01

Comment noted.

0018.02

The impacts from encroachment of SSC facilities into floodplains near the Illinois site have been discussed in EIS Volume I, Chapter 5, Section 5.1.2-9, and in more detail in Volume IV, Appendix 7. Of the four facilities which have some potential for floodplain encroachment in Illinois, only buried beam zone area J6 has the potential for significant adverse environmental impact. (See Volume I, Chapter 5, Section 5.1.2-4 for a description of the process of assessing floodplain impacts.)

As indicated in EIS Volume IV, Appendix 7, Section 7.1, further detailed studies will be made, should Illinois be awarded the SSC. These studies will include a more detailed floodplain analysis. Some flexibility in the final design may mitigate the impacts of the facility in the floodplain as discussed in EIS Volume I, Chapter 3, Section 3.6; this would be analyzed in detail in the site-specific Supplemental EIS. Any residual impacts, such as long-term local flooding, remaining after final design and site mitigation will be assessed according to Federal policies and Executive Order 11988 ("Floodplain Management").

0018.03

See Comment Response 7.03.

Existing groundwater quality at the proposed Illinois site is addressed in EIS Volume I, Chapter 4, Section 4.2.2 and in Volume IV, Section 5.3.2.2. Water quality impacts of the construction and operations of the SSC at the proposed Illinois site are discussed in Volume IV, Appendix 7, Sections 7.1.3.3 and 7.2.3.3. Small, but negligible water quality impacts are expected for shallow groundwaters. Construction impacts will be held to negligible levels through minimization of disturbed areas, use of state-of-the-art drilling and shaft-sinking techniques, in-place spill and leak response procedures, and control and minimal use of construction materials with potential for water contamination. Impacts of liquid effluents (i.e., sanitary sewage, cooling tower blowdown, and sump water) during operations will be negligible since extensive treatment of the effluents is planned to meet effluent quality standards. The construction and operations of the SSC at the proposed Illinois site are not expected to have measurable impacts on the quality of deep groundwaters.

The negligible amount of contamination of the shallow groundwaters will be prevented from moving deeper by the sorptive capacity of the soils and rocks and by confining layers and aquitards between the lower and deeper aquifers. Although vertical interconnections exist between the aquifers, they are localized and regional groundwater flow is essentially horizontal rather than vertical. For the excavations, including the tunnel, the surrounding groundwater pressure will result in infiltration into the tunnel rather than water flowing out of the tunnel; this will essentially prevent contamination of the aquifers from the tunnel excavation. Radiological effects are also projected to be negligible and well below existing standards (EIS Volume I, Chapter 5, Section 5.1.6.2.A). The radiation emitted during normal operations is extremely small. Even the groundwater contamination resulting from the highly unlikely loss of a beam (the worst-case accident) will meet regulatory standards (EIS Volume IV, Appendix 12, Sections 12.3.1.1.C and 12.4.1.1). (See also Comment Response 7.03 with respect to the number of potentially affected wells.)

0018.04

Volume I, Chapter 5, Section 5.1.4 has been revised and lists the number of people near E and F areas at each of the site alternatives expected to experience day-night average sound levels: (1) greater than 70 dBA, and (2) between 60 and 70 dBA. At the Illinois site, based on the current population distribution around E and F sites, approximately 454 people would experience a day-night average sound level of greater than 70 dBA. 1,246 people would experience a day-night average sound level of between 60 and 70 dBA at some point during construction. As noted in Volume IV, Appendix 9, the period of day and night construction activity at any particular E or F site should average 10 mo.

0018.05

The EIS has been revised to include the most current information on wetland location, type, and quality (see Volume I, Section 5.1.5.4 and Appendix 11, Section 11.3.3.3). The amount of wetland acreage that could be disturbed was determined from the amount of wetland habitat that is present within proposed areas of surface disturbance (Areas A, B, C, E, F, J and K), rather than for all fee simple areas. Careful design and location of surface facilities as well as sound construction practices will be used to avoid or mitigate likely wetlands impacts.

0018.06

Traffic on most roads near the SSC will increase as shown in EIS Volume I, Chapter 5, Section 5.1.8.6 and Volume IV, Appendix 14, Tables 14.2.1-5 and 14.2.1-6. Some sections of Route 59 will experience an increase in traffic of around 10 percent, while Routes 64 and 34 will experience lesser increases. During some peak periods, some sections of Routes 64 and 34 will operate at or over their design capacities, LOS F (see EIS Volume IV, Appendix 14, Section 14.2.1.2.C.1.b.1).

0018.07

The introduction of housing into farmlands in the eastern portion of the site has been addressed in Volume IV, Appendix 16 of the EIS. Section 16.3.3.1 notes that, along with housing, new development includes nodes of commercial and light industrial facilities. In some areas, new land uses are so divergent that there is no identifiable visual character; therefore, the SSC project facilities probably would go unnoticed and would create no visual impact. However, there are other areas where new residential development is extensive and the residential visual character well established. This is the case for the Boulder Hill subdivision. The SSC facility nearest to this residential development is service area F2. The impact of this facility on the subdivision is discussed in Volume IV, Appendix 16, Section 16.3.3.3.C.

Views from the subdivision are considered to be highly sensitive and the impact to be significant and long-term, but of a local nature. Nevertheless, measures can be taken such that over time the facility can be partially screened from view, thereby reducing the impacts on property values from visual intrusion.

0018.08

SSC-related effects on the social well-being of particular groups in the local communities will depend on the settlement patterns of SSC-related workers and their families. Social disruption will vary depending on the rate of population growth that the community experiences. While one cannot predict at an individual level what kind of people will settle in a community, the Fermilab experience does indicate that in-migrating operations personnel and their families collectively have assimilated well and had a positive influence on their new communities.

0018.09

Comments noted.

0018.10

The Forest Preserve District of DuPage County has provided the DOE with a "Land Acquisition Status by Project, September 20, 1988" data package that includes a map and notations as to project status. The comment correctly refers to the agency's Naperville/Big Woods Project, which is located adjacent to and south of Fermilab. The project consists of two portions, the first of which includes 954 acres located south of Fermilab, north of Interstate-88, and straddling
of Eola Road. Condemnation proceedings by DuPage County are continuing, with no estimate provided as to when these actions would be completed. The second portion of the project is located south of Bilter Road, but has been dropped from further consideration -- a decision that was made in cooperation with the city of Aurora. Changes have been made in the Errata to Volume IV, Appendix 5, Section 5.3.10.2.B which note this potential land use.

0018.11

Each location for the SSC will be evaluated against the same criteria. The site selection process is described in EIS Volume III, Chapters 1, 2, and 3.

EIS Volume I, Chapter 5, Section 5.1.6 presents the hazards that could result from normal operations or an accident at the SSC. The analyses take into account population residing above the SSC facilities. An important conclusion of the EIS is that during both normal operations and worst conceivable accident conditions there will be no health hazards or unacceptable health risks regardless of population size.

0019.01

The EIS was based on the State-submitted information and publicly available information. Publicly available information includes publications, reports by State agencies, and university research projects published as theses, for example. Every attempt was made to use as up-to-date information as could be provided and verified to be accurate. Where errors have been identified, they have been corrected in the Final EIS (see Errata sections for Volume IV, Appendices 1 to 16, and revised Volume I). Where more current data have been identified since the publication of the DEIS which enhance or alter the analysis they have been included in the appropriate revisions (Appendice
Volume I.

Further information will be reviewed in greater detail in the Supplemental EIS prepared for the selected site.

0019.02

Population estimates derived from the U.S. Bureau of the Census indicate that approximately 1 million people live in the primary impact counties of DuPage, Kane, and Kendall (see EIS Volume IV, Appendix 5, Section 5.3.11.1.B). Almost 7.5 million live in the nine-county Illinois Region of Influence. The number of people in the area that would be "adversely affected" by the SSC project is not certain. There are 219 relocations expected in the land acquisition process; these people would be affected directly, others may experience indirect adverse effects. On the positive side, many residents are likely to benefit from SSC-related jobs and income (see EIS Volume IV, Appendix 14, Section 14.1.3.3).

Four quarries have been proposed by the State of Illinois as disposal sites. The excavated materials would be generally transported to the nearest quarry (see EIS Volume IV, Appendix 10, Section 10.2.3.3 and Figure 10.2.3-6). Different roads could be used between the different SSC points and the quarries. Route 31 would not receive all the truck traffic. Traffic impacts during construction, including spoils disposal truck traffic, are addressed in the EIS Volume I, Chapter 5, Section 5.1.8.6.A and Volume IV, Appendix 14, Section 14.2.1.3.C.1.b. Mitigations to be considered for reducing the impact of the trucks are discussed in EIS Volume I, Chapter 3, Section 3.6 and in Comment Response 1095.02.

0019.03

The State of Illinois proposal suggests the use of freezing or slurry wall control to minimize groundwater inflow into major building excavations. Groundwater inflow into the tunnel is estimated to be low because the tunneling would be in low permeability dolomite rock formations. If sections of higher permeability, such as major rock fractures, are encountered during tunneling, they would be grouted or lined to minimize groundwater inflow.

The effects of the excavations, including tunneling, on groundwater levels and local wells will be negligible and will not increase effects of drought conditions on water levels in local wells. A portion of the water pumped from excavations and tunnel inflow could be returned to the groundwater system by recharge from retention basins, thus reducing impacts on the water table and existing wells. (See also discussions in Volume IV, Appendix 7, Section 7.2.3.3.)

0019.04

Comment noted.

0019.05

Comment noted.

0019.06

Comment noted.

0019.07

The costs of the SSC have been carefully evaluated in accordance with the ISP requirements. See EIS Volume IV, Appendix 2. For a comparison of site-adapted design cost estimates among sites, see EIS Volume III, Chapter 3.

0019.08

Comment noted.

0020.01

Comments noted.

0021.01

Comments noted.

0022.01

The issue of the Texas imported fire ant and its potential impact on the SSC project at the proposed Texas site has been added to the EIS in Volume I, Chapter 4, Section 4.6.2.2; Chapter 5, Section 5.1.6; Volume IV, Appendix 10, Section 10.1.3.2; and Appendix 12, Section 12.3.2. If the Texas site is selected for the SSC, the effect of fire ants on worker and public safety will be addressed in more detail in the Supplemental EIS. See also Comment Responses 223.01 and 223.02.

0022.02

See Comment Response 223.01.

0022.03

As indicated in Comment Response 22.01, the impacts associated with fire ants have been addressed in the EIS. If the SSC is sited where the ants are found, engineering controls will be considered during design and construction of the SSC to prevent the ants from entering and damaging equipment as discussed in EIS Volume I, Chapter 3, Section 3.6.6.

0022.04

See Comment Responses 22.01 and 22.03.

0022.05

See Comment Response 22.01.

The equipment systems comprising the SSC, which are still in the conceptual design phase, have not been evaluated for their resistance to fire ant infestation. This would be done if the proposed Texas site were to be selected for the SSC. A control plan will be prepared after site selection and as part of the Safety Analysis Review that will be done prior to construction and operations. This Review would include possible secondary effects and mitigations if chemicals were required for controls. Federal, State, and local regulations and standards for use of pesticides would be applicable.

0022.06

Comment noted. Potential mitigations to fire ant attacks have been added to EIS Volume I, Chapter 5, Section 5.1.6.1. Also see Volume I, Chapter 3, Section 3.6.6.

0022.07

Comment noted. See Comment Responses 22.01 and 22.03.

0022.08

See Comment Response 22.01.

0023.01

Comment noted.

0024.01

Comment noted.

0024.02

The comment cites the availability of trained construction and operations workers in the Texas Region of Influence (ROI), a claim which is substantiated by recent data unemployment for the Dallas-Fort Worth Consolidated Metropolitan Statistical Area (CMSA). Unemployment data for 1987 indicate that within the CMSA there was a 12.6 percent unemployment rate in the construction industry (representing approximately 16,000 unemployed construction workers) and a 3.8 percent unemployment rate in technical occupations (representing approximately 2,000 unemployed technical workers. Most of the CMSA (87 percent) consists of six of the eight counties in the ROI (including Dallas, Ellis, Johnson, Kaufman, Rockwall, and Tarrant Counties). Such unemployment data were incorporated in the EIS analysis, to project anticipated in-migration as a result of the SSC (see EIS Volume IV, Appendix 14, Section 14.1.3.7.A).

Regional resources, including the presence of educational institutions and other sources of professional staff, were considered during the proposal evaluation in the development of the BQL (see Volume III, Section 1.1).

0024.03

Comment noted.

0025.01

Comments noted.

0026.01

Comment noted.

0027.01

The assessments of environmental impact consequences at the seven site alternatives are presented in Volume I Chapter 5 of the EIS. This chapter states the impacts of transportation and other infrastructure requirements of the seven sites. The impact of the SSC on more populated and on less populated areas is also analyzed in Chapter 5. The DOE has evaluated each site alternative with respect to population densities and impacts on relocations required, local services, housing, and other aspects of the community (see EIS Volume I, Chapter 3, Tables 3-6 and 3-7).

The suitability of such factors as climate, soils characteristics, and topography at the seven site alternatives was considered by the DOE in the site selection process prior to their inclusion on the BQL. All sites analyzed in the EIS were found to meet criteria of geological and climatic conditions (Volume III, Chapter 1) for construction of the SSC.

The proposal submitted to DOE for the Liberty Hill, Texas site was evaluated as one of 43 received by the DOE in response to the ISP. As communicated in the September 17, 1987, letter from Dr. Hess to T. G. Lara, the Liberty Hill proposal was disqualified because it did not meet four of the five qualification criteria. These were:

- o Land size and configuration as specified in the ISP;
- o Absence of cost to the Federal Government for land acquisition;
- o Power and water supply requirements; and
- o Absence of known environmental impacts from siting, constructing, operating, or decommissioning the SSC.

As relayed in the October 27, 1987, letter to T. G. Lara from Dr. Hess, the additional information submitted could not be evaluated because it did not meet the deadline date for submittal.

Because the proposal did not meet all of the qualification criteria of the ISP, it was disqualified; therefore, it was not listed on the BQL or considered as a reasonable site alternative in the EIS.

0028.01

Comments noted.

0029.01

Comments noted.

0030.01

Comments noted.

0031.01

Comments noted.

0032.01

Comments noted.

0032.02

Comment noted.

0032.03

A discussion of the anticipated decision schedule is found in Volume III, Chapter 3 of the EIS.

0032.04

Comment noted.

0033.01

Comment noted.

0034.01

See Comment Response 1278.11.

It should be noted that with the implementation of appropriate control measures, the environmental consequences of the fugitive dust generated during construction should minimize health problems to individuals who have chronic lung disease, bronchitis, emphysema, asthma, and respiratory allergies. In addition, the particle size of most of the dust generated is large enough not to penetrate human respiratory defense mechanisms (e.g., cilia, mucous membranes, nasal hair, etc.).

0034.02

For the proposed Texas site, both surface and groundwaters will be used for on-site SSC use and for the resulting population growth in the site vicinity. Measurable regional impacts on the existing groundwater overdraft are estimated. However, groundwater use by the SSC and the resulting population growth are small in comparison to the total groundwater use in the region, and thus, the incremental regional effects of the SSC are considered small. To minimize the impact to groundwater, a greater reliance on surface water sources is planned. Surface water sources and available system capacity are adequate for the anticipated use. See discussions in EIS Volume I, Chapter 5, Section 5.1.2 and Volume IV, Appendix 7, Sections 7.2.3.7.A.1, 7.2.3.7.A.5, and 7.2.3.7.A.6.

0034.03

The trucks transporting the quantities of rock and soil material which will be generated during construction (see EIS Volume I, Chapter 5, Section 5.1.1) will not all be using the same road. During preconstruction planning, road conditions and capacities would be considered and, where practicable, truck routes would be selected to minimize the impacts on existing streets and traffic. In addition, a more detailed site-specific review of this issue will be provided in the Supplemental EIS.

0034.04

Comment noted.

0035.01

The technology used in the SSC is the most advanced in the world today. It is not now outmoded, nor is it expected to be for many years to come. The estimated useful lifetime of the SSC is expected to be at least twenty-five years from its completion. In EIS Volume I, Chapter 2, the purpose and need for the SSC is described in terms of its requirement to keep U.S. physics and physicists at the forefront of the world in elementary particle research. (See also Volume I, Chapter 3, Section 3.2.4 on consequences of delaying the project.)

0035.02

The EIS analysis indicates that construction and operations of the SSC would result in additional revenues for the State government. Local governments in Ellis County were projected to have a cumulative net fiscal benefit throughout construction and operations of the facility, except for a net fiscal deficit during the two years of construction. Additional details of the assessment of the impacts of SSC construction and operations on both State and local government finances are presented in EIS Volume I, Chapter 5, Section 5.1.8.4 and Volume IV, Appendix 14, Section 14.1.3.7.D.

0035.03

Comment noted.

0035.04

The comment is correct. According to the information provided to the DOE on October 5, 1988, by Mr. Robert Silvus, Assistant Chief Wastewater Enforcement Section, Water Quality Division, Texas Water Commission, Austin, Texas, the Trinity River Authority "Red Oak Wastewater Treatment Plant" does not exist. EIS Volume IV, Appendix 1, Section 1.2.7.12 has been revised accordingly.

0035.05

Comment noted.

0036.01

Comment noted.

0037.01

Comments noted.

0038.01

Comments noted.

0039.01

Comments noted.

0040.01

Comment noted. Impacts as assessed by the DOE are discussed and evaluated in EIS Volume I, Chapter 5.

0041.01

Comment noted.

0041.02

The estimate in the DEIS of the loss in property tax revenue in Kendall County, Illinois, cumulatively to all government jurisdictions was incorrectly stated as $0.4 million. The actual estimate was $0.04 million (rounded for presentation in the text and tables of the DEIS to $0.0 million). Volume I, Chapter 5, Section 5.1.8, and Volume IV, Appendix 14, and the accompanying text of the Final EIS have been corrected.

0041.03

See Comment Response 41.02.

0041.04

The most recent final estimate of the 1985 population in Kendall County (37,000), prepared by the U.S. Bureau of the Census and published in 1987, suggests that the rapid population growth experienced in this county during the 1970's had stopped during the first half of the 1980s. The comment is consistent with data presented in the EIS (see Volume IV, Appendix 5, Section 5.3.11.1.B).

0041.05

Kendall County housing vacancy rates have been at low levels throughout the 1980's. These rates, as well as an increasingly productive county housing industry were included in the analysis as presented in EIS Volume I, Chapter 5, and Section 5.1.8 and in Volume IV, Appendix 14, Section 14.1.3.3.B. It appears that Kendall County would have no difficulty in absorbing any SSC project-related housing impacts.

0041.06

The U.S. Bureau of the Census 1985 population estimates for U.S. counties were used as the database to provide consistency among all seven sites (see Volume IV, Appendix 5). The estimate of the 1985 Kendall County population was 37,000 persons, suggesting that the Illinois Department of Commerce and Community Affairs projection of 42,439 (made in the early 1980's) is nearly 15 percent higher than what was actually observed. Similarly, for purposes of consistency, projections beyond

1985 were adjusted to the most recent U.S. Bureau of the Census state-level projections, prepared in April 1988, for all states considered as site alternatives in the EIS. County-specific projections prepared by the Illinois Department of Commerce and Community Affairs, in turn, were used to determine the amount of total State population that each county would contribute.

0041.07

See Comment Responses 41.02, 41.04, 41.05, and 41.06.

0041.08

See Comment Response 41.02.

0042.01

The Texas Region of Influence is anticipated to have minimal difficulty absorbing SSC-related impacts on employment, housing, and public services (see EIS Volume IV, Appendix 14, Section 14.1.3.7).

In concurrence with the comment, the EIS found that the geology of this site is well-suited for the SSC (see Volume IV, Appendix 5, Section 5.7.1).

0043.01

Comments noted.

0044.01

Existing infrastructure, including utilities, and ground and air transportation, is discussed in the EIS (Volume I, Chapter 5, Sections 5.1.8.6 through 5.1.8.9 and Volume IV, Appendix 5, Section 5.7.11.2) for the Texas Region of Influence (ROI) and Ellis County. Public services in the Texas ROI and Ellis County are discussed in the EIS (Volume IV, Appendix 5, Section 5.7.11.1.C). Potential impacts related to SSC development are presented in Volume IV, Appendix 14, Section 14.2.2.3.G for utilities, Section 14.2.1.3.G for transportation, and Section 14.1.3.7.C for public services. The EIS evaluation of these impacts in general agrees with the comment: mitigations, when necessary, could be accomplished by upgrading existing facilities.

0045.01

Comments noted.

0046.01

Comment noted.

0047.01

Comment noted.

0048.01

Comments noted.

0049.01

Comments noted.

0050.01

Comment noted.

0051.01

Comments noted.

0052.01

SSC-generated population growth has the potential to cause social disruption, particularly in relatively small communities such as Ennis. In that regard, there will be impacts to public services, such as police, fire departments, and social service agencies -- as discussed for Ellis County as a whole (see EIS Volume IV, Appendix 14, Section 14.1.3.7.C). Although the EIS does not specifically address the question of potential increases in crime, it recognizes that the pace of development in northern Ellis County could be accelerated by the SSC. As a result, the quality of life for residents in the area would more closely resemble that found in the Dallas-Fort Worth metropolitan region (see EIS Volume I, Chapter 5, Section 5.1.8.5 and Volume IV, Appendix 14, Section 14.1.3.7.E).

0053.01

Comment noted.

0054.01

Comment noted.

0055.01

Comments noted.

0056.01

Comments noted.

0057.01

Comments noted.

0058.01

Comments noted.

0059.01

Comments noted.

0060.01

Comments noted.

0061.01

Comments noted.

0062.01

Comments noted.

0063.01

Comment noted.

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Comment noted.

0065.01

Comment noted.

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Comment noted.

0067.01

Comment noted.

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Comment noted.

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Comment noted.

0070.01

Comment noted.

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Comment noted.

0072.01

Comment noted.

0073.01

Comment noted.

0074.01

Comment noted.

0075.01

Comment noted.

0076.01

Comment noted.

0077.01

Comment noted.

078.01

Comment noted.

079.01

Comment noted.

080.01

Comment noted.

0081.01

Comment noted.

0082.01

Comment noted.

0083.01

Comment noted.

0084.01

Comment noted.

0085.01

Comment noted.

0086.01

Comment noted.

00510100318883

0087.01

Comment noted.

0088.01

Comment noted.

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Comment noted.

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Comment noted.

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Comment noted.

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Comment noted.

0093.01

Comment noted.

0094.01

Comment noted.

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Comment noted.

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Comment noted.

0097.01

Comment noted.

0098.01

Comment noted.

0099.01

Comment noted.

00510100318884

0100.01

Comment noted.

0101.01

Comment noted.

0102.01

Comment noted.

0103.01

Comment noted.

0104.01

Comment noted.

0105.01

Comment noted.

0106.01

Comment noted.

0107.01

Comment noted.

0108.01

Comment noted.

0109.01

Comment noted.

0110.01

Comment noted.

0111.01

Comment noted.

0112.01

Comment noted.

0113.01

Comment noted.

01010150318881

0114.01

Comments noted.

0115.01

Comments noted.

0116.01

Comment noted.

0117.01

Comment noted.

0118.01

Comment noted.

0119.01

Comment noted

0120.01

Comment noted.

0121.01

Comment noted.

0122.01

Comment noted.

0123.01

Comment noted

0124.01

Comment noted.

0125.01

Comment noted.

0126.01

Comment noted.

01010150318882

Comment noted.

0128.01

Comment noted.

0129.01

Comment noted.

0130.01

Comment noted.

0131.01

Comment noted.

0132.01

Comment noted.

0133.01

Comment Noted.

0133.02

A discussion concerning the design of the SSC can be found in Volume I, Chapter 3, Section 3.1.1. The goals for the SSC project are described in Volume I, Chapter 2. The size of the ring was optimized by engineering techniques during the conceptual design. To achieve the project objectives, the size of the ring cannot be substantially reduced using present technologies.

0134.01

Comment noted.

0135.01

Comment noted.

0136.01

Comment noted.

0137.01

Comment noted.

0138.01

Comment noted.

0139.01

Comment noted.

0140.01

Comment noted.

0141.01

Comment noted.

0142.01

Comment noted.

0143.01

Comment noted.

0144.01

Comment noted.

0145.01

Comment noted.

0146.01

Comment noted.

0147.01

Comment noted.

0148.01

Comment noted.

0149.01

Comment noted.

0150.01

Comment noted.

0151.01

Comment noted.

0152.01

Comment noted.

0153.01

Comment noted.

0154.01

Comment noted.

0155.01

Comment noted.

0156.01

Comment noted.

0157.01

Comment noted.

0158.01

The EIS indicates that during both the construction and operation periods, direct and secondary economic effects, including additional jobs, earnings, and spending would be created in the Texas Region of Influence (ROI). Spending in the region by direct SSC workers (including spending for real estate purchases) and spending for direct project purchases would create additional jobs and additional spending.

Housing impacts due to the SSC are examined for the ROI, and for Ellis County (EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.B). At these levels of aggregation, impacts are anticipated to be negligible. The SSC-related housing requirement of 2,700 units cited in the comment refers to peak year (1992) housing demand for the entire eight-county ROI. Although the comment claims that the city of Ennis could accommodate an increase in housing demand of 2,700 units, including the public service demands associated with such an increase, the peak year housing demand estimate for the city of Ennis is likely to be a small fraction of this total.

0159.01

Comment noted.

0160.01

Comment noted.

0161.01

Comment noted.

0162.01

Comment noted.

0163.01

Comment noted.

0164.01

Comment noted.

0165.01

Comment noted.

0166.01

Comment noted.

0167.01

The EIS assessment of SSC-related telecommunications impacts concurs with the comment: Increased telephone service requirements as a result of the project should be well within Southwestern Bell's capacity to accommodate them. (See EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.2.7.G.3.)

0168.01

The EIS indicates that during both the construction and operations periods, direct and secondary economic effects, including additional jobs, earnings, and spending would be created in the Texas Region of Influence (ROI). During construction, the direct jobs would employ workers with specific trade skills, as well as general laborers. During operations, professional and technical people would be employed, as well as clerical and other support personnel. Spending in the region by these direct workers (including spending for real estate purchases), and spending for direct project purchases, would create additional jobs and additional spending. The secondary jobs created would include jobs in all sectors of the economy, but would be concentrated in services, trade, transportation, communication, public utilities, and manufacturing. Additional discussion of these economic effects on the Texas ROI is presented in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.

0169.01

Comment noted.

0170.01

Comment noted.

0171.01

Comment noted.

0172.01

Comment noted.

0173.01

Comment noted.

0174.01

Comment noted.

0175.01

Comment noted.

0176.01

Comment noted.

0177.01

Comment noted.

0178.01

Comment noted.

0179.01

Comment noted.

0180.01

Comment noted.

0181.01

Historic time-series data of city level unemployment rates are not readily available from State employment departments. In lieu of this information, county-level unemployment data were used in the EIS (see Comment Response 182.01).

0182.01

Comment noted. The need for additional employment in Corsicana, Texas, reflected by the county-level unemployment statistics collected by the Texas Employment Commission was used in the EIS estimates of economic effects of SSC development. Since 1982, Navarro County has had the highest percentage unemployment rates of the eight counties that comprise the Texas Region of Influence (ROI). Estimates of the economic impact to the Texas ROI from SSC construction and operation, including the effect of increased income and retail sales from the additional jobs, are presented in Volume IV, Appendix 14, Section 14.1.3.7.

0183.01

Comments noted.

0184.01

Comment noted.

0184.02

See Comment Response 34.02.

0184.03

Comment noted.

0185.01

Comment noted.

0186.01

Comment noted.

0187.01

Comment noted.

0188.01

Comment noted.

0189.01

Comment noted.

0190.01

Comment noted.

0191.01

Comment noted.

0192.01

Comment noted.

0193.01

SSC-related housing impacts are examined for the Texas Region of Influence and for Ellis County (see Volume IV, Appendix 14, Section 14.1.3.7.B). Increased demands for both of these areas should be well within the levels which could be accommodated through existing housing and the housing construction industry.

0194.01

Comment noted.

0195.01

Comment noted.

0196.01

Comment noted.

0197.01

Comment noted.

0198.01

Comment noted.

0199.01

Comment noted.

0200.01

Comment noted.

0201.01

The U.S. Soil Conservation Service identified 3,389 acres of prime farmland and 1,287 acres of important farmland in the proposed SSC fee simple area in Texas. This information was used to estimate that 588 acres of prime and important farmland would be permanently converted by the SSC at the proposed site. Should Texas become the selected site, this information would be verified and analyzed in detail. The definition of prime and important farmland used in this EIS is that given in 7 CFR 657.5. See revised Volume I, Chapter 4, Section 4.8.6.

0202.01

SSC-related housing impacts are considered for the Texas Region of Influence (ROI) and for Ellis County. Within these two areas, sufficient housing should be available for in-migrating workers and their families during both the construction and operation phases of the SSC project (EIS Volume I, Chapter 5, Section 5.1.8.2 and Volume IV, Appendix 14, Section 14.1.3.7.B).

Characteristics of economic activity and labor force are also discussed for the Texas ROI and for Ellis County (Volume IV, Appendix 5, Section 5.7.11.1.A). The comment's characterization of high unemployment and economic depression across the state is supported for the two areas examined.

The EIS did not examine current trends in the Texas banking industry.

0203.01

A discussion of the DOE regulatory compliance requirements are covered in Volume I, Chapter 6 of the EIS. The DOE's policy is to conduct its operations in an environmentally safe and sound manner in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards.

The DOE has identified applicable regulations in EIS Volume I, Chapter 6. During final design for SSC construction at the selected site, a Regulatory Compliance Plan will be prepared by the DOE. This plan will detail the mechanisms of compliance at the Federal, State, and local levels of jurisdiction.

0203.02

As discussed in Volume I, Chapter 6, it is the policy of the DOE to comply with all applicable statutes, regulations, and standards.

0204.01

Comments noted.

0205.01

Comment noted.

0205.02

Comment noted.

0206.01

Comment noted.

0207.01

Comment noted.

0208.01

Statements in the comment regarding Ellis County labor force, housing market, and public service(s) are in agreement with conclusions drawn in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7. Also in agreement with the EIS is the statement that Ellis County is influenced by Dallas to the north, but has numerous rural areas as well (Volume IV, Appendix 5, Section 5.7.11.1.B). However, the claim that fewer private housing units and less private land would be transferred into Federal ownership than in the other proposed sites is not supported. Tabular data (Volume I, Chapter 3, Section 3.4) indicate that a decision to site the SSC in Texas would require federal acquisition of the second largest amount of private land.

0209.01

Comment noted. The development plan cited supports the EIS conclusion that public services, including fire protection, could serve demand generated by the SSC through expansion of existing facilities. Additional potential impacts to public service, namely increases in employment necessary to maintain current levels of service, are presented for the Texas Region of Influence and Ellis County in EIS Volume I, Chapter 5, Section 5.1.8.3 and Volume IV, Appendix 14, Section 14.1.3.7.C.

0210.01

Comment noted.

0211.01

Comment noted.

0212.01

The EIS presents a summary and comparison of existing socioeconomic conditions in each of the seven alternative Regions of Influence (ROI's) (Volume I, Chapter 4, Section 4.9.1). The existing socioeconomic conditions in each of the ROI's is presented in greater detail in Volume IV, Appendix 5.

A discussion of the Texas ROI is presented in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 5, Section 5.7.11.1. The evaluation of socioeconomic effects of SSC development in Texas considered the overall size of the existing labor force and recent unemployment rates for the ROI and for Ellis County (Volume IV, Appendix 14, Section 14.1.3.7.A). The socioeconomic analysis also included estimates of effects on housing and public services such as schools (see Volume IV, Appendix 14, Sections 14.1.3.7.B and 14.1.3.7.C, respectively); impacts of the SSC were found to be negligible for both issues for the ROI as well as Ellis County.

An additional discussion of the socioeconomic effects in the Texas ROI, and the methodology used to make the estimates, is presented in Volume IV, Appendix 14, Sections 14.1.3.7 and 14.1.2.3, respectively.

0213.01

Comment noted.

0214.01

Comment noted.

0215.01

Comment noted.

0216.01

Comment noted.

0216.02

The DOE will prepare a detailed decommissioning plan, cost estimate, and NEPA document prior to the need for a decision to decommission.

The purpose of Volume IV, Appendix 3 was to provide an evaluation of the feasibility of decommissioning and an order-of-magnitude cost estimate.

The decommissioning description in Volume IV, Appendix 3 was not intended to exclude the LEB, the MEB, and the HEB from consideration for reuse. There was simply no projected use at that time. If a viable reuse were determined for one or more of these accelerators, including the applications listed in this comment, it would be considered as an option when a detailed decommissioning plan is prepared and evaluated as part of the NEPA requirements.

0216.03

See Comment Response 381.04.

0216.04

The final disposition of the occupied facilities is covered in the EIS in as much detail as possible. It is not possible at this time to predict exactly what part of the facility will be useful, e.g., for medical research or educational purposes, at the time of decommissioning. However, as stated in EIS Volume IV, Appendix 3, the main sources of radioactivity at the time of decommissioning, namely the beam absorbers, will be completely removed and disposed of as low-level radioactive waste. All accelerator components not salvaged for use elsewhere would be left in place.

Prior to the end of SSC operations and before a decision on decommissioning is made, a detailed decommissioning plan will be prepared.

See Comment Response 381.05 for a discussion of measures taken to guard against inadvertent penetration of the tunnel.

0216.05

The collider tunnel will be fitted with adequate permanent support systems to provide a safe, structurally stable operating environment for the collider and the project personnel. By preventing the tunnel from collapsing, the support system also prevents potential collapse-related surface effects. The particulars of the structural support system for the collider tunnel were addressed in the report "Conceptual Design of the Superconducting Super Collider" (SSC Central Design Group 1986) for several general cases, and in the State of Texas' site proposal for the Dallas-Fort Worth site as a site-specific adaptation. In general terms, tunnel support in the Taylor Marl portions will consist of a concrete liner, made in precast segments that are erected as the tunnel is bored. Support in the Austin Chalk portion will rely principally on rock bolts, although locally some additional support by chain-link and shotcrete may be added. The collider tunnel support system that is employed will be the result of extensive testing and analysis of site geology and will have the specific purpose of keeping the tunnel open for many tens of years.

0217.01

At the Texas site, Quaternary terrace deposits and alluvium are found overlying the Austin chalk and Taylor marl. The proposed SSC tunnel is located within the Taylor marl and Austin chalk, not within the terrace deposits or alluvium. Thus, the Quaternary terrace deposits and alluvium are separated from the SSC tunnel by a variable thickness of either Austin chalk or Taylor marl, both of which have a low permeability.

The likelihood of having a beam loss accident is very low. However, should it occur, migration of radionuclides toward the terrace deposits or alluvium through the flow of groundwater will be minimized by the separating aquitards.

The potential for groundwater quality impacts from tunneling and tunnel construction is minimal. The tunnel will be wholly within the Austin chalk and Taylor marl which have minimal, if any, active groundwater flow except in shallow weathered zones. Second, because the hydraulic pressure in any groundwater encountered will be higher than the hydraulic pressure in the tunnel (which is essentially atmospheric pressure), groundwater will generally seep into the tunnel from the rock and will not flow from the tunnel back into the rock.

Water from any dewatering or sump pumps may be slightly contaminated by petroleum products from tunneling machines. However, as a standard practice, this water will be treated prior to disposal.

See EIS Volume I, Chapter 5, Section 5.1.2 and Volume IV, Appendix 7, Sections 7.2.3.7.A.3, 7.2.3.7.A.4, and 7.2.3.7.B.2.

0217.02

Comment noted.

0217.03

Published geology reports on the Ellis and Dallas County areas frequently make particular note of the large number of small faults (with a few inches to a few ft of displacement) and fractures in the Austin chalk and Taylor marl. While such faults are common, they generally have very poor water-transmitting properties -- quarries and deep excavations for buildings report few problems with inflowing water, and hydrologic tests in boreholes indicate low water yields in bedrock. Hence, most residents rely on stream-terrace deposits for their water supply. More accurate mapping of these terrace deposits and surveys of all well locations and yields would be important parts of the site characterization studies that would be done if the Texas site is the selected site.

Both the Twin Mountains/Woodbine and the surficial channel alluvium/terrace deposit aquifers are significant as groundwater sources in the vicinity of the Texas site. The only differentiation in the EIS is related to the fact that large municipal and irrigation supply wells are primarily in the Twin Mountains/Woodbine aquifer while wells in the shallow alluvial aquifers are generally of lower yield and more typically serve domestic, stock, and small irrigation uses. The potential for impacts to the shallow aquifers at the Texas site is described in Volume IV, Appendix 7, Section 7.2.3.7. Also see Comment Responses 217.01 and 223.05 (second paragraph).

0217.04

The SSC will be sited, designed, constructed, and operated in strict conformance with applicable Federal, State, and local environmental safety and health protection laws, regulations, and standards to assure adequate protection of both the SSC work force and the general public. EIS Volume IV, Appendix 12 identifies the human health impacts that are projected to result from the SSC project. As discussed in Volume I, Chapter 3 the projected impacts from radiation produced by the SSC on the population are small compared to existing background. The radiation to which the public will be exposed as a result of the SSC is of the order of 1/1000 of background (see EIS Volume I, Chapter 5, Section 5.1.6 and Volume IV, Appendix 12). It will be a matter of standard practice, during construction, to seal off any flow of water into the tunnels (except for minor seepage) by grouting or similar means.

0218.01

Comment noted.

0219.01

Comment noted.

0220.01

Comment noted.

0221.01

Comment noted.

0222.01

The reference in the comment to 4,500 construction-related jobs should be clarified. The EIS estimates indicate that approximately 9,650 direct and secondary jobs would be created during the peak year of the construction phase in the Texas Region of Influence (ROI) (see EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.A). Approximately 1,200 of these jobs would be direct construction crafts jobs. There would also be additional direct construction technical (e.g., designers, drafters, and installation technicians), construction management, and construction-related clerical jobs available to workers in the ROI. Over 5,800 of the 9,650 jobs would be secondary jobs created in the regional economy from project spending for materials and services, and spending of earnings for goods and services by direct workers. The majority of these jobs would be created in the services, trade, and manufacturing sectors of the economy, although some secondary jobs would also be created in the construction industry.

0223.01

The imported fire ant (Solenopsis sp.) is recognized as a biological hazard at the proposed Texas site. For discussions of the potential impacts, see the additions to EIS Volume I, Chapter 3, Section 3.6.3, Chapter 4, Section 4.6.2.2, and Chapter 5, Section 5.1.6; and Volume IV, Appendix 10, Section 10.1.3.2 and Appendix 12, Section 12.3.2.

Should the Texas site be selected for the SSC, during design, additional consideration would be given to the potential effects of fire ants on SSC equipment. This information and options for mitigating potential impacts of the fire ant would be evaluated in the Supplemental EIS.

0223.02

At this point in the SSC site selection procedure it is not possible to evaluate the use of pesticides at the proposed Texas site, since it has not been determined that pesticides would be used. A mitigation method to control fire ant problems would be determined by the DOE if Texas were selected as the site (see EIS Volume I, Chapter 3, Section 3.6.4). If pesticides were to be used for fire ant control, the application of the pesticides would be done in accordance with all State and Federal regulations. Potential impacts of the application of pesticide, if proposed, will be discussed in the Supplemental EIS if Texas is the selected site.

0223.03

Although the SSC will operate at energy levels higher than those at existing accelerators, the projected radiological products produced are well understood and have been studied extensively. After the initial few interactions of the 20-TeV proton, the products of the hadronic cascade are at energy levels that have been studied. There are cosmic rays with naturally occurring energies higher than those that will be produced by the SSC. In studies of these high energy cosmic rays, the products produced have been identified and the associated health hazards are understood. The SSC is to provide controlled laboratory conditions to facilitate the study of high energy physics at these energy levels.

In terms of health risks to residents, the SSC will be sited, designed, constructed, and operated in strict conformance with applicable Federal, State, and local environmental safety and health protection criteria, regulations, and standards to assure adequate protection of both the SSC workforce and the general public. As discussed in EIS Volume I, Chapter 3, the projected impacts from radiation produced by the SSC are well below applicable standards and limits.

Estimates of the amounts of radiation/radioactive materials (see Volume IV, Appendix 10 for source terms) that may be released from SSC operations are based on experience from other accelerators such as Fermilab. The radiation dose to humans from external exposure, inhalation, or ingestion of specified quantities of radionuclides can be calculated with reasonable confidence (Volume IV, Appendix 12). Volume IV, Appendix 12 identifies the human health impacts that are projected to result from the SSC project. These take into account specific populations around the seven site alternatives.

0223.04

The neutron skyshine issue initially discussed in DEIS Volume I, Chapter 5 is addressed in more detail in Volume IV, Appendix 10. As noted in Appendix 10, 16 ft of earth and the presence of large particle detectors around the beam interaction points will reduce the skyshine dose rate to less than 4 mrem/yr, well within the DOE exposure limit of 100 mrem/yr for the exposure of individuals of the public to radiation as a consequence of routine DOE activities and actions. The minimum shielding equivalent depth for the SSC is 30 ft. Projected dose equivalents have been calculated for all candidate sites and are presented in DEIS Volume IV, Appendix 12, Table 12.3.1-1. Because of the design and placement of the SSC, the projected dose equivalents are negligible.

Routine operations of the SSC will not produce any measurable radioactivity in the soil surrounding the tunnel. In case of a loss of beam, there would be some activation of the soil (Volume IV, Appendix 10). Although there has not been a loss of beam accident during operations of the superconductor accelerator (Tevatron) at Fermilab, an analysis was performed to evaluate the impacts if one were to occur at the SSC (Volume IV, Appendix 12). The projected radiation exposures are below the limits set by the U.S. Environmental Protection Agency. (See Volume I, Chapter 6.)

See Comment Response 1192.03 regarding psychological stress.

0223.05

Cracks like those described in this comment, and holes in the ground that appear and disappear are common phenomena in the Texas site region. One local soil type, known as the Houston Black soil, is particularly prone to these seasonal effects. The cracks form as the moisture content of the soil decreases in the dry months, causing the soil to shrink and crack apart, and disappear during wetter periods as the soil gains moisture and swells.

The shallow alluvial aquifers at the Texas site are identified and described in EIS Volume I, Chapter 5, Section 5.1.2 and Volume IV, Appendix 5, Section 5.7.2.2. Potential water quality impacts on the shallow aquifer system are assessed and described in Volume IV, Appendix 7, Section 7.2.3.7. The tunnel unit (Austin chalk and Taylor marl) is characterized by very low permeability which would restrict the migration of any radioactivity in rock or groundwater immediately outside of the tunnel. Groundwater quality impacts to the shallow aquifer system from surface derived sources are also assessed to be negligible given the limited use of materials with significant contamination potential and the measures that will be in place to limit the magnitude of any spill or leak-derived contamination of surface and groundwaters.

0223.06

All proposer states have committed to the resolution of any issue in regard to the land acquisition strategies. Questions concerning the proposers' SSC land acquisition strategies and commitments should be directed to the appropriate State agency (see EIS Volume IV, Appendix 4, Section 4.4.3.2). The DOE in the instructions to proposers (see EIS Volume III, Section 1.1) identified land requirements and required unconditional fee simple title to all land on which permanent improvements are planned or anticipated. It was determined that a stratified fee estate was sufficient to maintain the integrity of a deep tunnel (greater than 50 ft). In addition, the DOE required enough land to adequately support the SSC in various types of rights-of-way for off-site roads, utilities, and communication lines (see Volume I, Chapter 3, Section 3.6). Absence of cost to the Federal Government for land acquisition was one of five qualifications for proposals to be considered (see Volume III, Chapter 1, Section 1.1). Accordingly, the DOE will accept only land with clear title and at Chapter I, Section no cost to the Federal Government. Any options in this regard would be the responsibility of the appropriate State agency.

0223.07

The DOE is committed to and attempts to answer all questions raised if they can be answered at this time with available information. See EIS Volume II. The Supplemental EIS will be prepared for the selected site. When additional details will be available on the design of the SSC. Health and safety issues are discussed in EIS Volume I, Chapter 5, Section 5.1.6 and Volume IV, Appendices 10 and 12. A Safety Analysis Review will be prepared prior to construction and operation of the SSC to identify all potential hazards and their preventive/remedial procedures. It is the DOE's intention to construct and operate the SSC without any detrimental effects on the people or environment.

0224.01

Comment noted.

0225.01

Comment noted.

0226.01

The EIS analysis indicates the State government and local governments in Ellis County would collect additional tax revenue throughout construction and operations of the SSC facility. The revenues cited by the commenter do not, however, concur with the estimates in the EIS (see Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.D).

The EIS analysis indicates private real property in Ellis County would be removed from the tax base to site the SSC facility. The commenter suggests that the resulting tax loss would create a deficit for local jurisdictions, yet this does not concur with the estimates in the EIS. Although there would be negative net fiscal impacts during the first two years of construction, these impacts would be relatively small in comparison to positive net fiscal impacts which are projected for each of the subsequent years throughout the remainder of construction and operations of the SSC (see Volume IV, Appendix 14, Section 14.1.3.7.D, including Errata for that section).

The EIS does not contain any information to substantiate the increased tax burden reported by the commenter. The EIS does account for increased expenditures for payroll of public employees, including additional teachers, firefighters, police and general government workers, and for increased capital expenditures for construction of new facilities that would be required to accommodate SSC-related growth (see Volume IV, Appendix 14, Section 14.1.2.3.D).

The State originally estimated that the private real property to be acquired has a market value of approximately $2 million. This estimate is well below the lower portion of the range suggested by the commenter of $35 - $60 million. The State later revised the original estimate from $2 million to $35.8 million. Due to this change, the annual property tax loss estimate in the EIS for Ellis County jurisdictions has been revised from the original State estimate of $33,239, originally appearing in the EIS rounded to $0.0 million, to $0.4 million (see Errata for Volume IV, Appendix 14, Section 14.1.3.7.D). As stated in the same section of the EIS, the State government would be responsible for site and infrastructure improvements at a cost of approximately $25.7 million (see Volume IV, Appendix 14, Section 14.1.3.7.D).

See also Comment Response 238.03.

0226.02

See Comment Response 238.03.

0226.03

Comment noted.

0227.01

A discussion of the purpose and the need for the SSC project is found in Volume I, Chapter 2.

0227.02

Theories of matter have changed as knowledge concerning the nature of subatomic particles has been gained through the use of instruments such as accelerators. As detailed in EIS Volume I, Chapter 2, Section 2.2.1, the quality of human life may be enhanced through practical applications of new knowledge. Historically, high energy physics has resulted in benefits to society such as new medical diagnosis equipment, such as the PET scanner. This tool has contributed greatly to early disease detection, allowing early treatment and a better chance of success.

0227.03

EIS Volume I, Chapter 5, Section 5.1.3 and Volume IV, Appendix 8, which assess the impact on air quality of constructing and operating the SSC conclude that the short-term effects of the SSC on air pollutant concentrations will be normally confined to the areas immediately adjacent to the facilities during construction and to roads used during spoils hauling. EIS Volume IV, Appendix 9 (see Errata and Revisions) shows that noise generated by construction at E and F areas is expected to result in high human annoyance for approximately 25 percent of those persons who live within 630 ft of construction activity, or for approximately 9 percent of those living within 2,000 ft of construction activity.

During the operations phase, air pollutant emissions from the SSC, which will be primarily due to space heating and solvent handling operations, are expected to be far below the NAAQS. Noise emitted by operations at service areas is expected to be highly annoying to less than 5 percent of those persons living within 700 ft of the center of the service area.

0227.04

It can not be predicted at an individual level where displaced people will go. It is most likely that people will relocate near the area in which they currently live and will continue to work in employment sectors in which they worked in the past. In cases involving large agricultural land holdings, it may be necessary for displaced persons to move somewhat farther away from the SSC in order to purchase/lease equivalently sized holdings. The EIS projects approximately 3,800 direct, SSC-related jobs in the Texas Region of Influence during the peak construction year, of which 1,700 are expected to be held by either residents of or in-migrants to Ellis County. Some residents of Ellis County will benefit more than others. People who must move because of the SSC or people living near SSC service areas or access shafts will likely experience the greatest disruption.

In reference to the increase in taxes because of the SSC, Table 5.1.8-8 of Volume I, Chapter 5 of the EIS indicates that Ellis County would experience a negative effect in public finance in the first two years of construction, and net positive impacts thereafter.

0228.01

Comment noted.

0228.02

The number of relocations related to SSC construction is indicated in the EIS for all states in Volume I, Chapter 3, Table 3-6. As indicated in the table there are 175 residential relocations projected for the State of Texas. Of these, 120 are classified as permanent housing. The State classified 120 as permanent housing and 55 as manufactured housing.

0228.03

The Soil Conservation Service identified 3,389 acres of prime farmland and 1,287 acres of important farmland in the fee simple area. From these inventories, an estimated 588 acres of prime and important farmland would be permanently converted by the SSC at the proposed Texas site. See EIS Volume I, Chapter 3, Section 3.7.11; Chapter 4, Section 4.8.6; Chapter 5, Sections 5.1.7.2 and 5.2.11; and the Errata to Volume IV, Appendix 13.

0228.04

Water use impacts related to the SSC are assessed in EIS Volume IV, Appendix 7, Sections 7.1.3.7 and 7.2.3.7. Groundwater will be used for only about 20 percent of SSC water use to supply the far cluster and the remote service areas around the ring. During operations, this will amount to about 780 acre-ft/yr. This water will be pumped from the Twin Mountains/Woodbine aquifer and will incrementally affect the existing overdraft of this aquifer system. While any overdraft condition is significant, the amount of additional overdraft from SSC uses will be small because of the relatively small volumes to be used and the fact that supply wells will be distributed over a wide area. No groundwater will be pumped from the shallow alluvial aquifers at the site. The deep aquifers are not interconnected to the shallow alluvial aquifer in the vicinity of the site. Maximum use of surface water is made by the project to minimize the groundwater impact.

It is not anticipated that any wells in the Twin Mountains/Woodbine aquifer will have to be replaced or abandoned due to SSC water use. It is possible that a limited number of existing private wells may have to be abandoned because of proximity to project facilities. As part of the land acquisition process, the State will provide compensation or an alternative water supply to the affected well owner. The manner in which an alternative supply of water or compensation will be provided has not been finalized at this time but will be addressed in the Supplemental EIS for the selected site.

0228.05

See Comment Response 1278.11.

0228.06

Noise impacts of constructing and operating the SSC are assessed to be very local in scope. As discussed in general in Volume I, Chapter 5, Section 5.1.4, and in detail in Volume IV, Appendix 9, the peak of construction activity at service areas (F) and intermediate access areas (E), which coincides with the surface activities that support the boring of the collider ring tunnel, is expected to last 10 mo, and less than 25 percent of those living within 630 ft of construction and less than 10 percent of those living between 630 and 2,000 ft on construction will be highly annoyed by the noise. Noise impacts due to spoils hauling and construction of the balance of facilities at the near and far clusters will also be temporary, and are not expected to be highly annoying. Noise resulting from increased traffic on existing roads is not expected to be noticeable. Land that is converted from farmland to residential development will realize an increase in background sound level. Residential development in Ellis County is anticipated to increase more rapidly due to the SSC than has historically been the case (more than double the projected increase in residential development without the SSC project from 1990 to 1992). The resultant sound level is, however, expected to be representative of growing suburbs.

0228.07

The upgrading plans proposed by the State of Texas are expected to reduce the impact of increased traffic due to the SSC. These plans are discussed in Volume IV, Appendix 14, Section 14.2.1.3.G.1.a of the EIS.

0228.08

Comment noted.

0228.09

Comment noted.

0229.01

The DOE believes that this EIS is adequate for the purpose of site selection. However, as noted in EIS Volume I, the DOE recognizes that a more detailed site-specific review will be required under NEPA at the selected site prior to a final decision on the construction and operations of the proposed SSC. This more detailed review will be provided in a Supplemental EIS. Mitigation strategies will be described in greater detail in the Supplemental EIS. See Comment Response 13.02.

0229.02

It has been projected that the SSC will generate 10 ci of low-level radioactive waste per year (see EIS Volume IV, Appendix 10). Although Fermilab from 1976 to 1986 shipped an average of 23 ci/yr, the shipments from 1983 to 1986 were used to estimate the radiation levels for shipments of SSC waste. This was based on the fact the Fermilab was switching experimental emphasis from the fixed-target program (which generated about one-half of the residual radioactivity) to the colliding beam program, which is more closely related to SSC experiments.

0229.03

The proposed site in Texas has perched alluvial aquifers within the footprint of the ring that supply shallow wells, and are located in floodplains intersecting the footprint. This alluvium is generally separated from the tunnel by rock of very low hydraulic conductivity. Flows from the deeper aquifer(s) and SSC tunnel to the shallow alluvial aquifer are unlikely. The major aquifers at the Texas site occur far below tunnel depth (see EIS Volume I, Chapter 5, Section 5.1.6 and Volume IV, Appendix 12, Section 5.2.3.1). Additional field tests will be performed at the selected site to refine the characterization of hydrogeologic transport characteristics of soil/rock in which the tunnel will be placed.

0229.04

The EIS assesses the environmental impacts of the SSC during construction and operations, although these assessments are, of necessity, based only on project conceptual design because detailed design has not yet been accomplished.

Final details of landfill requirements, waste treatment requirements and design of waste treatment facilities will depend on final design for the selected site. For those reasons, the EIS relied upon the proposals of the various states for the locations of waste treatment facilities. Given the early stage of design and planning, the DOE plans to prepare the Supplemental EIS prior to a final decision to construct and operate the SSC at the selected site. The supplement will address the location, size, and impacts of any new landfills required by the SSC.

0229.05

It is DOE policy to conduct its operations in an environmentally safe and sound manner and in compliance with applicable environmental statutes, regulations, and standards (see EIS Volume I, Chapter 6, Section 6.1). DOE's commitment to properly handle and dispose of low-level radioactive waste is found in DOE Orders such as 5480.1B.

For assessing potential impacts and for planning purposes, it was reasonable to assume that all low-level wastes generated at the SSC would be disposed at the Hanford facility in Richland, Washington. See Comment Response 276.03 for information on the disposal of these wastes.

The DOE recognizes that there are environmental problems at some DOE facilities, and is working diligently to correct them. The reader is referred to site-specific monitoring reports and NEPA documents for other DOE facilities for additional information. These are available from the DOE and each facility's operating contractor.

0229.06

For the purposes of impact analysis, it was reasonable to assume that any SSC low-level radioactive waste would be disposed at DOE's Hanford facility in Richland, Washington (see EIS Volume IV, Appendix 10, Section 10.1.3.1) because this is the current practice at other DOE-operated national laboratories (see EIS Volume IV, Appendix 12). Such an assumption limits the impacts. However, disposal of the waste at a regional low-level waste facility is an option that will be considered if the State is willing to accept the waste. The decision to utilize a regional disposal facility would be based on whether the capacity of the regional site is adequate in accordance with the Low Level Radioactive Waste Policy Amendments Act of 1985. The DOE would also consider whether using a regional disposal facility represents a cost savings to the DOE. Impacts from selection of a disposal site would be evaluated in the Supplemental EIS.

0230.01

Existing public services (including schools), transportation (air and ground), power, and geological characteristics of the proposed Texas site and surrounding environs are discussed in EIS Volume IV, Appendix 5.

Potential impacts to local public services, transportation, and power are presented in Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14. Anticipated impacts on local geology, in turn, are discussed in Volume IV, Appendix 6.

0231.01

Comments noted.

0232.01

Comment noted.

0233.01

Comment noted.

0234.01

Comment noted.

0235.01

Comment noted.

0236.01

Comment noted.

0237.01

Comment noted.

0238.01

Comment noted.

0238.02

State agency-operated ambient air monitors are traditionally placed in areas with air quality challenges and would be expected to realize higher concentrations of criteria pollutants than areas without air quality challenges. However, these backgrounds were deemed appropriate for use in the air quality analyses because of their proximity to the proposed Texas site. Publicly available Texas Air Control Board monitoring information from 1986 was used because it was the most recent information available at the time of the writing of the Affected Environment sections in Volume I, Chapter 4, and in Volume IV, Appendix 5. An examination of the 1987 Texas Air Control Board data summaries does not indicate any substantive change in observed air quality.

Mitigation measures are discussed in Volume I, Chapter 3, Section 3.6.3 and Chapter 5, Section 5.1.3.2, and Volume IV, Appendix 8. These air quality sections have been revised in the final EIS to reflect the inclusion of additional mitigation measures to lower particulate concentrations to below AAQS. Worst-case scenarios, by definition, are designed to be very conservative.

0238.03

The EIS analysis indicates that local governments in Ellis County would experience a cumulative net fiscal benefit throughout construction and operations of the facility, except for a net fiscal deficit during the first two years of construction. Although there would be negative net fiscal impacts during the first two years of construction, these impacts would be relatively small in comparison to the positive net fiscal impacts projected for each year throughout the remainder of SSC construction and operations (see Volume IV, Appendix 14, Section 14.1.3.7.D, including the Errata and Revisions. The analysis allows for more than $5 million (1988 dollars) in capital improvements by local jurisdictions during the first four years of SSC construction, but direct and indirect tax revenues are anticipated to offset these outlays in all but the first two years of construction. Additional details concerning the impacts of SSC construction and operations on both State and local government finances are presented in Volume IV, Appendix 14, Section 14.1.3.7.D.

0238.04

Public finance impacts (including those to school districts in Ellis County) are presented in EIS Volume I, Chapter 5, Section 5.1.8.4 and Volume IV, Appendix 14, Section 14.1.3.7.D. Cumulative net fiscal impacts to all local government jurisdictions within Ellis County are expected to be negative in the first two years of project activity, but should be positive thereafter. Quality of life issues are discussed in Volume IV, Appendix 14, Section 14.1.3.7.E; and land use is discussed in Volume IV, Appendix 13.

0238.05

Comment noted.

0238.06

It is the DOE's policy to support local business in all areas where DOE facilities exist. The DOE and its contractors often buy goods and services from local business and contractors. However, both the DOE and its operating contractors are subject to applicable Federal Acquisition Regulations which in general require open and competitive bidding.

0238.07

Comment noted.

0239.01

Comment noted.

0240.01

The comment regarding the efficiency of the airport at DFW is not consistent with EIS Volume I, Chapter 5, Section 5.1.8.6 and Volume IV, Appendix 14, Section 14.2.1.3.G.3.b which lists the existing condition as currently congested.

The comment regarding the educational institutions is generally consistent with the requirements set in the ISP and with the Volume IV, Appendix 14, Section 14.1.3.3.

0241.01

Comments noted. The network of existing roads and the distance between the site and Dallas-Fort Worth Metroplex is discussed in EIS Volume IV, Appendix 5, Section 5.7.11.2. The impact of SSC traffic is presented in EIS Volume I, Chapter 5, Section 5.1.8.6 and in Volume IV, Appendix 14, Section 14.2.1.3.G.

Economic conditions in the Texas Region of Influence and in Ellis County are summarized in Volume IV, Appendix 5, Section 5.7.11.1.A. The economic impact analysis, presented in Volume IV, Appendix 14, Section 14.1.3.7.A, takes into account the existing composition of industries in the region and their interaction within the regional economy.

0241.02

At present, TXI Cement Company is using Austin chalk in making cement. The TXI Cement Co. could use a majority of the excavated materials from the SSC if chemical analyses show that the material is of acceptable quality. It is estimated that the excavated materials from the SSC would be composed of about 70 percent Austin chalk (Volume IV, Appendix 10, Section 10.2.3.7).

0241.03

Comment noted.

0242.01

Comment noted.

0243.01

Comment noted.

0243.02

The need to modify or amend the Request for Proposal for the SSC operating and managing (O&M) contractor is outside the scope of this EIS.

0244.01

Comment noted. These observations are consistent with those in EIS Volume I, Chapter 5, Section 5.1.2 and in Volume IV, Appendix 7.

0245.01

Comment noted.

0246.01

Comment noted.

0246.02

The discussion of the benefits of the SSC is provided in the EIS Volume I, Chapter 2 and Chapter 5, Section 5.8.

0246.03

Comment noted.

0246.04

Comment noted.

0246.05

Comment noted.

0246.06

Comment noted.

0247.01

Comment noted.

0248.01

Comment noted.

0249.01

Comment noted.

0250.01

Comment noted. These observations are consistent with those in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14.

0251.01

The observations regarding SSC-related impacts on employment in the Texas Region of Influence are consistent with EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.

0252.01

Comment noted.

0253.01

The observations regarding SSC-related impacts on public education in the Texas Region of Influence are consistent with EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.

0254.01

Comment noted.

0255.01

The observations regarding SSC-related impacts on housing in the Texas Region of Influence are consistent with those in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.7.

0256.01

Comment noted.

0257.01

Comment noted.

0258.01

At the public hearing on the DEIS, elected officials or their authorized representatives were allowed speaking time by agreement with the DOE.

0258.02

Comment noted.

0258.03

A recent attitudinal study (Ellis County Environmental Review Committee, 1988) indicated that some people (farm operators) were concerned with water quality and quantity impacts of the SSC and inconvenience caused by SSC construction and site access (see EIS Volume I, Chapter 5, Section 5.1.2 and Volume IV, Appendix 14, Section 14.1.3.7.E.3). It is likely that those who may be directly impacted by the project (either positively or negatively) are much more interested in the SSC than those who will not likely be affected by the project.

0258.04

All comments received during scoping were considered in determining which topics to include and emphasize in the EIS. The number of letters, either pro or con, was not important for the scoping process; it was the content of each letter that was important.

The DOE is committed to constructing and operating the SSC in compliance with applicable laws and regulations. In addition, the DOE will carry out the mitigations identified in the EIS (Volume I, Chapter 5, Section 5.1), and in the Supplemental EIS to be prepared for the selected site.

0259.01

The SSC is not entirely a "first of its kind." It is similar to the existing accelerators at Fermilab, Batavia, Illinois, and at CERN, Geneva, Switzerland, and is merely an extension of known and proven techniques to a higher energy than before available in the laboratory (see also Volume I, Chapter 2, Purpose and Need for Action).

0259.02

The information and data that were available for the EIS are sufficient for the site selection process. See Comment Response 13.02. A more detailed Supplemental EIS will be prepared for the selected site prior to construction of the SSC.

0259.03

See Comment Response 35.04.

0260.01

The acreage of prime farmlands permanently converted by the SSC if sited in Michigan, would be 205 acres. The temporarily disturbed prime farmland acreage would be 346 acres.

Of the seven site alternatives, Michigan ranks fifth in the acreage proposed to be permanently converted.

0260.02

Observations in the comment regarding the amount of prime farmland are consistent with information contained in EIS Volume I, Chapter 4, Section 4.8.6. See Comment Response 880.04 regarding compensation for land acquisition.

0260.03

Comment noted.

0261.01

Comments noted. The desirability of locating the SSC in proximity to facilities such as those noted by the commenter is mentioned in the Invitation for Site Proposals.

0262.01

Comment noted. Information has been provided in the DEIS (see Volume IV, Appendix 14, Table 14.2.2-4) on Consumers Power Company's (CPCo) reserve margins with and without the SSC. Volume IV, Appendix 14 of the DEIS also included an analysis of electric power demands if the SSC were sited in Michigan, including comparable data (such as CPCo's 23 percent reserve planning criterion) as noted in this comment.

0262.02

Comment noted.

0262.03

This is consistent with the SSC fuel requirement. In the ISP, Appendix C, Section C6, the typical fuel requirements were listed as "capable of providing at least 55 million Btu/h --- to serve the laboratory if the coldest month at the site corresponds to 900 degree-days." See EIS Volume III.

0262.04

Comment noted.

0263.01

See Comment Response 816.01. The site selection process considers higher learning Centers in its regional resources evaluation (see EIS Volume III, Chapter 1). The availability of educational facilities was considered in the socioeconomic impacts section (see Volume I, Chapter 5, Section 5.1.8.

0263.02

Comment noted.

0263.03

See Comment Response 816.01.

0264.01

Comment noted.

0265.01

These observations are consistent with those in EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14. The EIS analysis projected local government capital improvements based on the population growth rates expected to result during SSC construction in each primary impact county, including Ingham County in Michigan. Data collected from more than 3,200 municipalities and more than 4,000 school districts in the U.S. indicates a relationship between population growth rates and spending for capital improvements by local government jurisdictions. This evidence, provided in a report prepared by the President's Economic Adjustment Committee in 1981, was used as the basis for the capital improvement projections. The methodology used is described in greater detail in Volume IV, Appendix 14, Section 14.1.2.3.

0265.02

The SSC-related population impact on Ingham County is estimated to number about 1,600 in 1990, increasing to nearly 3,100 in the peak year of SSC construction (1992), as presented in EIS Volume IV, Appendix 14, Section 14.1.3.4.B. Impacts on Ingham County housing, public services, and infrastructure as a result of these population increases are anticipated to be negligible (Volume IV, Appendix 14, Sections 14.1.3.4.B, 14.1.3.4.C, and 14.2.2.3.D).

See also Comment Response 816.01.

0266.01

Comment noted.

0266.02

There is no area accessible to the public identified as having the highest probable radiation exposure. The radiation dose equivalent of the beam abort area has been evaluated and discussed in Volume IV, Appendices 10 and 12. The beam absorber consists of heavy shielding and stopping material sufficient to contain the heat and induced radioactivity of the full 20-TeV beam. Detailed discussions can also be found in Comment Responses 312.08 and 607.03.

Table B-1 on p. 49 of the Invitation for Site Proposals (ISP) for the SSC (April 1987) identifies the land requirements for each area of the SSC. A detailed explanation is also provided on pp. 48-50 of the ISP for the justification of the requirement for 15,830 acres for the SSC. Buffer area and buried beam zone areas will require 4,550 acres of stratified fee area to provide the minimum 30 ft of hadron shielding, to ensure that an individual would not be positioned underground in the path of the muon beam, and to allow some flexibility in the positioning of the ring and its components.

0266.03

EIS Volume I, Chapter 3, Table 3-1 presents data on the SSC land requirements for facilities development. Footnote "f" notes that unconditional fee simple title is required for areas J1 through J4, which includes the North Stockbridge area.

The people in group (a) are those most directly affected by the SSC, since this group includes suburban and rural residents whose property is acquired in fee simple and who thus would have to sell their property and move. The residents whose property is required in stratified fee, group (b), are those next most directly affected by the SSC. The effects of the SSC on the group (b) residents are presented in Volume I, Chapter 5, Section 5.1.8. An additional discussion of the effects on the group (b) residents can be found in Volume IV, Appendix 14 EIS Volume I, Chapter 4, Section 14.1.3.4.

See Comment Response 1129.02 for a discussion regarding concerns about living above the SSC.

0266.04

See Comment Response 10.03.

0267.01

The EIS methodology used for projections of school enrollments can be found in EIS Volume IV, Appendix 14, Section 14.1.2.3.B.3. Public school enrollments were assumed to comprise that portion of the population increase aged 5-17, as determined by the demographic analysis portion of the EIS (Volume IV, Appendix 14, Section 14.1.3.2.B).

0267.02

SSC impacts to public schools were projected based on the anticipated construction timetable (EIS Volume I, Chapter 5, Section 5.8.4). It is correct that the timing of these impacts could be altered, or postponed, due to subsequent delays or changes in the actual SSC schedule.

0267.03

The analysis assumes that 67.5 percent of the direct workers will be accompanied by their families. This and other assumptions about workforce in-migration are listed in the EIS Volume IV, Appendix 14, Section 14.1.2.3.

0267.04

It is assumed that residents displaced by SSC construction would relocate near their original residences and not cause population shifts appreciably affecting school enrollments (see Volume IV, Appendix 14, Section 14.1.2.3).

0267.05

The noted observation is correct. Although student enrollments during the construction phase of the project would accompany a "temporary" population (i.e., lasting only the duration of construction), enrollments during the operational phase would be associated with a more permanent population (see EIS Volume I, Chapter 5, Section 5.1.8 and Volume IV, Appendix 14, Section 14.1.3.4).

0267.06

Comment noted. The approach taken in the EIS to examine housing demand views population as the driving force in determining both housing demand and public services (e.g., school) requirements (Volume IV, Appendix 14, Section 14.1.2.3). If population is allocated to a particular place, it is assumed to generate a demand for housing. In some cases, this housing will be available in the form of present vacancies; in others it will have to be built, in which case housing construction capabilities at the county levels are examined to determine if rising construction demands can be met. School impacts, in the form of increased enrollment, are examined in terms of the proportion of the additional population anticipated to be of school age, that is, between the ages of 5 and 17 (Volume IV, Appendix 14, Sections 14.1.2.3 and 14.1.3.4.C).

0267.07

Locations of spousal employment opportunities are not explicitly accounted for in the population allocation procedure. To the extent that population centers also are centers of employment opportunities, however, the spatial allocation model does implicitly account for this factor. (See a discussion of the spatial allocation methodology in EIS Volume IV, Appendix 14, Section 14.1.2.3.) Moreover, in the case of Stockbridge, nearly equidistant employment opportunities in Lansing and Ann Arbor could tend to attract settlement to the centrally located Stockbridge area.

0267.08

EIS Volume I, Chapter 5, Section 5.1.8.5 provides a summary profile of the permanent operating staff. Both the Lansing and Ann Arbor areas may be attractive to these individuals, and a location as central to both urban areas as Stockbridge may be similarly attractive. No evidence has been found to date to support the contention that such a population would be older than the norm.

0267.09

Public school capacity and vacancy data given for Ingham County in this comment have been reviewed and incorporated into changes in Volume IV, Appendix 14, Sections 14.1.3.4.B and 14.1.3.4.C.

0267.10

The comment is consistent with the EIS analyses in Volume IV, Appendix 14, Section 14.1.3.4.C which explain that increased public school enrollments attributable to development of the SSC in the Stockbridge area could be serviced through current available capacity and potential school campus expansion or construction, as needed. The analysis of public finance impacts indicated that, although a net fiscal deficit may occur for all local jurisdictions in Ingham County during the first two years of SSC construction, a cumulative net fiscal surplus would occur thereafter (Volume IV, Appendix 14, Section 14.1.3.2.D).

0267.11

Comment noted.

0268.01

Comment noted.

0268.02

The comment addresses the site selection process followed to designate the BQL list. The DOE independently evaluated the recommendations of the NAS/NAE committee. The DOE believes the process was well founded and concurred in the findings (Volume III, Chapters 1 and 2). The cost of land is indeed a very small fraction of the project cost. However, there is no security issue facing SSC development and the DOE does not need title to the center of the ring. The ISP criteria are summarized in Volume III, Chapter 1.

0268.03

The SSC life cycle could be increased to 30 or 35 years instead of the conservative, i.e., minimum, estimate of 25 years. The SSC design life is indeed of this order. However, the actual useful life will not be known until much later since final design details are not yet determined, and yet-to-be-discovered applications and technologies could very well enhance or prolong it.

On the same basis, possible revenues from particular SSC facilities before and after shutdown and from equipment salvage are only speculative at this time. EIS Volume IV, Appendix 3 and the Argonne National Laboratory Report, "Technical Assessment of Environmental and Cost Implications of Superconducting Super Collider Decommissioning" by S.Y.

Chen, et al. discuss these topics in a general way. A separate document in accord with the National Environmental Policy Act, addressing decommissioning activities in detail, would be prepared after the end of SSC project operations but before decommissioning actually occurs. See also Comment Response 216.02.

0268.04

The site selection process is described in Volume III of the EIS. The DOE has not identified the need to select more than one preferred location in this FEIS, or more than one final site for the SSC.

0269.01

See Comment Response 816.01.

0270.01

These observations are consistent with those in EIS Volume IV, Appendix 5. These resources were considered in the site selection process as described in Volume III.

0271.01

Comments noted.

0272.01

Comment noted.

0273.01

Environmental consequences during the life of the SSC are summarized and health hazards of the project are discussed in EIS Volume I, Chapter 5, Section 5.1.6. Volume IV, Appendices 10 and 12 discuss details of health and safety assessments. The conclusions of the comment are consistent with DOE assessments.

0273.02

Comment noted. The findings are consistent with those presented in the EIS Volume I, Chapter 5, Section 5.1.6.

0273.03

Comments noted. The findings are consistent with the data presented in EIS Volume I, Chapter 5, Section 5.1.6.

0273.04

Comment noted. See Comment Response 1134.03.

0273.05

The commenter's information is correct and is consistent with the information presented in EIS Volume IV, Appendices 10 and 12.

0273.06

Comment noted. There is no mechanism for release of radioactive materials from cooling towers. Cooling water is not in contact with activated materials. See EIS Volume I, Chapter 5, Section 5.1.6. Further details of the system will be discussed in the Supplemental EIS for the selected site.

0273.07

EIS Volume IV, Appendix 10, Section 10.3.3.3 contains a presentation of the State of Michigan's proposal to dispose of pretreated cooling tower blowdown (together with sewage) through septic tanks, through a packaged treatment plant, or by direct discharge into the sewage system.

Additional alternatives regarding cooling tower blowdown disposal methods, including vacuum compression brine concentrator units or side-stream softening, have also been presented by the DOE (see Volume IV, Appendix 10, Section 10.3.3.3).

0273.08

The primary radionuclide produced in the water from the closed loop coolant system for the beam absorbers would be tritium (12.3-yr half-life). In a worst case scenario (i.e., the coolant would not be changed until decommissioning), the activity of tritium in the closed loop absorber water after 25 years of operation is estimated to be 0.14 curies. This is dispersed in the closed loop water volume of 1,600 liters.

It would be unlikely that any breach of the coolant system would result in a substantial loss of coolant. The tubes are in aluminum which is surrounded by steel and the steel surrounded by concrete. The current design of the cooling system incorporates an isolated sump with a drainage back to the recovery area. The beam absorber design also incorporates a liner outside of the concrete encasement which is monitored for any leakage. Accordingly, the loss of beam absorber coolant would not be expected to result in an impact to the environment. The frequency for monitoring will be part of the operating and maintenance procedures established by the management and operations contractor. These procedures will be reviewed prior to startup as part of an Operational Readiness Review. For health and safety reasons, it is anticipated that the tritium concentration in the coolant would be kept at some lower level (as is the current practice at Fermilab), by periodically draining the system and disposing of the water as radioactive waste.

Additionally, as stated in EIS Volume IV, Appendix 12, the design of the beam absorber is such that loss of the cooling system will not cause any loss of integrity to the beam absorber.

0273.09

See Comment Response 733.02.

0274.01

The DOE is committed to cooperating fully with the State in meeting their requirements if that site is selected. See Comment Response 1504.01 for a discussion of the site selection process.

0274.02

The EIS has been revised to more clearly indicate wetland impacts and how those impacts were determined (see Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.4.3). Wetland impact assessments were based on the amount and quality of wetlands located within areas that would be disturbed by surface construction (areas A, B, C, E, F, J, and K) rather than within all fee simple areas.

Potential hydrologic impacts associated with the SSC project at the Michigan site are discussed in Volume IV, Appendix 7, Section 7.2.3.4. If the Michigan site is selected, additional site-specific evaluations regarding water level declines will be performed and included in a Supplemental EIS.

0274.03

If Michigan is selected as the SSC site, a more detailed assessment of wetlands and wildlife populations will be made. This assessment would be presented in a site-specific Supplemental EIS. The supplement would also include a discussion of specific mitigation plans that would be developed in consultation with the Michigan Department of Natural Resources (the designated authority for the U.S. Army Corps of Engineers in Michigan), as required by Section 404 of the Clean Water Act. The wetland assessment presented in the EIS has been revised and is based on the most current information available on wetland location, type, and quality (see Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.4.3).

The sandhill crane is a sensitive species found in the Stockbridge area that might be impacted by development of the SSC project in Michigan. As stated in EIS Volume I, Chapter 4, Sections 4.7.3 and 4.7.5.4, the habitat of the sandhill crane is provided some protection within the Haehnle Wildlife Sanctuary. There may be other sites within the currently proposed SSC project area that may also contain habitat used by either migratory or nesting sandhill cranes. The Audubon Society would be consulted in developing more detailed information on the sandhill crane if the Michigan site is selected. This information would be included in the Supplemental EIS developed after the site selection is made.

0274.04

Comments noted.

0275.01

Comment noted.

0275.02

Comment noted.

0275.03

Comment noted. The responsibility for acquisition of property for the SSC project is the proposer's (see EIS Volume IV, Appendix 4, Section 4.1). The issue of whether or not eminent domain should be used is also the responsibility of the proposer State. The question of whether or not the proposer has the authority of eminent domain is addressed in EIS Volume IV, Appendix 4, Section 4.3.2.4.

0275.04

The general policy of the DOE is to competitively outlease areas which the DOE determines are not needed at that time for programmatic purposes. This policy is constrained by general safety and programmatic requirements of the SSC facility operations. Suggestions such as this would be considered after facility development is mature enough to determine the programmatic need for specific land.

0275.05

See Comment Response 880.04.

0275.06

For the Michigan site, the State of Michigan proposed the use of freezing or slurry wall techniques for minimizing groundwater inflow into major excavations, such as for buildings and shafts, and grouting techniques during tunnel construction through sections of significant groundwater inflow. These measures are expected to minimize groundwater inflow and thus any associated impacts on the local water table and wells.

See Comment Response 312.04, first paragraph, with respect to potential construction and operational water use impacts. See also discussions in Volume IV, Appendix 7, Section 7.2.3.4.

It is anticipated that a limited number of existing private wells may have to be abandoned because of proximity to the tunnel or to project construction sites or facilities. Proposers have indicated that an alternative well or water supply will be provided to affected well owners where a need exists. The manner in which an alternative supply of water is to be provided is at the discretion of the states and has not been finalized at this time. This matter will be addressed in detail in the Supplemental EIS for the selected site.

0275.07

See Comment Response 275.05.

0275.08

See Comment Response 880.04.

0275.09

Compensation for damages would be subject to applicable Federal and State laws and regulations. No special provisions for the SSC are planned.

0276.01

The role of international collaboration in the SSC development and operations is discussed in EIS Volume I, Chapter 3, Section 3.2.4.2. As noted in this section, the ISP specifically states the site must be in the U.S. The role of international collaboration is not yet defined and the DOE cannot currently address future conditions. Discussions such as are suggested would presumably be held between the U.S. Government and the governments of collaborating nations. There is no known mechanism by which foreign collaboration would impact state fiscal or voting issues.

0276.02

Volume I, Chapter 5, Section 5.1.4, which discusses cut-and-cover tunnels, refers only to the cut-and-cover construction of a portion of the collider ring in Arizona. Cut-and-cover construction of the injector facilities is addressed under the near cluster/far cluster description. An assessment of noise impacts associated with cut-and-cover injector construction was performed and is addressed in Volume IV, Appendix 9 in general and for the Michigan site specifically.

Volume I, Chapter 3, Section 3.1.4 refers to the fact that in order to assess the sites on an equal basis, it was assumed for the purposes of the EIS that the injectors at the Michigan and Tennessee sites would, like the other sites, be constructed using cut-and-cover techniques.

0276.03

Disposal of wastes at a regional low-level radioactive waste (LLRW) disposal site will be considered if the State is willing to accept the waste. The decision to use a regional disposal facility would be based on whether the capacity of the regional site is adequate, in accordance with the Low Level Radioactive Waste Policy Amendments Act of 1985. The DOE would also consider whether using a regional disposal facility would represent a cost savings to the DOE. The DOE will select a low level waste disposal site once the site selection process has been completed and specific options have been thoroughly evaluated. Impacts from selection of a disposal site would be evaluated in the Supplemental EIS. Currently, however, it is assumed that LLRW would be shipped to Richland, Washington, based on current practice in other DOE-operated national laboratories (EIS Volume IV, Appendix 12).

0276.04

For the proposed Michigan site, groundwaters would provide the source of water for SSC on-site use and for the resulting population growth in the site vicinity. Measurable regional impacts on the existing localized overdraft of the aquifers are estimated, and no mitigative measures appear to be available. Since the water use by the SSC and the resulting population growth will be small, however, in comparison to the total water use in the region, the incremental regional effects of the SSC are considered small. See also EIS Volume IV, Appendix 7, Sections 7.2.3.4.A.1, 7.2.3.4.A.5, 7.2.3.4.A.6, and 7.2.3.4.B.1.

Additional data on recent water supply and water use conditions have been compiled for the siting region and for individual communities. These data, as available, are now incorporated in the water supply discussions and evaluations in EIS (see Volume I, Chapter 4, Section 4.2 and Volume IV, Appendix 7, Sections 7.1.3.4 and 7.2.3.4).

0276.05

The number of radioactive material licenses issued under the jurisdiction of the U.S. Nuclear Regulatory Commission (NRC) for the entire State of Michigan was reported to be approximately 700 in the 1987 NRC Annual Report. The primary uses of radioactive sources are medical facilities, industrial facilities, and academic/research facilities. In the vicinity of the proposed SSC site, there are 43 facilities that currently possess NRC licenses to use radioactive material. Most of the facilities are located in the Jackson and Lansing areas. The SSC site itself is in a rural area that does not contain any of these licensed operations (see EIS Volume I, Chapter 4, Table 4-14; Volume IV, Appendix 5, Section 5.4.6.2 and Appendix 12).

0276.06

The EIS does address, to the degree possible, regulations applicable (Volume I, Chapter 6) and mitigative measures (Volume I, Chapter 3, Section 3.6). There are more detailed mitigation discussions in Volume IV, Appendix 1, Section 1.2 and in Appendices 6 through 16.

It is not possible, prior to final site configuration and more detailed design of the SSC, to determine the need for or to specify exact mitigations to be implemented. Site-specific mitigation evaluations will be made during the preparation of the Supplemental EIS for the selected site.

0276.07

There is no plan and no procedure for selecting a site alternative if construction does not proceed at the selected site. See Comment Responses 331.01 and 348.03.

0276.08

Comment noted. The use of "receptor" or "affected landowner" was not meant to minimize the importance of these impacts nor their meaning as humans. In the final EIS, the DOE has attempted to define in more detail residences, churches, schools, etc., which might be impacted.

0277.01

Volume I, Chapter 4, Section 4.1.5 has been revised to more accurately reflect the low potential for encountering "gassy ground" at all of the sites. See also Comment Responses 277.02 and 277.03.

0277.02

The need to consider drift gas, or potential "gassy ground" conditions, is based on the history of this phenomenon in the region. The potential for problem encounters during construction at the Stockbridge site would be negligible. As noted in Volume IV, Appendix 5, Section 5.4.1.5, occurrences of gas at shallow depths in the region are of three types:

(1) gas trapped within the Antrim, Coldwater, and Berea-Bedford bedrock formations

(2) gas that has escaped from these formations into the overlying drift where it has been trapped beneath clay-rich glaciolacustrine sediments

(3) gas that has been lost to the surrounding bedrock or drift from a blowout oil or gas well that penetrated a deep high-pressure reservoir.

The geologic conditions that contribute to (1) and (2) are absent from the Stockbridge site. An encounter with a type (3) occurrence appears to have happened only once in the region,i.e., the Cal-Lee/Marshall blowout in 1968. Although there are several oil fields tapping deep reservoirs beneath the site, the current State-required practice of using multiple blowout protectors when drilling through high-pressure gas reservoirs has been effective throughout the state in preventing further encounters of this type. Accordingly, there does not appear to be a need for specific construction procedures to mitigate potential hazards of encountering gassy conditions during underground excavation at the site.

0277.03

Three related questions that are relevant to underground projects in the vicinity of oil and gas fields are as follows:

(1) Are all of the exploration and production borings known?
(2) Are the locations of the borings accurately known?
(3) Are the abandoned and plugged wells adequately sealed?

Michigan's statutory requirements for recording oil and gas wells provide considerable assurance that there will be data regarding the first two questions. However, different available accountings of oil and gas wells in the vicinity of the site (Michigan Oil and Gas Commission, Petroleum Information Corporation "scout tickets," Department of Natural Resources publications, and Stockbridge SSC site proposal Figure 3.2-14) differ from one another with respect to the exact location and status (i.e., whether active or abandoned) of individual hydrocarbon borings. Although State-regulated procedures for plugging abandoned wells will assure that records are available with respect to the third question, sound engineering practice when an underground excavation may intersect an abandoned hydrocarbon well is to research not only State records, but also the records of the driller, the owner-operator, and the cementing service contractor to further ascertain that potential pathways from gas reservoirs have been adequately sealed. The site proposal proposed the following prudent course of action for abandoned oil and gas wells along the tunnel alignment, "These wells will be located, their condition evaluated, and additional exploratory holes drilled nearby to investigate for possible gas leakage at tunnel level, and to determine what, if any, remedial measures are needed. If necessary, these wells can be resealed" (State of Michigan 1987).

0277.04

See Comment Response 277.03.

0278.01

Comment noted.

0278.02

The statements in Volume I of the DEIS that a specific number of water wells would need to be abandoned at several of the alternative sites were an error, and the document has been revised. The number of wells listed are the total number of wells reported (based on available records provided by the states) to exist within the total area defined by the 1,000-ft restricted zone along the tunnel alignment, the campus, injector, expansion, and far cluster areas, and the buffer and buried beam zone areas. It is anticipated that only a small portion of the water wells noted at each of the sites will have to be abandoned due to proximity to the tunnel or location within facility or construction areas. Because the location of SSC facilities at each site may be changed slightly and because well location data are preliminary, an exact count of wells that may have to be abandoned due to the project cannot be made at this time. This information will be gathered when a site is selected and SSC design and facility locations are developed.

See Comment Response 312.04, first paragraph, with respect to potential water use impacts during SSC construction and operations.

0278.03

Although private land would be removed from the property tax base in Ingham and Jackson Counties, the public finance analysis presented in Volume IV, Appendix 14, Section 14.1.3.4.D indicates that there would also be a long-term increase in both direct and indirect tax revenue. These increases would derive directly from project spending and from additional spending by SSC construction and operations workers.

0278.04

The methods to finance the construction and operations of local public facilities have not been determined at this time. According to the Invitation For Site Proposals, these methods are the responsibility of the State, not the DOE, and are therefore not addressed in the EIS.

Public finance issues as they are currently known are discussed in detail in EIS Volume IV, Appendix 14, subsequent to a detailed examination of public services and facilities. In the assessment of impacts on public finances, it was determined that the two primary impact counties (where 988 of the 1,374 additional SSC-related pupils are anticipated to attend school during the peak year of construction) would indeed incur considerable capital infrastructure expenses in constructing new schools and other community facilities, and in purchasing related equipment. Property tax revenue is a main source of income for school districts, and the public finance modeling conducted considered expected local government revenue impacts from this source as well as other sources. The analysis indicates that local governments in Jackson and Ingham Counties would experience a cumulative net fiscal benefit throughout construction and operations of the SSC, except for a net fiscal deficit in Ingham County during the first two years of construction.

0278.05

The SSC-related impact on population and housing demand in the Michigan Region of Influence would be comparatively slight due to the large population and housing inventory already in place (see EIS Volume IV, Appendix 14, Section 14.1.3.4.B).

The environmental impact on people who do not work on the SSC is explained in Volume IV, Appendix 14, Section 14.1.3.4.E.

The cumulative net fiscal impact to all local government jurisdictions in the Michigan Region of Influence would be negative during the first two to three years of project activity but would be positive thereafter. The value of real property to be transferred from private to Federal ownership is not available from the State of Michigan (see Volume IV, Appendix 14, Section 14.1.3.4.D).

0278.06

Traffic analysis for the major roads is presented in EIS Volume IV, Appendix 14, Section 14.2.1.3. This includes Highways 52 and 106 in Stockbridge. The population of Ingham County is expected to increase by 0.9 percent to 1.1 percent as a result of the SSC. The indirect traffic may be expected to increase proportionally. The highway improvements proposed by the State of Michigan were designed to bypass the village of Stockbridge. Therefore, most of the traffic impacts in the village will be due to indirect traffic.

No estimate has been made of the number of visitors each year at the SSC. During most of its history, the Fermilab machine has been the world's most powerful accelerator. It is reasonable to assume that when the SSC takes over that role, the annual number of visitors would be similar to that which Fermilab has experienced, which is on the order of 50,000 per year. The actual number of visitors would depend upon how the SSC is promoted as a tourist attraction.

0278.07

Comment noted. See Comment Response 278.05.

0278.08

It is not possible to predict levels of funding throughout the assumed life of the project. Other similar research facilities such as Fermilab and SLAC continue to have active and outstanding research programs after more than 20 years of operations.

0278.09

See Comment Response 710.01.

0278.10

Comment noted.

0278.11

See Comment Response 13.02.

0278.12

The effects of various types of government projects on towns have been studied extensively over the last 15 years. Much of the research deals with the disruption that is associated with rapid population growth and shifts from rural ways of life to more urban ways of life. Specific research cited in Volume IV, Appendix 14 of the EIS that addresses these concerns includes England and Albrecht (1984), Finsterbusch (1982), Flynn et al. (1983), Freudenburg (1984), Stacey and Duchi (1978), and Wilkinson et al. (1982). This research was included in the socioeconomic analysis of the project.

0278.13

Comment noted.

0279.01

Comment noted.

0279.02

Comment noted.

0279.03

Public meeting policies of State agencies, such as Michigan's SSC Commission, are not addressed in the EIS. The reader is referred to John Hanieski, Executive Director of the SSC Commission for the Michigan site (517-334-6407) for information regarding State activities.

0279.04

Comment noted.

0279.05

The DOE cannot comment on State activities at the referenced State meeting. At the DOE-sponsored scoping meeting in Michigan in February 1988, the State was given an opportunity to make a presentation regarding the submitted proposal. Following the DOE and State presentations, all commenters who preregistered by mail were scheduled to speak before those who registered at the meeting. This was true regardless of the commenter's affiliation or position regarding the project. Because of the large number of preregistered commenters, the only time slots available to those who registered at the meeting were late in the evening. As stated in announcements for the scoping meeting, the DOE also accepted written comments, and written comments were considered to the same extent as those presented orally.

0279.06

The following four SSC project facilities would be located in Vevay Township: intermediate access areas E6 and E7, service area F6, and interaction point and experimental area K6 (see Volume IV, Appendix 5, Section 5.4.10, Table 5.4.10-1). Three of the four facilities, i.e., E6, E7, and K6 would be located in areas that have been zoned as A-1 - Agricultural, whose definition does not include these proposed land uses. The fourth facility, i.e., F6 would be located in an area that has been zoned as M-1 - Limited Industrial, whose definition does include the proposed land use. It has been anticipated by the DOE that the SSC project may trigger zoning changes (see Volume IV, Appendix 13, Section 13.1.1); however, any regulatory adjustments to be made are appropriately considered to be the responsibility of the affected planning agency, i.e., Vevay Township. A definition of the Vevay Township A-1 Agricultural zoning designation is added as Errata to EIS Volume IV, Appendix 13, Section 13.1.1.

0279.07

See Comment Response 13.02.

0279.08

Section 1501.06 (40 CFR 1501.6) of the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) indicates that the lead agency may request any other Federal agency with jurisdiction by law or with special expertise to be a cooperating agency. Although non-Federal agencies are occasionally requested to be cooperating agencies under special circumstances (normally when they have NEPA-like environmental analysis responsibilities - see 40 CFR 1506.2) in the case of the SSC (analyzing sites in seven states), this would have been unworkable. However, the DOE, through an extensive scoping process, endeavored to comply with the requirements of the CEQ regulations pertaining to the participation of local agencies in the NEPA process (see 40 CFR 1501.7).

0279.09

The DOE's solicitation required that the proposer provide the land for the SSC project (see Volume III, Chapter 2).

0279.10

Comment noted. This report referred to is not a DOE document, and the DOE has no control over or responsibility for its content. The DOE used information available from Federal, State and university sources, and the published literature in the preparation of this EIS. Data used were certified using authoritative sources or by correspondence with responsible utilities, agencies, etc.

0279.11

The DOE has required all proposers to certify that they will comply with Federal acquisition and relocation laws (Public Law 91-646 and 10 CFR 1039, 51 FR 7000) as a minimum standard (see Volume IV, Appendix 4, Section 4.3.1).

A stratified fee estate, in this instance, refers to Government ownership of a specific volume of land below the earth surface. For the purposes of the SSC, stratified fee estate ownership in fee simple is required for underground volumes of land 70 ft high by 1,000 ft wide, and at least 15 ft below the surface in areas D and I of the ring (see Comment Response 266.03).

The DOE does not anticipate that easements and rights-of-way owned by the surface property owner will be acquired for the Government. However, mineral rights are more problematic. These may remain as an outstanding third party right of the surface landowner (see Volume IV, Appendix 4, Section 4.2.1.2).

0279.12

The State of Michigan is responsible for land acquisition and relocations should the Stockbridge site be selected. The State has proposed an acquisition and relocation schedule which meets or exceeds the DOE site requirements (EIS Volume IV, Appendix 4, Section 4.4.4.4). Specific concerns should be directed to the Michigan SSC Commission (see Volume IV, Appendix 4, Section 4.3.2.4).

0279.13

Comment noted.

0280.01

See Comment Response 816.01.

0281.01

See Comment Response 816.01.

0282.01

See Comment Response 1517.81.

0282.02

See Comment Response 1517.79.

0282.03

The EIS has been revised to include the most current information on wetland location and type (EIS Volume I, Chapter 5, Section 5.1.4.5 and Volume IV, Appendix 11, Section 11.3.4.3). Potential impacts to wetlands have been reassessed, focusing upon wetland encroachment at sites where surface facilities could be located (Volume I, Chapter 3, Section 3.6.3). Based on this reevaluation, the maximum amount of wetlands that could be impacted is 190 acres as the SSC exists in conceptual design and 319 acres if future expansion options are exercised. This value is a conservative estimate (worse case) assuming no mitigation. With mitigation, discussed in the above mentioned sections, wetlands impacts would be much less. If Michigan is selected as the SSC site, a more precise estimate of wetlands impact would be provided based on final siting designs and additional mitigation. These would be discussed in more detail in the Supplemental EIS.

0282.04

The wetlands assessment has been revised to evaluate those wetlands that would be impacted directly by construction and operations (see EIS Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.4.3).

0282.05

See Comment Responses 10.03 and 1517.81.

0283.01

Comment noted.

0283.02

Comments noted.

0284.01

Any use of the land for purposes other than constructing and operating the SSC would require full compliance with the NEPA process, including preparation of additional NEPA documents to assess impacts. Disposal or use of the land after the useful life of the SSC by the Government would be analyzed as part of the decommissioning process.

Additional NEPA review would be required for a proposal to decommission the SSC.

0284.02

The quality of near-surface groundwaters could be affected by the construction of the SSC, but these impacts will be held to negligible levels through minimization of disturbed areas, in-place spill and leak response procedures, and control and minimal use of construction materials with potential for water contamination. Similarly, groundwater quality impacts by permitted liquid effluents (i.e., sewage treatment plants) during SSC operations will be negligible since extensive treatment of the effluents is planned to remove objectionable contaminants (see also EIS Volume IV, Appendix 7, Sections 7.2.3.4.A.4 and 7.2.3.4.B.2).

Radiological effects on surface and groundwaters are also projected to be negligible and well within existing Federal standards. See EIS Volume IV, Appendix 12, Sections 12.3.1 and 12.4.1.

0284.03

Comment noted.

0284.04

See EIS Volume I, Chapter 3, Section 3.1.2 and Volume III for discussions of the SSC site selection process. The DOE has identified the seven sites covered in this EIS as site alternatives for the SSC. As stated in the EIS, each of these meets the qualifications of the ISP.

The DOE, under NEPA, could have designated a single or multiple preferred sites. The department chose to select a single preferred site.

The DOE recognizes that a further, more detailed site-specific review will be required under NEPA prior to a final decision on the construction and operations of the proposed SSC, and will be provided in a supplement to the EIS. If detailed site-specific analyses were undertaken at more than one site, this could be a costly undertaking.

0284.05

Although the Government requires clear title to all land on which permanent improvements are planned or anticipated, it is not necessary that land inside the collider ring be owned or controlled by the Federal Government. General access across the ring may be allowed. See EIS Volume III, Chapter 1, Section 1.1.

The socioeconomic effects of locating the SSC at the Michigan site (including impacts on State and local tax revenues) are discussed in EIS Volume IV, Appendix 14, Section 14.1.3.4.D.

Also, see Comment Response 871.02.

0285.01

Comment noted.

0286.01

Comment noted.

0287.01

EIS Volume I, Chapter 6, Section 6.1 states that it is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with applicable environmental statutes, regulations, and standards. This includes compliance with the Farmland Protection Policy Act (see Volume I, Chapter 6, Section 6.2.19). See Comment Response 384.02 for a discussion of the DOE's recognition of the need for an value of establishing intergovernmental relationships.

0287.02

The EIS has been modified to reflect the commenter's concern in the following areas: Soil erosion control measures discussed in EIS Volume I, Chapter 3, Section 3.6; Volume 1, Chapter 5, Section 5.1.2.1, Runoff and Erosion Impacts; and Volume IV, Appendix 7, Section 7.1.2.2.D.2, Impact Mitigation.

0287.03

Volume I, Chapter 5, Section 5.1.2.1 discusses soil erosion control measures, including use of locally adapted plants, to prevent erosion following project installation.

0288.01

Comment noted.

0288.02

Population impacts are not explicitly discussed in the EIS at the level of individual townships. Some indication of the anticipated SSC-related population growth in Campton Township is provided by the township's location, which is on the fringe of the area expected to experience the greatest population impacts (i.e., the Fox River Corridor). It is likely that Campton Township could experience some SSC-related population growth, particularly in the northern part of Elburn. Between 1 and 2 percent of the Fermilab workforce currently resides in Elburn.

0288.03

See Comment Responses 13.02, 710.01, and 880.04.

0288.04

See Comment Responses 979.02 and 1279.115. It is anticipated that a limited number of existing private wells will have to be abandoned because of the project. As noted in Comment Response 979.02, the State of Illinois estimates that between 6 to 31 wells will be required to be closed due to proximity to SSC project facilities. An exact accounting and identification of individual wells cannot be completed until siting and design are final.

0288.05

The peak of construction at service and intermediate access points such as E8 will produce noise that has a day-night average sound level of 70 dBA at 630 ft from the center of construction activity, and will reach 60 dBA at 2,000 ft from the center of construction activity, as discussed in Volume I, Chapter 5, Section 5.1.4 and also in Volume IV, Appendix 9. This peak in construction coincides with the surface activities that support the tunnel boring machine. As noted in Volume I, Chapter 5, 70 dBA can be likened to average automobile traffic 100 ft away from the road. It is expected that a day-night average sound level of 70 dBA will highly annoy less than 25 percent of those persons exposed to that sound level, and a day-night average sound level of 60 dBA will highly annoy less than 10 percent of those persons exposed, as discussed in Chapter 5. This peak activity is expected to last 10 months or less. Spoils loading and hauling was assumed limited to 12 hours per day to preclude nighttime noise impacts on persons living along spoils haul routes.

0288.06

The EIS has identified possible mitigations to reduce impact on public safety. Routing truck traffic away from areas of highest risk of accident is one of the mitigations to be considered during the construction planning (see Volume I, Chapter 3, Section 3.6.3). Wherever possible, the trucks will use major roads rather than residential streets to reduce the risk of accidents. Distributing traffic on several roads, restricting the truck traffic during certain hours, and better traffic control are other possible options. Mitigations will be addressed in a Supplemental EIS for the selected site.

0288.07

Mitigation is proposed in EIS Volume I, Chapter 3, Section 3.6 and in the paragraph following the statement in the EIS quoted in this comment (Volume I, Chapter 5, Section 5.1.10.3.C.). Also see Comment Response 1123.05.

0288.08

The projected population increases associated with construction and operations of the SSC would result in increased school enrollments, as presented in EIS Volume IV, Appendix 14, Section 14.1.3.3.C. The EIS indicates that between 700 and 800 additional students would be associated with the SSC for Kane County as a whole. It should also be noted that although population impacts have not been prepared at the township level, Campton Township is located on the fringe of the area anticipated to experience the greatest growths -- the Fox River Corridor. See Volume IV, Appendix 14, 14.1.3.3.D for a discussion of the impacts on state and local public finance.

0288.09

See Comment Response 880.04.

0288.10

Comment noted.

0288.11

Comment noted.

0288.12

Comment noted.

0288.13

Comment noted.

0288.14

The DOE is confident that the radiation exposures expected from the SSC have been adequately characterized and is convinced that there will be no unacceptable health hazards from the program. There is also evidence that water supplies will not be contaminated and endangered.

The environmental safety and health implications of SCC-associated radiation are summarized in Volume I, Chapter 5, Sections 5.1.6.2, 5.1.6.3, and 5.2.5 and are discussed in more detail in Volume IV, Appendix 10, Section 10.1 and Volume IV, Appendix 12, Sections 12.2.1.1, 12.2.3.1, 12.3.1, and 12.4.1.

The concern about off-site contamination of water supplies has been addressed Volume I, Chapter 5; Volume IV, Appendix 10; and Volume IV, Appendix 12). The analyses have been very conservative and have considered conditions that are highly unlikely to occur. A comprehensive description of the analyses for the movement of radionuclides is provided in Volume IV, Appendix 12.

0288.15

Mitigation measures are described in EIS Volume I, Chapter 3, Section 3.6 and in Volume IV, Appendix 16, Section 16.3.3.3. One measure is to create berms around the subject facilities and landscape the berms with appropriate plants to screen the facility from view. A number of variables affect the success of such a measure, as noted in that section: the location of the facility relative to the planted berm and its distance from the viewer, the size of materials when planted, the rate of growth of the selected plants, the spacing of the materials, and whether the plants are deciduous or evergreen. Concerning "camouflaging," the careful choice of color, texture and materials can aid in reducing the noticeability of structures under some circumstances. But architectural styling cannot, by itself, conceal a facility from view.

0288.16

See Comment Response 1229.02.

0288.17

As noted in EIS Volume IV, Appendix 8, Section 8.3.4 the highest concentrations of total suspended particulates (principally soil dust) would occur in the vicinity of the service areas and the intermediate access areas (sites E and F) during the peak construction periods in each of these areas. The construction activities at these sites would produce particulate emissions as a consequence of handling, loading, and storing dirt. Another potentially large source of emissions would be the transport of spoils in haul trucks from the construction areas to the quarries where spoils would be dumped for disposal. There are many effective methods for controlling particulate emissions caused by haul trucks (EIS Volume I, Chapter 3, Section 3.6). The load can be covered, and the entrainment of road dust by truck tires can be reduced by keeping the roads in good repair and by watering them. If needed, truck speeds can lowered to reduce both the dust blowing out of the truck bed and the dust entrained into the air by the truck tires.

National ambient air quality standards (NAAQS) and all applicable State ambient air quality standards (AAQS) will be complied with both during construction and during operations of the SSC. As stated in Volume I, Chapter 6, "It is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with the letter and spirit of applicable environmental statues, regulations, and standards."

Fugitive dust emissions during any construction is a concern. The EIS has been modified in Appendix 8 and in the summary, Volume I to include for all states more efficient mitigations on TSP and PM_{10} emissions during construction, specifically the use of chemical soil stabilization instead of twice daily watering for control of general site activity emissions. This significantly reduces the generation of fugitive dust emissions and hence the resulting ambient air impacts for these pollutants.

The portion of the comment regarding tearing up the roads and blocking traffic is addressed in EIS Volume IV, Appendix 14, Section 14.2.1.3.C. Mitigation of accelerated wear and traffic congestion on the road system is offered by the State in its proposal in the form of improvements to the road system to be used by construction and operations traffic.

Construction activities at any specific E or F area are expected to last less than two years. Peak construction, which coincides with the surface activities that support the tunnel boring machine, are expected to last 10 months. Impacts from spoils haul trucks will last for the period of time that any particular route is in use. Since Illinois has proposed the use of several disposal sites, continuous use through the entire construction period of any particular route is not expected.

Additional air quality analysis will be performed after site selection and included in the Supplemental EIS. The availability of more definite design and construction planning information at that time will allow that analysis to be more detailed and contain more specific mitigation commitments.

Ultimate compliance with the AAQS will be addressed by the host State when its air pollution regulatory agency reviews any required permit applications.

0288.18

Comment noted.

0289.01

Comment noted.

0290.01

Comment noted.

0291.01

Comment noted.

0292.01

Comment noted.

0293.01

Comment noted.

0294.01

Comment noted.

0295.01

Comment noted.

0296.01

Comment noted.

0297.01

Comment noted.

0298.01

Comment noted.

0299.01

Comment noted.

0300.01

Comment noted.

0301.01

Comment noted.

0302.01

Comment noted.

0303.01

Comment noted.

0304.01

Comment noted.

0305.01

Comment noted.

0306.01

Qualification noted.

0306.02

The comments on the geology and tunneling conditions at the BQL sites have been noted. Geology and tunneling conditions at the sites are described in Volume IV, Appendix 5, Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1, 5.6.1, and 5.7.1; characteristics at all of the sites are within the range of ground conditions that can be handled by existing techniques for underground construction.

0307.01

Comments noted. The DOE has reviewed the photographic data supplied regarding floodplains at the Illinois site.

Floodplain impacts associated with the SSC are discussed in EIS Volume I, Chapter 5, Section 5.1.2.2. Potential encroachments by SSC facility areas K4 and F5 on the Welch Creek floodplains are specifically addressed at Section 5.1.2.2.

Surface structures erected as a part of SSC construction would occupy only a small portion of the area described. Should the Illinois site be selected for the SSC, exact positioning of the surface structures would be determined during the preparation of the Supplemental EIS. Specific structure location would be planned to avoid impacts to the floodplain and associated wetlands. Also, the wetlands encroachment area could be mitigated.

0307.02

See Comment Response 1146.04.

0307.03

FEIS Volume I, Chapter 5, Section 5.4.2 indicates that 197 acres of prime and statewide important farmlands would be withdrawn as a result of permanent SSC development (buildings and roads). It is an estimate based on the ratio of prime and statewide important farmland acreage to total acreage in the fee simple area times the total acreage occupied by buildings and roads.

0307.04

See Comment Responses 13.02, 710.01, and 880.04.

0307.05

See Comment Response 7.03.

0307.06

The impacts on people and communities are among the many issues examined in the EIS. (See Volume I, Chapter 5.) A more detailed analysis for the Illinois site is provided in Volume IV, Appendix 14, Section 14.1.3.3.

0308.01

Comments noted.

0309.01

Comment noted.

0310.01

These observations are consistent with those in EIS Volume IV, Appendix 6.

0310.02

Specific techniques for groundwater recharge by injection are not discussed in the EIS. As noted in the comment, techniques are available for recharge to minimize effects of dewatering. Once a site is selected and a site-specific layout for the SSC is developed, the preferred construction techniques for water control would be established. If dewatering is to be adopted, the use of injection to mitigate the effects on wells would be discussed in a Supplemental EIS.

0310.03

Comment noted. Geology and tunneling conditions at the Michigan site (as discussed in Volume IV, Appendix 5, Section 5.4.1.4) are amenable to excavation using a tunnel boring machine. Specific techniques for ground support are being evaluated within the geotechnical design portion of the SSC planning project. These will be evaluated and chosen during the final design for the selected site

0311.01

Comments noted.

0312.01

Comment noted.

0312.02

While energy levels and luminosities differ from one unit to the next, it is important to note that the cumulative amount of radiation for the SSC would be less than that experienced at Fermilab or CERN because of the longer average cycle time of the SSC, which results in a much lower number of protons being accelerated per day (see EIS Volume IV, Appendix 10). The SSC accelerates two beams of 1.3×10^{14} protons each to 20 TeV once per day. The Fermilab accelerates a single beam of 2×10^{13} protons to between 0.4 to 0.95 TeV every 20 seconds which is 8×10^{19} protons per year or 300,000 times more protons per year. The amount of activation is directly dependent upon the number of protons.

Activation levels and dose rates for the SSC will be qualitatively and quantitatively similar to those at existing large accelerator facilities. Previous studies based on operating data from existing accelerators have been made to determine the environmental radiation shielding for the SSC, and good descriptions of the sources of radiation are available.

0312.03

The maps presented in Volume I, Chapter 5, Section 5.1.4 are intended only to indicate, in general terms, the distribution of residences and other noise-sensitive human-based land uses at the site alternatives. The information was compiled from the most recent U.S.G.S. 7 1/2 minute quad sheets and from observations made by the DOE and its contractors during the site visits. New analysis presented in at the summary level in EIS Volume I, Chapter 5, Section 5.1.4 and at the detail level in Volume IV, Appendix 9, utilized recent (1988) aerial photographs to quantify the number of residents affected by construction and operations noise from E and F areas at the Michigan site. The impact of noise levels on land values has not been quantified as a function of the increase in or the resultant sound level. The impact of the SSC on adjoining land values will be a function of the prevailing attitudes at the selected site alternative, and cannot be determined at this time. The DOE will consider measures which will have the potential to reduce noise impacts of the project. It can be assumed that, if effective control measures are utilized, that impacts to adjoining land values due to noise would be minimal to insignificant.

0312.04

Existing hydrologic conditions and water use at the Michigan site are described in EIS Volume IV, Appendix 5, Sections 5.4.2.1 and 5.4.2.2. All direct and the great majority of indirect SSC water uses at the Michigan site will be supplied by groundwater. The potential impact of groundwater use is assessed in EIS Volume IV, Appendix 7, Section 7.2.3.4. The projected groundwater use will affect local overdraft conditions in the vicinity of the cities of Lansing and Jackson, and a localized overdraft condition may result in the vicinity of the Stockbridge well field.

Hydrologic and water use data were limited, and the water use data employed for assessment were approximately four years old, and it is not known to what extent overdraft conditions have increased over that time period. Because water use conditions do not appear to be changing rapidly in the site vicinity, this is not viewed as a significant limitation for the purposes of this EIS. Additional data, as available, have been compiled for the Michigan site and all other alternative sites. These data are included in the appropriate sections of the Final EIS, primarily in Volume IV, Appendix 7, Sections 7.1.3 and 7.2.3 and Volume I, Chapter 4, Table 4-4.

0312.05

A stratified fee estate is ownership in fee simple of a specific volume of space located below, at, or above the surface. No ownership interests are conveyed outside of the specific volume. For the purposes of SSC, a stratified fee estate is ownership in fee simple of a specific volume of space located at least 15 ft below the surface (see Comment Response 266.03).

0312.06

The visual impacts of facilities E5, K3, K4, K5, K6, and E6 were not addressed for several reasons. First, these facilities are in an area to be acquired fee simple estate and the public living there would relocate when their homes and land are acquired. Therefore, the sensitivity of views from the affected residential areas currently is considered to be low. In the absence of recreational trails, scenic highways or roads or other sensitive travel routes through the affected areas, impacts on views from such locations were not considered. See EIS Volume IV, Appendix 16, Section 16.2.1.3. for a definition of scenic and visual impacts. Second, there are no moderately to highly sensitive travel routes within the fee simple lands or outside them that pass close enough to the facilities for there to be visual impact. Finally, due to a combination of terrain and vegetation, views of these facilities from sensitive public use areas (such as residences) outside the fee simple area would not include the facilities. For a further discussion of these conditions see EIS Volume IV, Appendix 16, Section 16.3.

General mitigations for scenic and visual impacts are addressed in EIS Volume I, Chapter 3, Section 3.6.3.

Facility F4 would be seen in the foreground from Snyder Road, but the context is farmlands and there is low sensitivity. The analyses did not address impacts on views from low-sensitivity public use areas and travel routes (EIS Volume IV, Appendix 16, Section 16.3).

Facilities E7 and f7 are 1/4 mi south and 1/8 mi north of Columbia Road, respectively, and would be visible. Land use at both facility sites is agricultural, with a low level of sensitivity. Therefore, the analyses did not address the impact on these views. See Volume IV, Appendix 16, Section 16.2 for a discussion of the technical approach and methodology used in the EIS.

The literature on the effect to land values from large development projects suggests that the net effect on land values is quite uncertain. Local economic and population growth resulting from SSC-related development may exert a positive influence on local land values or could tend to adversely affect land values in the area of the SSC depending on the local housing market situation and the residents' perceptions and attitudes. Whether land value effects will prove to be permanent or transitory may depend in large measure on the stability of these conditions, perceptions and attitudes over time. Careful planning can minimize many negative conditions associated with growth that may also contribute to the perceptions of land value.

A review of the zoning ordinances for the 13 townships affected by the SSC project indicates that there are no policies or regulations which apply to scenic and visual resource protection (see EIS Volume IV, Appendix 13, Section 13.1.3.4).

0312.07

Volume IV, Appendix 14, Section 14.2.1.3.D.2 describes not only the proposed rail system modifications planned in support of the SSC project, but also potential direct and indirect impacts caused as a result of its construction and operations.

0312.08

In terms of health risks to residents, the SSC will be sited, designed, constructed, and operated in strict conformance with applicable Federal, State, and local environmental safety and health protection criteria, regulations, and standards to assure adequate protection of both the SSC workforce and the general public. These same stringent requirements will be applied to the beam absorption areas for SSC operations.

There are three areas associated with the beam absorbers: the buffer area and buried beam zone (designated by the letter I in EIS Volume IV, Appendix 4, Figure 4-1), the buried beam zone access areas (designated by the letter J in Figure 4-1), and the beam absorbers (designated by the letter L in Figure 4-1). Above-ground facilities (letter J) consist of zone access locations requiring approximately 40 acres for each of the six access areas. The underground buffer area and buried beam zones (letter I) are configured to accommodate two primary requirements. Space is provided for possible future upgrades to the SSC for new research opportunities (Invitation for Site Proposals for the SSC, page 50). In addition, this underground area provides shielding for beams of non-interacting muons. These shielding requirements are discussed in Volume IV, Appendix 10, Section 10.1.2.3.A.1.b and are covered in more technical detail in the SSC Environmental Radiation Shielding Task Force Report (SSC-SR-1026), and in Sections 5.10 and 6.6 of the SSC Conceptual Design Report (SSC-SR-2020). As noted in the Superconducting Super Collider Conceptual Design Report, March 1986 (SSC-SR-2020), and in the Superconducting Super Collider Environmental Radiation Shielding Task Force Report, July 1987 (SSC-SR-1026), the buffer area and buried beam zones are designed to allow continued, safe surface occupation within the stratified fee zones. A total depth of greater than 50 ft above the tunnel is required for stratified fee areas (Volume IV, Appendix 10, Section 10.1.2.3.A).

The main accelerator has a regular cycle of operation: injection, acceleration to 20 Tev, and storage of colliding beams. At the end of a cycle, when collisions over many hours have degraded the beam quality, the cycle is ended by ejecting the beam into a beam absorber. The beam absorber consists of heavy shielding and stopping material sufficient to contain the heat and induced radioactivity of the full 20-TeV beam. The conceptually designed beam absorber consists of graphite surrounded by aluminum, steel, and concrete (Volume IV, Appendix 10, Section 10.1.2.3.A.1.a and Figure 10.1.2-3).

Most of the particles initially produced during collision or beam interaction are massive and strongly interacting; they are called hadrons. Hadrons typically travel a few inches in matter before interacting and are completely stopped in a few yards to tens of yards, depending on the energy and the characteristics of the absorbing material. The hadrons are accompanied by high-energy photons and electrons, which are absorbed over typically shorter distances of at most a few yards in solid matter. The primary shield (30 ft of earth at density of 1.8 g/cm^3) around the tunnel effectively reduces the dose equivalent from hadrons and accompanying photons and electrons to a small fraction of natural background. At a distance of 46 ft in heavy soil (density of 2.24 g/cm^3), the hadron dose equivalent is less than 0.001 mrem/yr (Volume IV, Appendix 10, Figure 10.1.2-4, Hadron Dose: Beam Absorber). The depth of the beam absorber and the annual dose equivalent from hadron at the surface above the beam absorber are presented in Volume IV, Appendix 12, Table 10.1.3-3. This dose equivalent is based on the shielding of the soil and does not take into account the presence of the beam absorber.

Besides the strongly interacting hadrons, muons are produced in stopping the proton beam. A muon is a heavy electron, identical in all respects to an electron except in mass and the fact that it is unstable. It decays into an electron and a neutrino. Only a small portion of the radiation created in the SSC are muons (a few tenths of a percent). The muons, in contrast to the hadrons, photons, and electrons, interact very weakly with matter and may travel greater distance before they are stopped. The most energetic muons travel distances greater than a mile in earth. They are very strongly collimated along the direction of the primary proton beams (a narrow and straight beam), so the needed shielding would be confined to long, well-defined regions tangential to the circumference of the main ring, at the elevation of the beam plane and downstream of the primary beam absorbers (Volume IV, Appendix 10, Section 10.1.2.3.A.1.b and Figures 10.1.2.-6, -7, and -8). The dose equivalent at the surface from muons is essentially zero for all sites because they are highly collimated in the forward direction at the elevation of the beam plane. An individual would have to be continuously underground standing next to the tunnel at the tunnel depth in order to receive the dose projected. Therefore, the probability of any individual of the general public receiving the annual dose equivalents derived for the assessment is very remote (Volume IV, Appendix 10, Section 10.1.3.1.A.2).

A check has been made of general topography in the areas where beam absorbers would be at the proposed sites to see if there might be topographical depressions that would bring the surface below tunnel depth. There appears to be no area at any of the proposed sites where it would be possible to reach tunnel depth without digging or excavating to that depth (Volume I, Chapter 5, Section 5.1.6.2.A.1).

Specifically, at the Michigan site the beam ejection point is 130 ft (density of 2.4 g/cm^3) below the surface. Therefore, the total annual dose equivalent from direct radiation (hadrons and muons) at the surface would be immeasurably small (less than 0.001 mrem/yr). The annual hadron dose equivalent at the surface above the beam absorber for a depth of 130 ft is much less than 0.001 mrem/yr (Volume IV, Appendix 10, Table 10.1.3-3, Annual Dose Equivalent from Hadrons: Beam Absorber) since the dose equivalent from hadron at the surface for a depth of 46 ft (density of 2.24 g/cm^3) is less than 0.001 mrem/yr (Volume IV, Appendix 10, Figure 10.1.2-4, Hadron Dose: Beam Absorber). The muons are at approximately the beam depth of 130 ft.

The annual muon dose equivalent at the depth of the beam plane as determined at the boundary of the controlled zone downstream from the beam absorber is 0.9 mrem (Volume IV, Appendix 10, Table 10.1.3-5, Annual Dose Equivalent from Muons: Beam Absorber).

Overall radiation exposure to stratified fee residents is expected to be less than 0.001 mrem/yr, an immeasurable amount. It is insignificant when one considers that the average individual receives about 360 mrem annually from background radiation (Volume IV, Appendix 12, Section 12.2.1.1.A and Table 12.2.1-1).

0312.09

The initial estimated inflow to the tunnel encountered during construction at the Michigan site is estimated in EIS Volume IV, Appendix 7, Section 7.2.3.4 to range from on the order of less than 1 to 20 gal/min/100 ft. (A range of 5 to 20 gal/min/100 ft was stated in Volume IV, Appendix 10, Section 10.2.3.4; this has been corrected to correspond to estimates in Volume IV, Appendix 7; 20 gal/min/100 ft = 1,056 gal/min/mi.) This corresponds to estimates in the Michigan site proposal which ranged from 0.4 to 25 gal/min/100 ft. It is important to note that these values represent uncontrolled groundwater inflow or inflows initially encountered as tunneling progresses. When significant inflows are encountered, potentially any zone or fracture with inflows of more than a few gal/min would immediately be controlled by grouting, lining, or other appropriate control method. The fact that all areas of significant inflow will be immediately controlled would preclude any water-table or water-level effects near the tunnel and would minimize the amount of drainage water that would have to be managed in surface facilities. It is also planned that most of the Michigan tunnel would be lined as construction progresses, presumably after control of large inflows, i.e., fractures or joints. After lining, residual tunnel inflow would be essentially zero or the lining would provide a water-tight seal. The uncontrolled inflow or the amount that would need to be dealt with by sump pumps and managed at the surface over the long term from the limited unlined portion of the tunnel cannot be accurately estimated, but would be a small, manageable volume. It is likely that a grouting and control program would be continued until uncontrolled groundwater inflow ranged from less than one to, perhaps in some areas, a few gal/min/100 ft.

0312.10

Statements in the DEIS to the effect that a specific number of wells would be lost at each site were in error and have been corrected (see EIS Volume IV, Appendix 7, Section 7.2.3.4). The 1,000-ft restricted zone does not correspond to an area within which all wells would need to be abandoned or within which all wells would necessarily be affected by the SSC project or project activities. The purpose of estimating the number of wells within the 1,000-ft restricted zone at each site was to develop a comparison of the general density of existing wells. For the purposes of this EIS, existing well records were utilized as they should provide a general indication of well density. Detailed field surveys to verify and update well records will be performed for the selected site and documented in the Supplemental EIS. The DOE position as stated above replaces statements made in DEIS Volume I, Chapter 5, Sections 5.4 and 5.5. Corrections have been made to the EIS.

The DOE does not anticipate the use of restrictive easements on property where a stratified fee estate exists. This includes access to minerals or wells provided that there is no penetration of the DOE's stratified fee estate without prior DOE written approval. The "rights and privileges" of affected residents under a stratified fee estate are discussed in Volume IV, Appendix 4. Section 4.2.1.2.

0312.11

Comments noted.

0312.12

At the request of the Governor of the State of Michigan, a team of researchers from the Institute for Social Research at the University of Michigan has been conducting studies of the social effects and community response to the proposed SSC project in the Stockbridge area. The program of research activities was designed to obtain various types of data from different populations in relation to the expected degree of impact of the project. A third stage of the research activity involved systematic in-depth ethnographic reinterviews to measure attitude changes due to the announcement and the more real prospects of siting the SSC in Michigan. The social impact assessment methodologies are designed to provide scientifically valid findings about the social impacts and community responses to the SSC. Questions about the program should be directed to the appropriate State agency.

0313.01

See Comment 816.01 for a discussion on infrastructure impacts and mitigations.

0314.01

Regional resources, including educational institutions in the vicinity of a proposed SSC site and features associated with such institutions (such as availability of professional staff, graduate student availability, and related academic resources), were considered during proposal evaluation leading to the development of the BQL (see EIS Volume III, Section 1.1; Volume I, Chapter 5, Section 5.1.8; and Volume IV, Appendix 14, Section 14.1). Regional resources are part of the siting criteria and will be considered in the siting decision.

The support of the Michigan State University and their high energy physics group is acknowledged.

0315.01

The reference in the comment to 10,000 construction jobs should be clarified; the EIS estimates indicate that approximately 9,600 direct and secondary jobs would be created during the peak year of the construction phase in the Michigan Region of Influence (ROI). See Volume IV, Appendix 14, Section 14.1.3.4.A. Approximately 1,200 of these jobs would be direct construction crafts jobs. There would also be additional direct construction technical (e.g., designers, drafters, and installation technicians), construction management, and construction-related clerical jobs available to workers in the ROI. Almost 5,800 of the 9,600 jobs would be secondary jobs created in the regional economy from project spending for materials and services, and spending of earnings for goods and services by direct workers. The majority of these jobs would be created in the services, trade, and manufacturing sectors of the economy, although some secondary jobs would also be created in the construction industry. Project purchases would peak at $117.2 million in 1991, and consumer demand by direct SSC workers would peak the following year at $125.3 million as they spend part of their $176.1 million in earnings.

Additional information concerning these effects on the ROI economy and analysis of effects on related socioeconomic resources, including population and housing, public services and finance, and quality of life, are available in EIS Volume IV, Appendix 14, Section 14.1.3.4.

0316.01

See Comment Response 317.01.

0317.01

During the peak year of SSC construction, the EIS estimates that almost 1,200 jobs would be available to local workers in the construction crafts (or building trades) industry within the Michigan Region of Influence (ROI). (See Volume I, Chapter 5, Section 5.1.8.) The Michigan ROI had an annual average unemployment rate of 7.6 percent in 1987 (nearly 173,000 unemployed workers). Furthermore, national unemployment data indicate that the rate of unemployment among construction workers is typically almost double the rate among all other workers (U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, February 1988, p. S-10).

It is reasonable to assume that at least 1,200 crafts workers would be available among the 173,000 unemployed workers in the ROI, since the construction sector comprised 2.8 percent of the total jobs in the ROI in 1984 (note that 2.8 percent of 173,000 unemployed is 4,844 workers and double that amount is 9,688 workers). Furthermore, data from the U.S. Department of Labor, Bureau of Labor Statistics (in their April, 1988 publication, Geographic Profile of Employment and Unemployment, 1987) indicate that in 1987 there was a 13.5 percent unemployment rate in the construction industry (approximately 12,000 unemployed construction workers) within the Detroit Primary Metropolitan Statistical Area (PMSA). The Detroit PMSA consists of six counties, three of which -- Livingston, Oakland, and Wayne Counties -- comprised over 79 percent of the PMSA's 1980 population. These same three counties also comprised 73 percent of the 1987 labor force of the 12-county Michigan ROI.

However, in spite of these statistics, it is not anticipated that SSC's direct construction workforce would come exclusively from the ranks of the unemployed, or even exclusively from the Michigan ROI: 23 percent of the total direct and indirect workforce is expected to in-migrate from outside the ROI during the peak year of construction. As noted at the public hearing, some workers from the Michigan ROI worked on the Alaska pipeline project, emphasizing the point that construction workers do tend to migrate in search of work.

The socioeconomic assessment determined that the main factors that trigger in-migration into each ROI are unemployment rates and the overall size of the existing labor force. If each of these numbers are relatively high, as in the Michigan ROI, then in-migration into the ROI will be relatively low. During peak construction in 1992, in-migrants to the region are expected to number 2,230. This is the lowest amount of in-migration expected for any of the seven ROIs under consideration (see EIS Volume I, Chapter 5, Section 5.1.8). Therefore, in the Michigan ROI, most jobs would be obtained by local residents. The socioeconomic effects of in-migration to the ROI are discussed in EIS Volume IV, Appendix 14, Section 14.1.3.4.

0317.02

Comments noted.

0318.01

Comments noted. The impacts on prime farmlands are discussed in detail in Volume I, Chapter 5, Section 5.1.7 and Volume IV, Appendix 13, Section 13.2.

0319.01

Comment noted.

0320.01

These observations are consistent with those in Volume I, Chapter 3, and Volume IV, Appendices 11 and 14.

0320.02

Results of the post-DEIS survey of potential summer habitat for the Indiana bat in the vicinity of the proposed Michigan site have been incorporated into Volume I and Volume IV, Appendix 11, Section 11.3.4.2 of the EIS. While several areas were identified as containing potential habitat for the Indiana bat, this survey is not sufficient to determine the actual presence of the species. If the Michigan site is selected, additional surveys would be conducted and discussed in a Supplemental EIS.

0320.03

It is true that the State of Michigan has indicated that it will develop a water supply (groundwater) for SSC water requirements in the campus/ injector areas. This does not, however, preclude effects from development. Based on groundwater recharge conditions and the projected amount of groundwater use in the immediate vicinity of Stockbridge, a limited and localized groundwater overdraft condition is anticipated. The magnitude of this overdraft is not projected to result in any measurable impact to existing groundwater users in the Stockbridge area. See EIS Volume IV, Appendix 7, Section 7.2.3.4.

0320.04

Comment noted.

0321.01

The comment is consistent with the Volume I, Chapter 6 discussion of regulatory policies and requirements. The State of Michigan is delegated authority over wetlands management.

0322.01

Comment noted.

0323.01

Comment noted.

0323.02

The new technology mentioned in the comment relates to "warm" superconducting magnets. The possible use of "warm" superconducting magnets and smaller diameter rings in the SSC is discussed in Volume I, Chapter 3, Section 3.2.2.

0323.03

Comment noted.

0323.04

The purpose and need for the SSC are discussed in Volume I, Chapter 2. In particular, it is pointed out in Section 2.2.2 that two senior U.S. Physics Advisory Committees have strongly recommended that an instrument such as the SSC be constructed.

0323.05

All Federal agencies, including the DOE, are subject to litigation under appropriate circumstances.

It may be possible to adjust the location of certain features of the SSC. The discussion on the potential for flexibility in the SSC design has been expanded in the FEIS (see Volume I, Chapter 3, Section 3.6.1).

The DOE will do a Supplemental EIS which will assess final design details and identify potential impacts and mitigations.

See Volume IV, Appendix 2 for cost data on constructing and operating the SSC. See Volume I, Chapter 3 for a discussion of alternatives to constructing the SSC. See Volume I, Chapter 3 for a discussion of alternatives to constructing the SSC, including postponing the action.

0324.01

Comment noted.

0325.01

Comment noted.

0325.02

See Comment Response 275.03.

0325.03

Comment noted.

0326.01

Contractor hiring practices cannot be predicted with certainty, and the home locations of the SSC's potential construction contractors currently are not known. Estimates of the in-migrant construction workers for the Michigan site are lower than those for the other six proposed sites, due, in large measure, to recently high unemployment in the region (Volume I, Chapter 5, Section 5.1.8.1).

0326.02

Peak year SSC-related in-migrant workforce in the Michigan region is estimated at 2,228 workers (EIS Appendix 14, Table 14.1.3.4-2) based on the proposed schedule for construction of the SSC. The 6,680 figure cited in Appendix 14 includes the families of those in-migrating workers.

0326.03

Comment noted.

0327.01

The EIS considered economic impacts to the Michigan Region of Influence, and to the primary impact counties of Ingham and Jackson (EIS Volume IV, Appendix 14, Section 14.1.3.4.A). Anticipated impacts to the economy include changes directly related to the SSC, as well as secondary or induced changes in economic activity (such as in support industries). SSC-related impacts on Jackson County during the peak construction year (1992) include nearly 1,200 additional jobs and $50.2 million (1988 dollars) additional earnings; by full operation (2000), roughly 950 additional jobs and $31.5 million additional earnings would be associated with the project. As these economic impacts would not directly involve the automobile industry, the diversification noted in the comment could be expected.

The support of the Jackson Alliance of Business Development is acknowledged.

0328.01

There are 205 acres of prime farmland in Michigan which would be permanently converted if the SSC were sited as proposed. The DOE consulted with the Soil Conservation Service for identification of prime farmlands (see FPPA discussion in Volume I, Chapter 6, Section 6.2.19).

If the proposed Michigan site is selected for the SSC, the DOE and its contractors would work closely with the Michigan Department of Agriculture in resolving problems and minimizing adverse impacts on agriculture. Prior to construction or operations the DOE will publish a supplement to this EIS which will be more detailed as to potential impacts and mitigations. This will provide an opportunity for participation on a site specific basis.

0330.01

Regional resources, including educational institutions and related features of these institutions (such as availability of professional staff, graduate students, and other associated resources), were considered during proposal evaluation and the definition of a BQL (see EIS Volume III, Chapter 1, Section 1.1). Regional resources at all alternate sites is part of the siting criteria. See Volume III, Chapter 3.

0331.01

The DOE has evaluated impacts on all resources of the seven alternative sites sufficient to base the decision for site selection. These evaluations are as detailed as they can be using the conceptual design and a flexible site-specific adaptation of the conceptual design. A supplement to the EIS will be prepared for the selected site which will consider quantitatively impacts on wetlands, unusual soil conditions, and other unique features of the selected site. Actual design methods for the facility were evaluated at a conceptual level in the preparation of the CDR and the site-specific adaptations of the conceptual design. Final design will include specific methods and procedures for tunneling and surface facilities development (see EIS Volume IV, Appendix 1, Section 1.2).

0332.01

Comments noted.

0332.02

Comments noted. The information provided is consistent with the analysis in EIS Volume I, Section 4.1.6 and Volume IV, Appendix 5, Section 5.4.1.6. Regarding availability of a skilled labor pool, see Comment Response 816.01.

0332.03

Comment noted. The transportation facilities in the State of Michigan are discussed in Volume IV, Appendix 5, Section 5.4.11.2.A.

0332.04

The availability of skilled workers in each Region of Influence (ROI) was considered in developing reference case projections of in-migration in the EIS (see Volume IV, Appendix 14, Section 14.1.2.3.B, and the Errata for that section). In the Michigan ROI there is a relatively large labor force and relatively high unemployment rates, which suggests that in-migration would be lower than in an ROI with a relatively small labor force and low unemployment rates. Consequently, the EIS reference case study indicates that in-migration into the Michigan ROI would be relatively low in comparison to other ROI's. The comment's assertion that there is an adequate supply of, in particular, construction and supply industry workers in the Michigan ROI is also substantiated in the EIS by construction industry unemployment data from the U.S. Department of Labor.

0333.01

Comment noted. The socioeconomic impacts of the SSC on the Michigan site are discussed in Volume I, Chapter 5, Section 5.8. No "boom-town" impacts are expected to be significant in the site area; additional jobs will exist (see Volume IV, Appendix 14). General benefits to knowledge are discussed in Volume I, Chapter 2.

0334.01

Comment noted.

0334.02

Volume IV, Appendix 13, Section 13.1.3.4 presents an evaluation of SSC development implications at the project level, including secondary impacts. Cumulative land use impacts in the Region of Influence are presented in the same appendix in Section 13.1.4. Given the site's unique reliance on two large urban centers -- Lansing and Jackson -- plus a number of smaller communities in the immediate area, and Ann Arbor and Detroit in the larger region, SSC project-related growth will be diffused throughout the region, thereby reducing to a minimum development pressure in any one place. Project level land use changes will occur; however, given the area's dispersed settlement pattern, local growth is expected to occur either in the core or at the periphery of the village of Stockbridge, the city of Mason, and the village of Leslie. Such growth has less an adverse impact than cases where entire new towns are built in areas that were previously considered rural.

0334.03

SSC-related in-migration is expected to be dispersed throughout the Michigan Region of Influence (ROI), but concentrated in Ingham, Jackson, and Washtenaw Counties. Volume IV, Appendix 14, Table 14.1.3.4-5 provides a description of how population impacts would be distributed throughout the ROI.

0334.04

Comment noted.

0334.05

Comments noted. The community development plans referred to in the comment were evaluated during preparation of EIS Volume IV, Appendix 5, Section 5.4.10.1.G.

0335.01

See Comment Response 816.01. The commitment of the University of Michigan and other universities in the State of Michigan to make their resources available in support of the SSC is acknowledged.

0336.01

Comment noted.

0337.01

Comment noted.

0337.02

The DOE is aware of the recently built Jackson County resource recovery facility located adjacent to the State prison of southern Michigan. The State proposal did not identify this facility specifically in its plan for the disposal of nearly 30,000 yd^3 annually of SSC-generated solid waste. As a result, this particular facility has not been considered in the DEIS analysis. Jackson was identified as one of three districts (Lansing, Jackson, and Detroit) with enough remaining capacity to accept the solid waste generated at the SSC site. If Michigan is selected as the SSC site, use of these disposal facilities, as well as the waste water treatment facility in Jackson, would be addressed in the site-specific Supplemental EIS.

0337.03

Comment noted.

0338.01

Comment noted.

0339.01

Comment noted.

0340.01

It is assumed that commenter is referring to Site Environmental Report {Abstracts} that are used in EIS Volume IV, Appendix 5. See Comment Response 13.02.

Radiological impacts associated with the SSC have been analyzed extensively and can be predicted with reasonable confidence. The environmental safety and health implications of SSC-associated radiation are presented in EIS Volume I, Chapter 5, Sections 5.1.6.2, 5.1.6.3, and 5.2.5; and are discussed at length in Volume IV, Appendix 10, Section 10.1 and Volume IV, Appendix 12, Sections 12.2.1.1, 12.2.3.1, 12.3.1, and 12.4.1.

A comprehensive list of radionuclides produced during operations of the SSC is presented in Volume IV, Appendix 10, Table 10.1.3-14 of the EIS. Carbon-11 is one of several air-activation products that will be periodically vented from the underground structures of the SSC facilities. Most of the air-activation products have very short half-lives (Volume IV, Appendix 10, Table 10.1.2-4). The projected maximum individual dose equivalent rates from air-activation products at the site boundary of the 16 directional sectors for any proposed site are less than one-tenth of a mrem per year, as compared with the Federal (40 CFR Part 61 subpart H) limit for whole body dose from air activation products of 25 mrem per year. Sodium-22 (Na-22) and tritium (H-3) are activation products that have half-lives sufficiently long to merit consideration of the potential consequences. Accordingly, the potential of off-site migration via a groundwater pathway was considered and the impacts evaluated. The migration of Na-22 and H-3 in groundwater has been numerically modelled for the worst-case scenario for each SSC site alternative. A comprehensive description of this analysis is provided in Volume IV, Appendix 12. The annual dose equivalents derived from the model indicate that the radionuclide concentration in a nearby well (50 m from the source) which is used for normal daily consumption of water for an entire year would range from 0.0098 to 0.50 mrem (Volume I, Chapter 5, Table 5.1.6-1), as compared with the public drinking water standards of 4 mrem.

An aerial radiological survey was conducted over the Fermilab facility and adjacent area on 12-14 May 1977. Gamma radiation exposure rates were measured between 270 μR/h and 400 μR/h. These exposures originated from on-site activities that included a storage area for radioactive materials, a laboratory in the village where radioactive material was being used, and four locations along the accelerator beam tube resulting from multiple low-level radiation sources. Much of the gamma radiation emitted from stored materials at Fermilab was associated with the facility's fixed target program. As discussed in the EIS Volume IV, Appendix 10, Fermilab's fixed target program generates more low-level radioactive waste than is projected from the SSC colliding beam program.

0340.03

See Comment Response 520.06.

0340.04

The soil surrounding the collider tunnel can be activated (i.e., becomes radioactive)at any point along the ring from an accidental loss of beam, but such a loss is highly unlikely (see below). The primary radionuclides produced would include tritium (H-3), sodium-22 (Na-22), calcium-45 (Ca-45), and manganese-54 (Mn-54). Of these, the dominant radionuclides for migration in groundwater are H-3 and Na-22 as discussed in the EIS Volume IV, Appendix 10. The radiological impacts from a beam loss are discussed in detail in EIS Volume IV, Appendix 12, Section 12.4.1.

It should be recognized that a single loss of beam is a highly unlikely event and has never occurred at Fermilab in its superconducting magnet system. A highly sophisticated monitoring system is incorporated in the design of the SSC to protect against damage to accelerator components and prevent radiation releases that would result from loss of beam.

In the event that the magnet protection system failed and a beam loss occurred, the extensive earth shielding surrounding the collider tunnel would serve to protect potential receptors at or near the land surface (such as humans, animals, soil, crops, surface water supplies, etc.) from radiation exposure. Design criteria for the SSC call for a minimum 35 ft of primary earth shielding around the centerline of the accelerator tunnel. Additional earth shielding may be provided at many sites by deep burial of the accelerator tunnel. At the proposed Michigan site, the minimum buried depth of the tunnel is 80 ft; the maximum dose equivalent to an individual above that point is projected to be less than 0.001 mrem/yr (see EIS Volume IV, Appendix 10, Table 10.1.3-4). This dose represents a small fraction of the DOE 100 mrem/yr limit and may be considered insignificant relative to the 300 mrem/yr received by the average individual from natural radiation (see EIS Volume IV, Appendix 12, Table 12.2.1-1).

The potential for migration of radionuclides in groundwater is covered in the EIS Volume I, Chapter 5, and Volume IV, Appendix 12, and is discussed in Comment Response 340.02. The analysis provided in the document would apply to any well (50 m from the source) that intercepts ground water which has been in contact with the soil or rock surrounding the collider tunnel. At the Michigan site, the calculated annual dose equivalent in a nearby well (50 m from source) resulting from accidental loss of beam is 0.011 mrem/yr (EIS Volume IV, Appendix 12, Table 12.2.3-6). Again, this dose is a fractional increment of the EPA 4 mrem/yr drinking water standard and may be regarded as negligible when compared with natural background radiation.

A comprehensive discussion on radiation monitoring at the SSC is provided in Comment Response 769.04.

0340.05

Both on-site and off-site monitoring is conducted at Fermilab. These data are available to the public since Fermilab publishes annual environmental monitoring reports. These reports contain information regarding off-site environmental monitoring results based on water samples, direct radiation, and TLD's placed in the homes of some employees. A discussion of existing effects of Fermilab can be found in Volume IV, Appendix 5, Section 5.3.6.2 of the EIS. These data were used in the impact analysis for Illinois.

0340.06

The identification and half-life of the potential radionuclides that might migrate through groundwater were discussed in the EIS in following paragraphs and table:

Volume IV, Appendix 10, pp. 36-37, p.91.

Volume IV, Appendix 12, p. 19, Table 12.2.3-3.

The dominant radionuclides are tritium (H-3) and sodium-22 (Na-22) with half-lives of 12.3 years and 2.58 years, respectively.

0341.01

Comments noted.

0342.01

Comment noted.

0343.01

Comment noted.

0344.01

Comment noted.

0344.02

EIS Volume IV, Appendix 10, Section 10.2.3.4 presents a discussion of the State proposer's disposal options for excavated materials. Excavated materials will have to be stored on site, analyzed for pyrite, sulfur, and sulfate, (leachable materials which could affect groundwater quality in local wells) and then disposed of. The State proposes to transport leachable materials to Type II or Type III sanitary landfills.

Based on the information provided to date, the sulfide content of the excavated materials and subsequent impacts from leaching are expected to be relatively low. Mitigation techniques are available, including minimizing and leaching by: 1) adding limestone to increase the alkalinity of the water leaching through the material, and 2) soil stabilization (mixing material with lime, cement, and water) to decrease permeability, leachability, and the acidity of leached materials. If Michigan is selected as the SSC site, the DOE will address this concern in more detail in the Supplemental EIS.

0344.03

See Comment Response 344.02. Engineering controls designed to separate out pyrite containing spoils and reduce water contact with these materials will serve to control the production of acid leachate. Therefore, wildlife will not need extraordinary protection from acid leachate since it will not be formed.

0344.04

A set of noise mitigation measures was included in the conceptual design of the project and factored into the noise impact assessments. These include such mitigations as restricting spoils loading activities during construction to 12 hours per day and individually enclosing the cryogenic compressors (EIS Volume I, Chapter 5, Section 5.1.4.1.B). These mitigation measures would be applied regardless of which site is chosen. Other possible mitigations cited in Volume I, Chapter 3, Section 3.6.3 may be applied as a function of the final site chosen, detail facility location and design, and consultations with Federal, State, and local agencies. It is anticipated that noise control measures will be addressed and included in the course of detail facility design and construction planning and analyzed in detail in the site-specific Supplemental EIS.

0344.05

Hunting and fishing as recreational activities would be restricted at all sites during construction, and would continue to be tightly controlled within populated fee simple areas for the operational life of the SSC. The exact locations of these areas will be determined during final design of the SSC. Restrictions could be necessary for a number of reasons, for example, control of access to fee simple areas due to safety or security requirements, and disturbances such as noise during construction, which would impact the SSC site and vicinity temporarily. When the SSC site is selected, further environmental studies would be conducted prior to preparation of the Supplemental EIS.

0344.06

As noted by the commenter, the potential impacts on human health were evaluated in the EIS (see Volume IV, Appendix 10, Section 10.1 and Appendix 12) for both workers at the SSC and for the general public adjacent to the facility. No toxic material or safety hazards were identified that would impact the general public from construction through the operating life of the SSC. Therefore, there should be no long-term effects on residents near the SSC from toxic materials or from safety hazards associated with the SSC project.

As indicated in EIS Volume I, Chapter 6, it is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards.

0344.07

Regarding SSC direct and indirect water use impacts at the Michigan site, see Comment Response 312.04, first paragraph, and EIS Volume IV, Appendix 7, Section 7.2.3.4. Regarding well restrictions and potential for replacement, see Comment Response 810.03.

Underground injection has only been proposed by the state as an alternative means for disposal of the water generated by the limited amount of construction dewatering that may occur, freezing or slurry wall techniques will be emphasized.

Water derived from shaft or foundation construction dewatering would be unaltered site groundwater. Water derived from tunnel groundwater inflow control may contain some contaminants from TBM oil and lubricants. Any discharges considered for injection would be tested and treated, if necessary, prior to injection. This activity would be conducted only in accordance with all applicable regulations.

0345.01

The location of the ring in Michigan was determined by Michigan State's proposal. The location of the F7 site given in the EIS Volume IV, Appendix 5 was in error and is corrected in the final EIS. The location described in Appendix 1, Section 1.2 is correct.

For general statements regarding data sources see Comment Responses 13.02 and 710.01.

0345.02

One option for spoils disposal is disposal in local aggregate quarries as general fill. Table 10.2.3-5 (Volume IV, Appendix 10, Section 10.2.3.4) shows the distribution of the excavated material to eight quarries, their names, approximate distance from the shaft location to the quarry, and the capacity of each quarry.

0345.03

The effect of noise on wildlife is discussed in the DEIS Volume IV, Appendix 11, Section 11.3.4.3.A: "Construction noise (including noise from spoils haulage) is not expected to impact the adjacent Waterloo State Recreation Area and Haehnle Sanctuary." As explained, the results of conservative estimates indicate construction sound levels will be near the present ambient levels in these wildlife areas.

In addition, the fourth sentence in the first paragraph on p. 32 of Volume IV, Appendix 11, Section 11.3.4.3.A has been revised to clarify that noise attenuation due to the effects of terrain and vegetation have not been considered in the evaluation of the impacts.

0345.04

Regarding water use and water use impacts for the SSC project at the Michigan site, see Comment Response 312.04, first paragraph. In essence, the project's groundwater use will be distributed about the site and should have no discernible impact on wildlife and fisheries. Sensitive areas such as wetlands will be avoided when siting wells for the SSC.

The statements in DEIS Volume I that 80 wells would be directly affected was in error and has been revised. That number is only the number of wells, based on available State records, that occur within the 1,000-ft restricted zone, the campus and far cluster areas, and the buried beam and buffer zones. It is anticipated that only a small number of these wells would have to be abandoned because of proximity to the tunnel or an SSC facility or construction site. See Comment Response 810.03.

Regarding general and radiologic impacts to surface and groundwater at the Michigan site, see Comment Response 284.02.

0345.05

EIS Volume IV, Appendix 5, Section 5.4.4.2 notes that two counties (Oakland and Wayne) are currently not meeting the primary National Ambient Air Quality Standard (NAAQS) for carbon monoxide. The SSC site is many miles away from these counties, as shown on the title page to Volume IV, Appendix 5, Section 5.4. Volume I, Chapter 3 of the DEIS incorrectly states that regional exceedances of Chapter 3 NAAQS for carbon monoxide will result from SSC-related emissions. This error has been corrected in the revised Volume I. The impact of SSC-related carbon monoxide emissions (e.g., vehicular site and highway traffic) would be relatively small in comparison with the existing source impacts in Oakland and Wayne Counties and would not have a significant impact in those counties. The stated exceedances of NAAQS for carbon monoxide were the result of the use of background carbon monoxide values (from Detroit), which are not representative of the proposed SSC site.

0345.06

See Comment Response 345.05.

0345.07

Noise standards are established by Federal agencies (e.g., Federal Highway Administration and Housing and Urban Development Department) for certain activities (e.g., highway building). These regulations are not enforceable for the construction and operations of the SSC. However, these standards have been used in the EIS to provide guidelines for good environmental practices and have been proposed as limits with which the SSC would comply. Compliance with these limits by following the designs, practices, and mitigations proposed in the EIS would be the responsibility of the management and operations (M and O) contractor. The DOE would conduct periodic environmental safety and health protection appraisals of the O&M contractor's compliance program.

See Volume IV, Appendix 9 for detailed noise assessment of the SSC.

0345.08

Comment noted.

0346.01

EIS Volume I, Chapter 4, Section 4.1.5 has been revised to more accurately reflect the low potential for encountering "gassy ground" at all of the sites.

The need to consider potential "gassy ground" conditions is based on the history of encounters--some of which were tragic--with this phenomenon in the region. Fortunately, the result of our review of the issue is a well-founded conclusion that the potential for problem encountered during construction at the Stockbridge site would be negligible. As is noted in Volume IV, Appendix 5, Section 5.4.1.5, occurrences of gas at shallow depths in the region around the Stockbridge site are of three types as follows:

(1) Gas trapped within the Antrim, Coldwater, and Berea-Bedford bedrock formations

(2) Gas that has escaped from the above-named bedrock formations into the overlying drift where it has been trapped beneath clay-rich glacio-lacustrine sediments

(3) Gas that has been lost to the surrounding bedrock or drift from a "runaway" oil or gas well that penetrated a deep high-pressure reservoir.

The geologic conditions that contribute to (1) and (2) are absent from the Stockbridge site. An encounter with a type (3) occurrence appears to have happened only once in the region, i.e., the Cal-Lee/Marshall blow-out in 1968. Although there are several oil fields tapping deep reservoirs beneath the site, the current state-required practice of using multiple blow-out protectors when drilling through high-pressure gas reservoirs has been effective throughout the state in preventing further encounters of this type. Thus it appears that occurrences of "gassy ground" such as have been observed in neighboring counties are unlikely at the Stockbridge site. Accordingly, there does not appear to be a need for specific construction procedures to mitigate potential hazards of encountering gassy conditions during underground excavation at the site.

Three related questions that are relevant to underground projects in the vicinity of oil and gas fields are as follows:

(1) Are all of the exploration and production borings known?
(2) Are the locations of the borings accurately known?
(3) Are the abandoned and plugged wells adequately sealed?

Michigan's statutory requirements for recording oil and gas wells provide considerable assurance that there will be data regarding the first two questions. However, different available accountings of oil and gas wells in the vicinity of the site (Michigan Oil and Gas Commission, Petroleum Information Corporation "scout tickets," Department of Natural Resources publications, and Stockbridge SSC site proposal Figure 3.2-14) differ from one another with respect to the exact location and status (i.e., whether active or abandoned) of individual hydrocarbon borings. Although State-regulated procedures for plugging abandoned wells will assure that records are available with respect to the third question, sound engineering practice when an underground excavation may intersect an abandoned hydrocarbon well is to research not only State records, but also the records of the driller, the owner-operator, and the cementing service contractor to further ascertain that potential pathways from gas reservoirs have been adequately sealed. The site proposal proposed the following prudent course of action for abandoned oil and gas wells along the tunnel alignment, "These wells will be located, their condition evaluated, and additional exploratory holes drilled nearby to investigate for possible gas leakage at tunnel level, and to determine what, if any, remedial measures are needed. If necessary, these wells can be resealed" (State of Michigan 1987).

0346.02

See Comment Response 277.03.

The comment mistakenly refers to Volume IV, Appendix 5, Section 5.4.1.5.8 which discusses ground subsidence related to oil and gas production. The correct reference should be to Section 5.4.1.5.7, which discusses escape of methane gas during hydrocarbon drilling. This paragraph also states "...it is possible, through improbable, to inadvertently encounter either an unrecorded well or a poorly plugged abandoned well...."

0347.01

In terms of waste disposal plans, it was assumed that any SSC low-level radioactive waste would be disposed of at DOE's Hanford facility at Richland, Washington (see EIS Volume IV, Appendix 10). There is no connection between the State of Michigan's low-level radioactive waste disposal siting program and SSC. For the DOE to consider another disposal option it would require that at the time of siting, a state must have an approved low-level radioactive waste disposal site and be willing to accept DOE low-level radioactive waste. In addition, there would have to exist the availability of adequate regional compact disposal capacity, in accordance with the Low Level Radioactive Waste Policy Amendments Act of 1985 (Public Law 99-240). Additionally, a cost savings would have to be recognized prior to the DOE utilizing any low level radioactive waste disposal option other than the Hanford site.

Previous studies have been made of the environmental radiation shielding of the SSC and it is possible to project the environmental safety and health impacts based on performance data from existing colliders such as the Tevatron at Fermilab. The radiation dose to humans can be determined with reasonable confidence (EIS Volume IV, Appendix 12, Section 12.2.1.1). It should be noted that the cumulative amount of radiation for SSC would be less than that experienced at Fermilab because of the longer average cycle time of the SSC which results in a much lower number of protons being accelerated per day.

The limit set by the DOE for the exposure to individuals of the public to radiation as a consequence of routine DOE activities and actions is an annual effective dose equivalent equal to 100 mrem (EIS Volume I, Chapter 6, Section 6.3.2). As shown in EIS Volume I, Chapter 5, Table 5.1.6-1, the estimated dose equivalent rate to the maximally exposed individual in Michigan during construction and operations of the SSC is 0.0040 mrem/yr. This dose equivalent would be a negligible increase over the natural background radiation level of 359 mrem/yr.

0347.02

In contrast to DOE nuclear defense production reactor facilities, all radioactive waste produced by the SSC would be Class A (10 CFR 61), low-level radioactive waste (LLRW). Based on Fermilab's experience it is projected that the SSC will annually ship at most 8,000 ft^3 of LLRW with an activity of 10 curies. This volume does not take into account the implementation of a waste minimization program, such as the one instituted at Fermilab in 1987. Fermilab was able to reduce its volume by a factor of 20. It also produced a reduction in activity shipped by emphasizing recycling of materials, substitution of materials that when being activated would result in radionuclides of shorter half-life, storage for decay, sorting, and compaction.

It is planned that all shipped LLRW will be disposed at DOE's Hanford facility, Richland, Washington. However, disposal of wastes at a State or regional NRC-licensed low-level waste disposal site would be considered by the DOE. A decision in favor of regional disposal site(s) will depend upon: 1) willingness of the State to accept the waste, 2) the availability of adequate regional compact disposal capacity (in accordance with the Low-Level Radioactive Waste Policy Amendments Act of 1985, public law 99-240), and 3) whether State or regional disposal represents a cost savings to the DOE. These factors will be carefully and thoroughly considered upon selection of the SSC site.

Based on the above considerations and the 22 years of experience at Fermilab, the DOE expects the SSC LLRW disposal program to be well-managed and to comply with current State and Federal commercial environmental safety and health standards.

0347.03

The EIS addresses the potential impacts of radioactive waste (Volume I, Chapter 5, Section 5.1.6 and Volume IV, Appendices 10 and 12), radiation (Volume I, Chapter 3, Section 3.5 and Chapter 5, Section 5.1.6; and Volume IV, Appendices 10 and 12), and other health effects (Volume I, Chapter 5, Section 5.1.6; and Volume IV, Appendix 10). See also Comment Response 996.01.

0348.01

Comment noted.

0348.02

See Comment Response 524.04.

0348.03

The purpose of this EIS is to site the SSC. The DOE believes the EIS sufficiently identifies the impacts and mitigations to support that purpose. The EIS analyzes data in order to make comparative analysis between the site alternatives. The EIS provides regional and community-level analysis which identifies potential impacts and mitigations to support a siting decision. Until a site is selected, it is not possible to complete a final SSC design; without a final facility design and final placement of the collider ring, it is not possible to develop site-specific data. The DOE recognizes that prior to a decision to construct or operate the SSC, a Supplemental EIS will be required to provide a detailed site-specific analysis of impacts and mitigations. The organization of this siting EIS is in conformance with CEQ guidelines.

0348.04

Institution of habitat management practices at the selected site (similar to those currently employed at Fermilab) could indeed have a beneficial impact on wetlands in the area. See also comment Response 10.03.

0348.05

Comment noted.

0348.06

Impacts to hunting and fishing activities in Michigan are addressed in EIS Volume I, Chapter 5, Section 5.1.5.4 and in Volume IV, Appendix 11, Section 11.3.4.4.

0348.07

Because perception of impacts from noise are highly subjective, it is not feasible at the site selection level to set noise impact criteria at a level finer than "highly annoyed."

EIS Volume IV, Appendix 9, Section 9.1.3.5 discusses mitigation techniques, such as berms, that have the potential to reduce the service area noise emissions to an acceptable level.

Volume I, Chapter 3, Section 3.6 describes the conditions by which the DOE will mitigate noise impacts. Noise mitigation actions will depend on the site selected, final facility location and design, and consultations with Federal, State, and local agencies. Specific noise control measures will be addressed and included in the course of detailed facility design and construction planning and will be assessed in the Supplemental EIS. The final mitigation plan will include procedures for monitoring sound levels for compliance with the plan.

0348.08

Comment noted.

0348.09

In terms of SSC waste disposal plans, it was assumed that any SSC low-level radioactive waste (LLRW) would be disposed of at DOE's Hanford facility, Richland, Washington (EIS Volume IV, Appendix 10, Section 10.1.3.1.D.3.d). However, disposal of wastes at a regional LLRW disposal site will be considered if the state is willing to accept the waste. The decision to use a regional disposal facility would be based on cost savings and the adequacy of the capacity of the regional site. The DOE will select a LLRW disposal site once the site selection process has been completed and specific options have been thoroughly evaluated.

Impacts from selection of a disposal site would be evaluated in the Supplemental EIS. EIS Volume IV, Appendix 10, Table 10.1.3-16 summarizes the status of LLRW facilities for all seven states.

0348.10

EIS Volume I, Chapter 6 provides a discussion of DOE analysis of environmental laws, regulations, permits and licenses which could be applicable to the SSC. It is DOE's policy to conduct its operations in an environmentally safe and sound manner.

0349.01

Comments noted.

0349.02

Volume IV, Appendix 1 is a summary of the SSC conceptual design. The design of leak detection and radiation monitoring systems for cooling water loops will be done during the detailed design phase of the SSC. However, a brief conceptual description can be found in Volume IV, Appendix 1, Sections 1.1.2.1.B.3.b and 1.1.2.1.B.3.c.

It should be noted that there is not one but several cooling water systems. Some of these closed loop systems will be exposed to radiation fields or sources of radiological contamination. These cooling water systems will be designed with leak detection/monitoring systems.

At the minimum, these systems will consist of primary and secondary loops to provide double-barrier isolation of the radioactive materials in the piece of equipment being cooled. Leak detection/monitoring systems will be provided for the both the primary and secondary loops. The systems used for the SSC will be similar to those installed at Fermilab and CERN, although special design attention will be devoted to the cooling loops for beam absorbers (see Volume IV, Appendix 12, Section 12.4.1.2).

0349.03

Since there is much disagreement within the scientific community regarding the possible effects of electromagnetic fields from power transmission lines on wildlife, there is little that can be evaluated regarding the SSC project at this time. This issue will be addressed in greater detail once a site selection has been made and the specifics of power line routes are known. Then, wildlife characteristics of the affected areas would be studied in more detail and impacts would be assessed.

0349.04

Safety is a top priority of the SSC project. The concern for safety is shown in the current conceptual design of the collider and will be demonstrated by the safety policies and procedures that will be implemented when the SSC begins operations. It is the safety strategy of the DOE to mitigate potential hazards to personnel, as far as possible, through appropriate measures in the design and engineering of the facility. The Safety Review Document (SSC CDG, 1988; see EIS Volume IV, Appendix 10, References) identifies and discusses these mitigative measures in the design of the facilities and the structure of laboratory operations. Many safety-related facets of the SSC project are discussed in the EIS where appropriate (Volume I, Chapter 3, Section 3.6).

A Safety Analysis Review (SAR) will be prepared for the construction phase of the project by the contractor selected to manage the SSC construction activities. This document will be reviewed and subject to DOE approval before construction. Additionally, an SAR will be prepared by the SSC operating contractor and submitted to the DOE review. The DOE will provide authorization for SSC operation based on the review.

0350.01

Comment noted.

0351.01

Comments noted.

0352.01

In order to determine the amount of radioactive waste generated by the SSC, the DOE reviewed the waste production history of other operating accelerator facilities. Fermilab, in particular, provides an appropriate example because it is the highest energy accelerator currently in operation and, like the SSC, is a superconducting proton accelerator. Based on several years of Fermilab experience, together with considerations of the particular design features of the SSC, the DOE has projected that no more than 8,000 ft^3 of low-level radioactive waste (LLRW) will be shipped annually from the SSC site for disposal (EIS Volume IV, Appendix 10). This amount of LLRW could be dramatically reduced with implementation of a waste minimization program under consideration for the SSC. Such a program initiated at Fermilab in 1987 resulted in a volume reduction in LLRW of approximately 20 to one (EIS Volume IV, Appendix 10). Similar waste minimization efforts at the SSC could reduce the annual volume of LLRW to about 400 ft^3. See Comment Response 276.03.

0352.02

Comments noted.

0352.03

A comprehensive list of radionuclides produced during operation of the SSC is presented in Tables 10.1.2-4 and 10.1.3-14 in Volume IV, Appendix 10 of the EIS. The longest-lived of those radionuclides is tritium (H-3), with a half-life of 12.3 years.

The radiological impacts associated with the SSC have been analyzed extensively and can be predicted with reasonable confidence (EIS Volume I, Chapter 5 and Volume IV, Appendices 10 and 12). Conservative shielding requirements for SSC accelerator components are designed to prevent significant radiological emissions to the environment. Radiation exposure to any individual as a result of SSC activities is expected to be a small fraction (1/1000th) of that contributed by natural background sources.

In terms of waste disposal plans, it was assumed that any SSC low-level radioactive waste would be disposed of at DOE's Hanford facility, Richland, Washington (EIS Volume IV, Appendix 10). However, disposal of wastes at a state NRC-licensed low-level waste disposal site will be considered if there exists a willingness by the state(s) to accept the waste. The decision to utilize a regional disposal facility is also predicated on availability of adequate regional compact disposal capacity, in accordance with the Low Level Radioactive Waste Policy

Amendments Act of 1985, and a decision by the DOE that utilization of a regional disposal facility would represent a cost savings to the DOE. The DOE will select a low-level waste disposal option once the site selection process has been completed and the waste disposal options for the specific site have been thoroughly evaluated.

0352.04

The SSC water needs are listed in EIS Volume IV, Appendix 7. Table 7-1 lists the on-site water needs as an average for all candidate sites, and Table 7-5 lists the off-site water needs resulting from projected SSC-caused population increases specifically in the vicinity of the proposed Michigan site. During the seven years of SSC construction, the on-site water needs will average about 30 gal/min, while the off-site water needs by the estimated population increase will average about 315 gal/min. Thus the combined on-site and off-site water needs for the proposed Michigan site will average about 345 gal/min during SSC construction. During SSC operations, the on-site water needs will average about 1,350 gal/min, while the off-site water needs by the estimated population increase will average about 305 gal/min. Thus, the combined on-site and off-site water needs for the proposed Michigan site will average about 1,655 gal/min during SSC operations. During short peaks of operation, the on-site water needs could increase to about 2,450 gal/min due to additional cooling water demands. Not all of these water needs would be consumptive, that is, deplete existing water sources, since a portion would be returned as effluents to surface or groundwaters after suitable treatment. Since all on-site and most of the off-site project water needs will be supplied by groundwater, increases in localized overdraft conditions are expected. See also Comment Response 312.04.

See Comment Response 284.02 with respect to potential groundwater quality impacts.

Also see EIS Volume IV, Appendix 7, Sections 7.1.3.4 and 7.2.3.4 for more detailed discussions of water use and water quality impacts.

0352.05

The EIS analysis indicates that local governments in the two primary impact counties in the Michigan Region of Influence (ROI) would cumulatively experience a positive net fiscal impact throughout construction and operation of the facility, except for a negative net fiscal impact during the first two years of construction in Ingham County. The analysis indicates that millions of dollars in capital improvements, including expenditures for new school facilities, roads, police and fire protection facilities and other government equipment and improvements, would be made by local jurisdictions during the first two years of SSC construction in Ingham County, and during the first three years of construction in Jackson County. If local governments finance some of these capital investment expenditures, SSC-generated direct and indirect net tax revenues would likely offset these debt service payments. Additional details of the EIS assessment of SSC construction and operations impacts on both State and local government finances are presented in the EIS Volume IV, Appendix 14, Section 14.1.3.4.D.

0352.06

The issue of independent site monitoring will be considered by the DOE prior to start of construction and operations. The DOE is in the process of selecting a management and operations (M&O) contractor whose responsibility will be to prepare and implement detailed environmental safety and health plans that conform to the DOE orders and directives related to environmental safety and health. Prior to startup, the DOE will review and approve the contractor's submittal. Independent site monitoring will be considered by the DOE at that time. In addition to requiring its contractors to perform periodic performance reviews, the DOE conducts its own independent audits of contractor operations, and has established the practice of augmenting its programs, if necessary, with special oversite panels or advisory committees.

0353.01

Comment noted.

0353.02

Comments noted.

0354.01

Comment noted.

0354.02

See Comment Response 384.02.

0355.01

Decommissioning of the SSC is discussed in a general way in EIS Volume IV, Appendix 3, and in Argonne National Laboratory Report "Technical Assessment of Environmental and Cost Implications of Superconducting Super Collider Decommissioning" by S.Y. Chen, et al. Specific data on the actual useful life of the SSC project and decommissioning of system components will not be known until much later, since the final design is not yet determined, and technologies discovered during SSC operation may well change the outlook 25 years from now.

Additional National Environmental Policy Act (NEPA) review would be required before decommissioning the SSC.

0355.02

Comment noted.

0356.01

Comment noted.

0356.02

See Comment Response 710.01.

0356.03

Comment noted.

0357.01

Comments noted.

0358.01

The SSC project does not involve a reactor as alluded to in your comment. Potential water quality effects from construction and operations of the SSC are assessed in Volume IV, Appendix 7, Sections 7.1.3.4 and 7.2.3.4. Potential radiologic impacts to water are assessed in Volumes IV, Appendix 12, Sections 12.3.1 and 12.4.1. In summary, only negligible (i.e., non-measurable) water quality impacts are projected at the Michigan site.

The radiologic waste material generated will not be used on site. It is presently planned and the EIS assumed that the low-level radioactive waste generated by the SSC will be disposed of at the U.S. Department of Energy's Hanford facility near Richland, Washington. If a midwest regional disposal facility becomes available in the future, disposal at that facility would be considered should the proposed Michigan site be selected.

0358.02

The SSC is designed as a research facility of which the underlying purpose is "... to understand the basic structure of matter at a new, more fundamental level than is presently possible" (see EIS Volume I, Chapter 2, Section 2.1). Food irradiation has not been considered as an objective in the development and operation of the SSC.

Radiation source terms for the SSC are discussed in Volume IV, Appendix 10. The majority of accelerator-produced radionuclides have relatively short half-lives, generally expressed in terms of hours or minutes (see EIS Volume IV, Appendix 10). Exceptions include cobalt-60 with a half-life of 5.272 years. The cobalt-60 is produced at isolated points along the collider ring in the beam absorbers (see EIS Volume IV, Appendix 10, Table 10.1.3-14). It is formed as an activation product when the beam strikes absorbing media (such as stainless steel). The minute quantities so produced are insufficient to be used commercially for food irradiation and do not pose a unique waste management problem. Cesium-137 is not an accelerator-produced radionuclide.

The potential for the inadvertent irradiation of crops in the vicinity of the SSC collider ring has been evaluated with the conclusion that there will be no environmental impact on crops in the area. Radiation at the land surface is discussed in terms of impacts to the general public in Volume I, Chapter 5, Sections 5.1.6.2 and 5.1.6.3 of the EIS. Under normal operation, the heavily shielded beam absorbers and earth shielding surrounding the collider ring tunnel serve to absorb the small amount of radiation that could be scattered upward, thereby preventing irradiation of humans (or crops) at the land surface. Even in the event of the worst case scenario, the radiation that could be scattered upward would be completely dissipated within about 35 ft of material (soil) from the source. This distance would be well within the minimum buried depth of the collider tunnel.

In terms of waste disposal plans, it was assumed that any SSC low-level radioactive waste would be disposed of at DOE's Hanford facility, Richland, Washington (see EIS Volume IV, Appendix 10).

0358.03

Low-level radioactive waste would not affect groundwater. The LLRW which is generated during maintenance and repairs on equipment and periodic draining of closed-loop cooling systems will be collected, processed into a solid form, and stored in a secured area until enough is collected for a full truckload to an approved disposal facility. These materials will not be dumped in abandoned mines or dumped on site (see EIS Volume IV, Appendix 10).

The potential for SSC-related radiological contamination of groundwater supplies is minimal, and is discussed in EIS Volume I, Chapter 5; Volume IV, Appendix 10, Section 10.1.2.3.A.3; and Volume IV, Appendix 12, Sections 12.2.3.1, 12.3.1.2, and 12.4.1.1. The material contained therein can be summarized as follows: In summary, the EIS says that among the secondary particles produced when the collider beam strikes a material are sodium-22 (Na-22) and tritium (H-3). Potential off-site migration via groundwater was considered in the EIS and the impacts evaluated using a worst-case scenario (accidental loss of beam) for each SSC site alternative. A comprehensive description of this analysis is provided in the EIS Volume IV, Appendix 12, Section 12.2.3.1. The annual dose equivalents derived from the model indicate that the radionuclide concentration in a nearby well (50 m from the source) which is used for normal daily consumption of water for an entire year would range from 0.0098 to 0.50 mrem (EIS Volume I, Chapter 5, Table 5.1.6-1), which is well within the EPA public drinking water standard of 4 mrem.

There is no plan or intention for use of low-level waste from the SSC to irradiate foods. The SSC nuclear waste (LLRW) is far too low in activity to be used for food irradiation. Food irradiation would require levels millions of times higher than the levels in SSC's levels.

0359.01

Comment noted.

0359.02

There would be no SSC-caused restrictions on hunting, trapping or fishing on lands adjacent to the SSC.

0359.03

Volume IV, Appendix 5, Section 5.4.10.1.D presents an overview of existing land use plans, policies, and controls that are applicable to SSC project development. Regional and local planning agencies are identified and described according to the types of activities conducted. Under Michigan State law, establishment of comprehensive zoning regulations is delegated either to the township level of county government for all unincorporated lands or to incorporated municipalities, such as cities and villages. As a result, these local bodies become key planning agencies for enacting any major development changes. In Michigan, all 13 townships which would be directly affected by the SSC project have zoning ordinances in effect, as do the cities of Leslie and Mason and the Village of Stockbridge. EIS Volume IV, Appendix 5, Table 5.4.10-1 provides a complete listing of SSC project facilities by township location and associated current zoning designation. Volume IV, Appendix 13 provides, in part, an identification of which SSC project facilities may trigger zoning changes; however, it is the prerogative of local planning agencies themselves to enact any zoning changes. It is assumed that the SSC project will not alter the composition of or procedures by which actions are taken by local zoning boards.

0359.04

Haehnle Sanctuary and Waterloo Recreation Area have been included in the environmental impact analysis and are referenced in the EIS Volume I, Chapter 4, Sections 4.7.3 and 4.7.6; Volume I, Chapter 5, Sections 5.1.5.1.B.4, 5.1.5.3.D and 5.1.5.4.D; Volume IV, Appendix 11, Section 11.3.4; and Volume IV, Appendix 5, Sections 5.4.9.2.B and 5.4.9.6. Summarizing from these sections, sensitive plant and animal communities do exist in the Haehnle Sanctuary and Waterloo Recreation areas, including habitats for sandhill crane and great blue heron. However, operations noise levels of the SSC are not expected to impact these areas negatively. Although loss of recreational habitat may occur, this would be indirectly beneficial to bird species such as the heron and crane in terms of reduction of disturbances. Most State-protected species are not presently found in the immediate site area and therefore are not expected to be impacted. Further impact analyses for these areas, should Michigan be the selected site, would be included in the Supplemental EIS (see Volume I, Chapter 1, Section 1.1).

0360.01

Radiological impacts associated with the SSC have been analyzed extensively and can be predicted with reasonable confidence. The environmental safety and health implications of SSC-associated radiation are summarized in EIS Volume I, Chapter 5, Sections 5.1.6.2, 5.1.6.3, and 5.2.5 and are discussed at length in Volume IV, Appendix 10, Section 10.1, and Volume IV, Appendix 12, Sections 12.2.1.1, 12.2.3.1, 12.3.1, and 12.4.1.

Stratified fee zones comprise the nonrestricted areas included in the overall land requirements of the SSC for which no permanent, above-ground SSC facilities are planned. Radiation exposure to individuals within stratified fee zones is expected to be a small fraction (1/1000) of natural background radiation. Consequently, use of these areas by the general public can continue.

The beam collisions will be confined to the interaction regions of the SSC. The interaction halls will be enclosed in concrete and surrounded by considerable thickness of earth shielding. At the Michigan site, the shallowest depth at which any interaction hall will be constructed is 137 ft (EIS Volume IV, Appendix 12, Table 12.3.1-1). It has been estimated that the dose equivalents (which include the radiation contribution from neutron skyshine) directly above an interaction hall, will be reduced to 2 mrem/yr within only 23 ft of earth shielding (EIS Volume IV, Appendix 10, Table 10.1.2-1). Additional earth shielding will effectively reduce the radiation dose further.

The potential for SSC-related radiological contamination of groundwater supplies is discussed in EIS Volume I, Chapter 5; Volume IV, Appendix 10; and Volume IV, Appendix 12. The potential of off-site migration via a groundwater pathway was considered and the impacts evaluated. Migration of sodium-22 and tritium in groundwater has been numerically modeled for the worst-case scenario (accidental loss of beam) for each SSC site alternative. A comprehensive description of this analysis is provided in EIS Volume IV, Appendix 12. The annual dose equivalents derived from the model indicate that the radionuclide concentration in a nearby well (50 m from the source) which is used for normal daily consumption of water for an entire year would range from 0.0098 to 0.50 mrem/yr (EIS Volume IV, Appendix 12, Table 12.2.3-6), as compared with the EPA public drinking water standard of 4 mrem/yr.

0360.02

The potential health effects from the proposed usage of chemicals at the SSC are discussed in EIS Volume IV, Appendix 10. Based on the best available knowledge of the operation of the SSC and its support facilities, no public health hazards would result from the construction and operations of the SSC. The DOE and its contractors would comply with all applicable Federal and State standards for hazardous/toxic materials use and handling. Disposal of hazardous wastes is discussed in EIS Appendix 10, Section 10.1.3.2.

0360.03

Comment noted.

0360.04

Comment noted.

0360.05

Comment noted.

0360.06

The SSC would not be a "radioactive waste dump." It is a high energy particle accelerator which is a machine that accelerates sub-atomic particles (in this case protons). See EIS Volume I, Chapter 5, Section 5.1.6.2 for a description of the radiological aspects of the SSC.

0363.01

See Comment Response 276.03 for DOE waste disposal plans for the SSC. It is not intended that low-level radioactive waste be disposed of at the SSC site.

0366.01

Comment noted. These observations are consistent with those in Volume IV, Appendix 12.

0366.02

See Comment Response 349.02.

0366.03

See Comment Response 733.02.

0366.04

The EIS has been revised to incorporate a reevaluation of wetlands location, type, and quality (see Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.4.3). Information was obtained from field surveys conducted at the sites and from U.S. Fish and Wildlife Service National Wetland Inventory maps and aerial photographs of the site.

If the proposed Michigan site is selected for the SSC, additional wetlands studies would be undertaken in connection with the Supplemental EIS for that site.

0366.05

EIS Volume II, Comment/Response Document, was reserved in the DEIS. It was published in this final EIS. Volume II consists of a summary of comments and the DOE's Comment Responses to the DEIS. EIS Volume II reproduces the actual comments received.

0367.01

Comments noted.

0368.01

Comment noted.

0369.01

Comments noted.

0370.01

Comment noted.

0371.01

Comments noted.

0372.01

See Comment Response 816.01.

0373.01

Comments noted.

0374.01

SSC-related population projections were prepared for the Texas Region of Influence (ROI) and for Ellis County within the ROI (Volume IV, Appendix 14, Section 14.1.3.7.B). Although projections were not prepared for individual communities, population increases associated with the SSC were allocated to Waxahachie from 1989 to 2000 (Volume IV, Appendix 14, Table 14.1.3.7-4). SSC-related population growth associated with the SSC is expected to reach a maximum of nearly 2,150 persons in 1992, which is a large relative increase to Waxahachie population (approximately 18,000 persons in 1986). Impacts related to population growth -- such as increased demand for housing and public services -- similarly were assessed for the ROI and Ellis County, but not for individual communities. The EIS does not anticipate that Ellis County would have any particular problems absorbing these impacts. Additional analysis will be included in the Supplemental EIS prepared for the selected site.

As was the case with population change, SSC-related economic impacts were assessed for the ROI and Ellis County (Volume IV, Appendix 14, Section 14.1.3.7.A). A maximum of more than 1,550 additional direct and secondary jobs in Ellis County is expected to result from the SSC -- decreasing to roughly 1,300 for the duration of facility operation (Volume IV, Appendix 14, Table 14.1.3.7-3). Because of its size and relative proximity to the proposed Texas site, it is likely that many of these jobs will be filled by residents of Waxahachie.

See also Comment Response 1039.04.

0374.02

EIS Volume I, Chapter 1, Table 1-1 indicates that the total number of SSC-related relocations anticipated for the Arizona site is six; for the Illinois site 219 SSC-related relocations are anticipated.

0374.03

Comment noted.

0374.04

Comment noted.

0374.05

Comment noted.

0375.01

Comments noted.

0377.01

Comments noted.

0378.01

Comments noted.

0379.01

Comments noted.

0380.01

Comments noted.

0381.01

The scenarios examined were those most likely to be evaluated for decommissioning when the DOE proposes to decommission. A full safety review and environmental review would be required at that time. The purpose of including decommissioning in this EIS is to establish that (1) the SSC can feasibly be decommissioned, and (2) the costs for decommissioning are not unreasonable.

The actual decommissioning feasibility study prepared for the SSC is that referenced as ANL/EES-TM-347. A summary of this study was included in EIS Volume IV, Appendix 3.

0381.02

Comment noted.

0381.03

At this time, it is difficult to predict which parts of the SSC facility may remain usable for other purposes at the time of decommissioning. While it may be possible to use the boosters for other purposes, it is premature to determine their utility 30 years from now. The decommissioning scenario presented in the EIS Volume IV, Appendix 3 was meant to show that the only components with relatively large amounts of residual radioactivity (the beam absorbers) would be removed from the site and disposed as low-level waste, and that sealing the tunnel could be readily accomplished. The actual decommissioning plan would be subject to NEPA review before decommissioning began, and options such as those mentioned in this comment could be evaluated at that time.

0381.04

The DOE land acquisition and disposal activities are directed by DOE Order 4300.1B REAL PROPERTY AND SITE DEVELOPMENT PLANNING (7/1/87). The directive incorporates the requirements of the Uniform Relocation and Real Property Acquisition Policies Act of 1970 (P.L. 91-646), as well as Comptroller General Decisions and United States Department of Justice policies. In general, Federal agencies are required to obtain unconditional fee simple title to any land on which they intend to construct permanent improvements, and, accordingly, cannot accept title encumbered with reversionary interests.

At the end of the project, if there is no continuing DOE need for the facilities, the property would be disposed of under provisions of the Federal Real Property and Administrative Services Act of 1949, as amended (40 U.S.C. 471) and implementing regulations issued by the United States General Services Administration. The excess property disposal process gives priority first to other Federal agencies, then to State and local governments, then to selected public benefit uses (e.g., education, health care, airports), and finally by open sale to private citizens.

0381.05

Before sealing all accessways to the tunnel, a rigorous check would be made to assure no one was in the tunnel. Once sealed, the surface above the tunnel would be marked with signs and records would be filed with appropriate Government agencies in a manner similar to that done for underground pipelines. This would guard against inadvertent penetration of the tunnel.

There is a very low probability of the tunnel collapsing and of any resulting surface effects as discussed in Comment Response 216.05. This would be evaluated in considerable detail, taking into consideration the geology at the specific site, during preparation of the NEPA documentation for decommissioning at the time of decommissioning.

0382.01

The comment is consistent with the water supply and other service descriptions in the EIS.

0383.01

The EIS indicates that direct and secondary economic effects would be generated by the SSC during construction and operations. These effects are examined for Ellis County as well as the Texas Region of Influence in general, and include additional jobs, earnings, and spending. Further discussion of the economic effects of the SSC, including annual estimates of project-related increases in employment, earnings, and sales demand, is presented in Volume IV, Appendix 14, Section 14.1.3.7.A.

0384.01

Comments noted.

0384.02

The DOE is committed to establishing a full range of intergovernmental relationships to contribute to the successful establishment of the SSC project in the area of the selected site. The DOE recognizes the essential need of interacting with all levels of governmental responsibility to ensure the elimination or minimization of potential negative impacts, while also providing the opportunity for maximizing the attendant benefits of the SSC project to the host area. The DOE will prepare a site specific Supplement to this EIS before a decision to construct and operate the SSC. This process will continue the role of public involvement.

0385.01

Comments noted.

0386.01

Comments noted.

0387.01

Comment noted.

0388.01

Comments noted.

0389.01

Comments noted.

0390.01

Comments noted.

0391.01

Comments noted.

0392.01

See Comment Response 401.01.

0392.02

Comment noted.

0392.03

Volume IV, Appendix 8, Section 8.3.2 addresses construction-related air quality impacts and identifies a number of fugitive dust control measures that reduce the magnitude of fugitive dust emissions generated during construction. These and other control measures will be thoroughly reviewed and carefully considered for implementation by the DOE in the Supplemental EIS prepared for the selected site.

0393.01

Comments noted.

0394.01

Comments noted.

0395.01

Comments noted.

0396.01

Comments noted.

0396.02

Comments noted.

0396.03

Comments noted.

0397.01

Comments noted.

0398.01

Comments noted.

0399.01

Comments noted

0400.01

Comments noted.

0401.01

The use primarily of surface waters for the construction and operations of the SSC at the Texas site is discussed in EIS Volume IV, Appendix 7, Sections 7.1.3.7.G, 7.2.3.7.A.1 and 7.2.3.7.A.5. Groundwater use is only for construction and operations of some of the remote facilities along the collider ring; some of the resulting population increase may use groundwater sources.

The possibility that municipalities in Ellis County may change to surface water sources in the future is noted in Volume IV, Appendix 7, Section 7.2.3.7. If this were to occur within the time frame of the project, the existing overdraft would not be immediately or totally alleviated. The SSC groundwater use would still be an increment, although small, to an overdraft condition.

0402.01

The observation on faulting is consistent with the data on faulting used to prepare the EIS. Reaser (1961) describes "displacement up to 100 feet" for faults in northeast Ellis County; Shuler (1918) noted fault displacements that are "barely perceptible, or as much as two or three feet at a maximum" in Dallas County; Raney et al. (1987) indicate maximum throws that "rarely, if ever, exceed 100 feet" at the SSC site (see also EIS Volume IV, Appendix 5, Section 5.7.1.3). Volume I, Chapter 4, Table 4-1 has been revised to more accurately reflect these facts.

0403.01

For a response to the issue of Chambers Creek, see Comment Response 1547.45.

The wetlands assessment in the EIS has been revised to include additional information on wetlands location, type, and quality (see Volume I, Section 5.1.5.4 and Volume IV, Appendix 11, Section 11.3.7.3). For comparative purposes, wetlands impacts have been evaluated for all areas where surface construction could occur (areas A, B, C, E, F, J, and K).

EIS Volume IV, Appendix 11, Section 11.3.7.2 has been changed to indicate that the nearest known nesting habitat for the black-capped vireo occurs along the White Rock Escarpment, in an area approximately 10-15 mi north of the site. This section also includes the results of a habitat survey conducted by Texas Parks and Wildlife Department that indicated that no nesting habitat for the black-capped vireo occurred within the site area.

0403.02

The 3 percent figure for wetlands area is based on the percent of the study area occupied by wetlands. The study area is defined as 0.5 mi on both sides of the collider inner ring and 0.5 mi outside of the A, B, and C boundary. A text addition has been included to clarify this information (see Volume IV, Appendix 11, Section 11.3.7.3).

0403.03

The DOE agrees that the sentence in question was inaccurate and has modified the text. A number of alternatives do exist for mitigating possible impacts of construction at the J4 Chambers Creek location. These are discussed in Volume I, Chapter 5, Section 5.1.5.3; Volume I, Chapter 3, Section 3.6; and Volume IV, Appendix 11, Section 11.3.7.3; avoidance is the preferable mitigation. Since J areas are possible future expansion sites, and only two of the J areas would be developed if they were needed for operation of the SSC, avoiding Chambers Creek in the siting of the J areas is very feasible. More specific information relative to wetlands mitigation at the selected site would be included in the Supplemental EIS.

0404.01

Comments noted.

0405.01

Comment noted.

0406.01

Comments noted.

0407.01

Comments noted.

0407.02

Comment noted.

0407.03

Comments noted.

0407.04

Comment noted.

Comment noted.

0409.01

A discussion of the economic impact of the potential siting of the SSC in Ellis County, Texas, is found in Volume IV, Appendix 14, Section 14.1.3.7.a. A discussion of public finance impacts for the proposed Texas site is found in Volume IV, Appendix 14, 14.1.3.7.D.

0409.02

The SSC-related effect on urban and suburban residents is presented in the EIS, Volume I, Chapter 5, Section 5.1.8.5 and Volume IV, Appendix 14, Section 14.1.3.7.E. With the SSC-related development, the quality of life for Waxahachie residents is expected to more closely resemble that in the Dallas-Fort Worth metropolitan region. A more urban existence may be welcome for some residents but could be a source of dissatisfaction for others.

The available information on the impacts to the quality of life/social well-being in rapid growth communities is highly varied and sometimes contradictory due in large part to the difficulty in measuring quality of life and social well-being. The usual argument is that the elderly and people on fixed incomes would be negatively affected by an increase in the cost of living resulting from rapid growth. In addition, elderly persons are perceived as being less flexible or adaptable than young people. Recent evidence raises some questions about the accuracy of parts of this proposition. Psychologically, the very fact that some of the elderly residents are relatively "set in their ways" provides an important source of continuity in their lives, and does so at a time when many external changes are taking place. Socially, the elderly people tend to be reasonably buffered by a number of good friends. Culturally, the elderly may have strong beliefs in the importance of growth to their community; providing jobs for the young people so that they may stay in the area, and the opportunity for new retail outlets expanding the selection of goods and services available. It may be, indeed evidence points to the fact, that the costs of living may rise no faster in rapid growth communities than it does on a national average, except in the area of housing costs.

0409.03

Within the Texas Revised Civil Statutes, the 70th Texas State Legislature has adopted Article 4413(47e), "Superconducting Super Collider Facility Research Authority." This article enables two or more public entities, such as a county or a city, to adopt resolutions or ordinances necessary to create a research authority for the SSC. The research authority created would have the ability, among other things, to "make loans to public and private entities to fund eligible projects" [Sec. 4. (a) (5)], issue bonds to fund eligible projects" [Sec. 4. (a) (6)], "exercise power of eminent domain to acquire land, easements, and property" [Sec. 4. (a) (9)], and "levy taxes in order to provide for payment of amounts required under contracts, leases, and agreements with the United States, its departments and agencies, this state, its departments and agencies, counties, municipalities, ..." [Sec. 5. (a) (2)]. Article 4413(47e) enables jurisdictions to create the taxing authority referred to in the comment. Any tax burdens could be spread among all jurisdictions within Texas that wish to join the research authority; thus, within the legislation, these tax burdens are not necessarily limited to Ellis County.

0410.01

Comment noted.

0411.01

At the local level, Ellis County, Texas, would experience an annual fiscal increase in public finance of $3.4 million in 1992 and $2.9 million in the year 2000. During the first two years of SSC construction (1989 and 1990), County public finance would experience negative impacts; however, every year beyond 1990 the County would experience positive public finance impacts (see EIS Volume I, Chapter 5, Section 5.1.8.4). The application of four different types of taxes will contribute to revenue for the selected state: sales and use taxes, motor fuels taxes, vehicle registration, and public utilities taxes (Volume I, Chapter 5, Section 5.1.8.4).

0412.01

One entire community would be disbanded by the fee simple land offering in Texas, as complete a breakup of a societal group as one is likely to encounter. The town of Boz contains about 25 residents. All would have to be removed to make room for the SSC campus area (see EIS Volume IV, Appendix 14, Section 14.1.3.7.E).

The EIS was sent out to over 12,000 individuals: persons who requested a copy at scoping meetings, by letter or other communications. A copy of the EIS is being sent to you directly, and the DOE regrets any inconvenience to you. The Supplemental EIS will address in more detail the socioeconomic impacts of the SSC at the selected site.

0412.02

Comment noted.

0413.01

Comments noted.

0413.02

Comments noted.

0414.01

Comments noted.

0415.01

Comment noted.

0415.02

Comments noted.

0415.03

Due to the large number of local government service jurisdictions studied in the EIS, it was not feasible to analyze the existing capacities and quality of services (including health care) for each jurisdiction. However, current levels of service for public health care in the Texas Region of Influence (ROI) and in Ellis County are found in Volume IV, Appendix 5c, Section 5.7.11. The quality of the health care provided by the facilities included in the area evaluated is not examined. However, a discussion of SSC-related impacts to local health care services may be found in Volume IV, Appendix 14, Section 14.1.3.7.

0416.01

Comment noted.

0417.01

Comment noted.

0418.01

Comment noted.

0419.01

Comment noted.

0420.01

Both groundwater and surface water are proposed supply sources for the SSC project at the Texas site. Surface water is the primary source. Groundwater (from the Twin Mountains/Woodbine aquifer) will be used to supply the far cluster and the remote service areas. This will be a minimal amount of water during construction and will be about 780 acre-ft/yr during operations. Pumpage will be distributed around the ring area. The impacts of the project on the Rockett Water Supply and the implications of plans for supplementing the water supply by the construction of the planned Red Oak Creek Reservoir will be considered in detail and documented in the Supplemental EIS if the Texas site is the selected site.

See Volume IV, Appendix 7, Section 7.2.3.7 for an assessment of the potential impacts of groundwater use at the Texas site. See also Comment Responses 34.02 and 401.01.

0420.02

The development of a reservoir along Red Oak Creek above the collider tunnel will likely be precluded by construction of the SSC due to: concerns about changes in hydrology (increased head above the Taylor marl where the tunnel is at a shallow depth) and questions about radiological impacts to water quality.

It is the DOE's understanding that the Texas National Research Laboratory Commission is working with the Rockett Water Supply Corporation on the question of the necessity of the Red Oak Creek Reservoir even without the SSC, and about alternative supply sources.

If the proposed Texas site is selected for the SSC, this situation will be addressed in the Supplemental EIS. EIS Volume I, Chapter 5.2.1.4. has been revised and Volume IV, Appendix 7, Section 7.1.3.7. have been corrected in the Errata to address these concerns.

0421.01

Comments noted.

0422.01

Comment noted.

0423.01

Comment noted.

0424.01

Comment noted.

0425.01

Comment noted.

0425.02

The Corps of Engineers EIS on Lake Bardwell referred to in the comment was evaluated during preparation of the SSC EIS. The DOE believes that the level of treatment of the topics listed in the comment, Appendices 10 and 14, is sufficient for the purposes of a site-selection EIS.

0425.03

See Comment Response 238.03.

0425.04

The disposal of excavated material from the Texas site is detailed in EIS Volume IV, Appendix 10, Section 10.2.3.7 A. In the Texas proposal, the amount of excavated material is estimated to be 2.6 million yd^3: 70 percent (1.8 million yd^3) of Austin chalk, and 30 percent (800,000 yd^3) of marl. Texas has proposed two separate disposal alternatives for both the Austin chalk and the marl.

The State's first alternative for Austin chalk disposal is that all of the excavated chalk would be sold to commercial cement manufacturers, as Austin chalk is presently used for that purpose. The second alternative is that Austin chalk would be used for road construction as road sub-base. The state did not identify what percentage would be used for this purpose.

The estimated 800,000 yd^3 of marl would be disposed through one of two alternatives proposed by the State. Approximately 500,000 yd^3 could be deposited in several unnamed quarries. The second alternative would be to create a new landfill for the spoils. The landfill would cover 45 acres with a spoils height of 15 ft.

None of the alternatives proposed for the Texas excavated material involves placement of fill into floodplains. No increased flooding or flooding potential would be associated with any of the proposed disposal options. It is not likely that homes would ever be built on the spoils landfill; however, this would be controlled by local zoning and building regulations.

0426.01

Comment noted.

0427.01

Comment noted.

0428.01

Comment noted.

0428.02

The Arizona proposal, Volume 3, p. 93 states: "For the purpose of this proposal, use of a TBM was assumed for ring depths greater than 60 ft. The experience of local contractors with fanglomerate demonstrates, however, stable open-cut excavations to depths of between 80 and 100 ft. ... To be conservative in the estimates, a depth of 60 feet is assumed." The Arizona proposal then used depths up to 120 ft as shown on the tunnel profile to calculate the 22 percent of cut-and-cover tunnel.

The DOE selected an 80-ft maximum depth for estimating cut-and-cover construction, since this depth resulted in a more reasonable combination of cost vs. acceptable geotechnical risk than was specified in the proposal. This led to 11 percent of the collider ring as cut-and-cover tunnel.

0428.03

See Comment Response 658.55.

0428.04

See Comment Response 428.12.

0428.05

Reference to visual impacts being national in scope was made in error in Volume I, Chapter 5, Section 5.1.10.3.A, of the DEIS. The reference was to impacts on views from Wilderness Study Areas due to the campus and injector, and the text has been corrected to reflect a regional impact.

The second part of this question is interpreted as an assertion that, without the SSC project, adjacent private land would be developed over the next twenty years, and that if the SSC project occurs here, the management of visual resources would be improved. Development of private land near the SSC project has been addressed in Volume IV, Appendix 5a, Section 5.1.10.2.B.1 of the EIS. Privately held land in the project area is extremely limited in extent, nearly all of it being clustered near the town of Mobile. It includes a concentration of ranching activities toward the southern extension. Current and future plans and policies regarding the near cluster consider this location as acceptable either for open space, extremely low density residential, light grazing, or light industrial uses. There has been little or no pressure to develop the near cluster area. There is some interest in industrial and residential development in the vicinity of Mobile, including a waste management facility and oil refineries. There are no indications that the proposals are dependent on whether or not the SSC is built at the Arizona site; hence, there appears to be no basis for contending that building the SSC in Arizona will result in less development and improved management of visual resources of adjacent lands.

0428.06

Wherever possible, data from the Arizona proposal were verified through consultation with regional experts and the published literature. Based on the assumptions and references cited in the EIS, the analyses are correct, except for the following.

Regarding carbon monoxide values, see Comment Response 428.22.

The number of historic sites identified within the Arizona SSC site (Volume I, Chapter 3, Table 3-7) has been changed to 10 as verified by documentation regarding the cultural resource survey of the SSC site (Montero et al.). The Arizona SSC proposal and subsequent State submissions did not include information on intermediate access areas, service areas, or areas of construction and other ancillary activities. Information concerning the de Anza trail was provided by the BLM.

Volume I, Chapter 3, Section 3.6.4 of the EIS has been revised to state that the DOE will notify the Arizona Commission of Agriculture and Horticulture 30 days prior to site disturbance to allow the opportunity to salvage cacti and other protected plants. As a means of reducing impacts of the project, the DOE intends to restore and revegetate with native species areas not permanently disturbed.

Information provided by this commentator on the presence, distribution, and natural history of the desert tortoise has been used in Volume IV, Appendix 11, Section 11.3.1.2 of the EIS.

0428.07

Analyses in EIS Volume IV, Appendix 14, Section 14.2.2.3 A.1 indicate that APS's reserve margin planning criteria of 16 percent will not be met past the year 1992. This results primarily from the projected strong non-SSC growth in the area. The SSC construction and operations load will further reduce the reserve margins.

The commenter disagrees with this conclusion because APS says that it can modify its plans and schedules to better accommodate the SSC load and the non-SSC load growth. By modifying its plans and schedules, APS could acquire additional generating capacity and increase its reserve margins in future years.

It is acknowledged that APS can modify its plans and schedules in the future. However, the DOE has no control over the utility and cannot, therefore, assume that the plans and schedules will be modified.

Comment Responses 428.96, 428.97, 428.116, 428.117, 428.118, 428.119, 428.120, 428.121, 428.122, address the issues raised in the "attached document" referred to in the comment.

The future SSC energy costs were estimated for each site and were used in the development of life-cycle cost estimates. The average life cycle cost estimate for all sites is presented in the EIS, Volume IV, Appendix 2. See also the SSC Site Task Force Report included in EIS Volume III.

0428.08

Comment noted.

0428.09

See Comment Response 428.130.

0428.10

The Arizona estimate of 1.43 million yd^3 for spoils can not be verified from the proposal tunnel profile. Using tunnel profile data results in an estimate of total spoils for the Arizona/Maricopa site of 2,450,000 yd^3, as shown in EIS Volume IV, Appendix 10, Section 10.2.3.1.A. Differing amounts shown elsewhere in the EIS have been revised accordingly, excluding those instances where a rounded value of 2.5 million yd^3 was appropriately used.

For purposes of this EIS, the assumption was made that cut-and-cover construction of the collider ring tunnel will produce the same amount of spoils per mile as underground excavation by means of a tunnel boring machine. This assumption was based on criteria of no topographic change to the land surface and removal of spoils equal to the earth and rock material displaced by the 12-foot diameter tunnel. The cost estimating procedures used for EIS Volume IV, Appendix 2 were based on the cut-and-cover technique used for the Conceptual Design Report (CDR) wherein backfill methods were assumed to replace only the material excavated during the construction of the buried structure. Disposal of spoils by compacting the cut-and-cover areas to higher-than-necessary density and placing spoils in the resulting depression is uneconomical. With regard to the options for spoil disposal sites see Comment Response 428.128.

The spoils disposal site for purposes of analyses for this EIS, namely the Sacaton mine, was selected on the basis of information provided by the Arizona proposers in the original Arizona site proposal and in supplementary material submitted in mid-1988. In the event that the Arizona site should be selected, more detailed analyses will be performed within the Supplemental EIS.

0428.11

The number of miles of new roads for the Arizona site, listed in EIS Volume I, Chapter 3, Table 3-3, namely 101 mi, is correct for the configuration described. This configuration is exactly as shown in Volume IV, Appendix 1, Figure 1.2.1-3. These new roads consist of 54 mi of local SSC roads and 47 mi of a new four-lane highway that connects I-10 and I-8 which passes by the SSC campus area on the east side of the Booth Hills. This configuration (Figure 1.2.1-3) differs from the configuration shown in Figure 1.2.1-4, which represents a total of 60 mi of new roads, namely 15 mi of access highway and 45 mi of local SSC roads. The mileage of an 8-mi section of new road was not counted twice.

0428.12

Corrections have been made based on Soil Conservation Service acreage estimates to show zero acres of prime and important farmlands for Arizona in the FEIS as follows:

Volume I, Chapter 3, Table 3-7.
Volume I, Chapter 3, Section 3.7.1.12.
Volume I, Chapter 4, Section 4.8.6.
Volume I, Chapter 4, Table 4-23.
Volume I, Chapter 5, Section 5.1.7.2.
Volume I, Chapter 5, Table 5.2-1.
Volume I, Chapter 5, Section 5.4.
Volume I, Chapter 5, Table 5.6-4.

Volume IV, Appendix 5, Section 5.1.10.3.B, Table 5.1.10-6.
Volume IV, Appendix 13, Section 13.2.3.1, Table 13-8.
Volume IV, Appendix 13. Table 13-15.

0428.13

Table 3-7 is incorrect in the DEIS and has been corrected in the Final EIS. Ten historic sites are located in Arizona SSC project area based on surveys to date. These sites are described in the EIS in Section 5.1.12 of Appendix 5 and Section 5.1.3.1 of Appendix 15.

0428.14

See Comment Response 428.93.

0428.15

Volume I, Chapter 3, Section 5.2-3 and Volume IV, Appendix 8 of the DEIS incorrectly state or imply that regional exceedances of the CO National Ambient Air Quality Standards (NAAQS) will result from SSC-related emissions. The impact of SSC-related CO emissions (e.g., vehicular site and highway traffic) would be relatively small in comparison to the existing source impacts and would extend over a large area. Background CO concentrations in areas impacted by SSC-related emissions are expected to be well below NAAQS. Subject sentences have been deleted or corrected in the EIS.

0428.16

See Comment Response 428.12.

0428.17

The terms "older fanglomerate" and "younger fanglomerate" are used as in the Final EIS. The fact that no faults have been confirmed along the ring alignment has been noted. However the "Report on Geophysics Surveys for the Desertron Maricopa and Sierrita Sites, June 3-20, 1987" (LASI-87-4), provided as supplemental data by the State, presented the results of gravity and magnetic surveys in the Maricopa Valley which indicated the possible presence of diabase dikes, and an east-west trending fault bordering the north side of the southern segment of the Maricopa Mountains.

0428.18

Change to Volume I, Chapter 4, Section 4.1.2 has been made as suggested.

0428.19

Change to Volume I, Chapter 4, Section 4.1.3 has been made as suggested.

0428.20

The data quoted are, as is indicated in EIS Volume IV, Appendix 5, Section 5.1.3.3, that 10.33 inches of precipitation is the mean for the south-central Arizona climatic region, as substantiated in the reference at the end of Table 4-5. The Climatic Atlas is the source of data used for all seven sites in order to ensure comparability of treatment.

0428.21

The correct heading is indeed "Mean annual dewpoint (°F)"; EIS Volume I, Chapter 4, Table 4.5 has been corrected in the final EIS.

0428.22

The carbon monoxide air quality data for Arizona contained in EIS Volume I, Chapter 4, Section 4.4.2, Table 4-6 are not representative of background concentrations that would be expected in the vicinity of the proposed Arizona SSC site. The Sierra Estrella Sailport data is more representative. Changes have been made in EIS Volume I.

0428.23

The use of dust suppressant methods to control the spread of Valley Fever spores is addressed with other possible control measures in EIS Volume I, Chapter 5, Section 5.1.6.1.B.

0428.24

Although feral burros are considered by many to be a "nuisance species," the species is culturally important due to its role in the settlement of the western states. The species is protected and managed under the Wild Free-Roaming Horses and Burros Act of 1971 (16 USC 1331-1340). This Act is described in EIS Volume I, Chapter 6, Section 6.2.16.

0428.25

Volume I, Chapter 4, Section 4.7.1 has been revised in accordance with the commenter's suggestions.

0428.26

Volume I, Chapter 4, Table 4-16 of the DEIS has been modified to state "Gila River."

0428.27

The text in Volume I, Chapter 4 has been modified to read "...Gila River drainage basin."

0428.28

The word "disturbance" has been substituted for "stress" in phrase (1) and phrase (2) has been deleted in its entirety from Volume I, Chapter 4, Section 4.7.2.

0428.29

See Comment Response 658.34.

0428.30

The information provided by the commenter is consistent with the information in the EIS in Volume I, Chapter 4, Section 4.7.2.

0428.31

See Comment Response 658.36.

0428.32

See Comment Response 658.37.

0428.33

See Comment Response 658.39.

0428.34

See Comment Response 658.40.

0428.35

See Comment Response 658.41.

0428.36

See Comment Response 658.42.

0428.37

See Comment Response 658.43.

0428.38

Volume I, Chapter 4, Section 4.8.3 has been modified to reflect the clarification. A more detailed description of historic land use is provided in Volume IV, Appendix 5, Section 5.1.10.1.C.

0428.39

See Comment Response 428.12.

0428.40

See Comment Response 428.12.

0428.41

See Comment Response 2.01.

0428.42

The usage of the term "fanglomerate" to describe the basin-filling sediments is being followed throughout the EIS. However, the geotechnical properties of the material are more akin to dense, locally indurated soil (see the properties listed in Volume IV, Appendix 5, Table 5.1.1-3 and compare them with the properties for rock listed in Table 5.1.1-4).

0428.43

The Sierra Estrella Sailport carbon monoxide data are more representative of background conditions at the proposed Arizona site than data presented in EIS Volume I, Chapter 5, Table 5.1.3-3 in the DEIS. This table has been revised to reflect carbon monoxide data from the Sierra Estrella Sailport in the FEIS.

040104503348814

0428.44

The noted Errata have been corrected in EIS Volume I, Chapter 5. The numbers were presented correctly in Volume IV, Appendix 8, Table 8-7.

0428.45

This comment is consistent with EIS Volume I, Chapter 5, Section 5.1.5.1.13. See also Comment Response 658.51.

0428.46

The sentence in EIS Volume I, Chapter 5, Section 5.1.5 has been revised to indicate that reclamation could be enhanced by use of fertilizers and spraying of blue-green algae. Although fertilizers may enhance many plants, it is only one of the limiting factors. In most desert habitats, water, heat, and soil conditions are the primary limiting factors.

0428.47

See Comment Response 428.93.

0428.48

See Comment Response 658.39.

0428.49

See Comment Response 658.55.

0428.50

See Comment Response 658.56.

0428.51

See Comment Response 658.57.

0428.52

Hunting and fishing as recreational activities will be restricted at all sites during construction, and will continue to be tightly controlled within populated fee simple areas for the operational life of the SSC. This statement is made in Volume IV, Appendix 11 for each of the BQL sites. While the final restrictions will be site specific, similar restrictions can be anticipated and are site independent. Further specification of resource management plans will be contained in the site specific Supplemental EIS.

0428.53

The control measures that might be used to mitigate the potential hazard from Valley Fever spores at the Arizona site (as listed in EIS Volume I, Chapter 3, Section 3.6 and Chapter 5, Section 5.1.6.1.B) were called special control measures, because even though commonly used at construction sites to reduce road dust, the dust suppression procedures needed to control the spread of Valley Fever spores are likely to be more extensive and rigorously applied than those for a project where simple nuisance dust is a concern.

0428.54

The DOE agrees that Arizona is the only state where cultural resource surveys have been completed of all defined impact areas of the proposed SSC footprint. EIS Volume IV, Appendix 5, Section 5.1.9.1. has been modified to acknowledge the status of the Arizona surveys. In addition, as stated in the comment, additional surveys would be required of yet-to-be-defined ancillary activity and construction areas. These could include new and improved access roads, construction staging areas, spoils deposition areas, parking areas, storage yards, field offices, and other activities and facilities involving ground disturbances. Utility rights-of-way would also be surveyed.

0428.55

The comment is correct. EIS Volume I, Chapter 5, Section 5.1.9.1, has been revised as verified by the results of the cultural resource study of the SSC site (Montero et al.).

0428.56

The seven site alternatives occur in a diversity of settings. The methodology used was selected because it may be applied to any type of landscape: natural-appearing, rural, or urban. To compare the visual and scenic impacts at the site alternatives, one common methodology had to be applied. The BLM system of visual resources management, on the other hand, cannot be used in assessing visual and scenic impacts of projects in urban or rural areas, which are the land types characterizing all sites but Arizona. The BLM approach was developed to help set management priorities for natural-appearing landscapes. For additional information, see Comment Response 1172.03.

0428.57

See Comment Response 428.05.

0428.58

See Comment Response 428.15. The subject sentence in Volume I, Chapter 5, page 5.2-3 of the DEIS has been deleted.

0428.59

See Comment Response 658.65.

0428.60

The statement in Volume I, Chapter 5, Section 5.4 regarding extractable geologic resources has been deleted.

0428.61

The Arizona proposal, Volume 3, p. 93 states: "For the purpose of this proposal, use of a TBM was assumed for ring depths greater than 60 feet. The experience of local contractors with fanglomerate demonstrates, however, stable open-cut excavations to depths of between 80 and 100 feet. ... To be conservative in the estimates, a depth of 60 feet is assumed." The 22 percent cut-and-cover is not consistent with the 60-ft maximum cut-and-cover depth as proposed by Arizona. Cost comparisons between cut-and-cover at various depths and tunneling showed that 80 ft was the maximum economical depth for cut-and-cover in fanglomerate. Using 80 ft as the maximum depth results in 11 percent of the collider ring being located in this type of construction.

0428.62

See Comment Responses: 428.17, 428.18, 428.19, 428.42, 428.60, 428.63, 428.64, 428.65, 428.66, 428.67, 428.124, and 428.126.

In addition, reference to the Basin Range physiographic province in Volume IV, Appendix 5, Section 5.1 has been corrected in the Errata for Appendix 5. See Comment Response 428.124.

0428.63

The reference to the Booth Hills in Volume IV, Appendix 5, Figure 5.1.1-1 has been corrected in the Errata to Appendix 5.

0428.64

Volume IV, Appendix 5, Figure 5.1.1-2 and Table 5.1.1-1 have been corrected in the Errata for Appendix 5 to conform to the standards of capitalization of the rules of stratigraphic nomenclature. The thickness of the Quaternary alluvium has been corrected in Figure 5.1.1-2 of the EIS.

0428.65

In response to the comment the text of Volume IV, Appendix 5, Section 5.1.1.2 has been corrected in the Errata to Appendix 5.

0428.66

In Volume IV, Appendix 5, Section 5.1.1.3, the age of the Proterozoic rocks has been corrected in the Errata to Appendix 5.

0428.67

The text has been corrected in the Errata for Volume IV, Appendix 5.

0428.68

Volume I, Chapter 5, Section 5.1.2.4 and Volume IV, Appendix 7, Section 7.2.3.1 B.1 have been revised to reflect the range of numbers reported. In addition, Volume IV, Appendix 5, Section 5.1.2.2.A.1 has been corrected in the Errata.

0428.69

The reference (U.S. Environmental Science Services Administration 1968) indicated a high of 123°F occurring in September. There is no difference in the analysis whether the high is July, August, or September in any particular year.

0428.70

These later data for carbon monoxide from Sierra Estrella Sailport have been inserted into EIS Volume I, Chapter 5, Section 5.1.3 but do not significantly change the analysis presented in Section 5.1.3 and in Appendix 8, Section 8.4.1. Also see Comment Response 428.22.

0428.71

Because of the more rural nature of the Sierra Estrella Sailport and its proximity to the SSC site, its carbon monoxide data are more representative of background conditions at the proposed Arizona site than data presented in Volume IV, Appendix 5, Table 5.1.4-3 of the DEIS. This table has been corrected in the Errata to Appendix 5 to reflect carbon monoxide data from the Sierra Estrella Sailport.

0428.72

The corrected location of Sierra Estrella Sailport has been incorporated in the Errata to EIS Volume IV, Appendix 5.

0428.73

The 30 mi distance is from the nearest point on the ring. The Superstition Wilderness is located 45 mi from the center of the ring. This has been clarified in the Errata to EIS Volume IV, Appendix 5.

0428.74

The specific location of this structure does not alter the noise impact assessment for Arizona presented in EIS Volume I, Chapter 5, Section 5.1.4, and in Volume IV, Appendix 9. After site selection, surveys will be performed to verify the locations of residences and other noise sensitive locations.

0428.75

The noted change is incorporated in the Errata for Volume IV, Appendix 5.

0428.76

The noted change is incorporated in the Errata for Volume IV, Appendix 5.

0428.77

The map is correct in the EIS (see Volume IV, Appendix 5, Figure 5.1.8-1). However, a correction has been made to the text in Volume IV, Appendix 5, Section 5.1.8.2: "The southwest regional landfill will be located 30 mi northwest of the SSC site, near Buckeye (MAG 1987)."

0428.78

The references for EIS Volume IV, Appendix 5, Section 5.1.9, Ecological Resources, are included in the Errata for Appendix 5 of the EIS. They include all citations used in the text.

0428.79

See Comment Response 658.96.

0428.80

See Comment Response 658.97.

0428.81

See Comment Response 658.98.

0428.82

See Comment Response 658.34.

0428.83

The comment is consistent with Volume IV, Appendix 5, Section 5.1.9.1.C.

0428.84

See Comment Response 658.101.

0428.85

See Comment Response 658.102.

0428.86

See Comment Response 658.103

0428.87

The word "most" has been deleted from Volume IV, Appendix 5, Section 5.1.9.2.A.2. This change can be found in the Errata section of Appendix 5.

0428.88

See Comment Response 1036.02.

0428.89

See Comment Response 1036.02.

0428.90

See Comment Response 1036.02.

0428.91

See Comment Response 658.37.

0428.92

The reference to the University of Arizona in Volume IV, Appendix 5, Section 5.1.9.5.A.3 has been changed in the Errata to Arizona State University.

0428.93

Based on the comment, the discussion of the Arizona Native Plant Law has been revised (EIS Volume I, Chapter 3, Section 3.6 and Chapter 5, Section 5.1.5). The DOE has committed to mitigate as necessary disturbed Sonoran Desert scrub habitat by collecting cacti and other protected plants, and restoring and revegetating acres temporarily disturbed.

0428.94

Revisions have been made in Final EIS Volume I, Section 4.7.3.1 (formerly Section 4.7.5.1) to indicate that the Maricopa Mountains on the proposed SSC site are covered by plant and animal communities that are similar to those in the immediate region.

0428.95

See Comment Response 428.12.

0428.96

This comment concerns statements made in the EIS Volume IV, Appendix 5. Modifications to the paragraphs in this Appendix were made to clarify the future resources of APS. The data used to modify this paragraph were Arizona Public Service Company Integrated Least Cost Planning Analysis, 1987. See Errata for modifications to paragraphs 1 and 2 in the EIS Volume IV, Appendix 5, Section 5.1.11.2 B.I.e and the addition of the APS report to the references.

0428.97

Corrections have been in the Errata for Volume IV, Appendix 5.

0428.98

Applications for special use permits for two oil refineries at Mobile have been approved by Maricopa County. Neither project has submitted an application for a building permit. As a result, there are neither project plans to review, nor are the visual impacts of such facilities in the EIS. The sites for the planned refineries are 9.5 mi from the nearest sensitive viewing positions on the upper slopes of the Southern Maricopa Mountains. The extensive facilities of the campus and injector would be only 4 mi away from those viewing positions and would render the visual consequence of the comparatively distant refineries irrelevant.

The waste facility mentioned, the Butterfield Station Facility Landfill, is to be located about 1 mi north of Mobile. The application for a special use permit for this project has been approved. The site is 11.8 mi from the slopes and crests of the Southern Maricopa Mountains, the nearest sensitive viewing positions. Given the distance involved, it was not considered in the analyses.

0428.99

The Wilderness Study Areas (WSA) have been delineated such that the majority of jeep trails will continue to be accessible, should the WSA's become designated as Wildernesses. For trails penetrating the WSA's, boundaries for the study areas run alongside, but do not include, the trails, which then appear as long, thin stringers of excluded land. Other trails trace the edge of the WSA's, but are not included within them. Therefore, off-road vehicle users would still have access to the WSA's via many of their accustomed trails if the lands were to become designated as Wilderness. The sensitivity for views from those trails would, then, remain high.

0428.100

The suggested wording change has been incorporated into Volume IV, Appendix 7 of the EIS.

0428.101

This report is entitled "Interim"; however, an analysis of the emissions from material-handling processes, which were calculated to produce less than 1 ton/yr in the categories assessed with the old expression, indicates that the revised emission factor expression will produce emissions that are approximately 75 percent less. Therefore, the emissions inventories for material handling presented in EIS Volume IV, Appendix 8 are bounding values. Because of this, plus the interim nature of the referenced report, no reanalysis of the fugitive dust emissions inventory was performed.

0428.102

This has been revised in EIS Volume IV, Appendix 8.

0428.103

See Comment Response 428.15. The incorrect sentence in EIS Volume IV, Appendix 8 has been revised.

0428.104

See Comment Responses 428.15 and 428.22.

0428.105

The analysis presented in Volume IV, Appendix 8, Table 8-4 has been revised to utilize an assumption of 11 percent cut-and-cover collider ring construction.

0428.106

See Comment Response 428.71. Table 8-9 has been corrected in the Errata to EIS Volume IV, Appendix 8 to include CO data from the Sierra Estrella Sailport.

0428.107

See Comment Response 658.129.

0428.108

See Comment Response 658.55.

0428.109

Volume IV, Appendix 11, Section 11.3.1.2, has been revised based on a recent survey conducted by the BLM at the proposed Arizona SSC site. All of the proposed campus facilities (A, B and C) and sites J2, J5, E3, E4, F2, F3, F4, and K6 were sampled. The night-blooming cereus was found throughout the site at densities of up to 0.5 plants per acre or 320 plants per square mile. Throughout its range this species has been found to be much more common than previously known. This species is regulated under the Arizona Native Plant Law, which would require a permit to clear land that would result in the removal of any cacti and other listed plants. The DOE would consult the State of Arizona regarding any recommended mitigation measures. In the event the Arizona site is selected, more detailed studies would be conducted to identify the locations of cacti and other native plants and determine impacts of site preparation. The results of these studies would be provided in the Supplemental EIS.

0428.110

See Comment Response 428.78.

0428.111

The second sentence of Volume IV, Appendix 11, Section 11.3.1.3 has been changed to indicate that xeroriparian habitat associated with larger ephemeral drainages and stock ponds is present in the project area, but would not be significantly impacted by SSC construction.

0428.112

See Comment Response 658.57.

0428.113

See Comment Response 658.137.

0428.114

See Comment Responses 655.03, 655.04, 655.05, and 655.06.

0428.115

See Comment Response 655.07.

0428.116

There is no suggestion in the EIS that the Arizona Public Service Company (APS) management does not support the SSC project. EIS Volume IV, Appendix 14, Section 14.2.2.2.C., describes precisely the retention of flexibility in planning that most utilities preserve and concludes with the sentence "Most utilities would be able to modify their resource plans to accommodate changes in planned requirements with little difficulty." This statement does not exclude the Arizona Public Service Company.

0428.117

The column titled "Planned Reserves w/o SSC" in DEIS Volume IV, Appendix 14, Table 14.2.2-1 is accurate. Development of numbers in the column "Planned Reserves w/SSC" was for the purpose of determining if currently planned reserves are sufficient to accommodate the SSC and its secondary load. This is not erroneous, but the possibility of misunderstanding exists. The current plans of APS do not include the SSC loads, so the "Planned Reserves w/SSC" reflects current resource plans, but the with SSC load added. It is fully understood that utilities can and must modify their resource plans frequently. It is expected that APS would do so if Arizona were selected as the site for the SSC. The potential for misunderstanding has been reduced by including a subtitle under "APS RESERVE MARGINS WITH AND WITHOUT SSC" to be "UNDER CURRENT RESOURCE PLAN w/o SSC" in Tables 14.2.2-1, 14.2.2-2, 14.2.2-3, 14.2.2-4, 14.2.2-5, 14.2.2-6, and 14.2.2-7.

See Comment Response 428.116.

Deletion of Table 14.2.2-1 would eliminate valuable information from the EIS. The columns "Planned Reserves w/SSC" and "Percent Reserves w/SSC" provide useful information about the extent to which current resource plans must be modified in order to accommodate the addition of the SSC electric load.

The proposed substitute paragraph addresses issues other than the reserves projected under current plans.

0428.118

See Comment Response 428.116. The proposed substitute sentence was not incorporated into the EIS because it addresses the commitment of APS management. The sentence referred to in the text addresses current utility resource plans and the factual matter of whether sufficient excess reserves will exist to meet the SSC and secondary loads.

0428.119

It is not anticipated that any existing power transmission lines would need to be relocated based on the location and orientation of the SSC as proposed by the State of Arizona. However, the proposed location and orientation of the SSC analyzed in the DEIS is based on a conceptual design. Minor revisions in the location, orientation, and/or design made during detail design could potentially lead to the requirement to relocate portions of the APS 69-kV distribution line presently being constructed along the Maricopa-Gila Bend Road and other existing lines. If a relocation is required, interruption in service to existing customers would be short-term. A more detailed site specific review will be required under NEPA prior to a final decision on the construction and operation of the proposed SSC. This more detailed review would be provided in the Supplemental EIS if the Arizona site is selected.

The fourth paragraph of Volume IV, Appendix 14, Section 14.2.2.3 A.1.c has been revised accordingly.

0428.120

Volume IV, Appendix 14, Section 14.2.2.3.A.1.c, paragraph 5 has been deleted.

0428.121

EIS Volume IV, Appendix 14, Section 14.2.2.3.A.1.c, has been corrected in the Errata to clarify the statements as suggested.

0428.122

See Comment Response 428.121.

0428.123

This reference has been added to Volume IV, Appendix 5 and Appendix 15.

0428.124

Volume IV, Appendix 5, Section 5.1.1.1 has been corrected in the Errata to Appendix 5. The lowest portions of the alluvial fans, as at Waterman Wash, certainly form a bajada; slightly higher portions, although presently slightly incised, probably were bajadas during the cooler, wetter period in which they were formed.

0428.125

See Comment Response 428.65.

0428.126

The wording in Volume IV, Appendix 5, Section 5.1.1.3 has been corrected for clarity in the Errata for Appendix 5. The fanglomerate originated as alluvial fan deposits.

0428.127

The statement in question was referring to the drainage area of the west branch of Waterman Wash upstream from the point of intersection with the ring alignment. The text of EIS Volume IV, Appendix 7 has been revised to state this. It is also noted that the value given for upstream drainage area was typographically in error and has been corrected to read "on the order of 130 mi^2" instead of "over 150 mi^2."

0428.128

The Arizona site proposal, dated September 2, 1987, identified three options for spoils disposal: transportation of the tunnel muck to one or the other of two dormant open-pit copper mines, or dumping of the muck on site within the high energy booster ring. That third option was dismissed from further consideration for the DEIS because of obvious objections to that option on environmental impact grounds. The Arizona proposal itself in fact advocated the use of the mines "...so that the current environment of the Maricopa Site would not suffer unacceptable degradation."

Of the two dormant mines, the Sacaton mine is described in the Arizona proposal as closer to the SSC site, cheaper to reach by truck, and also offering rail transport as an alternative. The Sacaton mine option was therefore selected for use in the FEIS.

A fourth option, namely commercial use of the spoils for construction projects, was added later. The Arizona response to an information request from the DOE (following the STF visit to the site) introduced this option as follows: "Finally, it has subsequently been suggested that a commercial market may exist for the excavated spoils material...." The phrasing of the response properly reflects the uncertainties inherent in this option at the present time. In order to quantify this option sufficiently for the final EIS analyses, too many unsupported assumptions would have to be made. These assumptions would have to define the prospective receiver sites by location as well as in terms of their individual schedules relative to the SSC construction schedule, which, in itself, is by no means fixed. During the peak of the tunneling operations, the extent and the density of the spoils hauling traffic will be very large. For the commercial-use option, this traffic would be further complicated by multiple receiver sites and schedule restrictions. The notion that this traffic can be orchestrated so perfectly that temporary spoils disposal can be avoided has been rejected as unrealistic. On the other hand, an operation that does involve temporary disposal begins to resemble the Sacaton scenario.

0428.129

The Arizona proposal included 101 miles of new roads as shown in the EIS Volume I, Chapter 3, Table 3-3 and Volume IV, Appendix 1, Figure 1.2.1-3. These included 54 mi of local SSC roads and 47 mi of the proposed four-lane highway (Estrella Freeway) between I-10 and I-8. The road configuration used for analysis in the EIS is shown in Figure 1.2.1-4 and consists of 60 mi of new roads. Figure 1.2.1-4 does not include the 47-mi road between I-10 and I-8, and has been revised in the area between F-2 and F-4 as well.

See also Comment Response 428.11.

0428.130

The construction schedule for the Conceptual Design Report (CDR) was driven by the needs of the technical system production schedule which was specified by the Central Design Group (CDG). The site-specific construction schedule will be determined by the authorized annual DOE construction budget for the SSC and the final design criteria.

The cost estimates were made using the methods developed during preparation of the CDR. The tunnel cost models were modified to reflect the tunnel material properties submitted in the proposal and site-specific geologic conditions. Adjustments to the estimate were added for any items in the proposal not specifically covered by the basic cost models.

Specific mitigations and costs for these would be more definitively considered at the selected site during final design and preparation of the Supplemental EIS.

It should be understood that fabrication of technical components must proceed in parallel with construction of conventional facilities if the overall schedule for the SSC is to be met. Ideally, funding would be such that speeding up construction of conventional facilities, with concomitant increase in spending over a shorter period of time, could be accomplished without reducing the funds spent on development and fabrication of technical components during that same time period. However, annual budgets will be appropriated by Congress and could be such that considerable managerial skill will be required to optimize the amounts going to conventional facilities vs technical components in any year. It is not possible to assert that overall schedule improvements would be accomplished by speeding up tunnel and underground cavern construction, i.e., spending more money annually for such conventional construction over a shorter number of years, because under the present budgeting profile, this would mean slowing down work on technical components during those years. This, in turn, implies additional costs and time for overall project completion.

Since publication of the DEIS, a more detailed cost analysis was prepared by the DOE, which is reflected in the SSC Site Task Force Report reprinted in its entirety in the final EIS Volume III.

0429.01

Government life-cycle costs of constructing, operating, and decommissioning the SSC at each of the seven site alternatives are not explicitly presented in the EIS, since the purpose of the document is not to compare monetary costs to the Federal Government, but to examine and compare both physical and socioeconomic environmental impacts. The EIS did, however, incorporate the most recent available engineering project cost estimates within the socioeconomic assessment to estimate the effect of SSC development on each of the seven regional economies. Only expenditures that would be spent within the regional economy were included in the EIS socioeconomic assessments. Additional information concerning estimates of the total project cost (undiscounted) during the constructing, operating, and decommissioning phases of the project are presented in the EIS Volume IV, Appendix 2, Section 2.4.

Existing regional demographic, economic, and utility (water and electricity) characteristics for the proposed Tennessee site are discussed in Volume IV, Appendix 5. The EIS in general concurs with the commenter's claim that SSC-related population impacts could be readily absorbed within the Tennessee Region of Influence (see Volume IV, Appendix 14, Section 14.1.3.6).

Health impacts of the SSC are presented in Volume IV, Appendix 12. Potential impacts under normal operating conditions would be negligible.

0430.01

See Comment Response 327.01

0431.01

Comment noted.

0432.01

Comment noted.

0433.01

Comment noted.

0434.01

Comment noted. Geologic units and conditions at the Illinois site are described in EIS Volume IV, Appendix 5, Section 5.3. The comment is accurate in that the geology at the Illinois site consists of relatively undisturbed sedimentary units with relatively homogeneous lithology. The primary tunnel unit is also relatively massive. All of these factors are positive regarding tunnel construction.

Transportation facilities are discussed in EIS Volume IV, Appendices 5 and 14. The traffic analysis in Appendix 14 considers existing as well as proposed new roads to estimate the impact of the SSC at each site. The Illinois site does have some established infrastructure in the site area due to the urban character of the eastern half of the ring.

Volume IV, Appendix 14, Section 14.2.2.3 C.1 identifies that electric utility upgrades are necessary at the Illinois site. The inference in the comment that electric utility systems are in place and ready for SSC use is inaccurate. See Comment Response 916.02.

All of these factors have been considered in the site selection process (see EIS Volume III).

0435.01

Comment noted.

0436.01

Comment noted.

0437.01

Comment noted.

0438.01

Comment noted.

0439.01

See Comment Response 415.03.

0440.01

Comment noted.

0440.02

The EIS does indicate (Volume IV, Appendix 14, Section 14.1.2.3.B), as stated in the comment, that of the seven regions of influence (ROI's) examined, the Texas ROI was estimated to have the highest output-per-worker ratios in the mining sector (due mainly to petroleum production in the region, which is an industry with a relatively high output-per-worker ratio) and in the services sector. As also stated in the comment, output-per-worker in the Texas ROI manufacturing sector was second only to that of the Michigan ROI in the regions considered. The input-output multipliers employed in the analysis take into account the existing technological composition of industries in each ROI, and their interaction within each regional economy.

0440.03

Comments noted. See Comment Response 816.01.

0441.01

Comment noted.

0442.01

Comment noted.

0443.01

Comment noted.

0444.01

Comment noted.

0445.01

Comment noted.

0446.01

Comment noted.

0447.01

The Woodbine and Twin Mountains aquifer are presently regionally overdrafted, as evidenced by declining water levels. The SSC would obtain only a portion of its water from groundwater sources. Although the regional overdraft condition exists, the project water requirements would increase the apparent level of overdraft only slightly. See Volume IV, Appendix 7, Section 7.2.3.7.A.1 and also Comment Response 401.01.

0447.02

Comment noted.

0448.01

Comment noted.

0449.01

Comment noted.

0450.01

Comment noted.

0451.01

Comments noted.

0452.01

Comments noted.

0453.01

Comments noted.

0454.01

Comments noted.

0455.01

Comments noted.

0456.01

See Comment Response 401.01.

0456.02

See Comment Response 238.03.

0456.03

In the sections of the EIS dealing with socioeconomic impacts (e.g., Volume IV, Appendix 14, Section 14.1.3.7), the term "growth" does occur. However, the term "progress" is not employed, as it embodies certain value judgments which are not appropriate in an EIS. "Growth" refers to increase over time, such as population growth and growth in employment. Use of the term "growth" should not necessarily be interpreted to imply something positive. For example, whereas population growth in one situation might produce side effects which in some sense can be judged as positive, population growth in another setting may well be considered detrimental.

0456.04

Comments noted. The technology used in the SSC conceptual design is not outmoded. Current development in high-temperature superconductors is still many years away from commercialization (see Volume I, Chapter 3).

0457.01

Comments noted.

0458.01

Comments noted.

0459.01

Comments noted.

0460.01

Comments noted.

0461.01

Comments noted.

0462.01

Comments noted.

0463.01

The anticipated increases in public school enrollments and increases in instructional employment required to meet this growing demand -- as cited by the commenter and presented in EIS Volume I, Chapter 5 (2,031 students and 113 teachers in 1992 and 1,900 students and 106 teachers in 2000) -- represent the anticipated impacts to the entire eight-county Texas Region of Influence (ROI), not just Ellis County or a single school district within the region. Further discussion of potential impacts to local public education in Ellis County is presented in EIS Volume IV, Appendix 14, Section 14.1.3.7.C.

0464.01

Comments noted.

0465.01

Comments noted.

0466.01

Statements in the EIS regarding recent population growth in Ellis County (Volume IV, Appendix 5, Section 5.7.11.1.B.2) in general concur with the claim that this county has experienced an increase in population from 1970 through the mid-1980's, and that SSC-related population impacts would comprise a relatively small proportion of this recent growth. The impacts of projected population increases on key areas of concern, such as housing, public services, and public finance, are anticipated to be minimal.

0467.01

Comments noted.

0468.01

Comments noted.

0468.03

SSC siting requirements and the DOE site selection methodology as presented in the EIS Volume III are totally independent of any other DOE project consideration. There is no relationship between siting the SSC and the monitored retrievable storage system.

0469.01

Comments noted.

0470.01

Comment noted.

0471.01

Comments noted.

0472.01

Comments noted.

0473.01

Comments noted.

0474.01

Comments noted.

0475.01

These observations are consistent with those in Volume I and Volume IV.

0476.01

Comment noted.

0477.01

Comments noted.

0478.01

Comment noted.

0479.01

Comment noted.

0479.02

Discussion of SSC-related educational impacts in Ellis County, Texas, can be found in EIS Volume I, Chapter 5, Section 5.1.8 and in Volume IV, Appendix 14, Section 14.1.3.7.

Demand on public services associated with construction of the SSC would peak just two to three years following commencement of the project. Public school enrollments in Ellis County attributable to SSC construction would peak with 551 students in 1992. Such a rapid increase in enrollment without correspondingly rapid increases in cumulative revenue over the same period may require local school districts to seek alternative sources of revenue for necessary facility construction. Strategies and commitments to mitigate local infrastructure impacts, including those schools, will need to be developed by the appropriate State and local agencies.

0479.03

These observations are consistent with Volume IV, Appendix 14.

0479.04

Quality-of-life impacts are discussed in Volume IV, Appendix 14, Section 14.1.3.7, and in Volume I, Chapter 5, Section 5.1.8.5.

0479.05

See Comment Response 401.01.

0479.06

Comment noted.

0480.01

Comments noted.

0481.01

Comments noted.

0482.01

Comments noted.

0483.01

Comments noted. The total steel used in the construction of the SSC is estimated to be 18,400 tons - see Volume I, Chapter 5, Table 5.6-1. The total cement used in the project will be 149,000 tons - see Volume I, Chapter 5, Table 5.6-4. In addition, detectors will use large amounts of steel, but these amounts are as yet undetermined (see Volume IV, Appendix 1).

0484.01

Comments noted.

0485.01

According to the State's proposal, the SSC would be situated entirely within Ellis County, Texas. There are no affected land parcels in Navarro County (See EIS Volume IV, Appendix 4, Section 4.4.7).

0485.02

Navarro County, Texas, and the various communities within it such as Corsicana, were included in the SSC Region of Influence (ROI). However, because Navarro County was not defined as a primary impact county, it was not included in any detailed analysis. Statements in EIS Volume IV, Appendix 14, Section 14.1.3.7.B.1 regarding housing within the Texas ROI support the central point of this comment that an abundance of housing is available in the region.

0485.03

Comments noted.

0486.01

Comments noted.

0486.02

Navarro County is one of the eight counties in the Texas Region of Influence (ROI) -- the region in Texas anticipated to experience noticeable socioeconomic changes from the construction and operations of the SSC. Available data indicate that unemployment in Navarro County as a whole averaged 10.7 percent in 1986, and 9.8 percent in 1987. Unemployment rates and sectorial differences in employment were incorporated in the socioeconomic analysis at the regional level. Additional details regarding the effects of the SSC on the Texas ROI economy are presented in Volume IV, Appendix 14, Section 14.1.3.7.A.

0486.03

See Comment Response 485.02.

0486.04

Comments noted.

0487.01

Comments noted.

0488.01

The additional mitigative measures suggested, such as more frequent road watering, will be carefully considered on a case-by-case basis during development of final mitigation measures for control of fugitive dust emissions. EIS Volume I, Chapter 3, Section 3.6 and Volume IV, Appendix 8 have been revised to further address fugitive dust emission mitigation and to adjust emission projections.

0489.01

Comment noted.

0489.02

SSC low-level radioactive waste (LLRW) will be handled in accordance with DOE Order 5820.2 "Radioactive Waste Management" and transported in accordance with U.S. Department of Transportation regulations. It will be disposed of at an approved LLRW disposal site. The handling and disposal of the SSC's LLRW will be in conformance with applicable standards and regulations. There is flexibility as to which approved disposal facility will be used (see Comment Response 276.03).

The safety and long-term effects on the environment of handling and disposal of LLRW have been considered in the rules and regulations applicable to disposal of these wastes.

0489.03

See Comment Response 17.01.

0489.04

The SSC would not contain sources of radioactivity that could "leak" into the environment. However, environmental radiation exposure could occur from an accidental loss of beam. The radiological impacts from a beam loss are discussed in EIS Volume IV, Appendix 12, Section 12.4.1. Such an event represents the worst-case scenario for SSC operations, from both a radiation and a machine-damage point of view. A highly sophisticated monitoring system is incorporated in the design of the SSC to protect against damage to accelerator components and prevent radiation releases that would result from loss of beam. Such a system, currently in use at Fermilab, has proven to be both reliable and effective. In the event that the protection system fails, the extensive earth shielding surrounding the accelerator tunnel would serve to protect the public from radiation exposure. At the Tennessee site, the annual dose equivalent to an individual at the land surface above the point of beam loss is projected to be less than 0.001 mrem/yr (EIS, Volume IV, Appendix 12, Table 12.4.1-2), an insignificant dose when one considers that the average individual receives about 300 mrem annually from natural background radiation (DEIS, Volume IV, Appendix 12, Table 12.2.1-1).

0489.05

A description of the wildlife associated with the Tennessee site is provided in Volume IV, Appendix 5, Section 5.6.9.2.B, with impact assessments, including long-term effects, found in the revised Volume IV, Appendix 11.

0489.06

Noise and land resources assessments for the Tennessee SSC site are provided in EIS Volume IV, Appendix 9, Section 9.1.3.8, and Appendix 13, Sections 13.1.3.6 and 13.2.3.6. Should Tennessee be the selected site, site-specific noise assessments that evaluate impacts to livestock will be conducted as part of the Supplemental EIS.

0489.07

The economy of the Tennessee SSC region would experience increases in employment, income, and sales as a result of construction and operations of the SSC (Volume IV, Appendix 14, Section 14.1.3.6.A). SSC-related population in-migration would increase demands for housing and public services in the region, on the other hand, particularly in Bedford, Marshall and Rutherford Counties, where negative fiscal effects would be felt during the first three or four years of SSC construction (Volume IV, Appendix 14, Section 14.1.3.6.D). Positive fiscal impacts would result in later years.

0489.08

Comment noted.

0490.01

These observations are consistent with the data presented in Volume I, Chapter 5, Section 5.8 and in Volume IV, Appendix 14. If the proposed Tennessee site is selected for the SSC, the DOE and its contractors would work with the SSC Regional Authority to resolve problems and minimize adverse impacts.

0490.02

The DOE has worked with State agencies in the preparation of materials used for site selection (see Volume III) and included in this EIS (see Volume IV, Appendices 6 and 7.) Should the Tennessee site be selected for the SSC, the DOE would continue to work with State agencies as the proposal project develops.

0490.03

The comment is consistent with the information contained in Volume 1, Section 5.1.2.4 and Volume IV, Appendix 7.

0491.01

Comment noted.

0492.01

Comment noted.

0493.01

Comment noted.

0494.01

The information contained in the comment is consistent with the discussion of Smyrna airport's capability to handle corporate jets, airliners, and cargo planes (Volume IV, Appendix 5, Section 5.6.11.2).

Rutherford County, in general, has the capability to support secondary growth, based on the natural gas supplies (Volume IV, Appendix 14, Section 14.2.2.3.F.2.b).

The description of water supply capacity and plans is consistent with general descriptions related to Consolidated Water District in EIS Volume IV, Appendix 7, Section 7.1.3.6.

The comment about the existing Smyrna sewage treatment plant is consistent with the EIS Volume IV, Appendix 5, Section 5.6.8.1, Figure 5.6.8-1.

0495.01

Comments noted.

0496.01

A small portion of the excavated materials would be used in site development and in some roads to be constructed on-site later. Sale to industry is possible to the extent that industry can use additional limestone materials. The DOE could offer materials for use at some price which would be attractive to some businesses yet reduce the cost of spoils disposal. The majority of the spoils will, however, likely require disposal in spoils piles. See Comment Response 496.02 for the impacts of blowing dust.

0496.02

Several alternative fugitive dust control measures were considered in assessing impacts from dust. The use of water sprays varies in effectiveness with the amount applied, the frequency of application, and weather conditions, which have a direct bearing on the evaporation rate of moisture. Under optimal conditions 50 percent reduction in fugitive dust from haul roads and aggregate storage piles could be achieved with twice-daily watering.

The use of chemical soil stabilizers could reduce fugitive dust from spoils and haul roads by 95 percent. Three different types of stabilizers are typically used. These are wetting agents, hygroscopic salts, and surface crusting agents. Wetting agents reduce surface tension and enable water or a chemical stabilizer to spread more evenly over a greater surface area. Hygroscopic salts increase the moisture content of the dust by attracting moisture out of the air. Surface crusting agents are applied wet, and form a hard crust when dry. These agents can be composed of various compounds, typically styrene/butadiene or acrylic lattices, vinyl compounds, synthetic polymers, lignosulfonates or petroleum-based resins. These compounds are nontoxic and should not pose a groundwater or surface water contamination problem, when properly applied.

0496.03

As indicated in the EIS, measurable impacts on surface and groundwater quality may be expected from the disposal of spoils materials as proposed for the Tennessee site if disposed on-site rather than used as construction materials or for other purposes (See Volume IV, Appendix 7, Sections 7.1.3.6 and 7.2.3.6). If deposited on-site at several spoils disposal sites, the main concerns would be suspended sediment runoff and leachates containing iron and sulfur. Retention ponds would be lined and would trap suspended sediments in the surface runoff, liners would reduce the amount of leachates reaching underlying groundwaters, and mixing the excavated limestone with the iron- and sulfur-containing rocks would retain some of these substances by adsorption on the limestone.

Sites for spoils piles will be chosen to avoid sinkholes or karst windows which could provide rapid connection to the underlying aquifer. If the Tennessee site is selected as the SSC site, the potential ecological impacts will be evaluated in greater detail as part of the Supplemental EIS. Mitigative actions, and monitoring of the spoils leachates and surface runoff, would be planned to reduce potential impacts on water quality and aquatic fauna and flora (see EIS Volume I, Chapter 3, Section 3.6). The monitoring will likely be undertaken by appropriate State agency personnel.

The retention ponds and drainage ditches for the spoils disposal sites would be built in a manner that would not cause ponding on adjacent, including upstream, private lands, or otherwise affect their current use where practicable.

0497.01

The radiological hazards of SSC operations have been considered and the concern about accidents was one of the topics addressed. Tables 5.6.1-1 and 5.6.1-2 in Volume I, Chapter 5, summarized the possible radiation doses that could result from operation and construction of the SSC. The analyses supporting the doses in the above referenced tables took into account both accident and normal operating conditions. The cumulative exposures from the interaction halls, beam dump areas, and the emissions from the ventilation shafts were also considered. The projected dose equivalents in the tables doses are particularly relevant to any person residing on or using land located above the SSC in stratified fee areas. At the proposed Tennessee site, the operation of the SSC may result in a dose equivalent of 0.002 mrem/yr for a maximally exposed individual. This level of exposure is 1/1000th of background radiation, which is estimated to be 428 mrem/yr in Tennessee and well within the DOE guideline of 100 mrem/yr for a continuously exposed individual (DEIS Volume I, Chapter 6, Section 6.3.2). This guideline is discussed in more detail below.

The concern about off-site contamination of groundwater has also been addressed in the EIS (Volume I, Chapter 5, Section 5.1.6; Volume IV, Appendices 10 and 12). When the SSC beam strikes any material or when the beams collide, there are secondary particles produced. Some of the particles have sufficiently long half-lives to merit further consideration for off-site migration through groundwater. As a conservative approach to estimating exposure levels, two radionuclides, sodium-22 (Na-22) and tritium (H-3), have been considered under accident conditions in the extremely unlikely event that a beam loss occurs. A comprehensive description of the analyses for the movement of these substances was provided in EIS Volume IV, Appendix 12. The annual dose equivalents from the model indicate that the radionuclide concentration in a nearby well at the Tennessee site (50 m from the source), which is used for normal daily consumption of water, would be 0.0098 mrem/yr. This level greatly overestimates that which could be expected under normal operating conditions, and the level is considerably less than the EPA public drinking water standard of 4 mrem/yr (40 CFR 141). The hazards expected under normal conditions are, therefore, projected to be negligible.

The concern that there is no safe level of radiation should be considered in terms of risks versus benefits. For example, there can be risks associated with medical and dental X rays, but medical and dental experts agree that under most circumstances the possible risks are outweighed by the benefits. Another factor that should be considered in evaluating the potential exposures of SSC activities is that exposure to background radiation is a normal daily occurrence that cannot be avoided and is not perceived by the public to be sufficiently harmful to alter lifestyles or to take special precautions. The dose equivalent from cosmic radiation during a 5-hour transcontinental flight is approximately 2.5 mrem (National Council of Radiation Protection. Natural Background Radiation in the United States. Report No. 45. Washington, DC: NCRP, 1975), which is greater than 1,000 times the estimated dose equivalent to the maximally exposed individual of the general public from operation of the SSC for one full year.

0497.02

All of the state proposer groups have indicated that the state will provide a replacement well or a water supply of equal or better quality to any individual whose water supply source is lost due to the SSC. The details of implementation are not known at this time. They will be defined and described in the Supplemental EIS for the selected site.

Regarding the number of wells affected, see Comment Response 505.02.

0497.03

The DEIS Volume IV, Appendix 8, Section 8.3.2 identified a number of fugitive dust control measures which would reduce the magnitude of fugitive dust emissions generated during construction. The EIS Volume IV, Appendix 8 has been revised to further address fugitive dust emission mitigation and to adjust emission projections. These and other control measures will be thoroughly reviewed and carefully considered for implementation by the DOE.

The duration of dust-producing construction activities at any one location will be much less than the total project construction period.

0497.04

See Comment Responses 500.03, 523.03, and 522.23.

0497.05

Impacts to local city and county infrastructure are addressed in Volume IV in the following appendices:

Appendix 7 - Water supply and sewage disposal
Appendix 10 - Solid waste disposal
Appendix 14 - Public services, roads, and utilities

Questions concerning strategies and commitments by the State to mitigate local, city, and county infrastructure impacts should be directed to the appropriate State agency.

0497.06

See Comment Response 497.12.

0497.07

Comments noted.

0497.08

Construction of the underground tunnel is not expected to drain or exhaust adjacent water wells on a permanent basis. Negligible groundwater infiltration is expected along tunnel sections which penetrate intact rock, since the tunnel will be bored in limestone of generally very low permeability. Groundwater inflow is expected, however, from rock dissolution features and fractures that may be intersected. These can be grouted during excavation to reduce the inflow to negligible levels. Without grouting, these inflows could be a few tens of gal/min/100 ft of tunnel. Short-duration drawdowns of adjacent groundwater wells penetrating dissolution features or fractures near the tunnel may occur until the leaking inflow sections are grouted.

See Volume IV, Appendix 7, Section 7.2.3.6. See Comment Responses 497.02 and 509.01.

0497.09

The emissions from the ventilation shafts at the 11 service facilities and 4 interaction regions are air activation products and radon gas and its progeny. The air activation products (H-3, Be-7, C-11, N-13, O-15, Cl-39, and Ar-41) are produced as secondary products of proton interactions which activate, i.e., make radioactive, air molecules. The majority of these activation products have a very short half-life (less than 2 hours). The dose equivalent to the general public in Tennessee from atmospheric venting is 0.008 percent of the Federal limit (40 CFR Part 61, Subpart H) for whole body dose (25 mrem/yr) (see EIS Volume I, Chapter 5, Section 5.1.6.5). The radon gas is a naturally occurring element that emanates from geologic deposits of subsurface uranium. The infiltration of radon gas and its progeny through cracks in tunnel walls or through porous material used in tunnel construction can result in the buildup of these gases within the tunnel. As a worst case for this assessment, the tunnel was assumed to be unlined and in amorphous material in all cases. The radon activity in the tunnel and the interaction hall depend on the radium concentration in the rocks, the diffusion rate in soils, the pressure difference between the inner and outer tunnel wall, and the ventilation rate (see Volume IV, Appendix 10). The estimated general population dose from the venting of radon and radon progeny is less than .001 percent of the natural background exposure to the general public (see Volume I, Chapter 5, Section 5.1.6, Table 5.1.6-2).

With respect to the expressed concern about emissions from the refrigeration units, the superconducting magnets are cooled with cryogenic elements. These elements are liquid helium and nitrogen and helium gas. The cryogens continuously circulate throughout the collider ring to provide cooling for the magnets. The cryogens are within a closed system (see Volume IV, Appendix 10, Section 10.1.3.2). An accidental cryogen release at any of the ground-level refrigeration plants would not result in a public health hazard since cryogens are nontoxic (nitrogen and helium are natural constituents of the atmosphere) and nonflammable. The potential hazard associated with being exposed to the extreme temperature of the cryogen would occur only within a yard or so from a catastrophic release. Any escaping liquid cryogen would vaporize in the atmosphere and disperse with ambient winds.

Noise produced during operations at service areas is discussed at the summary level in EIS Volume I, Chapter 5, Section 5.1.4 and in detail in Volume IV, Appendix 9. Noise produced by service area activities is expected to have a day-night average sound level of 59 dBA at the property line and is expected to reach 55 dBA at 450 ft from the property line. It is anticipated that approximately 5 percent of those living within 450 ft of a service area property line would be highly annoyed by the noise produced by the facility.

0497.10

There are several precautions that will be taken during the construction of the collision chambers to prevent unacceptable levels of radiation in the environment. All beam collisions will be confined to the interaction regions of the SSC. These interaction halls will be enclosed in concrete and buried to a sufficient depth to take advantage of the natural shielding of the earth. The shallowest depth at which an interaction shall will be constructed in Tennessee is 250 ft (see EIS Volume IV, Appendix 10, Table 10.1.3-1). Primary shielding at the interaction points will be offered by the massive detectors which may weigh as much as 50,000 tons (see Volume I, Chapter 3, Section 3.1.1.2). The detectors themselves are sensitive to particles produced outside of the interaction point, so beams through the interaction hall must be very "clean," i.e., they must not produce radiation outside of the interaction points.

0497.11

The excavated materials would be temporarily stored near the excavation points, then they would be transported by 20-yd³ covered trucks to the nearest disposal site. The State of Tennessee proposed 35 spoils disposal sites along the collider ring; these sites would cover a total area of 250 acres. The excavated materials would be covered with topsoil and the areas would be revegetated. Some of the limestone could also be used in road building and site construction, or used by industry, which would reduce the area needed for spoils disposal at the SSC site.

Limestone is not a hazardous material. At the proposed Tennessee SSC site, however, it contains small amounts of shaley and silty impurities. These impurities contain pyrite, which consists of iron and sulfur. Leachates from the spoils disposal site could contain these constituents, plus suspended sediments and other dissolved solids. These leachates could impair both surface water and groundwater quality.

Leaching of iron and sulfur, however, could be minimized by mixing the pyrite-containing rock with other limestone, since limestone has the capacity to absorb (i.e., retain) these constituents. Also, liners installed under the spoils could reduce the amount of leachates reaching the underlying groundwaters. See EIS Volume IV, Appendix 7, Sections 7.1.3.6.F.1 and 7.2.3.6.A.4.

Surface runoff from the spoils caused by rainfall could be collected in retention ponds at each disposal site in order to trap suspended sediments. Even with this mitigation, measurable impacts on surface water quality are likely. See EIS Volume I, Chapter 3, Section 3.6 and Volume IV, Appendix 10, Section 10.2.3.6.

Air quality impacts of constructing the SSC are discussed in Volume I, Chapter 5, Section 5.1.3 of the EIS and in more detail in Volume IV, Appendix 8.

Mitigations will be applied to reduce all air quality impacts to levels allowed by the applicable National Ambient Air Quality Standards (see EIS Volume I, Chapter 3, Section 3.6 and Comment Response 1278.11).

0497.12

Priorities in science evolve through the pursuit and practice of scientific research. Such research increases our overall knowledge of the universe. The results are documented in scientific publications, in the training of students, and in the technical developments that arise from the studies. Theoretical and experimental physicists work in a wide variety of fields to study different aspects of nature. For the experimental study of high energy physics, large accelerators and massive detectors are needed. Proposals for the construction of such major instruments are made to the Federal funding agencies, primarily the DOE.

Following that, arguments to justify the construction and operations of the research devices are made to the national and international communities of scientists. In the case of the SSC, the merit of the undertaking has been debated extensively among the scientists, within the Government agencies, and before peer review groups (Volume I, Chapter 2, Section 2.2.2).

See Comment Response 1276.01.

0497.13

SSC project cost estimates were adjusted to reflect savings that would be realized by using the Fermilab Tevatron as the SSC injector facility. Other credits considered for the Illinois site cost estimate include reduced construction costs for utility systems and campus facilities, and reduced operating expenses due to cost sharing with ongoing, funded Fermilab research programs. See EIS Volume IV, Appendix 2, Section 2.4.2.2. To develop this adjustment, the DOE considered all available data such as the site proposal, Conceptual Design Report, and DOE Fermilab experience. Cost, however, is only one criterion used in the site decision.

0497.14

The CERN accelerator that spans the border of France and Switzerland did have flooding problems during construction. The flow was stopped by the installation of a tunnel liner. There has been no problem since the tunnel liner was put in place.

Where the SSC ring will be below the water table, a concrete liner or grouting will be used to stop flooding.

0497.15

The inability of recent experimental advances in high-temperature superconductors to meet SSC project requirements is identified in the EIS in Volume I, Chapter 3, Section 3.2.

0497.16

The electromagnetics used in the SSC will not expose the public to measurable magnetic fields. The superconducting magnets will be designed with iron yokes, which considerably reduce the magnetic field from extending beyond the vacuum beam tube. The field produced by the magnets will not affect the public, because the strength of the SSC-induced fields at the tunnel wall will be about the same as that of the earth's magnetic field (EIS Volume IV, Appendix 10, Section 10.1.3.2).

For a discussion of the possible hazards of power distribution and transmission lines, see Comment Response 733.02.

0497.17

Decommissioning is addressed in EIS Volume IV, Appendix 3, where it is stated that the "aim of decommissioning will be to return the SSC site to its pre-SSC condition so far as is practical or desirable." A specific proposal for decommissioning the SSC will be completed before the end of the operations period and analyzed in appropriate NEPA documentation.

Property which is purchased for the SSC will be unconditional fee simple title in accordance with the ISP, Section 1.1. Thus, the property will not have any rights for prior owners to buy it back at some later time attached. Disposition of land no longer needed by the DOE at the end of decommissioning will be in accordance with existing Federal law in existence at the time.

0497.18

There is no relationship between the SSC and MRS programs. The comparison of impacts among the seven site alternatives is presented in Volume I, Chapter 3, Section 3.4. The site is expected to be selected in January.

The reason given by Governor Cuomo for withdrawal of the Rochester site, which was recommended for the BQL list, was public opposition. See EIS Volume III for the methodology the DOE used to identify the best qualified sites.

0497.19

Comment noted.

0497.20

Comment noted.

0497.21

Counting direct and secondary jobs, peak total SSC-related employment in the Tennessee region would be about 9,400 jobs during the construction period, resulting in about 4,860 in-migrant workers to the region. During operations, total jobs would number about 6,890, with about 3,620 in-migrant workers moving to the region. These estimates are presented in EIS Volume IV, Appendix 14, Table 14.1.3.6-2. Population and housing impacts, shown in Table 14.1.3.6-6, amount to about 14,640 people, and 3,990 housing units at the peak of construction, about 12,690 people, and 2,970 housing units during SSC operations.

There should not be a need to build new schools solely to service these population impacts.

Impacts to other infrastructure systems, such as sewage and waste disposal sites and roads are not addressed per se, given the current lack of specificity in determining exactly where SSC-related population will reside in the region. If Tennessee were the selected site, such concerns would be addressed in the Supplemental EIS.

Local jurisdictions in Rutherford, Bedford, and other counties should realize eventual fiscal surpluses, derived from revenues associated with project spending and worker purchases, to cover costs of public service and infrastructure provision. Jurisdictions in Marshall County may require subsidies to cover project-related expenditures. For more information, see details of the public finance analysis in EIS Volume IV, Appendix 14, Section 14.1.3.6.D, and Errata pertaining to this section.

The consequences of growth, such as loss of open spaces, changes in wildlife species, and the like are generic concerns that apply to any development project. With careful planning, many of these concerns can be minimized although not entirely reduced.

0497.22

<u>Response to Questions on Ionizing Radiation.</u>

Radiation doses to persons who could reside above beam abort dumps and targets was addressed in EIS Volume I, Chapter 5, Table 5.1.6-1. The estimated dose equivalent rate from operations to the maximally exposed individual would be 0.002 to 0.013 mrem/yr for the proposed sites. See Comment Response 288.14 for information on health aspects of the SSC. see Volume I, Chapter 3, Section 3.6.

An environmental monitoring program will be established prior to operation of the SSC. See Comment Response 1473.02 for information about monitoring programs.

A storage area for SSC-related components that became activated will be necessary. The location of the secured, limited access storage area will be determined when the final design of the SSC is made. Many components will be temporarily stored until disposed at a low-level waste site, but it is possible that some equipment will be kept and reused. Any storage facility at the SSC will be designed with the goal of minimizing radiation exposures to levels as low as reasonably achievable (ALARA).

The concern about access of the public to underground areas before, during, and after experiments has been considered in preliminary safety reports and detailed design will include appropriate control techniques. Public access to underground areas will not be permitted and will be controlled in the same manner as access will be for SSC workers.

Response to Questions on Airborne Radionuclides

The locations at which radiological emissions will be released to the atmosphere are at the service area and the interaction hall locations, which are depicted by the letters F and K, respectively, in Figure 3-1 (EIS Volume 1, Chapter 3).

A magnetic debonding program such as the one at Fermilab is not planned at this time.

Water contaminated with tritium will not be evaporated into the air as a treatment method.

An environmental monitoring program has been implemented at Fermilab, which includes monitoring airborne radionuclides. See Comment Response 1478.09.

The DOE agrees that the best environmental solution to releasing radionuclides is to prevent their release. The DOE's commitment to protecting the public and workers from unnecessary radiological exposures is stated in its policy of maintaining exposures as low as reasonably achievable (ALARA) in DOE Order 5480.1B (EIS Volume I, Chapter 6, Section 6.3.2). (Also, see EIS Volume I, Chapter 3, Section 3.6.)

Response to Questions on Waterborne Radionuclides

The resins will be treated and disposed in accordance with accepted treatment technology practices at that time. Low-level waste will be disposed off-site. See Comment Response 276.03. (Also see EIS Volume I, Chapter 3, Section 3.6.)

As stated in EIS Volume I, Chapter 1, the SSC differs from Fermilab in that it is currently not intended that SSC will have a fixed target program.

The groundwater pathway and soil activation (EIS Volume I, Chapter 5) was considered for the loss of full beam. A hypothetical accident was considered with radionuclide migration to a well 50 m from the tunnel. All of the candidate site alternatives were below U.S. EPA Standards of 0.5 pCi/ml for sodium-22 and 20 pCi/ml for tritium. Accordingly, there are no plans to implement special controls to capture radionuclides in leachate outside the tunnel wall during normal operating conditions.

Vent stack(s) design will consider water intrusion and the resulting health and safety impacts in terms of migration of radionuclides. Actual final designs may change, subject to climate considerations at the selected site.

It is possible, depending upon humidity levels and other factors, for tritium to become airborne by evaporation from the liquid waste during solidification. These levels would be very low even under uncontained conditions and the resulting population exposures would be negligible.

0497.23

It is planned to contain the limestone spoils from tunnel and shaft construction within several on-site disposal sites. At each disposal site, the topsoil would be removed and stockpiled on site and used later to cover the emplaced spoils and serve as a root bed for revegetation. Dependent upon site conditions, berms or dikes may be used to prevent surface erosion and runoff from the sites. Low-permeability liner material or leachate drains may be employed, if site conditions indicate a significant potential for leachate generation and groundwater contamination. Mitigations are discussed briefly in EIS Volume I, Chapter 3, Section 3.6 and in Volume IV, Appendix 10. Specific mitigations would be addressed in detail in the Supplemental EIS for the selected site.

It is not anticipated that nutrients would be leached from the spoils at the Tennessee site. There are two geologic formations in the area known to contain notable amounts of phosphate (i.e., Leipers and Catheys formations). However, these formations occur only on ridgetops, if at all, in the immediate SSC vicinity. There is no indication that they would be penetrated at any shaft site or by the tunnel. Consequently, no spoils would be derived from these units. This effect will be addressed in the Supplemental EIS.

0497.24

See Comment Response 597.06.

Cobalt-60 would not be present in measurable amounts.

Decommissioning the SSC will not be similar to decommissioning nuclear reactors. Exposure rates at a reactor site just prior to decommissioning are hundreds of rem or more. Residual rates of radiation at the most intense SSC locations will be in thousandths of a rem (millirem) or less. Prior to decommissioning, a detailed proposal for decommissioning will be prepared and appropriate review provided.

Decommissioning will be financed by the DOE.

Volume IV, Appendix 12 addresses health and safety effects on both SSC workers and local area residents. The results of the analyses indicate that the SSC project will not create any long term health hazards for either workers or residents.

0497.25

Compensation for damages resulting from construction would be the responsibility of the DOE and/or its contractor. Questioning about strategies of the State to mitigate potential loss of water should be directed to the appropriate State agency.

0497.26

At the Tennessee site, negligible groundwater infiltration would be expected along tunnel sections which penetrate intact rock, since the tunnel will be bored in limestone of generally very low permeability. Limited and localized inflow may come from joints (fractures) that may be intersected. These can be grouted during excavation to reduce inflow to negligible levels. Without grouting, total inflows are expected to range from less than five to several tens of gal/min/100 ft of tunnel (see Volume IV, Appendix 7, Section 7.2.3.6.A.1, and Appendix 10, Section 10.2.3.6.B).

Material in the tunnel will not suffer damage from water and its chemical constituents. The small amounts of water leaking into the tunnel during operation will be collected in drains and pumped from the tunnel (see Volume I, Section 3.1.1.2.D and Figure 3-4 for information on the tunnel cross section and Volume IV, Appendix 1, Section 1.1.2.1.B.6 for information on tunnel drainage systems).

Uncontrolled groundwater infiltration was estimated to be from zero to several tens of gal/min/100 ft of tunnel (the higher values at isolated fractures) for the Texas site, and essentially zero for the Arizona site, compared to up to from less than five to several tens of gal/min/100 ft of tunnel for the Tennessee site. For all of these sites, dewatering is not a safety concern and can be handled with standard tunnel construction, leakage control, and dewatering techniques. Although construction, leakage control and dewatering costs will differ between sites, they are only one factor in the total cost of the project. In addition, the environmental impacts need to be considered in tradeoff analyses with cost and other factors in selecting the site.

Hydrogen sulfide and sulfur compounds are noted in this part of Tennessee in water pumped from the Knox dolomite which underlies the SSC tunnel horizon. The Murfreesboro and younger limestones through which the tunnel will pass are not known to produce hydrogen sulfide.

Adequate ventilation will be provided to the tunnel during construction and operation to remove objectionable gaseous constituents in the tunnel air, including hydrogen sulfide, to assure the health and safety of the workers, and to minimize corrosive and other deleterious effects on tunnel components and equipment. Since the amount of groundwater infiltration during SSC operations will be very small, the amount of any gases in the water that would be released into tunnel air is expected to be negligible.

0497.27

Both tritium and sodium-22, as well as other radionuclides generated underground by the SSC, will be safely contained from leaching to the environment. For instance, each of the SSC beam absorbers, where the induced radioactive materials are concentrated, is surrounded with a thick concrete shell that is further sealed from the surrounding soil by a waterproofing layer. The radioactive coolant is also confined in a closed-loop system and, therefore, would not contaminate the environment (DEIS Volume IV, Appendix 10, Figure 10.1.2-3).

Potential health effects caused by exposure to radiation released into the atmosphere from venting tunnels and experimental halls can be estimated according to the recommendations of the International Commission on Radiation Protection (ICRP). The conversion factors are 1.25×10^{-4} latent somatic effects per person-rem and 4.0×10^{-5} genetic effects per person-rem received by the exposed population. Based on these factors, the estimated potential health effects resulting from releases from the SSC would be negligibly small (see EIS Volume IV, Appendix 12 Health Hazards Assessments).

The Fermilab experience indicates that measurable levels of accelerator-induced radionuclides (e.g., tritium) are mainly detected within the site boundary of the laboratory; off-site releases amount to only a small fraction of the total release. No accelerator-produced radionuclides were reported in three water samples taken from Ferry Creek and four samples each from Indian Creek and Kress Creek. No accelerator-produced radionuclides have ever been detected in the water from the creeks and river. Tritium detected in on-site water samples in 1987 ranged from 0.19 to 4.5 percent of the Derived Concentration Guides of the draft revision to DOE Order 5480.1 (Baker, S., Site Environmental Report for Calendar Year 1987, Fermilab 88/40, Fermi National Accelerator Laboratory, Batavia, Illinois, May 1988).

0498.01

Comments noted.

0499.01

See Comment Responses 500.03, 503.03, and 522.23.

0499.02

The Endangered Species Act, a Federal law, requires that effective mitigations be devised to protect listed threatened and endangered species jeopardized by a Federal action. The U.S. Fish and Wildlife Service (USFWS) is responsible for administering the law. If the USFWS believes the project places a species in jeopardy, the project may not proceed until mitigations are proposed that satisfy the USFWS. Mitigation often includes avoidance. Also, States with laws to protect rare species have a similar responsibility to protect listed species. The DOE would work in consultation with the USFWS to develop and administer any necessary mitigations (see EIS Volume I, Chapters 3 and 5).

0499.03

Comments noted.

0500.01

Comment noted.

0500.02

The DOE is committed to establishing a full range of intergovernmental relationships to contribute to the successful establishment of the SSC project in the area of the selected site. The DOE recognizes the essential need of interfacing with all levels of governmental responsibility to ensure the elimination or minimization of potential negative impacts, while also providing the opportunity for maximizing the attendant benefits of the SSC project to the host area (see EIS Volume I, Chapter 3, Section 3.6).

Impacts to local city and county infrastructure are addressed in EIS Volume IV, Appendix 14, Sections 14.1.3.6, 14.2.1 and 14.2.2. Questions concerning strategies and commitments by the State to mitigate local city and county infrastructure impacts should be directed to the appropriate State agency.

0500.03

Recent studies of water flow and fauna in the near-surface karst (cave and sinkhole) system near the Tennessee site have been done by Drs. Barr (University of Kentucky) and Crawford (Western Kentucky University) with the assistance of the National Speleological Society. These studies are important additions to the understanding of how caves function in the natural system and how to protect the groundwater and fauna that occur in them.

Dr. Crawford found, for the area of the planned campus/injector facilities and the area of Snail Shell Cave (west and northwest of the campus and injector), that groundwater flows generally northward through a system of caves or small solution openings toward the Stones River. The flow was monitored at cave openings, karst windows, and springs to reach this conclusion. Although this was a geographically limited study, the presence of karst terrain (a topography with sinkholes and caves) over much of the site vicinity suggests that other caves and cave flow systems may be found in the future. However, it is doubtful that another cave system as large and through-going as Snail Shell Cave will be found. EIS Volume IV, Appendix 5, Section 5.6.2.2 and Appendix 7, Section 7.2.3.6 have been revised to incorporate Crawford's and Barr's (1988) findings.

When considering potential impacts and mitigations for karst hydrology (water flowing underground through caves and other minor solution features), it is important to consider that, although the network appears to cover a large geographic area, the water flows only through a limited volume of underground openings. These openings are joints and bedding surfaces that have been dissolved out by the groundwater. The rock between these discrete dissolution channels is solid with generally low permeability.

Hence, if a dissolution channel or cave (or sinkhole) is found at the planned location of an excavation or building, the easiest way to avoid an impact -- either the impact of the excavation on the cave or the impact of the cave on the excavation -- may be simply to dig elsewhere. Some portions of the SSC can be moved in this way if the site conditions dictate; this would include the shafts and the campus buildings. The portions that are not so readily moved, such as the collider ring, interaction halls, and probably also the injector, are purposely planned to be so far underground that they are far below the karst features and will not impact or be impacted by them since the caves are near-surface (the upper few hundred feet) features.

If Tennessee is the selected site, it will be important to do additional studies of karst features at the construction sites before the design of the facility is "locked-in" and construction begins. More studies like Dr. Crawford's "tracer tests" (nontoxic dyes are injected into cave windows and possible downstream exits are monitored) will be done, as will detailed cave inventories similar to that begun by the National Speleological Society. To this may be added geophysical studies such as carefully measuring the earth's gravitational pull, which decreases slightly over caves and drilling. Since drilling is an intrusive test -- although potentially the most definitive -- care will be taken in the drilling process to use environmentally safe drilling fluids and drilling techniques that will not impair any caverns that are penetrated. If caves are indicated by these methods, a decision can be made to "move over." Alternatively, the cave hydrology studies and cave fauna studies (see Comment Responses 503.03 and 522.13 for a discussion of cave fauna studies) may indicate it is environmentally acceptable to proceed with construction or excavation as planned. In that instance, a variety of construction methods are commonly used in the region for constructing on or excavating through karst features (including sinkholes) without compromising either the strength of the structure or the environment of the caves (see Comment Response 509.01 for a discussion of possible techniques for excavation/ construction).

The karst terrain at the Tennessee site indicates a hydrologic environment in which shallow groundwater is more susceptible to contamination from surface and near-surface sources. Avoiding or mitigating potential impacts of constructing through karst features will be the largest contribution to protecting the cave and groundwater resources at the

Tennessee SSC site (see EIS Volume I, Chapter 3, Section 3.6.3). Additionally, for any SSC site, measures will be implemented during operations to assure that the groundwater and surface water quality and flow characteristics are not impaired. These will include: (1) avoiding erosion and stream siltation by carefully planning surface drains and retention ponds; (2) building redundant barriers to contain toxic materials; and (3) monitoring groundwater and surface water quality and groundwater levels from before construction to the end of decommissioning. Implementation of these preventative steps at the Tennessee site will obviously depend on a sound evaluation of the region's cave, groundwater, and sinkhole features.

New Reference:

Crawford, N. and Barr, T. Hydrogeology of the Snail Shell Cave - Overall Creek Drainage Basin and Ecology of the Snail Shell Cave System. Nashville, TN: Tennessee Department of Conservation, Sep 1988.

0500.04

Radiological impacts associated with the SSC have been analyzed extensively and can be predicted with reasonable confidence. The environmental safety and health implications of radioactivation resulting from SSC operations are summarized in Volume I, Chapter 5, and are discussed at length in Volume IV, Appendices 10 and 12.

For a discussion of the beam abort area and the beam absorber, see Comment Response 607.03.

The beam absorber will become radioactive (although still low level), but will remain in place until decommissioning, when it would be removed and disposed as low-level radioactive waste (see Volume IV, Appendix 3).

0501.01

Comments noted.

0502.01

Significant resources have been spent on the preparation of the EIS within the DOE and its contractor organizations. Volume I, Chapter 7 identifies the staff and the professional credentials of the preparers of the document. Through the publication of the DEIS, more than 50,000 person-hours were spent in the data collection and analyses presented. Additional effort, approximately 10,000 person-hours, have been spent in comment response, in preparation of errata, and changes or inputs to the FEIS.

The relative advantages and disadvantages among the seven site alternatives are summarized in EIS Volume I, Chapters 1 and 3. Each of the seven site alternatives meets the criteria established by the DOE in the ISP. The EIS objective was to evaluate the sites and present the environmental benefits and impacts at each of the seven site alternatives consistent with the CEQ guidelines.

Impacts to the Tennessee Region of Influence and its people are summarized in EIS Volume I, Chapter 5. A more detailed discussion of the socioeconomic impacts can be found in EIS Volume IV, Appendix 14, Section 14.1.3.6.

0502.02

It is true that the SSC would be a laboratory for performing experiments. While the proposed SSC would be bigger and of higher energy, it is similar to the existing collider at Fermilab. Based on the similarities, potential environmental impacts can be assessed. Potential impacts of the SSC construction and operations on water and air pollution and other environmental factors were evaluated and documented in the DEIS. These evaluations were based primarily on publicly available information. This information was sufficient for evaluating the candidate sites for comparison purposes in order for the DOE to select the site. More detailed evaluations will be performed for the selected site. These evaluations will require additional, more detailed information to be collected. The resulting evaluations will be documented in a Supplemental EIS prior to SSC construction.

0502.03

The primary contamination associated with the lifetime operation of the SSC will be limited to radioactivation products in components. Of these components, the largest inventory will be contained within the two main beam absorbers (see EIS Volume IV, Appendix 10, Section 10.1.3.1.D). The beam absorbers are designed to contain the induced radioactivity over the lifetime of SSC operations and be removed at the time of decommissioning (see DEIS Volume IV, Appendix 10, Section 10.1.2.3.A.1.a). The other activation products are contained in various activated components. During maintenance and replacement of components, some protective clothing, cleaning supplies, etc. may become contaminated with low levels of radioactivity. These, along with unrecyclable components, will be disposed of as radioactive waste. The radioactivity that is produced in the air is vented to the outside (see DEIS Volume IV, Appendix 10, Section 10.1.2.3.A.2 and 10.1.3.1.B). The air activation products have short half-lives and do not create ground contamination.

0502.04

There is every reason to believe that the SSC will not have any unacceptable long-term consequences on the public health and environment. The SSC will be sited, designed, constructed, and operated in strict conformance with applicable Federal, State, and local environmental safety and health protection criteria, regulations, and standards to assure adequate protection of the SSC workforce, the general public, and the environment (see EIS Volume I, Chapter 6).

Previous studies have been made of environmental radiation shielding for the SSC including a general description of the sources of radiation (SSC-SR-1026). Review of the existing information emphasizes the benign nature of the planned SSC. See Comment Response 810.05.

Regarding the concern about siting the SSC near populated areas, the DOE has estimated the maximum radiation exposures that could possibly be experienced by a population residing near the SSC. There is considerable confidence in the estimates, because they are based in part on experiences from other accelerators such as CERN, which is located in Europe, and Fermilab, which has been operating for over 15 years in Illinois. EIS Volume I, Chapter 5, Table 5.1.6-2 indicates that the maximum population dose for residents near the proposed site in Tennessee would be no more than 0.004 person-rem/yr during construction and operations. The estimated population dose equivalent attributed to construction activities (e.g., radon exposure and air activation) is 0.0018 person-rem/yr. This exposure level is considerably less than doses of 13,000 person-rem/yr that would be experienced from existing background radiation levels that would occur naturally. The estimated radiation doses for a maximally exposed individual residing near the SSC would be no more than 0.002 mrem/yr from all exposure pathways (EIS Volume I, Chapter 5, Table 5.1.5-1), which would also be a small fraction of background levels and well within the DOE exposure guideline of 100 mrem/yr (EIS Volume I, Chapter 6, Section 6.3.2).

Therefore, the possible long-term consequences of the SSC have been considered by the DOE, and there is no indication that operations will cause unacceptable health impacts in the general population.

0502.05

Comment noted.

0503.01

See Comment Responses 496.03, 500.03, 502.02, 542.06 and 616.03.

0503.02

The East Fork Stones River, located about 15 miles northeast of the proposed site, will not be affected by the SSC. The tunnel alignment would be beneath the West Fork Stones River, Harpeth River, and tributaries of the Duck River. Potential impacts of the SSC project on streams and lakes may result from surface erosion, channel erosion, pollutant wash-off, dewatering the tunnel, and increased wastewater treatment plant effluent. EIS Volume I, Chapter 3, Section 3.6 and Volume IV, Appendix 7, Sections 7.1.2.2 and 7.1.3.6 presents a detailed assessment of the potential impacts and mitigative measures. The assessment indicates that, with implementation of proper mitigative measures, the impacts will generally be short-term and insignificant. If Tennessee site is selected, detailed site-specific mitigation plans will be developed and presented in a Supplemental EIS which will be prepared for the selected site.

0503.03

The potential for surface water movement into cave systems may occur during or after construction activities and may change the hydrologic regime of the cave streams by flooding or drying individual cave ecosystems.

Should Tennessee be selected for the SSC, extensive surface and subsurface exploration activities will be done for the final siting of the SSC facilities. These geotechnical activities should identify both surface and subsurface karst features. Final placement of critical surface and subsurface facilities will take into consideration the potential for both construction and operational impacts to cave systems. As the collider ring will be placed well below the confining layer of the Snail Shell System (i.e., below the Pierce Confining Layer), any impacts to the cave systems could result from the construction of access shafts and borings through karst connections.

Standard construction mitigation activities will be augmented by additional mitigation techniques specific to karst topography in order to reduce or eliminate the potential for subsurface contamination of cave systems by suspended particulates, sewage, petroleum products, trash, and additional volumes of water (see EIS Volume I, Chapter 3, Section 3.6). The DOE is aware of the impacts to both biological and physical cave/stream systems which can arise due to hydrological changes resulting in flow rate alterations, or changes in the routing of cave streams resulting from obstructions of the natural cave stream water course.

Physiological impacts from suspended particulates can be received by those aquatic organisms which retrieve small particles of food from the water and those organisms with gills. Those organisms which rely upon entrained food particles (directly or indirectly originating from the surface) could be affected by a reduction or increase in food sources, quantities and contaminants. Some cave organisms have substrate specific habitat requirements which could be changed by an increase or decrease in particulates moving through their particular cave system.

Impacts to cave systems resulting from urban encroachment are likely; however, state and regional regulatory agencies, through their local zoning power, have the ability to control secondary development resulting from SSC siting.

0503.04

The State of Tennessee has proposed several options to dispose of excavated material: 1) the limestone could be used by contractors during site development for roadway surfacing, road bases, asphalt mixes, concrete aggregate, and construction embankment materials; 2) the limestone could be sold; or 3) the limestone could be disposed of at 34 disposal sites. At each disposal site, topsoil would be removed and stockpiled on site and used later to cover the emplaced excavated materials to serve as a root bed for revegetation (see EIS Volume IV, Appendix 10, Section 102.3.6.A).

Additional details of the disposal of excavated material (including the potential for leaching) will be developed during the detail design and will be addressed further in the Supplemental EIS for the selected site.

It is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards.

0503.05

The purpose of the retention ponds would be to collect runoff from the excavated materials disposal sites and retain the suspended solids. Clear water would overflow to local streams or tributaries (see Volume I, Chapter 6, Table 6-1).

The excavated materials do not contain any industrial solvents because industrial solvents are not required to drill this tunnel. Therefore, industrial solvents would not be in the runoff.

Six quarts of oil would be used by one tunnel boring machine for every 500 ft of tunnel length excavation. Whenever oil is changed, used oil would be collected and disposed of separately.

The retention ponds would be located adjacent to the disposal sites.

0503.06

Percolation tests have not been reported for the proposed Tennessee site to evaluate the effectiveness and feasibility of septic tank systems for domestic sewage disposal at the far cluster area. These tests would be performed and documented in the Supplemental EIS if the Tennessee site is selected. Alternate disposal means, such as packaged sewage treatment plants, would be considered if septic tank disposal is not feasible.

0503.07

See Comment Responses 496.02 and 496.03.

0503.08

Cooling tower blowdown (water flushed through the towers to wash away deposited salts) will not contain radioactive waste products. The only materials that might be in the blowdown would be chemicals used as biocides in the cooling water. About 300 gal/min of blowdown would be generated from the 23 water towers on an SSC site. This would be disposed of locally in lined evaporation ponds, or be hauled away for treatment. In either case, there would be no contaminated waste released into environmental groundwater. Any water that has the potential for activation (in an active beam area) will be analyzed for accelerator-produced radionuclides and treated accordingly.

0503.09

There are no mitigative measures currently planned to recover or treat groundwater that becomes radioactive after a loss of beam, because the probability of such an event is extremely remote and the resulting tritium and sodium-22 levels that might show up in a nearby well would be so low that there would be no health impacts (EIS Volume I, Chapter 5, Section 5.1.6.3). However, if a loss of beam were to occur, the SSC environmental monitoring program would be intensified to assess potential radiation releases to the environment. If it were found that groundwater contamination had occurred as a result of any SSC activity, DOE would implement a program to assure that no adverse health impacts could occur and to maintain radiation doses as low as reasonably achievable (ALARA).

The beam absorption areas will be designed to capture radiation and heat from the beams that are dumped (EIS Volume IV, Appendix 10, Section 10.1.3.1), and therefore there will be no activation of groundwater outside the beam absorbers.

0503.10

Volume I, Chapter 5, Section 5.1.5 of the EIS discusses the impacts of the proposed action on sensitive plant and animal habitats, including the unique cedar glades and the Snail Shell Cave system. Section 5.2 discusses impacts of ancillary facilities, including roads, sediment and cooling ponds, spoils areas, and transmission lines. Included is a discussion of best engineering measures used to control and mitigate construction impacts. The DOE has committed, in Volume I, Chapter 3, Section 3.6, to avoid construction in wetlands and other sensitive areas to the extent practicable.

Should the Tennessee site be selected for the SSC, all sensitive habitats potentially affected by project development would be surveyed and evaluated for adverse impacts. At that time, the proposed mitigation measures would be reevaluated and revised to be site-and activity-specific. It is expected that State wildlife and fisheries personnel would have a role in reviewing and modifying, as necessary, any construction and mitigation plans to protect valuable aquatic resources. The results would be reported in a Supplemental EIS. During site preparation, engineering control and mitigation measures would be monitored for effectiveness, and modified to be more effective or to avoid secondary impacts.

Also see Comment Response 500.03.

0504.01

Comments noted.

0504.02

The labor pool area considered is depicted in EIS Volume IV, Appendix 14, Figure 14.1.3.6-5. This region extends toward Chattanooga as far as Marion County, parts of which would be more than 90 minutes in one direction away from the SSC site. Standard geographic practice often delineates labor market boundaries at 60 minutes from a worksite, and rarely exceeds a one-way commuting distance of 75 minutes; thus, the region used in the analysis is considered conservatively large.

0504.03

Comments noted.

0504.04

The DOE Invitation for Site Proposals for the SSC (April 1987) included "Regional Resources" as one of six general technical evaluation criteria for choosing a site for SSC. Cost considerations also are to be a factor in selection. Included among a number of other elements under the "Regional Resources" technical evaluation criterion is adequacy of community resources -- e.g.... educational and research activities..." Thus, the evaluation of sites involves many other considerations besides educational and research activities, and even in that area, is not narrowly limited to the presence or absence of other high energy physics accelerators. See the EIS Volume III for a description of the methodology for site selection

0504.05

Comments noted.

0505.01

The intent of discussions in the DEIS regarding potential abandonment of water wells due to the SSC project was in terms of access to groundwater. The DEIS did not suggest that any specific number of wells would have direct quality or quantity impacts or would "dry up." The number of wells that may have to be closed at the Tennessee site was, however, not consistently presented in the DEIS. See Comment Response 505.02.

0505.02

The discussions in the DEIS on the impacts related to administrative (land acquisition) or safety-related (nearness to tunnel or other SSC facilities) loss of water wells were inconsistent among states and within the various sections of the DEIS. Consequently, several sections have been revised to provide a consistent assessment of the potential for loss of water wells at each site.

To assure safety from radiologic effects, a 150-ft radius around the tunnel will be established within which no water wells, existing or new, will be allowed. A 1,000-ft-wide restricted zone along the tunnel (approximately 500 ft on each side) is anticipated. This zone is established for control of construction activities; however, and wells within it would not be required to be closed. Replacement of wells within this zone may be limited due to the vibrations from drilling. However, this would likely be dictated by site-specific conditions or timing of the drilling and is not excluded. Existing wells on project fee simple land would likely have to be abandoned for reasons of access or conflict with construction activities, but this is not assured in all cases.

State records of water wells were available for the DEIS but it was indicated by the State that records were not complete. Field survey information was available but it was assumed that the well data were not detailed enough to develop an accurate count of all the wells that fell within the specific restriction areas identified above. Given these limitations, the intent of the presentation was only to identify the approximate number of wells within the footprint of the SSC and to provide a general comparison of the relative density of water wells near the individual state sites. The number of wells that might be hydrologically impacted by SSC activities (water level declines or possible water quality changes) also cannot be accurately estimated with the available well records and the lack of final siting and design information. Both of these issues (well closures due to land acquisition and proximity to facilities and wells hydrologically impacted) will be addressed in detail in the Supplemental EIS to be prepared for the selected site.

For changes in the EIS related to potential for well closures, see revised EIS sections as follow: Volume I, Chapter I, Table 1-1; Volume I, Chapter 3, Table 3-7; Volume I, Chapter 5, Section 5.4 and Table 5.6-3; and Volume IV, Appendix 7, Sections 7.2.3.1.A.6 through 7.2.3.7.A.6.

The figures showing the location of wells have been deleted from the EIS as it was unclear whether all wells shown would not be required to be closed or abandoned.

To reflect the potential lack of completeness in well records, the Tennessee discussion in Volume IV, Appendix 7, Section 7.2.3.6 has been revised to indicate "approximately" 350 wells in the SSC footprint and the State's estimate that on the order of 70 wells may be directly affected and required to be abandoned by the project. If the Tennessee site is selected, detailed field surveys will be performed to accurately determine the number and location of all existing water wells within the footprint and the number that would be required to be abandoned.

0505.03

See Comment Response 505.02.

0505.04

See Comment Response 505.02.

0505.05

These observations are consistent with those in the EIS Volume IV, Appendices 1 and 7.

0506.01

Comments noted.

0507.01

Regional resources such as housing, medical services, educational institutions (including availability of professional staff, academic resources and graduate student research availability), accessibility to major airports and other transportation, and the availability of a skilled labor pool were considered during proposal evaluation leading to the Best Qualified List and will be considered in the site selection. See EIS Volume III, Chapter 1, Section 1.1. The EIS addresses SSC-related impacts on public education at the primary and secondary level (grades K-12); it does not, however, discuss potential impacts to institutions of higher education in the region (see Volume IV, Appendix

14, Section 14.1.3.6.C).

The benign nature of the SSC project is emphasized in EIS Volume IV, Appendix 12, Section 12.2. As noted in subsection C, the releases of radiation/radioactive materials from SSC activities are expected to be quite low, and expected radiation doses to any individual would be a small fraction (1/1000th) of natural background radiation.

0508.01

This comment is considered a modification to your proposal of March 31, 1988. The EIS was based on data supplied as part of the initial proposal submittal of September 2, 1987 and supplemental data submitted on or before March 31, 1988. As a result, the analyses presented offer an upper bound of potential impacts to assure equitable treatment of all proposers. Until the collider ring location is agreed to by the DOE, exact acreages, parcels, and ownerships cannot be determined. However, the EIS analysis does reflect a reasonably accurate picture of conditions that would exist should the SSC be sited in the referenced area (see Volume IV, Appendix 4, Section 4.1).

0508.02

The road information presented in the comment is generally consistent with information presented in EIS Volume I, Chapter 3, Table 3-7. One value in the comment (20.8 mi of upgraded roads) is not consistent. This value represents a change to the Tennessee proposal and therefore was not addressed in the EIS.

0509.01

At the Tennessee site, several portions of the collider footprint are known to be in areas of highly developed karst terrain, i.e., areas with a higher density of features such as sinkholes, solution-widened joints, disappearing streams, and caves. Since these features are generally limited to the upper few hundred feet (generally much less), their engineering significance would be limited to the potential for impacting the foundations of surface structures and the uppermost portions of the shafts. Karst features are not expected to have an impact at the depth of the collider tunnel, experimental halls, or the beam absorbers.

Contractors in the central Tennessee area have developed engineering approaches for treating karst-related features in the foundations of buildings and other surface engineering works. The approaches are based on a thorough understanding of the site-specific top-of-bedrock topography; i.e., it is necessary to know the locations of any dissolution-widened joints or sinks before construction begins. Generally, depending on the thickness of the soil cover, closely spaced borings or excavations to bedrock are made. Should Tennessee be selected, closely spaced geophysical surveys may also be done.

When solution-widened joints are found, they may be treated by "dental work," i.e., excavating the soil fill from the joint sufficiently to allow the placement of a concrete "bridge" to span the gap. Deeper sinkholes may be treated by removing much of the soil and placing a compacted clay cap in the hole; this helps to support the planned foundation, and also serves to stop rainwater from infiltrating the sink and washing out the deep natural soil plug, thereby possibly causing a subsurface void. Often, the most cost-effective approach is simply to relocate the building away from the sinkhole. These engineering remedies can be used for the campus facilities and the surface buildings related to the experimental halls and access shafts.

If field investigations indicate that any of the main access shafts, intermediate shafts, or experimental hall shafts would penetrate troublesome dissolution channels, a likely approach would be to grout the channels with cement injected through a ring of wells around the shaft location before the shaft is excavated.

Additional engineering concerns are: (1) drainage modifications (including modifications due to spoils piles) should carefully avoid channeling surface runoff into surface sinkhole depressions; and (2) dewatering operations should not lower the water table elevations significantly at the location of a sinkhole. Deep sinkholes commonly have a plug of soil and rock rubble at the bottom of their funnel-shaped mouth. If the amount of water flowing into the sinkhole increases, or the water table is lowered below the plug so that water flows freely through the plug, the fine soil particles may be washed out of the plug. In this event the plug may collapse, resulting in a deeper surface depression.

0509.02

See Comment Response 523.03

0510.01

Comment noted.

0511.01

Comment noted.

0511.02

The information provided by the commenter regarding cedar glade plant communities and the presence of the endangered Tennessee purple coneflower is consistent with information reported in the EIS. If the proposed Tennessee site is selected for the SSC, the DOE and its contractors would work closely with the Tennessee Department of Conservation to minimize any potential adverse impacts as a result of the SSC.

0511.03

Details and minor adjustments such as those mentioned would be made in facility placement and addressed in the Supplemental EIS to be prepared for the selected site. The DOE would work with the State Division of Ecological Services for protection of any identified areas such as the cedar glades.

0511.04

Additional information about the ecology of the Snail Shell Cave system, including material from Dr. Thomas Barr, has been included in the revision to Volume IV, Appendix 11, Section 11.3.6.1 as well as other relevant sections of the EIS, i.e., the geological and hydrological sections.

The discussion on endangered species in the EIS places emphasis on those species noted by the U.S. Fish and Wildlife Service in their coordination letters to the DOE (see Volume IV, Appendix 11, Attachment A). The EIS has expanded text on threatened and endangered species (see Volume I, Chapter 4, Section 4.7.4.1) resulting from additional information provided by State and Federal agencies and environmental organizations.

The inaccurate listing of the Duck River as a wild and scenic river has been deleted from the text.

0512.01

The observations regarding Corps of Engineers' estimates are consistent with those in Volume IV, Appendix 7, Section 7.1.3.6.

0513.01

Comment noted.

0513.02

Comment noted.

0513.03

Comment noted.

0513.04

Comment noted.

0514.01

Comments noted.

0515.01

Comments noted.

0516.01

This information is consistent with growth figures presented in EIS Volume IV, Appendix 14.

0517.01

Comments noted.

0518.01

See Comment Response 816.01.

0519.01

See Comment Response 816.01.

0520.01

Comment noted.

0520.02

Some experts predict global warming will occur as a result of increases in atmospheric CO_2 from the combustion of fossil fuels. The SSC has no potential to affect global warming, except through the consumption of electric power generated from fossil fuels. The SSC would consume about 900,000 MWH/yr, which is 0.4 to 2.1 percent of the regional generating capacity of each region.

0520.03

Comment noted.

0520.04

See Comment Response 524.02.

0520.05

Comments noted.

0520.06

The budgetary impacts of funding the SSC versus other programs of the Federal Government are outside the scope of this EIS. See EIS Volume I, Chapter 2 for a discussion of the purpose and need for the SSC.

0520.07

The SSC is totally independent of and separate from the monitored retrievable storage (MRS) program. The SSC siting decision in no way affects the siting of the MRS.

0520.08

Comments noted.

0520.09

Comment noted.

0520.10

Comment noted.

0520.11

Comments noted.

0521.01

The definition of a "negative" effect on an economy often depends on the definer's viewpoint. The EIS did not make such an assessment. Rather, it attempted to present an objective study of the impacts to regional and local economies by measuring such economic indicators as the number of jobs, additional earnings, and sales demand created by the proposed SSC project. Although growth in these indicators is often regarded as a "positive" effect on an economy, there can be side effects to this stimulus to growth that some might consider "negative".

These less desirable effects may include short-term housing shortages, lack of adequate public services related to the inability of local government jurisdictions to finance capital improvements or to meet increasing payroll requirements, and changes to the existing quality of life in local communities. Because such side effects can occur, the EIS analysis also quantified estimates of additional housing requirements, public service demands, and government finance impacts from SSC-related growth. It also compared the characteristics of potential newcomers to each region with those of existing residents to provide some insight into the ability of newcomers to adjust socially with existing residents and the ability of existing residents to accept such change in their community (EIS Volume IV, Appendix 14, Section 14.1.6). With regard to public finance, note that there were mathematical errors in the calculation of property tax losses for Bedford, Marshall, and Rutherford Counties; net cumulative impacts are revised, generally being negative during the first few years, and positive thereafter (see Comment Response I322.120).

The determination of the SSC's "positive" or "negative" effect on an economy is the result of an evaluation that each person would have to make independently. The EIS analysis was intended to provide enough information for people to make such determinations. Estimates of the economic impact to the Tennessee Region of Influence, and the primary impact counties of Bedford, Marshall, and Rutherford, are presented in Volume IV, Appendix 14, Section 14.1.3.6.

0521.02

The Tennessee State Government is expected to purchase private land that would be required for the SSC, but the U.S. Government would pay for construction and operations of the facility; thus, taxpayers throughout the U.S. would bear the major portion of the expense for the facility. Details of analyses concerning the revenue effects for the Tennessee State Government, and the cumulative local government fiscal effects to jurisdictions in the three primary impact areas, Bedford, Marshall, and Rutherford Counties, are presented in Volume IV, Appendix 14, Section 14.1.3.6.D.

0521.03

The impacts on wildlife due to habitat destruction are assessed to be minimal. EIS Volume I, Chapter 5, Section 5.5 provides the commenter a detailed assessment of the SSC's potential impacts on wildlife.

0521.04

See Comment Response 0996.01.

0522.01

Comment noted.

0522.02

The DOE believes that the 45-day comment period provided interested persons with an adequate opportunity to review the DEIS. See Comment Response 1126.05. The Tennessee White Paper was reviewed by the DOE and resulted in a number of revisions to the EIS. See Comment Response 523.03. The DOE will prepare a Supplemental EIS before construction at a selected site, and additional opportunities for public comment will be provided.

0522.03

In EIS Volume IV, Appendix 11 and related sections of Volume I, Chapters 4 and 5, the issues related to the new materials provided to the DOE on the Snail Shell Cave system that are included in the discussion of sensitive habitats. See also Comment Response 500.03.

0522.04

See Comment Response 503.03.

0522.05

EIS Volume IV, Appendix 11, Section 11.3.6.1 has been revised to include more information about the Snail Shell Cave system. The revisions note that if the Tennessee site is selected for the SSC, extensive surface and subsurface exploration will be done for the final siting and design. Final placement of SSC facilities will take into account the potential for both construction and operational impacts to the cave systems. Mitigation activities would be selected as part of a Supplemental EIS (see EIS Volume I, Chapter 3, Section 3.6). At that time, mitigative measures would be identified and assessed for local features such as the Snail Shell Cave system.

See also Comment Responses 503.03 and 523.03.

0522.06

Comments received after October 17, 1988 were considered to the extent practicable.

The karst report, mentioned in your comment, was not a DOE publication, but was received by the DOE as part of the formal comment submittal process. This report was reviewed and the results considered in the development of the EIS. A copy of this report is part of Volume IIa.

0522.07

If the Tennessee site is chosen, during the preconstruction phase of the project it will be important to accurately survey the natural resources near the site so that potential impacts and mitigations can be identified (see EIS Volume I, Chapter 3, Section 3.6). This activity, which should be done with the involvement of the speleological community, will obviously require access to the caves. During the construction phase, access may be limited at certain places and times primarily as a matter of safety to cavers (see Comment Response 522.36). Access to the caves during the operating phase will probably vary from place to place; in the stratified fee areas, the tunnel is deep enough below the shallow cave system so that sport caving may be permitted. In the site areas that the DOE holds in fee simple, decisions to permit or preclude caving will be based on the requirements to maintain site security and public health and safety.

0522.08

The DOE has been, and will continue to be, responsive to all public concerns, including those of the National Speleological Society's SSC Karst Impact Task Force. Members of the DOE's Site Task Force met informally with members of the National Speleological Society during the Site Task Force visit to Tennessee in June, 1988, to discuss concerns over potential impacts to caves located in the vicinity of the site. The Site Task Force's questions, left with the Tennessee proposers, was the impetus for the field studies and "white paper" prepared by Drs. Crawford and Barr (September 1988), with input from National Speleological Society members. The findings of the white paper have been incorporated in EIS Volume IV, Appendices 5, 6, 7 and 11, so that potential impacts may be more accurately assessed.

The DOE believes that it has responded to all commenters in full compliance with NEPA requirements (40 CFR 1500-1508). All information submitted to the DOE following the scoping meetings was reviewed by technical staff and used as appropriate in preparation of the EIS. See also Comment Response 1504.01.

0522.09

As announced in the Notice of Availability issued at the time the DEIS was released, the DOE considered, to the extent practicable, any comments received after October 17, 1988.

0522.10

EIS Volume IV Appendix 3 presents a preliminary decommissioning plan for the SSC which is site-independent. To the extent that they can be determined, the site-specific issues surrounding decommissioning will be addressed in the Supplemental EIS.

At the time the SSC is proposed to be decommissioned, appropriate NEPA review would be prepared.

See the introduction to EIS Volume IV, Appendix 3.

0522.11

See Comment Response 523.03 which addresses handling of the new information about the Snail Shell Cave system in the Final EIS.

It is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with all applicable environmental statutes, regulations, and standards. Should Tennessee be the selected site, further study would be conducted into the possible locations of critical habitats or presence of threatened or endangered species. As required, the DOE, in consultation with U.S. Fish and Wildlife Service, would incorporate mitigations to minimize potential impacts (see EIS Volume I, Chapter 3, Section 3.6).

0522.12

Representatives of the DOE met with members of the National Speleological Society in Tennessee in June 1988, to discuss concerns over potential impacts to caves located in the vicinity of the site. They also visited several known cave or karst features. However, data sources in the open literature noted the presence of only nine caves in the site region; none had faunal data available. The "white paper" prepared by Drs. Crawford and Barr (September 1988), with input from National Speleological Society members, has been used to bridge the data gap. The results of these field studies have been incorporated into the EIS, especially in Volume IV, Appendices 6, 7, and 11, so that potential impacts may be more accurately assessed.

0522.13

Information on cave biota contained in Dr. Thomas Barr's paper has been added to the EIS in Volume IV, Appendix 11, Section 11.3.6.1.

0522.14

As indicated in Comment Response 522.03, the new information on the caves at the proposed Tennessee site has been incorporated into the EIS. Regarding the recommendation to drop the Tennessee site from further consideration, the findings in the EIS comprise one criterion to be used by the DOE in selecting the site (EIS Volume III, Chapter 3). The cave habitat and endemic species are discussed in Volume IV, Appendix 11, Section 11.3.6.

0522.15

See Comment Response 503.10, paragraph 2.

0522.16

See Comment Response 522.03.

0522.17

See Comment Response 503.03.

0522.18

See Comment Response 503.03.

0522.19

See Comment Response 503.03.

0522.20

Although the comment's concern with Snail Shell Cave may be well-founded, a direct connection between SSC-related population impacts and increased visits to the cave has not been established.

0522.21

Plans for the disposal of sewage generated by the various SSC facilities are discussed in Volume I, Chapter 3, Section 3.6 and Volume lV, Appendix 10, Section 10.3.3.1.F, and the resulting impacts to groundwater are summarized in Volume I, Chapter 4, Section 4.6.3 and Volume IV, Appendix 7, Sections 7.2.3.6.A.4 and 7.2.3.6.B.2. Existing sewage treatment facilities in the communities near the proposed Tennessee SSC site are discussed in Volume IV, Appendix 5, Section 5.6.8.1. Regional impacts from increased sewage disposal associated with urban expansion are likely not to be influenced by the construction of the SSC.

0522.22

See Comment Response 522.03. See Comment Responses 522.23-37 for detailed answers to this set of questions.

0522.23

A recent "white paper," titled "Hydrogeology of the Snail Shell Cave-Overall Creek Drainage Basin and Ecology of the Snail Shell Cave System" (September 1988) was prepared for the Tennessee Department of Conservation by Drs. Crawford and Barr, based on studies at the proposed site. Drs. Crawford and Barr were assisted by members of the National Speleological Society who identified numerous caves not previously identified in the open literature in the vicinity of the site footprint. Errata to EIS Volume IV, Appendix 5, Section 5.6.1.5 and Appendix 6, Section 6.3.6., contain revisions which reflect this recently available information.

0522.24

The Indiana bat occurs in Tennessee during the summer months, but does not use caves for roosting. A recent survey of the site vicinity located potential foraging and roosting habitat, which is typically mature hardwoods associated with forested riparian wetlands. Results of this survey are in EIS Volume IV, Appendix 11, Section 11.3.6.2.

The gray bat occurs throughout Tennessee and is associated with caves on a year-round basis. Ross (1988), cited in Appendix 11, states that the gray bat tends to avoid caves that are periodically flooded, and that the Snail Shell Cave system often floods. He found no evidence of gray bats utilizing the Snail Shell Caves in the vicinity of the site.

0522.25

If Tennessee is the selected site, field investigations like those done by Drs. Crawford and Barr, with input from the Nashville Grotto of the National Speleological Society, will be done in all areas of the site for the Supplemental EIS. These investigations, to be done as a part of the site characterization in the preconstruction phase, will be used for the purpose of evaluating potential impacts to the karst aquifer system and the cave ecological systems. Construction-phase mitigations will be evaluated in greater detail during these field studies (see EIS Volume I, Chapter 3, Section 3.6).

0522.26

The botanical resources around the Tennessee site are described in Volume IV, Appendix 5, Section 5.6.9. The U.S. Fish and Wildlife Service was consulted; they provide an indication of the species of concern which may be in the proposed site area. A ground level wetland survey has been conducted by the DOE and a survey made of potential summer habitat for the endangered Indiana bat. Additional field surveys are planned, if Tennessee is selected as the site for the SSC. DOE-authorized field surveys would be undertaken to document the botanical resources of the area. Results of the surveys would be reported in the Supplemental EIS.

0522.27

After the SSC site is selected, the DOE would conduct further field studies at the selected site to confirm the absence of threatened, endangered, or candidate species. If such a protected species were present, and if it were determined that they could be adversely affected by project development, the DOE would initiate formal consultation with the USFWS under Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543). A biological assessment would then be prepared for the affected species to allow the USFWS to render a biological opinion. The biological opinion could also contain specifications to monitor project activities to ensure that mitigative measures are successful and that no additional impacts occur (see EIS Volume I, Chapter 3, Section 3.6).

Endemic species that are not listed as Federally protected candidate, threatened, or endangered species are not afforded legal protection under the Endangered Species Act. Candidate species for listing as threatened or endangered are protected under Section 7 consultation, and are taken into consideration in planning the proposed action. Endemic species protected by State law would typically result in consultation between the DOE and the responsible State agency to plan and implement measures to avoid or reduce adverse impacts to the listed species.

0522.28

The DOE will pursue a policy to resolve all potential legal obstacles before initiation of construction at the selected SSC site. Should a situation arise that would prevent the DOE from completing construction or operations of the SSC at the selected site, a decommissioning plan would be proposed and evaluated under NEPA prior to implementation.

0522.29

In accordance with Council of Environmental Quality regulations, the DOE has sought to involve as many individuals and groups as possible in the NEPA process for the SSC, including those individuals and groups known to be opposed to the project. Environmental organizations are an important element in the DOE fulfilling its commitment for a comprehensive and accurate EIS for the SSC. See Comment Response 1126.05.

0522.30

The hazards associated with construction in karst topography have been recognized and addressed in the EIS (Volume I and Volume IV, Appendix 5, Section 5.6.1.5; also see Comment Response 1462.04). The methods employed to control primary groundwater inflow are well established from years of tunneling and excavation experience in karst environments worldwide.

0522.31

The Snail Shell Cave system and anticipated impacts upon it are addressed in the EIS Volume IV, Appendix 11, Section 11.3.6.1.

Should the Tennessee site be selected, additional site-specific environmental studies would be conducted and addressed in the Supplemental EIS. Whether additional studies will be done on the four endemic species proposed in Dr. Thomas Barr's paper depends upon the potential for risk to these species from construction and operations of the SSC.

0522.32

At the present time, for the Tennessee site, the closest known cave (Snail Shell Cave) is approximately 2,000 ft west of the western edge of the proposed high energy booster facility. EIS Volume IV, Appendix 9, Section 9.2.3.6.B.4 states: "Blasting is expected to have no effect on caves which are in the vicinity of the Tennessee site.... The combination of the rock strength and distance should result in no effect on the caves due to blasting."

If Tennessee is the selected site, a more precise review of existing cave locations would be performed during the preparation of the Supplemental EIS.

If caves are discovered closer to a construction site than 500 ft, a monitoring program could be set up at the cave and charge-weight-per-delay amounts regulated similarly to the way they are regulated for structures, to reduce the potential for damage to the cave.

While a vibration level of 2.0 inches/s is regarded as safe for poor plaster (Volume IV, Appendix 9, Section 9.2.2.1.C.1), a level of 12 inches/s is necessary to cause the fall of rocks in unlined tunnels (Blasters' Handbook 1980). Maintaining vibration levels below this level will easily be done.

In the unlikely event that a passageway in an existing cave were to suffer damage as a result of blasting, the extent of the damage would be assessed and options available to correct the situation would be evaluated.

0522.33

Spill response procedures will be developed and documented in a Safety Analysis Report (SAR) (see EIS Volume IV, Appendix 12) that will be prepared prior to operation of the SSC. The SAR will address hazards which maybe associated with the installation and operation of the SSC, including the issue of chemical spill response. In addition, the Supplemental EIS for the selected site will define the required monitoring programs in more detail. The reader is referred to Volume I, Chapter 6 for regulatory requirements applicable to the SSC.

0522.34

The role of the DOE in controlling urban encroachment on SSC areas is limited to the original land acquisition. Property will be purchased in fee simple or stratified fee for use by the SSC.

Beyond this, State and/or local governments may wish to specify adjacent land use or zoning requirements for adjacent land during construction and operations of the SSC. Officials responsible for planning and implementation of zoning for controlled growth in the vicinity should consult the EIS Volume IV, Appendix 13, Land Resources Assessments, for estimates of SSC impact on adjacent areas.

0522.35

If Tennessee is the selected site a specific plan would be developed to protect the watershed and fauna of Snail Shell Cave. This would be compiled concurrent with the Supplemental EIS for the site.

0522.36

Because of the number of caves known in the Tennessee site area, and the potential for more to be found, it is likely that key members of the speleological community would be involved during the site characterization/construction planning portion of the project. At that time, risks to cavers can be evaluated, networks for disseminating information about construction schedules among caver groups can be identified, and procedures for safety checkouts of caves after construction can be developed. This would be assessed in the Supplemental EIS if Tennessee is the selected site. Presently, no risks to cavers or caves are expected; most of the underground structures would be excavated at depths far below the zone of near-surface karst development. Most of the rock to be excavated would be excavated by a tunnel boring machine; where blasting is needed, it would be done by procedures that avoid vibration-caused damage to nearby structures. Such procedures would also minimize the potential impacts on the caves. Additionally, other environmental mitigations would work to protect the cave environment from drastic changes (see EIS Volume I, Chapter 3, Section 3.6).

0522.37

Additional geotechnical activities would be required prior to completion of the design process during the preconstruction period for the SSC. The karst topography of Tennessee is recognized as requiring specialized geotechnical techniques which the DOE would use in order to prevent inadvertent damage to unknown caves and related cave ecosystems. Any new karst cave systems discovered during construction would be noted and analyzed for their impact on overall construction and operations activities.

The term "critical habitat" is a special designation given by the U.S. Fish and Wildlife Service for selected areas critical to the survival of Federally protected endangered species. There is no critical habitat in the vicinity of the Tennessee site or any other BQL site.

0522.38

See Comment Responses 522.23 and 522.25 regarding incorporation of Drs. Crawford's and Barr's research into this EIS, and plans for further study of site karst features, respectively. The potential for karst-related construction hazards was noted (EIS Volume IV, Appendix 5, Section 5.6.1.5, Figure 5.6.1-1); methods for construction in karst terrain are discussed in Comment Response 509.01.

0522.39

The DOE acknowledges the significance of the new information provided in the report by Barr and Crawford. This material was used extensively in preparation of the FEIS. In Volume IV, Appendices 6 and 7, expanded discussions are included regarding the nature and potential effects associated with the karst terrain at the Tennessee site. Discussions in Volume IV, Appendix 6 emphasize effects of constructing in karst terrain while those in Volume IV, Appendix 7 focus on the increased potential for water level and groundwater quality impacts.

In Volume IV, Appendix 11, Ecological Resources, the caves continue to be listed as a sensitive community/habitat as they were in the DEIS. However, the discussion is expanded and includes specific information about the endemic species. The possibility of risk of downstream transport of impacts via underground waterways which may link the Snail Shell Cave with other caves is also discussed. Volume I, Chapters 4 and 5 contain a summary and overview of these materials.

The DOE is committed to the minimization of environmental impacts to the extent practicable. If Tennessee were selected as the site for the SSC, additional investigations would be required prior to final design to locate, study, and define the risks and potentials to mitigate impacts to the Snail Shell Cave system in Tennessee.

0523.01

A copy of the "white paper" on hydrologic and ecologic studies of the Snail Shell Cave system has been provided to the DOE. The information contained in this study has resulted in several additions and changes to the EIS.

EIS Volume IV, Appendix 5, Table 5.6.1-4 has been expanded to list the additional caves described in the "white paper" as occurring in the vicinity of the proposed SSC.

Volume IV, Appendix 5, Section 5.6.2 has been expanded to note potential impacts to caves from construction of the injector complex by cut-and-cover methods. Additionally the need to assure that spoils piles are located away from inlets to the karst aquifer system has been addressed.

Volume IV, Appendix 7, Section 7.2.3.6 has been revised to describe the potential sensitivity of the karst aquifer to contamination and the ways in which contaminant impacts can be avoided or mitigated. This section has also been modified to state that detailed subsurface studies will be undertaken in areas identified for construction so that karst features with a potential for collapse can be avoided or stabilized.

Volume IV, Appendix 11, Section 11.3.6.1 has been expanded to include more detailed discussions of caves as habitats for sensitive terrestrial and aquatic communities.

Volume I, Chapter 5, Section 5.1.5.1.6 has been revised to present an expanded discussion of terrestrial and aquatic cave communities and the need for detailed site studies prior to establishing a final design and layout for the SSC at the proposed Tennessee site.

0523.02

See Comment Response 523.03.

0523.03

During the comment period, the DOE received a report prepared for the Tennessee proposers by N.C. Crawford of Western Kentucky University, on the karst topography of the Snail Shell Creek/Cave system near the proposed SSC site in Tennessee. This report was processed into the comment procedure as it was submitted by the Tennessee Division of Geology as part of the Tennessee response to the DEIS. All comments made at the public meetings and letters to the DOE received during the comment period, including the Crawford report, were subjected to a process in which individual comments within a letter were answered separately. The Crawford letter (No. 523) contained a number of separately catalogued comments. Other letters asked questions about the same topical area (No. 1322, No. 1381, No. 1411, No. 1482, No. 1485) and some of the responses to comments in those letters are grouped together with the Crawford comments.

The text of the EIS was revised (see Volume I, Chapters 4 and 5, and Volume IV, Appendices 5, 7, and 11) using information from the Crawford report.

Comment Response 500.03 consolidates a number of technical issues and comments regarding cave hydrology from the letters and answers them in a single response. The response is arranged in a technically logical flow to not only answer individual responses, but also to provide background information on Tennessee karst. Similarly, Comment Response 503.03 is a unified response for questions on cave fauna, and Comment Response 509.01 addresses questions on the feasibility of construction in karst terrain.

0523.04

It is not felt that the monitoring and collection system described in the comment will provide adequate assurance that contaminants will be prohibited from entering the West Fork of Stone River. A system to prohibit contamination of ground and surface water will be selected and designed based on more detailed evaluation of the karst hydrology of the site, and will be described in the Supplemental EIS, if Tennessee is the selected site.

0523.05

See Comment Response 500.03.

0523.06

See Comment Response 500.03.

0523.07

See Comment Response 500.03.

0523.08

See Comment Response 500.03.

0523.10

See Comment Responses 500.03 and 523.03.

0524.01

Regarding concerns related to the existence of karst at the Tennessee site, see Comment Responses 500.03, 509.01, and 503.03. The existence of "sulfur water" at the Tennessee site is noted in Volume IV, Appendix 5c, Section 5.6.2.2.B. It is noted in the EIS that a substantial number of water wells exist within and near the footprint of the SSC as presently located at the Tennessee site. Although the number cannot be accurately defined at present, it is expected that only a very few wells would be directly impacted (closure due to proximity to SSC tunnel -- assume 150 ft -- or other SSC facilities or construction activities).

0524.02

The Soil Conservation Service estimates 4,000 acres of prime farmland in Tennessee in the fee simple area of the SSC project. Information on important farmland was not provided by the State. However, an estimate of 1,839 acres was made using soil maps available for two-thirds of the counties affected. Based on this calculation, approximately 606 acres of prime and important farmland would be permanently converted and 498 acres would be temporarily disturbed by the SSC project. See Volume I, Chapter 3, Section 3.7.11; Chapter 4, Section 4.8.6; and Chapter 5, Section 5.1.7.2 as well as Volume IV, Appendix 13.

0524.03

All comments received regarding the EIS are published in Volume II, Comment Resolution. The site selection schedule is published. A preferred site was identified in November and a site will be selected in January 1989 when the record of decision for the EIS is filed. Public input on the SSC, including petitions sent to DOE prior to publication of the DEIS, was considered in preparation of the EIS.

0524.04

The DOE is conducting a comprehensive program of CERCLA investigations and remedial actions at other DOE sites. See Comment Response 627.01.

0524.05

The estimated annual radioactive waste disposal volume of 8,000 ft^3 for SSC operations is based on operating experience at other accelerators and in particular Fermilab. See EIS Volume IV, Appendix 10, Section 10.1.3.1.D for the basis of the volume estimate.

0524.06

EIS Volume IV, Appendices 10 and 12 discuss waste generation and disposal, including radioactive mixed waste (RMW), in detail. RMW has a radioactive as well as a hazardous chemical component. At Fermilab in the past very small quantities of this waste have been generated, on the order of a few ft^3 per year. The RMW at Fermilab has consisted of irradiated PCB's and lead/acid battery packs from emergency lights in the accelerator tunnel. At present, this RMW is composed entirely of the lead/acid battery packs, which are being scrapped at a rate of four per year. The volume rate of accumulation of this waste at Fermilab is about 0.1 yd^3/yr. The short half-life of radionuclides and the relatively small levels of radioactivity in this waste generally allow for treatment as a purely hazardous chemical waste. This will be universally true when the newer model emergency lights, which are being installed, place the battery packs outside the radiation zone of the tunnel. This change will eliminate this source of RMW at Fermilab in the future.

Based on this experience, the rate of RMW accumulation from the SSC should be much less than 0.1 yd^3/yr, and at this time, the expectation is that it will be zero (see EIS Volume IV, Appendix 10, Section 10.1.3.1.D.4). The current practice at Fermilab is on-site storage of RMW. The management of this waste, if it exists at the SSC, will be in accordance with DOE RMW management practices. RMW sites are required to comply with RCRA requirements.

Although the DOE has several low-level disposal facilities, currently there are no mixed waste disposal facilities in operation. The DOE has mixed-waste facilities that will meet RCRA criteria in different stages of development and permitting. It is anticipated that one or more of these facilities will be operable and available for the disposal of SSC RMW, if there is any, by the time the SSC is completed.

0524.07

The DOE has no plans for any alternate use of the proposed SSC site. See Comment Response 284.01.

0524.08

Comment noted.

0524.09

Previous studies have been made of the environmental radiation shielding for the SSC and include a general description of the sources of radiation (SSC-SR-1026). Review of these existing data will emphasize the benign nature of the SSC. As discussed in EIS Volume I, Chapter 3, the projected impacts on the total population from radiation produced by the SSC are small compared to existing background. The dose equivalent from direct radiation at the surface would not be measurable at the proposed Tennessee site. This is because hadrons are effectively stopped by a few tens of yards of soil or equivalent shielding. Muons, although they travel much farther, would be in a narrow beam at the depth of the beam tube (see EIS Volume IV, Appendix 10, Section 10.1.3.1A). The minimum depth in Tennessee is approximately 325 ft, which would effectively shield the surface from the direct radiation produced by the SSC.

In response to the comment regarding restricted access at Fermilab, the facility grounds are open to access by the general public, except for working portions of the facilities that are restricted to employees and other qualified personnel.

See Comment Response 633.04 for a discussion of the risk of cancer.

0524.10

Air quality, noise, blasting, and spoils disposal impacts from construction of the SSC at the Tennessee site are discussed both in Volume I, Chapter 5, and Volume IV, Appendices 8, 9, and 10. Construction is not expected to result in exceedences of the primary Ambient Air Quality Standards (AAQS) for total suspended particulate (TSP), as discussed in Appendix 8. (See Comment Response 1278.11.) Dust concentrations from truck traffic will be less than that calculated for E and F site tunnel excavations. Noise from surface construction and shaft blasting is expected to be of short duration, and approximately 25 percent of those living within 700 ft of a service (F) or intermediate access (E) area are expected to be highly annoyed by the noise. Approximately 9 percent of those living within 2,000 ft of an E or F area are expected to be highly annoyed by the construction noise. Approximately 3 million yd^3 of rocks and earth material are expected to be excavated during construction. On the average, about 5,760 yd^3 of rocks and earth materials would be excavated and hauled away daily (when six tunnel boring machines are operating simultaneously). This would amount to about 288 truck loads of materials daily during construction, for a typical haul truck capacity of 20 yd^3. For the whole project, this would result in a grand total of approximately 150,000 truck loads of spoils hauled.

0524.11

The potential for loss of existing water wells and areal restrictions on drilling of new water wells was not consistently presented in the DEIS.

See Comment Response 505.02 for clarification on the number of wells potentially lost and drilling restriction areas.

0524.12

See Comment Response 820.03.

0524.13

The public finance analysis for Tennessee considers the cumulative local government fiscal effects to jurisdictions in Bedford, Marshall, and Rutherford Counties which are expected to receive the primary impact from SSC construction and operations. The tax revenue losses of local governments from the transfer of private land to Federal ownership in each county, as well as the anticipated requirements for capital improvements, were estimated and presented in Volume IV, Appendix 14, Sections 14.1.3.6.C and 14.1.3.6.D.

0524.14

This observation is consistent with the land acquisition plan as presented in EIS Volume IV, Appendix 4.

0524.15

See Comment Response 1229.02.

0524.16

Comment noted.

0524.17

Comment noted.

0524.18

In Tennessee, 128 relocations are anticipated due to the SSC. Information on the number of relocations is presented in Volume I, Chapter 3, Table 3-6 and Volume IV, Appendix 4.

The SSC in Tennessee would require 7,750 acres in fee simple estate, of which 415 acres would be prime farmlands permanently removed from agricultural production. The effects of the SSC on land use in Tennessee is presented in Volume I, Chapter 4, Section 4.8 and Chapter 5, Section 5.1.7. Information on land acquisition plans can be found in Appendix 4, Section 4.4.

0524.19

SSC-related population in-migration would increase demands for public services in the Tennessee Region of Influence (ROI) to maintain existing levels of service. During the peak year of construction in 1992, about 450 additional government employees would be required throughout the region; by the time of full SSC operations, this requirement would level off to slightly less than 400 employees (see Volume IV, Appendix 14, Section 14.1.3.6.C).

Impacts to infrastructure, including roads and utilities, are discussed in the EIS (see Volume IV, Appendix 14, Sections 14.2.1.3.F and 14.2.2.3.F). As is noted in the former section, decreased levels of service are anticipated on several roads due to the SSC, but most of these would be negligible in their ultimate impacts. Similarly, utility impacts are anticipated to be negligible.

0524.20

Radiation Health Effects

Potential effects from radiation produced by the SSC have been carefully studied and can be predicted with reasonable confidence. The environmental safety and health implications of radioactivation resulting from SSC operations are summarized in EIS Volume I, Chapter 5, and are discussed at length in Volume IV, Appendices 10 and 12.

During operations of the SSC, the event representing the worst reasonably foreseeable accident would be an accidental loss of beam. The radiological impacts from a beam loss are discussed in EIS Volume IV, Appendix 12, Section 12.4.1. At the Tennessee site, the maximum radiation dose to an individual at the land surface above the point of beam loss is projected to be less than 0.001 mrem/yr (see Volume IV, Appendix 12, Table 12.4.1-2), as compared with the DOE limit of 100 mrem/yr. Considering that the average individual receives an annual radiation dose of about 300 mrem/yr from natural sources (see Volume IV, Appendix 12, Table 12.2.1-1), the potential radiological impacts from the SSC may be regarded as negligible. The above considerations would apply equally to other potential receptors near the SSC, such as soil, crops, and surface water supplies.

Potential radiological impacts to groundwater supplies have been considered as well, and are addressed in EIS Volume I, Chapter 5 and Volume IV, Appendix 12. At the Tennessee site, the calculated annual dose equivalents in a nearby well (50 m from source) resulting from an accidental loss of beam would be 0.0098 mrem/yr (see Volume IV, Appendix 12, Table 12.2.3-6), well below the 4 mrem/yr DOE guideline for drinking water. Radiation doses from airborne activation products have been calculated for each of the SSC site alternatives. As shown in Volume IV,

Appendix 12, Table 12.3.1-2, the projected maximum radiation exposures from airborne radionuclides at the Tennessee site amount to 0.0071 percent and 0.074 percent of the Federal limits (40 CFR 61) for whole body and organ doses, respectively.

Electromagnetic Fields

Potential impacts from the electromagnetic fields generated during operations of the SSC are addressed in Volume IV, Appendix 10, Section 10.1.3.2. The superconducting magnets used in the SSC will be designed with iron yokes that considerably reduce the strength of the magnetic field beyond the vacuum beam tube. At the tunnel wall, the strength of the SSC-induced field will be about the same as that of the earth's magnetic field (see Volume IV, Appendix 10, Section 10.1.3.2.A.2). See Comment Response 733.02.

0524.21

The excavated material is rocks and earth material (soil) removed while digging the tunnel, shafts, and building foundations. The excavated material would be hauled away in covered trucks to be stored in the designated disposal sites. The excavated material would be covered with top soil, compacted, and the area revegetated.

There will be significant impacts resulting from the large volume of material produced in the construction of the tunnel at all seven site alternatives. These impacts will be mitigated as discussed. (See EIS Volume I, Chapter 5, Sections 5.1.1 and 5.1.10) for discussion of impacts and mitigation measures.

The State of Tennessee has proposed several options to dispose of excavated material: 1) the limestone could be crushed and used by contractors during site development for roadway surfacing, road bases, asphalt mixes, concrete aggregate, and construction embankment materials, 2) limestone could be sold, and 3) limestone could be disposed of at 24 disposal sites. (See Volume IV, Appendix 10, Section 10.2.3.6 for details.)

0524.22

Comment noted.

0524.23

Comment noted.

0524.24

See Comment Responses 497.08 and 497.26 with respect to potential groundwater leakage into the tunnel and potential effects on water wells.

It is anticipated that a limited number of existing private wells may be affected or will have to be abandoned because of their proximity to the tunnel or other project sites and facilities. Several proposers have indicated that an alternative well or water supply will be provided to affected well owners where a need still exists. The manner in which an alternative supply of water is to be provided is at the discretion of the States and has not been finalized at this time. The impacts of providing such an alternative source will be addressed in more detail in the Supplemental EIS for the selected site.

0524.25

The Tennessee State government is expected to purchase private land that would be required for the SSC. See Comment Response 0880.04. The EIS analysis of the revenue effects for the Tennessee State government and the cumulative local government fiscal effects to jurisdictions in the three primary impact Counties (Bedford, Marshall, and Rutherford) are presented in EIS Volume IV, Appendix 14, Section 14.1.3.6.D.

0524.26

Impacts to infrastructure, including roads, are discussed in EIS Volume IV Appendix 14 Section 14.2.1.3.F.

EIS Volume IV, Appendix 14, Table 14.1.3.6-13 which summarizes the potential SSC-related impacts at the Tennessee site to Rutherford County, indicates that during the peak of construction in 1992, local public service agencies would need to expand employment by 4.2 percent above baseline employment levels to meet demand generated by SSC-related in-migrants. Furthermore, 45 additional public school instructors would be needed to serve the enrollment increase of 907 students incurred by the County from SSC workforce families. During the first year of full operation in 2000, public service agencies would need to expand employment by 3.6 percent above baseline employment to meet increased demand created by SSC development. Public school enrollments in 2000 would experience a county-wide increase of 1,005 students and would require an additional 49 teachers to meet demand.

Impacts to utilities are discussed in EIS Volume IV, Appendix 14, Section 14.2.2.3.F.

Potential impacts to local public services, which include police and fire protection, health care, public education, and total government employment, are projected based on meeting SSC-related demands while maintaining current levels of service. The projected impacts are discussed in Volume IV, Appendix 14, Section 14.1.3.6.C.

0524.27

Potential effects from radiation produced by the SSC have been carefully studied and can be predicted with reasonable confidence. The environmental safety and health implications of radioactivation resulting from SSC operations are summarized in Volume I, Chapter 5, and are discussed at length in Volume IV, Appendices 10 and 12.

During operations of the SSC, the event representing the worst reasonably foreseeable event would be an accidental loss of beam. The radiological impacts from a beam loss are discussed in Volume IV, Appendix 12, Section 12.4.1. At the Tennessee site, the maximum radiation dose to an individual at the land surface above the point of beam loss is projected to be less than 0.001 mrem/yr as compared with the DOE limit of 100 mrem/yr. (DOE Order 5480.1B as cited in EIS Volume 1, Chapter 6, Section 6.3.2).

Potential radiological impacts to groundwater supplies have been considered as well and are addressed in Volume I, Chapter 5 and Volume IV, Appendix 12. At the Tennessee site, the calculated annual dose equivalents in a nearby well (50 m from source) resulting from an accidental loss of beam would be 0.0098 mrem/yr (Volume IV, Appendix 12, Table 12.2.3-6), well below the 4 mrem/yr DOE guideline for drinking water.

Radiation doses from airborne activation products have been calculated for each of the SSC site alternatives. As shown in Volume IV, Appendix 12, Table 12.3.1-2, the projected maximum radiation exposures from airborne radionuclides at the Tennessee site amount to 0.0071 percent and 0.074 percent of the Federal limits (40 CFR 61) for whole body and organ doses, respectively.

Considering that the average individual receives an annual radiation dose of about 300 mrem/yr from natural sources (Volume IV, Appendix 12, Table 12.2.1-1), the potential radiological impacts from the SSC may be regarded as negligible.

0524.28

See Comment Response 733.02 which addresses the potential impacts from the electromagnetic fields created by overhead power lines; and Comment Response 497.16 for a discussion of the magnetic fields from the SSC magnets.

0524.29

Volume and disposal of excavated materials are discussed in EIS Volume IV, Appendix 10, Sections 10.2.2.3 and 10.2.3.6. The State of Tennessee has proposed 35 disposal sites within a hauling distance of about a mile (Volume IV, Appendix 10, Figure 10.2.3-8) of the site. Traffic impacts from the transportation of spoils are addressed in Volume IV, Appendix 14, Section 14.2.1.3.F.1.b. Water pollution impacts from spoils disposal are addressed in Volume IV, Appendix 7, Section 7.1.3.6. Air pollution impacts from spoils disposal are addressed in Volume IV, Appendix 8, Section 8.4.6. The transportation and disposal of spoils will be addressed in greater detail in the Supplemental EIS to be prepared for the selected site.

0525.01

Comment noted.

0526.01

Although public services such as primary and secondary education, health care, and other social services may have responded effectively in the past to temporary increases in demand due to in-migration associated with the Pawnee Power Plant, since the 1950s they have not experienced the long-term impacts of in-migration of a permanent resident population such as the SSC would. The reported 1987 expansion of public safety facilities in Morgan County should be sufficient to meet SSC-related public safety impacts, although an increase in personnel would likely be required (see EIS Volume IV, Appendix 14, Section 14.1.3.2.C, Tables 14.1.3.2-11 and 14.1.3.2-12).

0526.02

The passage cited refers specifically to Fort Morgan and Brush, as noted earlier in the quoted sentence. Anticipated problems in these towns as a result of SSC-related growth (EIS Volume IV, Appendix 11, Section 14.1.3.2.C.3 and Volume I, Chapter 4, Section 4.9.1) include increases in demand for several public services--namely those associated with educational facilities, health facilities, and social services. It is also anticipated that these towns might have difficulty absorbing increased housing demands associated with the project during peak years of construction and operations.

0526.03

The cited text from the EIS (Volume IV, Appendix 14, Section 14.1.3.2) refers to projections which indicate that the number of jobs in local public services would need to be increased by 16.5 percent in 1992 in Morgan County to meet SSC-induced demand while maintaining current levels of service. These are cumulative projections for all governments within the County which includes the county, five cities, four school districts, and 17 special districts. To meet this demand, public service employment would need to expand by approximately 3.25 percent annually between 1988 and 1992; growth at this rate is considered substantial.

0526.04

The cited passage (see EIS Volume IV, Appendix 14, Section 14.1.3.2.B) refers to SSC-related impacts on public services in Morgan County -- notably to small communities in this county. To maintain existing levels of service and accommodate the SSC-generated population increase in Morgan County (projected to be 3,455 people in 1992), public services provided by local governments would need to be expanded by 137 full-time employees in 1992. Potential population impacts caused by SSC development in Morgan County are presented in EIS Volume IV, Appendix 14, Section 14.1.3.2.B.

0526.05

The passage cited (Volume IV, Appendix 14, Section 14.1.3.8.B) refers to cumulative impacts to Fort Morgan and Brush which would result if the timing of the Pawnee Power Plant expansion were to coincide with SSC construction. (See also Volume I, Chapter 5, Sections 5.2.10 and 5.2.12). Of particular concern are impacts associated with increased demand for public services--notably public education, public health, and social services--as well as increased demand for housing in these two communities.

0526.06

The analysis of public service impacts used most recently available employment and population data from Federal surveys of local government sources to formulate projections that maintained current levels of service for full-time government employees per 1,000 population. This methodology helps to make comparisons between sites and uses data consistent among the sites. Due to the large number of local government jurisdictions studied in the EIS, it was not feasible to analyze the existing capacities for each local jurisdiction. A finer level of analysis could be included in the Supplemental EIS after the final site is selected.

0527.01

Comment noted.

0528.01

The geological characteristics of the Illinois site, as they relate to constructibility, are described in EIS Volume IV, Appendix 5, Section 5.3.1. These and other factors were considered in the selection of the

SSC site (see Volume I, Chapter 3 and Volume III for a discussion of the site selection process). See also Comment Responses 1276.01, 0203.01, and 798.01.

0529.01

Comments noted.

0530.01

Comments noted.

0531.01

Illinois has areas that require little mitigation from the environmental standpoint (e.g., Volume IV, Appendix 6), but other areas where significant mitigation will be required (e.g., Volume IV, Appendix 7, Volume IV, Appendix 16, and Volume IV, Appendix 4).

0532.01

The potential effects of the SSC project have been evaluated. Refer to the discussion of hazardous source terms in EIS Volume IV, Appendix 10 and the assessment of health impacts in Volume IV, Appendix 12.

Estimates of the amounts of radiation that may be released from SSC operations are based on experience from other accelerators such as Fermilab. Also, an experimental monitoring and occupational health and safety program would be implemented during operations to ensure the protection of workers and the general public. See EIS Volume IV, Appendix 12, Section 12.2.1.1.

0532.02

Fermilab employees (like employees at all DOE facilities) are offered an occupational medicine program as prescribed in DOE Order 5480.8. Risks and hazards associated with specific jobs are identified and communicated to the occupational physician who then determines if there are any special medical tests which should be conducted. Workers who may be exposed to radiation are carefully monitored. Exposures are routinely low and well below established standards. Health records of Fermilab employees show no evidence of unusual illnesses or injuries that result from working at the Laboratory.

The potential health effects of the SSC project on SSC workers have been estimated by health and safety professionals based on the best available information regarding the proposed SSC facility design and the proposed sites. Safety Analysis Reviews (SAR) will be performed prior to construction and operation of the SSC and will address in greater detail potential worker hazards.

The Fermilab Site Environmental Reports (prepared annually) are publicly available and present data on levels of chemical and radiological parameters onsite.

0532.03

Comment noted.

0532.04

The DOE is responsible for the qualifications of the potential SSC project staff. The DOE does not anticipate that the SSC project would require security clearances. The subject of worker clearance was not addressed in the EIS.

0532.05

See Comment Response 880.04.

0532.06

Comments noted.

0532.07

See EIS Volume IV, Appendix 14, Section 14.1.3.7.D for a discussion of the impacts on public finance in Texas. Also see Section 14.1.3.7.A for a discussion of the impacts of the SSC on area and State economic activity.

0533.01

Comments noted.

0533.02

See Comment Responses 533.05 and 1175.04.

0533.03

Groundwater is the planned source of on-site water for the SSC at the proposed Illinois site, both during construction and operations. In addition, the project-related population growth is expected to rely heavily on groundwater, depending on the current and planned sources of water for the communities and rural areas in the vicinity of the SSC. Most of this water will be withdrawn from the deeper aquifers. Import of Lake Michigan water and use of Fox River water may be considered in the future for both on-site and off-site water needs.

A negligible impact on the regional overdraft of the deeper aquifers is expected during construction, but a measurable impact is projected during SSC operations due to the higher on-site water use. Localized water table impacts are expected from new residential shallow wells resulting from the project-induced population growth. Although vertical connections exist between the shallow and deeper aquifers, they are localized, and vertical water movement is restricted by confining layers and aquitards of low hydraulic permeability. Thus, regional groundwater flow is essentially horizontal and recharge of the deeper aquifers occurs primarily laterally rather than vertically. Consequently, the withdrawals from the deeper aquifers are expected to have negligible impacts on shallow water tables and wells.

In addition to water conservation, a possible mitigation would be increased reliance on surface water sources, such as the Fox River or Lake Michigan (see EIS Volume I, Chapter 3, Section 3.6). Import of Lake Michigan water is already planned by some of the communities to the east of the proposed SSC site. Indirectly, this would also benefit residents and communities in the western portion of the project due to the resulting reduction in the regional overdraft of the deeper aquifers.

Impacts on specific wells and water supplies cannot be assessed until the SSC design is finalized. These impacts and potential means of mitigation will be evaluated in the Supplemental EIS for the selected site. See Comment Responses 497.26, 524.24, and 1133.02 with respect to potential compensation to affected well owners.

See also Volume IV, Appendix 7, Sections 7.1.3.3 and 7.2.3.3 for more details on the assessment of water resources, including groundwater impacts.

0533.04

See Comment Response 533.11.

0533.05

SSC-related impacts on public finance were assessed in the EIS for the Illinois Region of Influence (ROI) and for the primary impact Counties of DuPage, Kane, and Kendall within the ROI. However, impacts were not assessed at the sub-county level, such as individual school districts. For Kane County as a whole, cumulative impacts to all jurisdictions are projected to be negative for the first three years of SSC construction and operations and positive thereafter (see EIS Volume IV, Appendix 14, Table 14.1.3.3-16).

Questions regarding State legislation should be addressed to the appropriate State of Illinois authorities.

0533.06

See Comment Response 1175.04.

0533.07

See Comment Response 1175.04.

0533.08

In the specific case of Kaneland's school, the nearest surface construction location would be E6, located approximately 4,000 ft from the school. Noise levels at the school caused by surface operations supporting the tunnel boring machine, would be expected to average less than 45 dBA at that distance, and should not be discernible in the normal background sound.

It is not feasible to schedule this work outside of school hours as the consequent noise impact would be greater because the noise would coincide with sleeping hours and would be inconsistent with the spirit of the Illinois noise code.

Most of the blasting will be done at a depth greater than 100 ft, greatly reducing noise and vibration impacts from this source. With regard to surface blasting, impacts are discussed in EIS Volume I, Chapter 5, Section 5.1.4.2 which also discusses air blast overpressure. A monitoring and mitigation plan for blasting is outlined in Volume I, Chapter 5, Section 5.1.4.2 A.1.

0533.09

Students can experience disruption related to relocation as well as changes related to the in-migration of new students, some of whom may have different values, experiences, and needs. It is expected that direct and secondary economic effects of the SSC project on local Kane County governments would lead to increased revenue to fund social services such as family counseling beginning in 1992. The county would experience a negative fiscal impact from the start of construction through 1991 as a direct result of higher demand for public services (due to in-migration to the county) and the loss of property taxes (related to land being taken out of the tax base for the SSC). EIS Volume IV, Appendix 14, Table 14.1.3.3-16 shows the SSC-related changes in public finances as a cumulative total for local governments in Kane County.

0533.10

See Comment Responses 533.03 and 1133.02.

0533.11

It is expected that the fiscal effects of the SSC project on local Kane County governments would lead to increased revenue beginning in 1992. The county would experience a negative fiscal impact from the start of construction through 1991 as a direct result of higher demand for public services and the loss of property taxes. EIS Volume IV, Appendix 14, Table 14.1.3.3-16 shows the SSC-related changes in public finances as a cumulative total for local governments in Kane County.

The use of funds within the State or Federal budget is a matter of fiscal policy. See Comment Response 278.08. Education is primarily funded at the local level, and questions concerning the proposer's authority to mitigate the effects to the local educational system should be directed to the appropriate State agency. See Volume IV, Appendix 14 for a discussion of anticipated impacts to educational services.

0533.12

See Comment Response 1175.04.

0533.13

See Comment Responses 533.08 and 533.09.

0534.01

A cost summary of the total project cost is presented in EIS Volume IV, Appendix 2, Table 2-2. Future new-technology possibilities and technical alternatives to the SSC are summarized in Volume I, Chapter 3, Sections 3.2 and 3.3.

0534.02

EIS Volume IV, Appendix 5, Section 5.5.5 addresses existing sources of vibration at the North Carolina site. Information provided by the State has been reviewed and verified by the DOE. Criteria for ambient vibration sources were delineated in the Invitation for Site Proposals, and information presented by the seven site alternatives indicates that the SSC can be sited at any of the sites in compliance with those criteria.

0534.03

Vibration has little or no effect on the tunnel construction costs.

Vibrations large enough to cause tunnel construction costs to vary would have to be extremely large (such as quarry blasting within 200 ft of a tunnel under construction) before a change in tunnel costs would be noticeable. The tunnels themselves have no basic way of dampening vibrations through design or construction of isolators.

Sources of vibration which would be detrimental to the operation of the machine (such as a freight train crossing within 30-40 ft over the ring) can be mitigated by locating the ring slightly deeper (see EIS Volume I, Chapter 3, Section 3.6). The cost for this is negligible.

0534.04

In EIS Volume I, Chapter 3, Table 3-8 shows the average yearly energy consumption for both construction and operations. The peak electric power requirement for the SSC is 200 MW (see Volume III, Chapter 1, Section 1.1).

0534.05

Comments noted. EIS Volume III, Chapter 3 contains a discussion of the methodology used as well as the decision process and the required content of a Record of Decision.

0534.06

As explained in EIS Volume III, Chapter 2 the Invitation for Site Proposals (ISP) listed the technical evaluation criteria in descending order of relative importance. The method of selecting the SSC site set forth in the ISP, including the descending order of importance of the technical evaluation criteria, and the life cycle cost considerations, are described in EIS Volume III, Chapter 2. Note that not only are the criteria set forth, but numerous subcriteria are described in the ISP.

0535.01

Comment noted.

0535.02

Comment noted.

0535.03

Comment noted.

0535.04

Comment noted.

0536.01

Comments noted.

0537.01

Comment noted.

0538.01

Comment noted.

0538.02

The technical resources of the area were evaluated in the process leading to selection of the site alternatives and will be considered in site selection (see EIS Volume III for discussion).

0538.03

Many of the Fermilab operations personnel will be familiar with the Linac, the Low, Medium, and High Energy Boosters, and with the general plant management. Nonetheless, research scientists will be assimilated from throughout the high energy physics community.

In terms of the value of the existing physical plant, this has been assessed and special adjustments for the Illinois site have been included as stated in EIS Volume IV, Appendix 2, Section 2.4.2.2. See also Comment Response 1276.01.

0538.04

Geoengineering conditions at the Illinois site are discussed in the EIS Volume I, Chapter 4, Section 4.1.4 and Volume IV, Appendix 5, Section 5.3.1. This section states that the rock quality designation at tunnel depth ranges from very good to excellent.

0538.05

Comment noted.

0539.01

Comments noted.

0540.01

Comment noted.

0541.01

Both procurement for the SSC itself and hiring of employees at the facility will be consistent with Federal policies on minority set-asides and minority employment. It is not possible to predict the hiring practices which will be exercised by the private sector to fill jobs associated with induced economic development.

0541.02

These figures are consistent with data presented in EIS Volume IV, Appendix 14.

0541.03

Comment noted.

0542.01

Volume I, Chapter 3, Section 3.2.4.3 describes the conditions under which the DOE will commit to a specific mitigation or set of mitigations. Should Tennessee be selected for the SSC, the DOE commitment will be a function of detailed facility location and design, and consultations with Federal, State, and local agencies. It is anticipated that noise control measures will be addressed and included in the course of detailed facility design and construction planning and included in the Supplemental EIS for the selected site.

0542.02

Comment noted.

0542.03

Table 5.1.8-9 does not refer to numbers of relocations. However, Table 3-6 does reflect the number of relocations noted in your comment. You are correct that Arizona has the lowest number of relocations.

0542.04

Discussions in the EIS document that a greater number of existing water wells may require closure at the Tennessee site than at the Arizona site. The number of wells that may have to be closed at the Tennessee site was however, not consistently presented in the DEIS. See Comment Response 505.02.

0542.05

The cemeteries listed in EIS Volume IV, Appendix 15, Section 15.1.3.6.A.5 are located in the fee simple areas of the proposed Tennessee SSC site. In general, they are situated away from direct impact areas. The Isaac Miller Cemetery is located within the proposed buried beam zone access area J-1. This could require relocation. If Tennessee is selected as the site for the SSC, consideration would be given to the historic significance of this site and other cultural resources by applying National Register criteria. Whether eligible or not, the cemetery would only be relocated if it interfered with construction or operations of the facility.

0542.06

The regionwide course of the surface water draining the SSC site should not represent an important site selection factor. As discussed in EIS Volume IV, Appendix 7, Section 7.1.3.6.F.2, the projected impacts on surface water quality associated with SSC operations in Tennessee will be negligible. While there may be measurable impacts from sediment transport associated with construction activities (see Volume IV, Appendix 7, Section 7.1.3.6.F.1), these impacts will be short term and will likely be noticed only along short sections of drainages in the vicinity of the construction sites (see Volume I, Chapter 5, Section 5.1.2). Similar conditions will be present at the other sites.

0542.07

At the present time, no approved/permitted hazardous waste disposal facilities exist in the State of Tennessee. Therefore, any hazardous waste generated by the SSC, if sited in Tennessee, would be shipped to an approved disposal facility outside the State. Both Arizona and Colorado are in the process of constructing permitted hazardous waste disposal facilities that are close to their respective proposed SSC sites.

0542.08

Comment noted.

0543.01

Comment noted.

0543.02

Quantitative characteristics of this site's location, namely its proximity to the Denver metropolitan area, are taken into account in making this assessment. Similarly considered are recent trends in regional development, such as the growth in western Adams County with the expansion of suburban Denver and the development of key communities east of Denver such as Brighton. Neither of these considerations changes the fact that the proposed Colorado site is located some distance from a major population center, a point which becomes clearer when compared to certain other proposed sites which are being considered (e.g., the Illinois and Texas sites).

The EIS neither states nor implies that Colorado "will be unable to respond adequately to SSC-related growth." Rather, it suggests that focused efforts will be required to meet impacts generated by the project, notably impacts on housing demand and public services (see Volume IV, Appendix 14, Sections 14.1.3.2.B and 14.1.3.2.C). The EIS recognizes that the communities of Fort Morgan and Brush are not isolated, but in fact part of a regional network. Despite the presence of other communities in the region, it is likely that a number of project-related in-migrants will reside in Morgan County, and probably in these two towns (see Volume IV, Appendix 14, Section 14.1.3.2.A). Impacts to housing demand and public services will thus affect this pair of communities; the presence of other communities in the general vicinity and their respective amenities will not remove these effects.

The previous experience of this area in dealing with project-related growth in other contexts, albeit of a lesser magnitude and duration than that anticipated with the SSC (see Comment Response 4.03), should provide useful experience in dealing with SSC-related impacts. Similarly, the commitment of the Colorado State government, local government jurisdictions, and various other agencies will aid in the absorption of expected impacts. Drawing upon such past experience and the wide range of resources to be made available would comprise part of the focused effort to accommodate projected SSC impacts.

0544.01

Any cost savings associated with the use of the existing Fermilab facilities have been factored into the cost analysis in EIS Volume IV, Appendix 2. The Invitation for Site Proposals (ISP) (Volume IV, Foreword) lists the various criteria for site selection. The SSC site evaluation report is included in EIS Volume III. Local economic conditions are not a site selection criterion, but are incorporated in the socioeconomic impact analysis presented in EIS Volume IV, Appendix 14. See Comment Response 880.04 for a discussion of land acquisition and compensation activities.

0545.01

Comments noted.

0546.01

The analysis in the EIS concurs with the comment that the Texas Region of Influence (ROI) has the highest output-per-worker ratios in the services sector and the mining sector--the latter due mainly to petroleum production in the region which is an industry characterized by a relatively high output-per-worker ratio. The EIS also supports the comment's claim that output-per-worker in the Texas ROI manufacturing sector was second to that of the Michigan ROI. Support for both of the above positions may be found in the table entitled "Sector-Specific

Regional Output Per Worker Adjustment Factors" in Volume IV, Appendix 14, Section 14.1.2.3.B.a.1.

The EIS does not describe the explicit technological capabilities of a particular ROI's industrial composition, let alone compare such a characterization to that of the nation as a whole. However, the availability of advanced technological industries in each of the seven alternative ROI's was indirectly included in the EIS analysis by incorporating the most recent input-output multipliers for each ROI (see Volume IV, Appendix 14, Section 14.1.2.3.B). These multipliers in essence described the interaction between regional industries. To the extent that advanced technological firms are required during SSC construction and operations, for those expenditures that could be made within the region, the availability of such firms in the Texas ROI would be a factor in preventing the flow of money outside the ROI.

In addition to industrial capabilities, numerous other regional characteristics, such as the presence of educational institutions, were considered during the evaluation of proposals and the development of the BQL (see Volume III, Chapter 1, Section 1.1)

0547.01

Comment noted.

0547.02

Anticipated economic impacts of the SSC on the Texas Region of Influence and Ellis County are discussed in Comment Response 383.01. With reference to the comment's mention of benefits on the social, cultural, and educational climate of the region, SSC-related impacts on general quality of life may be found in EIS Volume IV, Appendix 14, Section 14.1.3.7.E.

0548.01

Comment noted.

0549.01

The EIS contains analyses sufficient for the DOE to support site selection. Please refer to the following sections of the EIS as corrected in the Errata or as revised by the FEIS for more detailed information on the topics of concern:

- o Water tables -- Volume I, Chapter 5, Section 5.1.2 and Appendix 7, Section 7.2
- o Water purity -- Volume I, Chapter 5, Section 5.1.2 and Appendix 7, Sections 7.1 and 7.2

- o Radiation -- Volume I, Chapter 5, Section 5.1.6, Appendix 10, Section 10.1, and Volume I, Appendix 12, Sections 12.3.1 and 12.4.1

- o Land use -- Volume I, Chapter 5, Section 5.1.7, Appendix 13, Section 13.1

- o Land values -- Volume I, Chapter 5, Section 5.1.8, Appendix 4, and Appendix 14, Section 14.1.3.4.B

- o Noise -- Volume I, Chapter 5, Section 5.1.4, Appendix 9 (entire Volume)

- o Community disruption -- Volume I, Chapter 5, Section 5.1.8.5, and Volume IV, Appendix 14, Section 14.1.3.4.E

At the selected site, the DOE will prepare a detailed evaluation of the exact ring configuration, service center, and other surface feature placement and infrastructure required to support the development. This will be covered in the Supplemental EIS that will analyze in detail the impacts of construction and operations on the selected site. This supplement will be available for public comment prior to project construction.

0550.01

Comment noted.

0551.01

The geological composition of the proposed Illinois SSC site is discussed in EIS Volume IV, Appendix 5, Section 5.3.1.

In characterizing educational opportunities associated with each proposed SSC site, the EIS considers only local public, primary and secondary education. Existing conditions in the Illinois Region of Influence, and the primary impact Counties of DuPage, Kane, and Kendall are discussed in Volume IV, Appendix 5, Section 5.3.11.1.C. Public education impacts associated with the SSC are presented in Volume IV, Appendix 14, Section 14.1.3.3.C. Employment opportunities for family members and access to research institutions were considered by the DOE STF in its evaluations. A copy of its report is contained in Volume III, Chapter 3.

Infrastructure associated with the proposed Illinois SSC site is discussed in Volume IV, Appendix 5, Section 5.3.11.2. Anticipated capital expenditure associated with infrastructure expansion associated with the SSC is incorporated in the public finance analysis in Volume IV, Appendix 14, Section 14.1.3.3.D.

0552.01

Should the SSC be sited in Michigan, 576 acres of prime and important farmland would be temporarily disturbed during construction, and 341 acres of prime and important farmland would be permanently removed from production. (See Errata to EIS Volume IV, Appendix 13.) During final design, consideration would be given to placement of SSC facilities with an attempt to avoid prime and important farmland. If Michigan is the selected site, a site-specific analysis will be provided in the Supplemental EIS.

0552.02

A revised estimate is that approximately 190 acres of wetlands may be impacted at the Michigan site from surface facility construction. However, these impacts may not result in loss of natural wetlands. The 250 acre estimate does not incorporate mitigation activities, and a variety of mitigation alternatives (especially wetlands avoidance) is possible (see Volume I, Chapter 3, Section 3.6 and Volume IV, Appendix 11, Section 11.3.4.3). In the event that Michigan is the selected site, mitigation measures to reduce impact to wetlands would be developed in consultation with appropriate Federal and/or State agencies (e.g., USFWS, MDNR). More detailed information relative to wetlands mitigation would be included in the site-specific Supplemental EIS.

0552.03

See EIS Volume I, Chapter 2 for a discussion of the purpose and need for the SSC. Also see Volume I, Chapter 3, Section 3 for a discussion of consequences of not building the SSC. See Comment Response 520.06.

0553.01

The SSC-related effects on the quality of life/social well-being in Michigan are presented in EIS Volume I, Chapter 5, Section 5.1.8.5 and in Volume IV, Appendix 14, Section 14.1.3.4.E.

The SSC-related effects on the environment are presented in EIS Volume I, Chapter 5, Sections 5.1.1, 5.1.2, 5.1.3, 5.1.5, and 5.1.7 and in Volume IV, Appendix 5, Section 5.4; Appendix 6, Section 6.3.4; Appendix 7, Sections 7.1.3.4 and 7.2.3.4; Appendix 8, Section 8.4.4; Appendix 11, Section 11.3.4; and Appendix 13, Sections 13.1.3.4 and 13.2.3.4.

The benefits from the SSC are presented in EIS Volume I, Chapters 2 and 3. See Comment Response 278.08.

0554.01

Comment noted.

0555.01

Comment noted.

0556.01

See Comment Response 549.01.

0557.01

Comment noted.

0558.01

Comments noted.

0559.01

Comments noted.

0560.01

Comments noted.

0561.01

Comments noted.

0562.01

Comment noted.

0562.02

Volume I, Chapter 3, Table 3-3, and Volume I, Chapter 5, Sections 5.1.2 and 5.1.5, have been revised to clarify that no new withdrawals of water from the South Platte or Colorado Rivers are planned to support the SSC project.

0562.03

See Comment Response 562.02.

0562.04

Statements in the comment regarding the long-term positive effects of the SSC on communities and families in Colorado, and the possibility of a "boom" but no "bust", are in agreement with EIS Volume IV, Appendix 14, Section 14.1.3.2.E. Given that necessary effort is made to meet the anticipated increases in local demands for housing and public services in Morgan County, the EIS concurs that impacted areas in Colorado could adequately accommodate SSC-related growth (see Volume IV, Appendix 14, Sections 14.1.3.2.B and 14.1.3.2.C).

0562.05

Baseline data describing public services in the affected environments in Colorado are presented in the EIS Volume IV, Appendix 5, Section 5.2.11.1.C. Although a comparison with the Pawnee Power Plant experience is useful in assessing SSC-related impacts in northeastern Colorado, as noted elsewhere (see Comment Response 4.03) growth associated with the former was both smaller and for a more limited period of time.

0562.06

The characterization of the Morgan County housing industry as "historically small scale" was based upon the relatively low number of housing units located within the county (roughly 8,900 in 1980), and the fact that an annual average of less than 60 building permits for the construction of housing units was issued county-wide between 1980 and 1987 (see Volume IV, Appendix 5, Section 5.2.11.1.B). Based upon this construction history, coupled with historically low-to-moderate vacancy rates, the DEIS concluded that SSC-related housing demands would not be met easily in Morgan County.

Logan County was not overlooked in the EIS. Although not named as one of the primary impact counties because of its distance from the proposed SSC site, Logan County was included within the Region of Influence

(ROI). As noted in Comment Response 4.04, the spatial allocation model employed in the DEIS predicted that individuals associated with the SSC will indeed live in Logan County (Volume IV, Appendix 14, Table 14.1.3.2-6). The EIS does not anticipate serious housing impacts in the ROI.

0562.07

Comment noted.

0562.08

Comment note.

0563.01

Comment noted.

0563.02

The EIS recognizes the small volumes of potentially hazardous waste and the multiple dispositions possible at the Colorado site (Volume I, Chapter 4, Section 4.6.2).

0563.03

The EIS does not identify any significant water quality impacts associated with SSC construction at the Colorado site. See discussions in Volume IV, Appendix 7, Sections 7.1.3.2 and 7.2.3.2.

0563.04

The DOE welcomes and strongly encourages the participation of State and local governments in developing, where necessary, more detailed site-specific control measures and impact assessment methods. Also see Comment Response 1278.11.

0563.05

Comment noted.

0564.01

The comment is generally consistent with statements made in EIS Volume IV, Appendix 5. Fort Morgan municipal water supply is discussed in Section 5.2.2.2.C. Fort Morgan wastewater treatment facilities are discussed in Section 5.2.8.1. The Fort Morgan County landfill is discussed in Section 5.2.8.2. Finally, the Fort Morgan electric power utility is discussed in Section 5.2.11.2.B.1.

0564.02

The comments on power distribution and transmission are consistent with the discussion presented in EIS Volume IV, Appendix 14, Section 14.1.3.2.

0564.03

A discussion of the Colorado Interstate Gas Company natural gas supply systems is provided in EIS Volume IV, Appendix 5, Section 5.2.11.2.B.2. In addition, Section 5.2.11.2.B.2 has been corrected in the Errata to include reference to the Fort Morgan natural gas system.

0564.04

These comments are consistent with the discussion presented in EIS Volume IV, Appendix 5, Section 5.2.8.

0564.05

This comment is consistent with EIS Volume IV, Appendix 10, Section 10.3.3.2.

0564.06

Comment noted. See Comment Response 1068.31.

0564.07

The statement of impact on Fort Morgan's streets (EIS Volume IV, Appendix 14, Section 14.2.1) is based on a projected 14 percent increase in population in Morgan County. The magnitude of impacts would depend on where new housing developments are located and what new traffic patterns are established. It is recognized that impacts to existing roads could be minimized or prevented by proper planning and mitigations, as noted in EIS Volume I, Chapter 5, Section 5.1.8. Fort Morgan's program to maintain the streets is noted.

0564.08

Comment noted.

0564.09

See Comment Response 1068.30 regarding water quality data for the Colorado site in the DEIS. Comments regarding the condition of the Fort Morgan municipal water supply system and the availability of additional water for Fort Morgan are noted.

0564.10

The commenter correctly cites the EIS referenced sections.

0564.11

Annual SSC-related population growth in the early construction years is projected to peak at 6.8 percent for Morgan County as a whole, more than four times the 10-yr average growth cited in the comment for the City of Fort Morgan as discussed in EIS Volume I, Sections 5.1.8 and 5.2.12. Although the county has experienced growth in the past as a result of various developments, as noted in Comment Response 4.03, none has been of the magnitude and duration projected to result from the SSC. Housing impacts in Morgan County are also addressed in Comment Response 562.06.

0564.12

The State and local communities have stated that Fort Morgan has the ability to meet the indirect SSC utility demands resulting from SSC workers' living in or near the Town of Fort Morgan. The socioeconomic and infrastructure analysis (see EIS Volume I, Chapter 5, Section 5.1.8) discusses the impacts on the local area of Fort Morgan.

0564.13

See Comment Response 1068.39.

0564.14

See Comment Responses 4.03 and 587.02.

0564.15

Baseline data for public health care services, both at the regional level and primary impact county level, is presented in Volume IV, Appendix 5, Section 5.2.11.1.C. The analysis of public services used the most recently available employment and population data from a Federal survey of local government sources to formulate projections that maintained current service ratios between employment and population. This methodology, performed at the regional and county levels, facilitated comparison between sites and utilized data consistent among the sites. Due to the large number of local government jurisdictions studied in the EIS, it was not feasible to analyze the existing capacities for each local jurisdiction. A finer level of analysis could be included in the Supplemental EIS if the proposed Colorado site were selected by DOE for SSC development.

Potential impacts to local public services, including health care, are analyzed for the Colorado Region of Influence (ROI) and for individual primary impact Counties (Adams, Morgan, and Washington) within the ROI in EIS Volume IV, Appendix 14, Section 14.1.3.2.C.

0565.01

The total prime farmland in the SSC fee simple area at the Colorado site is zero as submitted by the Soil Conservation Service on the U.S.

Department of Agriculture Farmland Conversion Impact Rating Form AD-1006. This is the information used to compare the farmland acreages at the seven sites. For more information on prime and important farmland see EIS Volume I, Chapter 3, Section 3.7.11; Chapter 4, Section 4.8.6; Chapter 5, Sections 5.1.7.2, and 5.2.11; and Volume IV, Appendix 13. These sections have been revised or corrected in the Errata to incorporate information from AD-1006.

0565.02

Potential impacts related to water supply for the SSC at the Colorado site are discussed in EIS Volume IV, Appendix 7, Sections 7.1.3.2 and 7.2.3.2. It is also noted that the total annual direct water use requirement estimated for the project in Colorado is 1,775 acre-ft, not 2,200 acre-ft as stated in the comment (see EIS Volume IV, Appendix 7, Section 7.1.3).

0565.03

Site qualification requirements required by the DOE are found in EIS Volume IV, Appendix 4, Section 4.3. The Colorado Department of Local Affairs is the designated authority for all SSC land acquisition and relocation matters for the State.

0565.04

The EIS indicates, as stated in the comment, that average earnings of SSC direct construction and operations workers would be relatively higher than average earnings of current or future residents that do not have direct SSC jobs (see Volume IV, Appendix 14, Section 14.1.3.2.A). It is possible that a number of current residents, including agricultural workers, would obtain direct SSC jobs.

0565.05

The EIS indicates that the SSC will generate economic and public finance impacts on the Colorado Region of Influence (ROI) and on the primary impact counties. These impacts would include increased employment and increased revenues (see Volume IV, Appendix 14, Sections 14.1.3.2.A and Sections 14.1.3.2.C, respectively), which in turn may help to "promote the redevelopment" of rural sections of the region. As suggested in the comment, the EIS indicates that SSC construction and operations would necessitate investment in infrastructure in the Colorado ROI, including health care and educational facilities in Adams and Morgan Counties (Volume IV, Appendix 14, Section 14.1.3.2.C).

0565.06

Comment noted.

0566.01

Comment noted.

0567.01

Comments noted. There are impacts associated with the 90 or more miles of new roads. These impacts are summarized in EIS Volume I, Chapter 5, and detailed in Volume IV, Appendices 8, 9, 10, and 11, and Appendix 14, which contains the discussion of roads/infrastructure. Also see EIS Volume I, Chapter 3, Section 3.6.

0567.02

The Colorado Department of Highways completed a historic resources survey of the proposed roadway system. Six significant historic sites were identified. It is likely that these resources could be avoided or otherwise mitigated. (See EIS Volume I, Chapter 3, Section 3.6.)

A corresponding archaeological survey of 20 percent of the roadway corridor identified two potentially significant prehistoric sites. Evaluations are needed to determine whether these sites meet National Register eligibility criteria and, if necessary, to develop mitigation measures. If the Colorado SSC site is selected, additional surveys will be needed of the area not studied. It is possible that similar resources will be identified.

0567.03

Mitigations for wetlands impacts are discussed in EIS Volume IV, Appendix 11. Also see Volume I, Chapter 3, Section 3.6. The DOE will continue to consider potential mitigative measures throughout the SSC development process, including investigations related to preparation of the site-specific Supplemental EIS for the selected site and during the final design and construction process. Should Colorado be selected, the DOE will work with the Colorado Department of Highways in an effort to minimize wetlands impacts.

0567.04

Comments noted.

0567.05

The quantitative information given in this comment conforms with the corresponding information given in EIS Volume I, Chapter 5, Section 5.1.8.6. In addition, impacts to existing traffic patterns are addressed in Volume IV, Appendix 14, Section 14.2.1.3 B.1.a.2). The mitigations proposed by the State would considerably reduce adverse impacts to traffic patterns. Also see Volume I, Chapter 3, Section 3.6.

0567.06

The information presented is consistent with that presented in EI` Volume IV, Appendix 14, Section 14.?

0567.07

Comment noted.

0568.01

Comment noted.

0568.02

Comment noted.

0568.03

The attractiveness of the quality of life in a particular place may play a major role in the decision making of individuals with regard to their place of residence and will be one of the considerations taken into account in the site selection process as mentioned in the ISP. In order of relative importance, the technical evaluation includes concerns with geology and tunneling, regional resources, environment, setting, regional conditions, and utilities (see EIS Volume III, Chapters 2 and 3; also Chapter 3 of the ISP).

The proposed Colorado SSC site is characterized in the EIS as "relatively remote," based upon its distance (in both miles and travel time) from a metropolitan area. Of the seven sites on the BQL, the Colorado site is the farthest from such an area. The role of the front range metropolitan area is incorporated explicitly in the allocation of SSC-related population impacts to metropolitan Denver; as noted in the first paragraph of Comment Response 1068.14, this area is anticipated to receive 51 percent of the peak construction (in 1992) population impacts, and 49 percent of the population impacts projected during the first year of full operation (in 2000; see Volume IV, Appendix 14, Section 14.1.3.2.B).

Although noteworthy impacts in Morgan County are anticipated, primarily in the form of increased demand on housing and public services, the EIS neither states nor implies that State and local agencies would be unable to mitigate these impacts, only that focused efforts would be required to respond adequately.

0568.04

Comments noted. The preparers of the EIS employed the same methodology and analytic methods for every proposed site. Refer to Volume I, Chapter 3, Table 3-4 for the comparison of required infrastructure development at the seven site alternatives.

0568.05

See Comment Response 13.02.

0568.06

See Comment Responses 4.03 and 564.11.

0569.01

The EIS analysis does not examine health care facilities in sufficient detail to assess the impact on current occupancy capacity on an individual basis. The methodology used for determining impacts on these facilities can be found in EIS Volume IV, Appendix 14, Section 14.1.2.3. The Supplemental EIS could examine in detail the impacts on health care facilities.

0569.02

Information presented in the comment regarding emergency medical services and personnel is consistent with the data and discussion presented in EIS Volume IV, Appendix 5, Section 5.2.11.

0570.01

The scope of the cultural resource assessments used in the EIS are described in Volume IV, Appendix IV, Section 15.1.1. To date, the information on cultural resources at each of the proposed SSC sites varies; intensive cultural resource surveys have no yet been done. After selection of the SSC site, the DOE will consult with the State Historic Preservation Office (SHPO) and, if appropriate, will identify and, where necessary, mitigate adverse impacts on cultural resources.

For any site selected for the SSC, further cultural resource assessments would be necessary (Volume I, Chapter 5, Section 5.1.9). Data pertaining to known cultural resources were derived from information provided by the proposing states, data gathered through independent literature review, and consultation with the SHPO (see Volume I, Chapter 5, Section 5.1.9.1). These results provide indications of likely cultural resource types without identifying all locations. It is expected that additional prehistoric and historic archaeological sites, and historic buildings and cemeteries will be identified during archival research and intensive field surveys.

After the SSC site is selected, additional surveys and evaluations would be completed in order to identify cultural resources within potential project impact areas which are eligible for listing on the National

Register. Also after the SSC site is selected, a Memorandum of Agreement (MOA) between DOE, SHPO and the Advisory Council on Historic Preservation will be affected and cultural resource management procedures would be completed. (EIS Volume IV, Appendix 15, Section 15.1.2). Mitigation measures will be developed to appropriately mitigate impacts to significant cultural resources. The additional surveys and evaluations would be conducted as a part of a Supplemental EIS for the selected SSC site.

During these procedures, local historical organizations, such as the Fort Morgan Historical Foundation, will be contacted to provide information pertaining to site locations and significant evaluation.

0570.02

If the Colorado site is selected for the SSC, cultural resource management procedures would be completed in compliance with Section 106 of the Natural Historic Preservation Act and in accordance with a Memorandum of Agreement (MOA) between the DOE, the State Historic Preservation Officer and the Advisory Council on Historic Preservation. This would necessitate the involvement of professional archaeologists and historians familiar with the regional history and prehistory. A curatorial facility would be needed to maintain the archaeological collectors recovered during excavation (mitigation) procedures. Appropriate consideration would be given to selection of such a facility in accordance with the MOA.

0570.03

Comment noted. Site specific impacts will be addressed prior to construction and operations in a Supplemental EIS.

0571.01

Comment noted.

0571.02

The EIS states that although "boom" conditions may occur in local communities due to the SSC, problems associated with "bust" conditions probably would not occur (EIS Volume IV, Appendix 14, p. 94).

Colorado's endorsement of the socioeconomic impact methodology used to prepare the EIS, notably population and employment projections and distributions, is acknowledged. The EIS (Volume I, Sections 5.1.8 and 5.2.12; Volume IV, Appendix 14) notes that the absorption of public service and housing impacts will require focused efforts within Morgan County, notably in the communities of Fort Morgan and Brush (see Comment Responses 562.06, and 578.07).

The willingness of the State of Colorado, through the Department of Local Affairs, to provide assistance in mitigating impacts of the project is acknowledged.

0571.03

Comment noted.

0571.04

EIS Volume IV, Appendix 4, Section 4.4.2 reflects the land acquisition approach in Colorado's proposal. See Sections 4.4.2.1 and 4.4.2.3 of the referenced Appendix for the discussion of issues stated in the comment.

0571.05

The EIS must comply with Public Law 95-87 (7 CFR 657), which requires the identification of prime and important farmland acreages affected by Federal projects (see EIS Volume IV, Appendix 13, Section 13.2). Although policies of the State of Colorado may call for industrial diversification, Federal law requires information on impacted important farmlands.

The EIS also demonstrates compliance with the Farmland Protection Policy ACT (FPPA) (7 USC 4201-4209). See EIS Volume I, Chapter 6, Section 6.2.19.

0572.01

Comments noted.

0573.01

Detailed responses to the comment are given in the responses referred to in Comment Response 573.02.

0573.02

See Comment Responses 577.02 (paragraphs 1, 5, and 6), 1068.04, 1068.05, 1068.06, 1068.07, 1068.09, 1068.10, and 1068.12.

0574.01

EIS Volume IV, Appendix 14, Section 14.1.3.2, second paragraph states that the SSC location is "more than 60 mi from the Denver metropolitan area." Commuting times were used in the spatial allocation methodology (Section 14.1.2.3). The estimates employed included a travel time of 60 min to Brighton, assuming the existence of a proposed highway linking Brighton to the SSC site, and 80 min to downtown Denver.

0574.02

EIS Volume IV, Appendix 14, Section 14.1.3.2 states that "most" of the in-migrants would be attracted to the Denver metropolitan area, and that "many" of the workers would reside in Adams, Morgan, or Washington Counties. Details of the spatial allocations of population impacts are provided in EIS Volume IV, Appendix 14, Table 14.1.3.2-6. As noted in Comment Response 4.03, the impacts of the Pawnee project were of a smaller scale and more temporary than those expected from the SSC.

0574.03

EIS Volume IV, Appendix 14, Section 14.1.3.2 states that increased project and worker "spending would not create a correspondingly large amount of secondary jobs within the county. This is partly because consumers would likely travel to the Denver metropolitan area or Greeley to make many large retail purchases and partly because during additional rounds of spending, retailers and service providers would also make large wholesale purchases from distributors in the Denver area." It is fully expected that retail sales in the communities of Morgan County will increase; however, it is probable that many new residents will travel to the Denver area for large consumer items, in search of lower prices and greater selection. The EIS also emphasizes that the estimate made of secondary employment may be low if the Morgan County business sector is able "to retain a larger portion of the SSC-related spending" (Volume IV, Appendix 14, Section 14.1.3.2).

0574.04

Construction of housing units on platted lots which have readily available utilities, within the guidelines of existing local development plans, will help to accommodate the SSC-related housing impacts in Morgan County in general, and Brush and Fort Morgan in particular (see Comment Response 578.07).

Although Fort Morgan and Brush have experienced project-induced growth in the past, neither has recently experienced growth of the magnitude or duration expected to accompany the SSC. Compared to the Pawnee Power Plant, for example, in terms of people in-migrating to the area, the SSC is anticipated to require nearly twice as many construction workers, take more than 3 times as long to construct, and require roughly 25 times as many people to operate it (see Volume IV, Appendix 14, Section 14.1.3.3).

0574.05

Morgan County has not recently experienced growth-related impacts of the magnitude and duration expected to accompany the SSC. Compared to the Pawnee Power Plant, for example, the SSC is anticipated to require nearly twice as many construction workers, take more than three times as long to build, and require roughly 25 times as many people to operate. SSC-related population impacts on Morgan County are anticipated to be greater than Pawnee Power Plant-related impacts during both the construction and operations phases of the project.

Impacts to Fort Morgan and Brush wastewater treatment systems as a consequence of SSC-related population impacts are discussed in Volume IV, Appendix 7, Section 7.1.3.2.F. Impacts to the Morgan County water supply, in turn, are discussed in Volume IV, Appendix 7, Section 7.1.3.2.G. Negligible impacts are anticipated in both cases.

Past experience in dealing with growth-induced impacts should help to mitigate impacts anticipated to accompany the SSC.

0575.01

Comment noted.

0575.02

Logan County was considered in the analysis as a potential home for SSC workers (see Volume IV, Appendix 14, Table 14.1.3.2-6 and Figure 14.1.3.2-5). Assuming the existence of Colorado's proposed highway linking the SSC site to the city of Brighton, in terms of driving time, the city of Sterling would be roughly equidistant from the SSC, as would be suburban Denver. However, because of the relatively larger size of the Denver area, it probably would attract more workers. As a result, potential problems associated with rapid growth are not anticipated for the Sterling area.

0575.03

See Comment Response 816.01.

0575.04

Comment noted.

0575.05

Comment noted.

0575.06

Logan County was included within the Colorado Region of Influence, and was considered in the EIS as a potential home for SSC workers (see Volume IV, Appendix 14, Section 14.1.3.2.B). However, it was not considered to be one of the primary impact counties (which comprised Adams, Morgan, and Washington counties), and thus was not considered individually in the analysis of socioeconomic impacts.

A discussion of the anticipated impacts on public services (including public education and public health services), economy (including retail activity), and housing (including year-round and temporary facilities) at the level of the ROI -- of which Logan County is a part -- is provided in Volume IV, Appendix 14, Section 14.1.3.2.

0576.01

As noted in Comment Response 526.01, the recently expanded public safety facilities in Fort Morgan should be sufficient to meet SSC-related public safety impacts, but additional personnel would be required (see Volume IV, Appendix 14, Section 14.1.3.2.C). The sources of law enforcement training cited in the present comment should help to meet increased needs for such personnel.

0577.01

Comment noted.

0577.02

Supplies of aggregate in the Denver region are adequate to fill the construction needs of the SSC project and several other major planned projects, and will continue to support the continuing growth of the Denver area. However, because these reserves are not widespread in the geologic setting, the combined major projects will have a significant cumulative impact on local aggregate supplies. If necessary, this can be mitigated for the SSC project by procuring aggregate from outside the region. EIS Volume I, Chapter 3, Section 3.7.2 has been revised to state this more concisely.

The availability of sand and gravel construction materials in the Denver region was evaluated in the 1987 "Strategic Resource Assessment Study" chartered by the Governor, the Mayor of Denver, the Colorado Association of Commerce and Industry, and the Denver Chamber of Commerce. The study panel considered the impact of continued regional growth on currently available reserves of sand and gravel construction materials. They also considered the likely impacts to the reserves if several major projects (such as the planned construction of a new Denver area airport and planned improvements to E-470 and I-70) are added to the continued regional growth. Under the latter scenario, the available reserves, although adequate for SSC project needs, are expected to be exhausted during the first decade of the next century.

The panel based its assessment on estimates of "currently permitted reserves," i.e., deposits of sand, gravel, or rock, suitable for use as construction material, for which the owner already has a permit to operate a pit or quarry. They noted that many other deposits exist in the region, but most have been covered by the general urban/suburban sprawl and are no longer available for extraction. They also noted that most operators who have sought permits to open new quarries in the Denver region in recent years have had their applications denied or blocked by environmental or esthetic issues. The permit applications are being handled at the local municipality level without a regional scale strategy to assure the continued availability of basic construction materials. The panel projected that this trend will continue.

As the Denver region reserves of sand and gravel are exhausted, additional sources from outside the region will probably be developed to fill the demand. However, the greater haul distances will result in higher prices, and will also have secondary impacts resulting from increased truck or rail traffic into the Denver area.

Several commenters have stated that adequate reserves of aggregate are available along the South Platte River in Morgan County. The geologic literature on this area indicates that the most accessible gravel deposits (gravel is less abundant than sand along this stretch of the river) are either within or near the 100-year floodplain. Additionally, the river sand and gravel deposits are an important regional aquifer. Therefore, development of adequate project-specific aggregate resources might be hampered by environmental concerns regarding floodplain impacts and impacts to surface water and groundwater quality.

0577.03

Although a preliminary decision has been made not to use water directly from either the South Platte River or the Colorado River (Colorado-Big Thompson Project), it is the DOE's understanding that there remain several alternatives using South Platte River aquifers for the source of water for the proposed SSC which include augmentation by allocation of South Platte River or Colorado-Big Thompson Project supplies; alternatives for maintaining the flows of the two rivers. Because of this uncertainty, the assessment of potential impacts to protected species associated with the South Platte River and Colorado River was concerned primarily with the effects of altered flows. This issue has been addressed in Volume IV, Appendix 11 and in Volume I, Chapter 5, Section 5.1.5.2 of the EIS. The DOE has included a discussion of aquatic species and species dependent on the river basins to fulfill the agency's responsibilities under the Endangered Species Act.

Statements made in Volume I, Chapter 5, Section 5.1.5.2 and Volume IV, Appendix 11 concerning impacts to the whooping crane, least tern, and piping plover refer only to effects that may occur in the event project water needs result in altered flows in the South Platte River.

The threatened and endangered species associated with the Colorado River system (Colorado squawfish, humpback chub, bonytail chub, and razorback sucker), which could be affected in the event water from the Colorado-Big Thompson Project (CBT) would be needed for the SSC in Colorado, are addressed in Volume I, Chapter 5, Section 5.1.5.2.B of the DEIS under the assessment of impacts.

If the Colorado site is the selected site, the source of water would be identified in order to evaluate any effects on protected species. An evaluation would be included in the Supplemental EIS.

0577.04

EIS Volume IV, Appendix 11 states that eagles wintering at Barr Lake and at the Rocky Mountain Arsenal, as well as the nesting pair at Barr Lake, could be exposed to disturbance by construction of State Highway 7. This evaluation is based on information that the final location and alignment of the access highway has not been decided upon, although the current preferred alignment is approximately 2 mi from the eagle nest site. It is also based on an understanding of the sensitivity of this species to disturbance, particularly during the breeding season. Therefore, the DOE cannot state with certainty that there would be no adverse effects to bald eagles present in the region at various times of the year. If the proposed Colorado site is selected, a more thorough study would be made in connection with a Supplemental EIS and mitigations for adverse effects would be addressed.

0577.05

The EIS has been revised to include a reevaluation of facility locations, wetland locations, and wetland acreages (see Volume IV, Appendix 11, Sections 11.2.2 and 11.3.2.3). Based on this information, the maximum acreage of wetlands that could be impacted as a result of construction of surface facilities associated with the proposed collider ring in Colorado is 4.7 acres. The EIS now estimates about 200 acres of wetlands to be encroached upon by the proposed alignment for the east-west access road. Pending final design and implementation of mitigative measures, it is anticipated that very few of the wetlands associated with the proposed access road would be impacted (see EIS Volume I, Chapter 3, Section 3.6). Also, no impacts on wetlands of the Barr Lake area are anticipated due to its distance from the proposed location of the east-west access road. Potential mitigation is discussed in Volume IV, Appendix 11, Section 11.3.2.3. If Colorado is the selected site, the supplement to the EIS will go into more specific detail on potential wetland impacts associated with the access road and proposed mitigations for these impacts.

0577.06

Floodplain mapping indicates that the 100-yr floodplain near the confluence of Beaver Creek and Buck Creek has a width of about 10,000 ft.

The wording in EIS Volume I, Chapter 4, Section 4.2.1.1 has been modified to indicate that this width occurs at a point of channel confluence.

0577.07

See Comment Response 578.04 for a discussion of the impacts to oil and gas wells at the Colorado site. Regarding water wells, EIS Volume IV, Appendix 7, Section 7.2.3.2 states that impacts to water users can be partially mitigated if replacement wells or hookups to alternative water supply sources of equal or better quality are provided (see EIS Volume I, Chapter 3, Section 3.6.3). It is assumed that even with this mitigation there would remain a measurable impact due to the potential for disruption in supply and other adjustments required of the user to utilize the replacement well or water supply.

0578.01

Comments on minimal impacts on archaeological and visual resources, spoils disposal, and groundwater hydrology are in general agreement with analyses presented in EIS Volume IV, Appendices 15, 16, 10 and 7, respectively. The important farmlands (no prime farmlands) proposed for conversion are a very small fraction of the regional resource base (see Volume IV, Appendix 13, Section 13.2). The potential existence of the new Denver airport is acknowledged in Volume IV, Appendix 14.

Comment statements are consistent with those made in Volume IV, Appendix 14, Section 14.2.2.3.B.1. The fact that there are construction options available for the serving electric utility in routing new power lines is noted. These lines will be built to support the SSC and must be considered in this EIS even though easements may exist.

The comment is generally in agreement with the information presented in Volume IV, Appendix 5, Section 5.2.11.2 and Appendix 14, Section 14.2.1.3.B. Use of the existing rail spurs or alternate locations for a new spur may be considered during the construction planning stage.

Site-specific mitigation measures for the selected site will be identified and analyzed in a Supplemental EIS.

0578.02

See Comment Response 562.02.

0578.03

It is correct that the Morgan County Quality Water District does not need new wells to meet projected SSC water requirements. The EIS Volume 1, Chapter 3, Table 3-3 has been revised to reflect this fact. It is also noted that the estimated SSC water requirements have been revised slightly, based on recent design reviews. Potable water requirements are estimated to be 400 acre-ft/yr (250 gal/min) while industrial water requirements are estimated to total 1,775 acre-ft/yr (1,100 gal/min). Industrial water use at the campus area is estimated to be 995 acre-ft/yr (620 gal/min) or slightly in excess of 50 percent of the total industrial water requirement.

0578.04

Discussions, tables, and figures in EIS Volume I, Chapters 3 and 4 have been revised to more clearly depict the distribution of oil and gas wells near the site and the potential impacts of the project on oil and gas wells. Corrections to p. 13 in Volume IV, Appendix 6 and p. 15 in Volume IV, Appendix 5 have been made in the Errata. Recently available data confirm that three active hydrocarbon wells are known within the collider footprint, two or three of which will need to be decommissioned. Numerous additional wells are quite close to the footprint; these would be evaluated by field tests to determine whether they could cause vibrations (due to pumping) which might interfere with the operation of the SSC. The commenter is correct in noting that the well locations which are shut down to accommodate the SSC operation, and oil and gas reserves made unavailable during operation of the SSC, would be available again for production at the end of the operational phase of the project.

0578.05

The EIS analysis focused on the impacts created as a result of converting prime and other agriculturally important farmlands to other uses associated with project development. An analysis of other U.S. Soil Conservation Service programs was not conducted as it would not have provided data useful to support a siting decision. If Colorado is chosen as the selected site, these programs will be considered as appropriate topics for inclusion in a Supplemental EIS.

0578.06

This statement applies to all proposed sites as well as Colorado, and it was given consideration in the site selection process.

0578.07

This comment appears to misstate a quote which should read, "Local impacts due to the implementation of this project are possible in the housing markets in Fort Morgan and Brush in Morgan County, Colorado ..." (EIS Volume I, Section 3.7.1). The EIS concurs with the comment that SSC-related demands for housing could be met if housing in areas further from the planned facility site are also considered -- the areas of Adams and Washington counties, as well as the Region of Influence, are specifically addressed (See EIS Volume IV, Appendix 14, Section 14.1.3.2.B).

The likelihood of more serious housing impacts in Fort Morgan and Brush stated in the EIS is based upon a more detailed examination of housing in Morgan County (Volume IV, Appendix 14, Section 14.1.3.2.B.3). Vacancy rates in Morgan County traditionally have been low-to-moderate, and housing construction between 1980 and 1987 (as indicated by the issuance of building permits) averaged less than 60 units annually. Given these characteristics, the EIS concluded that SSC-related increases in population (projected to reverse population declines anticipated in the county without the SSC) are likely to produce demands for year-round housing in the aforementioned communities which would require special effort on the part of the county housing industry. Increased construction of housing to take advantage of foundations and utilities presently in place, including factory-produced housing, would comprise part of such an effort.

0578.08

The statement in EIS Volume I, Chapter 4, p. 4-8 is made in respect to the potential for encountering inadequately sealed hydrocarbon wells that could introduce gas into underground excavations. Records of the Colorado Oil and Gas Commission indicate that over 80 borings related to hydrocarbon exploration and extraction have been drilled within the SSC project footprint. This includes wells listed as "dry and abandoned" "plugged", and "shut in", and both active oil and gas wells. Three related questions that are relevant to underground projects in the vicinity of oil and gas fields are as follows:

(1) Are all of the exploration and production borings known?
(2) Are the locations of the borings accurately known?
(3) Are the abandoned and plugged wells adequately sealed?

Colorado's statutory requirements for recording oil and gas wells provide considerable assurance that there will be data bearing on the first two questions. Additionally, it is always prudent to field-verify the actual locations, either visually or using the geophysical techniques noted in the comment. Although State-regulated procedures for plugging abandoned wells will assure that records are available with respect to the third question, sound engineering practice when an underground excavation may intersect an abandoned hydrocarbon well is to research not only the State records, but also the records of the driller, the owner-operator, and the cementing service contractor to further ascertain that potential pathways from gas reservoirs have been adequately sealed. If a potential for a problem is indicated by the records search, a variety of field techniques are available for confirming whether leakage is or is not occurring to the tunnel horizon.

0578.09

The term "aquifer" as used in the EIS is based on the generally accepted technical definition which can be summarized as, "any geologic unit or deposit which yields groundwater in economic quantities to wells or springs." This includes aquifers in contained basins such as the alluvial aquifers in the basin and range of the western U.S., stream channel alluvium aquifers which occur at the Colorado site, and regional aquifers such as the Ogallala aquifer. The term "tributary water" is a legal-based term applied within the State of Colorado; however, this terminology or distinction as to types of groundwater is not commonly made throughout the U.S. All groundwater is derived from percolation recharge or lateral inflow to the aquifer and this may be local or at some distance from the point of withdrawal. Therefore, discussion of groundwater in Colorado in terms of "aquifers" is accurate.

0578.10

The threatened and endangered species listed for Colorado include those species (Colorado squawfish, humpback chub, bonytail chub, and razorback sucker) associated with the Colorado River system and which could be affected in the event water from the Colorado Big Thompson (CBT) would be needed for the SSC in Colorado. Superscripts identifying these species were included in Volume I, Chapter 4, Table 4-17 of the DEIS. The DOE included these species to fulfill the Agency's responsibilities under the Endangered Species Act. If the proposed Colorado SSC is selected and if CBT water would be needed, the DOE would obtain more detailed information about the species and evaluate the potential effects of water withdrawal and mitigation options in the Supplemental EIS which will be prepared for the selected site.

0578.11

See Comment Responses 565.01 and 571.05.

0578.12

The effects of construction dewatering and groundwater use for construction and operations of the SSC in Colorado are discussed in EIS Volume IV, Appendix 7, Section 7.2.3.2. The amount of groundwater to be used for construction and operations of the SSC is projected to be only a small portion of present groundwater use in the proposed siting area. However, any amount of groundwater use will result in some cumulative water level decline and these declines are discussed in the EIS. It is also noted that if existing groundwater rights are purchased by the State, as is planned for a portion of SSC groundwater use in Colorado, then no "new" water level declines should result (unless the purchased right was inactive at the time of transfer).

0579.01

This comment corroborates the findings and recommendations described in the EIS. The research questions to be developed by the Colorado Historical Society would be useful evaluating the significance of cultural resources. If the Colorado site is selected, the professional cultural resource management establishment noted in the comment would provide a background for developing future cultural resource compliance procedures.

0580.01

Regional resources such as housing, medical services, educational institutions (including availability of professional staff, academic resources and graduate student research availability), accessibility to major airports and other transportation, and the availability of a skilled labor pool (which includes minorities) were considered during proposal evaluation leading to the Best Qualified List (BQL). See EIS Volume III, Section 1.1.

See first two paragraphs of Comment Response 587.02.

Criteria used in the first round of the site selection process insured that all of the proposed SSC sites remaining on the Best Qualified List would be within commuting distance of a major metropolitan area. The EIS acknowledges this fact in Volume I, Chapter 5, Section 5.1.8.5.

0581.01

The support expressed by the Department of Physics at the University of Colorado at Boulder for the proposed Colorado SSC site is noted. The evaluation of existing educational and research activities has been evaluated by DOE under the regional resource criterion which is one of the six technical criteria, to select the most qualified site. Results of this evaluation are described in Volume III, Chapter 3, of this EIS.

0582.01

Comments noted.

0582.02

The analysis for public service impacts used most-recently available employment and population data from a Federal survey of local government sources and state education agencies to formulate projects that maintained current service ratios between employment and population. This methodology facilitates comparison between sites and utilizes data consistent among the sites. Due to the large number of local government jurisdictions studied in the EIS, it was not feasible to analyze the existing capacities for each local jurisdiction. A finer level of analysis could be included in a Supplemental EIS if the proposed Colorado site were selected by DOE for SSC development.

Nevertheless, the projected increase of 42 teachers necessary to meet the potential enrollment increase of 704 students in 1992 in public schools in Morgan County represents a substantial increase over the projected baseline instructional staff (see Volume IV, Appendix 14, Section 14.1.3.2.C).

0583.01

In the DEIS, Volume I, Chapter 5, the table referenced as Table 4.7-2 on pages 5.1.5.-9 and 5.1.5-10 should be referenced as Table 4-18. This table is properly referenced in the revised Volume I of the FEIS.

0584.01

See Comment Response 816.01. This EIS focused on the evaluation of seven site alternatives for the SSC. Detailed evaluation of higher education was conducted in the site selection process (see Volume III) as Regional Resources, the second criteria given in the ISP for site selection.

0584.02

Comment noted.

0585.01

See Comment Response 1515.213.

0586.01

Quality of life impacts are examined for the Colorado Region of Influence (ROI), and for the primary impact counties of Adams, Morgan, and Washington (see Volume IV, Appendix 14, Section 14.1.3.2.E). Individual types of recreation and entertainment within individual communities are not considered.

The cultural and recreational amenities provided by the community of Fort Morgan noted in the comment, coupled with additional sources of entertainment located throughout the ROI, should help to accommodate anticipated SSC-related impacts.

0587.01

Comment noted.

0587.02

With regard to part 1 of this comment, Morgan County's past experience in dealing with growth-induced impacts is acknowledged. However, the area has not recently experienced growth of the duration or magnitude anticipated to accompany the SSC. For example, compared to projected SSC requirements the Pawnee Power Plant employed roughly half the construction workers and took less than one-third the time to build. The major impacts associated with the power plant occurred during construction, when many of the workers commuted to the construction site instead of moving to that area. And during operations roughly 25 times the number of personnel would be needed to operate the SSC than are required to operate the Pawnee Power Plant. Finally, due to its longer period of construction and larger operations work force, the SSC is expected to generate substantial secondary economic effects, which in turn would further increase the ultimate population impact of the SSC (see Volume IV, Appendix 14, Sections 14.1.3.2.A and 14.1.3.2.B).

With regard to part 2 of this comment, note that the EIS considered the relatively few year-round housing units located in Morgan County (about 8,900 in 1980), and the relatively slow construction of new units in the county between 1980 and 1987 (less than 60 annually; see Volume IV, Appendix 5, Section 5.2.11.1.B.2). These data led to the characterization of the county housing industry - that is, the present and being built within the county - as "small scale." The vacancy data used included information gathered from the U.S. Bureau of the Census during the 1980 Census of Population and Housing; the census data are not based upon property listings with realtors, and thus should not be prone to the under reporting suggested in this part of the comment. It is important to note that the EIS does not state that Morgan County could not meet SSC-related housing impacts; rather, it suggests that a focused effort would be required to accommodate increased demands adequately (see Volume IV, Appendix 14, Section 14.1.3.2). Increased construction of housing units within the county by local contractors, increased production of modular housing units, and assistance of builders from nearby counties could all constitute part of such an effort.

With regard to part 3 of the comment, note that the EIS analysis projects dispersal of SSC-related population impacts throughout a 14-county region of Colorado (see Volume IV, Appendix 14, Section 14.1.3.2.B). However, because of their relative proximity to the SSC, Fort Morgan and Brush are projected to receive a sizable share of this population - accounting for the absence of a more dispersed "boom" effect. Although certain parts of the EIS discussed distance instead of travel time (including Volume I, Chapter 4, Table 4-29, as noted in the comment), travel time was a central consideration of the model used to allocate SSC-related population impacts (Volume IV, Appendix 14, Section 14.1.2.3.B). Because the results of the spatial allocation model in turn provided a basis for much of the subsequent EIS analysis, travel time played a major role in the socioeconomic analysis.

In response to the final two paragraphs of the comment, note that socioeconomic assessments in the EIS are based as much as possible upon quantitatively measurable variables, and not upon subjective terminology. The Region of Influence was examined as a regional system, and not as a collection of separate, independent communities. However, impacts such as demands for increased housing and public services tend to affect localized areas or communities, and cannot be dispersed throughout the region.

0588.01

Comment noted.

055106003348824

0589.01

The numerous planning mechanisms in place for Fort Morgan, coupled with recent developments (such as the industrial park), should help to mitigate anticipated socioeconomic impacts to this community (see Volume IV, Appendix 14, Section 14.1.3.2).

Housing data are provided for Morgan County (Volume IV, Appendix 5, Section 5.2.11.1.B), but not for individual communities within Morgan County. The use of available vacant housing units in Fort Morgan, coupled with increased construction of additional units, would help to meet anticipated impacts on housing demand in the community (Volume IV, Appendix 14, Section 14.1.3.2.B).

0590.01

The proposed action for this EIS is to select the site for the SSC. The EIS assesses and compares the environmental impacts of the proposed construction and operations of the SSC at each of seven site alternatives. The subject of minority participation in SSC construction and operations is an issue which the DOE addresses in the management and operations contractor selection, the Architect-Engineer/Construction Manager selection, and in the contractual negotiations for the SSC construction and operations. Minority participation is one of the criteria upon which contractor selection is based, in accordance with Federal procurement requirements.

However, the Invitation for Site Proposals (ISP) (See EIS, Volume 3, Chapter 1) does require states to provide "Evidence with regard to the current policies and history of compliance with Federal fair employment practices, Equal Employment Opportunity statutes, and open housing practices," along with a description of local employment opportunities. (See ISP section 2.2.3.2.5 and Appendix D, section D2.7.3.)

0591.01

The EIS analysis projected local government capital improvements based on the population growth rates expected to result during SSC construction in each primary impact county, including Morgan County. Data collected from more than 3,200 municipalities and more than 4,000 school districts in the U.S. indicate a relationship between population growth rates and spending for capital improvements by local government jurisdictions. This evidence, provided in a report prepared by the President's Economic Adjustment Committee in 1981, was used as the basis for the capital improvement projections. The methodology used is described in greater detail in Volume IV, Appendix 14, Section 14.1.2.3. The analyses in Appendix 14 were not at the level of detail for individual cities that is contained in this submission, and therefore the document cannot be addressed in the context of this EIS. If the proposed Colorado site is selected for the SSC, details such as these would be taken into account in the Supplemental EIS for that site.

0592.01

The Fermilab Annual Report is a public document available to the public; the most recent issue is "Site Environmental Report for Calendar Year 1987," by Samuel I. Baker, May 1, 1988. Fermilab 88/409, 1104.100, UC-41.

0592.02

The scenario of a full beam loss (or sometimes simply called "beam loss") could be described as follows. The proton beam, which is traveling in a highly evacuated tube, is bent around the ring by magnets. If these bending magnets suddenly lost their ability to bend the beam, from loss of power or quenching, the beam would continue in a straight line. If just a few magnets were lost, the beam would still be confined to the beam tube. If the loss involved all or many of the magnets in a line, the beam would continue straight eventually scraping the beam tube wall and finally penetrating it. After penetrating the tube wall the beam would pass into the magnets, the surrounding cryogenic system, and out into the tunnel. It could then penetrate the wall of the tunnel and finally be absorbed in the primary soil/rock shield surrounding the tunnel. The depth of penetration would depend upon the energy of the protons. The amount of radioactivation caused by the hadronic cascade, produced when the high energy protons interact with matter, is dependent upon the number of initial protons and their energy. For this assessment the protons were assumed to be at 20 trillion electron volts (TeV) and the beam contained three times the design intensity number of protons.

It is almost impossible to conceive a scenario in which an accidental beam loss could occur. Each magnet has its own current and magnetic field sensors. If these sensors detect any uncontrolled change in magnetic field or current or in fact if any sensors fail, the beam abort system would be automatically activated, and the beam would be ejected from the machines into the beam absorber in a few thousandths of a second. It is not physically possible for the circulating beam to strike the walls of the magnet in that amount of time. In addition, between magnets there will be beam position monitors which will continuously sense the position of the beam. If the beam behaves in any way erratically, or if the monitors fail, once again the beam would be ejected. The beam abort system is itself a fail-safe system. That is, even under a total loss of power instantaneously, the system would eject the beam. This is the basis for the SSC design statement that an accidental beam loss would very rarely, if ever, occur. Nonetheless, because such a beam loss would produce radiation outside of the "controlled" areas of the SSC, detailed calculations were made to quantify the radiation results for such an accident.

The activation of air for a beam loss would be small because the path length of the beam in air is very short (the distance between the beam line components and the tunnel wall). There would be some air activation products formed by the hadronic cascade as the beam interacted with the components, but again the majority of the cascade is carried forward. As the major air activation products have short half-lives, by not immediately venting that region where beam loss occurred the air activation products can be allowed to decay prior to release.

Soil activation from a beam loss was addressed in terrestrial and aquatic pathways, EIS Volume IV, Appendix 12, Section 12.2.3.1.C. The sodium-22 is formed in the soil/rock and leaches out into groundwater. The tritium is formed both in the soil/rock and interstitial water. Other radionuclides formed in the soil/rock have relatively short half-lives and/or do not migrate in groundwater. These are addressed in Volume IV, Appendix 10, Section 10.1.2.3.A.3. The primary soil/rock shield is sufficient to attenuate the radiation from the radioactivation products.

Volume IV, Appendix 12, Figure 12.2.3-5 illustrates the radionuclide generation and migration from beam loss. These figures are simplistic and not to scale.

Wells specifically designed to be used in case of a loss-of-beam accident are not anticipated. The loss of a beam is an accident and it is not predictable if, when, and where it could occur. A health impacts assessment for a loss of beam was addressed in Volume IV Appendix 12, Section 12.4.1.1. The major pathways for exposure were direct radiation at the instant the beam is lost and the migration of radionuclides in groundwater. The dose equivalent from direct radiation requires that an individual be in a specific spot at the instant the beam is lost. Even if it did occur that an individual were in that spot, the dose equivalent would be less than that received annually from background radiation. The dose equivalent received via the aquatic pathway was based on very conservative assumptions and was calculated to range from 0.0098 to 0.50 mrem for the year with the maximum concentration well below the U.S. EPA limit of 4 mrem per year from public water supplies. Thus, it is not necessary from the health impacts involved to dewater the activation zone. The term "plug flow" was used to denote nondispersion.

0592.03

EIS Volume IV, Appendix 12, Table 12.2.1-1 presents an average annual dose equivalent for background radiation exposure levels in the U.S. The approximate level of exposure for the U.S. is 360 mrem/yr of which 300 mrem/yr comes from natural sources such as radon and cosmic rays and 60 mrem/yr comes from other sources such as medical x-rays or consumer products. Natural sources of background radiation can vary from one part of the country to another. The variations for the candidate SSC sites are reflected in Volume I, Chapter 5, Table 5.1.6-1. The background levels for the Colorado site are estimated to be 451 mrem/yr, which indicates the higher levels of radiation doses received from natural sources, such as cosmic rays.

The quotation is from the DOE guide entitled "A Guide to Reducing Radiation Exposure to As Low As Reasonably Achievable," which is not referenced in the EIS.

0592.04

Neutron skyshine is the rescattering of neutrons (not alpha, beta, or gamma radiation) by air nuclei above a source back down to the surface of the earth (see Volume I, Chapter 5, Section 5.1.6.2.A.2.c). The locations of the source of neutrons are the interaction halls, where neutrons are produced as a result of beam interactions.

Neutron skyshine contribution from the SSC was evaluated as a function of shielding thickness above the interaction hall and distance from the hall (see Volume IV, Appendix 10, Section 10.1.2.3.A.1.c). The shielding thickness depends on the depth of earth cover over the interaction hall and the amount of roof shielding designed in the structure. The annual dose equivalent at the outer surface of the interaction hall for various shield thicknesses is tabulated in Volume IV, Appendix 10, Table 10.1.2-2. The dose equivalent at various surface distances from the interaction hall with various thicknesses of earth shielding is tabulated in Table 10.1.2-3. About 23 ft (7 m) of earth or equivalent shielding is required to reduce the skyshine dose rate to about 0.041 mrem/yr at 330 ft (100 m) surface distance from the interaction hall. The presence of large particle detectors around the interaction point adds additional shielding and further reduces the dose equivalent at the aforementioned surface distance to less than 0.041 mrem/yr. The limit set by the DOE for the exposure to individuals of the public to radiation as a consequence of routine DOE activities and actions is an annual effective dose equivalent equal to 100 mrem (see Volume I, Chapter 6, Section 6.3.2).

At the Illinois site, the interaction hall at K1 has a depth of 350 ft (110 m); the annual dose equivalent contributed by neutron skyshine is less than 0.001 mrem (see Volume IV, Appendix 12, Table 12.3.1-1).

0592.05

Some of the energy absorption in the radiation cascade will take place in the air of the interaction region (IR) halls, as well as in the air of the accelerator tunnel. A fraction of the energy absorbed by the air results in activation of the air nuclei. Ionization and excitations will result in ozone and various oxides of nitrogen. Since the accelerated beams of the machines would be contained in vacuum, the amounts of noxious gases such as ozone produced by radiation would be negligibly small. Nevertheless, careful monitoring would be maintained to ensure by direct measurement that the laboratory operates well within safe limits and permissible guidelines. Because the radioactive atoms are in the gaseous state, particulate filters would not provide any removal.

At CERN, thermoluminescent dosimeters are used to monitor the effluent stack from the tunnels. Aerosol and gaseous radioactivity are monitored using charcoal filters at the Super Proton Synchrotron which is ventilated continuously. Both Fermilab and TRIUMF have continuous stack monitors using thin window geiger counters on NaI detectors in shielded chambers.

The SSC environmental monitoring program will utilize continuous monitoring of the site boundary and the points of release, such as a stack, and on-site and off-site samples as is currently done at the Fermilab. The specific procedures for continuous monitoring at above-ground locations will be determined before the initiation experiments.

0592.06

The tunnel is closed to personnel when the collider is in operation; therefore, no ventilation is needed during this extended period of time. Ventilation is reestablished prior to personnel entry to assure adequate fresh air is supplied.

0592.07

Modeling results presented in EIS Volume IV, Appendix 12, Section 12.4.1, Figure 12.4.1-1 and Figure 12.4.1-2 suggest that a hypothetical pumped well 50 m away from a beam loss would have water with Na-22 and H-3 concentrations below EPA standards at all times after a beam loss accident. That would suggest that all wells at 50 m or more away from the SSC tunnel on either side would be safe as sources of drinking water after a beam loss accident. However, the modeling was based on simplistic assumptions. For example, one of the assumptions states that "aquifer and well characteristics are uniform all through space and time, including hydraulic conductivity, effective porosity, aquifer geometry, pump rate of well, and dispersitivity." (See Volume IV, Appendix 12, Section 12.2.3.1.) At the selected site, detailed field studies will be necessary to fully characterize the potential transport of radionuclides from a hypothetical beam loss to nearby water supply facilities.

0592.08

The EIS indicates that the Richland, Washington facility was considered as a reasonable option for disposing the low-level radiological waste from the SSC. This approach was taken for planning purpose and for assessing potential impacts. The location for low-level waste disposal has not been decided, but the Richland facility is an alternative if no other sites are available or feasible. Another option to be considered by the DOE is a regional low-level radiological waste site, if such a facility becomes available. Among the factors to be considered before a regional location would be selected as the final waste site are the facility's available capacity and the cost savings that the government could obtain. The Supplemental EIS will provide further analysis of the options.

0592.09

The Colorado proposal located the beam line in the vicinity of the experimental halls as close to the surface as possible. This minimized the excavation required to construct the halls but left the top of the halls above the existing grade. The halls will be covered with an appropriate layer of earth for shielding.

The ISP states (p. 46, Appendix B): "It is desirable that the experimental facilities be near the surface to provide convenient and economical access for heavy experimental equipment." Note that this was stated as "desirable," not "required."

0592.10

The actual release of radionuclides to the air, water, and soil from an accident has been estimated, and the data are summarized in the following tables in Volume IV:

Air	Appendix 10, Tables 10.1.3-10 and 10.1.3-11
Soil	Appendix 12, Table 12.2.3-5 (first and second rows)
Water	Appendix 12, Table 12.2.3-5 (fifth and seventh rows)

0592.11

Because of their inert property and extremely low concentration, there is no significant chemical toxicity associated with any of these radionucldies. The potential harmful effects from these radionuclides are (1) increasing cancer risk and/or (2) increasing genetic defect in a non-measurable stochastical manner from ionizing radiations. Due to their radioactivity, they may be classified as carcinogens and/or teratogens. These effects are discussed in Volume IV, Appendix 12, Section 12.2.1.1. The risk associated with airborne releases, which is the major route of exposure, is reported in Volume IV, Appendix 12, Tables 12.3.1-32 to 12.3.1-37. The risk of any effect from the operations of the SSC is very low, and any effect would not be measurable.

0592.12

Scavenging of radionuclides as discussed in Volume IV, Appendix 10 is the process through which rain or snow removes particles or dissolved gases from a gaseous plume and deposits them on the ground. In the presence of precipitation, radionuclides are physically removed from a plume primarily by being incorporated into the precipitation as it is formed (rainout) or by being swept out of the air by the precipitation as it falls.

0592.13

DARTAB is a program to combine airborne radionuclide environmental exposure data with dosimetric and health effect data to generate tabulation of predicted health impacts. It was compiled by a group of researchers, i.e., C.L. Begovich, K.F. Eckerman, E.C. Schlatter, S.Y. Ohr, and R.O. Chester, in the Health and Safety Research Division of Oak Ridge National Laboratory. The work was performed under interagency agreement number IAG-EPA-78-D-X0394 for the U.S. Environmental Protection Agency.

The 70-year dosimetric S factors for DARTAB are calculated by RADRISK and, in general, are consistent with those in International Commission on Radiological Protection, ICRP-30. The unit of these factors is mrad/year per pCi/year. The committed dose is the total dose over a future period associated with an intake. The total committed dose for the 70 years after a unit intake was used in Clean Air Act Codes (CAAC). It is more conservative than the total committed dose for the 50 years alternative after a unit intake.

Since there is not enough research data for Cl-39 to allow an estimate of its risk, the best information can be obtained from its "cousin," Br-84. The two are listed in the same column in the Periodic Table of the Elements, which indicates that they have very similar chemical and physiological properties. Their radiological characteristics are also very similar.

0592.14

The concern about a fire in the SSC facilities was addressed in the EIS (Volume I, Chapter 5, Section 5.1.6.3). The potential for fire is considered to be an important safety concern that will be given additional attention in the Supplemental EIS and in the final design of the SSC. To minimize the potential for a fire in the tunnel, non-flammable materials will be used to the extent possible in equipment and components. DOE Orders 5480.4 and 5483.1A indicate DOE's commitment to establishing programs in safety and fire protection that will be applicable to all aspects of the SSC, including the experimental halls where flammable substances may be present.

The principal toxic/hazardous materials to be used at the SSC are identified (Volume IV, Appendix 10, Section 10.1.3.2 and Volume I, Chapter 5, Section 5.1.6). Quantities of each chemical to be used at the facility have not been estimated nor are these estimates necessary to evaluate potential environmental impacts. Quantities of hazardous and low-level radiological wastes of the SSC have been estimated and provided in EIS Volume IV, Appendix 10, Sections 10.1.3.1 and 10.1.3.2. There are no plans to bring radioactive materials from outside sources into the SSC, except in those instance in which they would be required as check sources or standards for monitoring or other laboratory activities supporting research at the SSC. If other radioactive sources are required, their uses will be subject to a safety review.

Regarding the concern about depleted uranium, this material is used in some large detectors at other accelerators. There are no plans to use depleted uranium at the SSC. If plans were to change and depleted uranium were to be used in a detector, it would be allowed after being approved by a safety review.

0593.01

Comment noted.

0593.02

The conditions that affect the SSC site selection are summarized in the EIS (Volume III, Chapters 1, 2, and 3). The health and safety issues considered for site selection purposes were those addressed in the EIS (Volume I, Chapter 5, Section 5.1.6.1 and Volume IV, Appendix 1, Section 1.1). The DOE has considered all applicable Federal, state and local safety codes, regulations, and standards in preparing the EIS and these requirements will be considered further in the final design process after the site is selected.

0593.03

This comment regarding the suitability of the geology of the Colorado site for the SSC is consistent with data used to prepare the EIS (see EIS Volume IV, Appendix 5, Section 5.2.1). The suitability of the geology of the Colorado site for construction of the SSC was considered in the evaluation of the site alternatives. See EIS Volume III for a discussion of the site selection process.

0593.04

The assessment of flooding potential and mitigations presented in EIS Volume I, Chapter 5, Section 5.1.2.2 and Volume IV, Appendix 7, Section 7.1.3.2.C is based on the 100-year flood, as required by Executive Order No. 11988, Floodplain Management, May 24, 1977, rather than specific historical flood events. Site-specific flood mitigation measures, such as reservoirs upstream of the project, on-site retention ponds, and channel improvement, would be evaluated in a Supplemental EIS if the Colorado site is selected for the SSC.

0593.05

See Comment Response 816.01.

0593.06

See Comment Response 816.01.

0594.01

The referenced section in EIS Volume IV, Appendix 14 addresses the potential impacts of SSC-induced growth on Morgan County's ability to maintain all local public services without experiencing deterioration of current levels of service. The potential impacts address all of the county's services combined (law enforcement, fire protection, health care, and public education) and do not single out an individual service.

Potential impacts to public education in Morgan County were assessed at the county level based upon combined enrollment and employment data from the four school districts in the county; impacts on individual school districts were not evaluated in the EIS. Although the Fort Morgan School District may have the physical capacity to accommodate the projected increase in students caused by development of the SSC, the district would still need to increase its instructional and support staff to maintain the current educational level of service.

0595.01

See Comment Responses 526.01, 526.02, 526.03, 526.04, 526.05, and 526.06.

0595.02

Comment noted. The comment correctly notes the figures stated in the EIS Volume I, Chapter 3, Section 3.4, Table 3-6.

0595.03

Comments noted. Volume I, Chapter 4, Section 4.8.6 on prime and important farmland has been revised. See Comment Responses 428.12 and 1279.178.

0595.04

Comments noted.

0596.01

This information is not consistent with the EIS discussion of SSC-related impacts on the Colorado Region of Influence (ROI) and Morgan County, as presented in EIS Volume IV, Appendix 14, Section 14.1.3.2. For the ROI as a whole, a maximum of 3,350 construction jobs are anticipated, with the average number of such jobs about 1,950 over the 1989-1996 construction period. In-migrating work force for the ROI is calculated in the EIS for total (direct and secondary) SSC-related jobs -- and peaks at roughly 2,800 in 1992. The total population impact (in-migrating workers and their dependents) during 1992 is projected at 8,350 persons. This increase in population would require approximately 2,300 housing units.

In Morgan County, the EIS projects that the number of total jobs (construction and operations) directly related to the SSC will peak at nearly 2,000 in 1992 (Volume IV, Appendix 14, Section 14.1.3.2.A). The population impact on Morgan County during 1992 would total 3,450 persons; this population impact translates into an increased demand for about 950 housing units in Morgan County over the number required by baseline residents.

The EIS makes no assumptions regarding the commuting behavior of the nonresident work force, either in the ROI or Morgan County. Based upon the projected increases in housing demand in Morgan County due to the SSC -- particularly during peak construction (1992), the year of greatest annual growth (1992-1992), and the first year of full operations (2000) -- the EIS concludes that a focused effort would be required to accommodate additional housing requirements (see Volume IV, Appendix 14, Section 14.1.3.2.B).

The experience of local Morgan County banking establishments in financing construction is acknowledged.

0597.01

The quotation that the comment partially cites would better be represented by extending the text quoted to read that the SSC is "likely to lead to adverse socioeconomic impacts in some of the smaller communities close to the site, particularly Fort Morgan and Brush" (see EIS Volume IV, Appendix 14, Section 14.1.3.2). Neither of these communities is in Adams County.

The comment correctly cites figures in Volume IV, Appendix 14, Table 14.1.3.2-15, but incorrectly interprets conclusions concerning net fiscal impacts to Adams County; fiscal effects of the SSC on this county would remain positive from 1992 throughout the life of the project, and eventually would offset deficits experienced in the first three years. Furthermore, the annual fiscal impact projections for Adams County are the estimated cumulative impact to all 42 local jurisdictions within the county, including 7 municipalities, 7 school districts, 27 special districts, and the county government itself. The responsibility for bearing the costs of specific infrastructure improvements has not yet been determined.

Tax revenues generated by SSC development, including real and personal property tax revenues, are included in the indirect revenues portion of the analysis (see Volume IV, Appendix 14, Section 14.1.3.2.D).

0597.02

See Comment Response 577.02.

0597.03

The actual schedule for the Two Forks water supply project will not affect the aggregate resources available to the SSC. The 1987 "Strategic Resource Assessment Study" chartered by the governor of Colorado, the mayor of Denver, the Colorado Association of Commerce and Industry, and the Denver Chamber of Commerce shows that the Two Forks project will be entirely self-sufficient, as its aggregate needs will be met by mining at the site. If the Two Forks project is not constructed, the aggregate sources planned for Two Forks will not be developed for any other use.

The human resources will be minimally affected since the labor needs of the Two Forks project are only three to nine percent of the SSC needs.

0597.04

It is true that more SSC-related workers may choose to reside in the Denver area than predicted in the EIS. The allocation of population impacts for each region of influence (ROI) is based upon a model which estimates the most likely distribution of workers (Volume IV, Appendix 14, Section 14.1.2.3.B.2; see also Comment Response 4.06). For the Colorado ROI, the Denver metropolitan area (including western Adams and Arapahoe counties, Boulder County, Denver County, and Jefferson County) is projected to receive 51 percent of the peak year population impacts (see EIS Volume IV, Appendix 14, Section 14.1.3.2.B)

0597.05

The EIS land use analyses focus on the status of existing land use plans and zoning (see Volume IV, Appendix 13, Section 13.1.2) without regard to discussing the mechanisms available to modify them. See Comment Response 384.02 for a discussion of the DOE policy regarding the need for and value of establishing intergovernmental relationships.

0597.06

The actual mode of decommissioning would not be determined until the decision to decommission is made by the DOE. At that time a detailed decommissioning plan and environmental review in compliance with NEPA would be prepared. The analysis presented in Volume IV, Appendix 3 is the evaluation of the order of magnitude cost and technical feasibility of decommissioning the SSC after its useful life. Alternative uses of facilities would be addressed when the decision to decommission is made. See also Comment Response 216.02.

0597.07

The Strasburg and Byers wastewater treatment facilities are not included in the EIS because these plants do not have excess capacity to accommodate 150,000 gal/d generated by the SSC main campus.

According to a letter dated October 17, 1988, from Mr. Steve Norris, Department of Natural Resources, State of Colorado, Strasburg treatment plant design capacity is 68,000 gal/d and present use is 68,000 gal/d. The Byers wastewater treatment plant design capacity is 80,000 gal/d and present use is 60,000 gal/d.

0597.08

Corrections to EIS Volume IV, Appendix 5, Section 5.2.8.2, Table 5.2.8-2 and Figure 5.2.8-2, can be found in the Errata to Appendix 5.

0597.09

EIS Volume IV, Appendix 5, Section 5.2.10.1 has been corrected in the Errata to Appendix 5 to reflect the change.

0597.10

Volume IV, Appendix 5, Section 5.2.10.1.F has been corrected in the Errata to Appendix 5 to reflect this change.

0598.01

The observations are consistent with historic land uses as discussed in EIS Volume IV, Appendix 5, Section 5.2.10.1.C.

See Comment Response 1337.01.

0599.01

Comments noted.

0600.01

Comment noted.

0600.02

The EIS considered SSC-related impacts on public services, including public health care, in the Colorado Region of Influence (ROI), and in the primary impact counties of Adams, Morgan, and Washington (Volume IV, Appendix 14, Section 14.1.3.2.C). Neither Weld County nor communities within it (such as Greeley) were examined individually in terms of these impacts. However, Weld County was included as part of the ROI, and hence impacts on its public services were considered at this greater level of aggregation. SSC-related increases in demand for public health services within the Colorado ROI are anticipated to be negligible.

0600.03

Comment noted.

0601.01

Comment noted.

0601.02

Socioeconomic impacts were examined for the Colorado Region of Influence (ROI) and for the primary impact counties of Adams, Morgan, and Washington (Volume IV, Appendix 14, Section 14.1.3.2). With the exception of certain impacts on Fort Morgan and Brush, effects were not considered at the level of individual communities (including Log Lane Village).

The willingness of Log Lane Village to cooperate with other ROI communities in helping to accommodate SSC-related impacts is acknowledged.

0602.01

The EIS considered socioeconomic impacts for the Colorado Region of Influence (ROI), and for the primary impact counties of Adams, Morgan, and Washington (Volume IV, Appendix 14, Section 14.1.3.2). Probable effects on certain select communities within the primary impact counties were also discussed. As Weld County was not one of the primary impact counties, with the exception of allocated population impacts (which are anticipated to be minimal -- see Volume IV, Appendix 14, Section 14.1.3.2.B), impacts on the county itself as well as communities within the county were considered only as part of the larger ROI. At the regional level, impacts on housing demand (both temporary and year-round), public services (including health care and education), and recreation areas should be absorbed easily. Demands on "cultural outlets" were not considered in the EIS assessment of SSC impacts.

0602.02

General aviation airfields available to serve the SSC are addressed in EIS Volume IV, Appendix 5, Section 5.2.11.2.A.3. It is acknowledged that the Greeley-Weld County Airport could serve some general aviation flights to the SSC site area. However, the airport is located approximately 60 mi from the proposed site. In addition, the Fort Morgan Municipal Airport has the capacity to serve small corporate jets as stated in "Morgan County, All You Ever Wanted to Know...But Were Afraid to Ask," published by the Morgan County League of Woman Voters. Therefore, it is anticipated that most of the SSC general aviation traffic will use the Fort Morgan Municipal Airport.

0602.03

Comments identifying local resources noted. See also Comment Response 4.04.

0603.01

Comment noted.

0604.01

Comment noted.

0605.01

Comment noted.

0606.01

Comments noted.

0607.01

Comments noted.

0607.02

See Comment Response 523.03.

0607.03

In terms of health risks to residents, the SSC will be sited, designed, constructed, and operated in strict conformance with applicable Federal, State, and local environmental safety and health protection criteria, regulations, and standards to assure adequate protection of both the SSC workforce and the general public. These same stringent requirements will be applied to the beam absorption (abort) areas for SSC operations.

The beam absorption areas are configured to accommodate two primary requirements. Space is provided in the beam absorption areas for possible future upgrades to the SSC for new research opportunities. In addition, the area provides shielding for beams of noninteracting muons. These shielding requirements are discussed in EIS Volume I, Appendix 10, Section 10.1.2.3.A.1.b. The abort areas are designed to allow continued, safe occupation within the stratified fee zones. A total depth of greater than 50 ft above the tunnel is required for stratified fee areas (Volume IV, Appendix 10, Section 10.1.2.3.A).

The main accelerator has a regular cycle of operation: injection, acceleration to 20 TeV, and storage of colliding beams. At the end of a cycle, when collisions over many hours have degraded the beam quality, the cycle is ended by ejecting the beam into a beam absorber. The beam absorber consists of heavy shielding and stopping material sufficient to contain the heat and induced radioactivity of the full 20 TeV beam. The conceptually designed beam absorber consists of graphite surrounded by aluminum, steel, and concrete. (EIS Volume IV, Appendix 10, Section 10.1.2.3.A.1.a and Figure 10.1.2-3).

Most of the particles initially produced during collision or beam interaction are massive and strongly interacting; they are called hadrons. Hadrons typically travel a few inches in matter before interacting and are completely stopped in few yards to tens of yards, depending on the energy and the characteristics of the absorbing material. The hadrons are accompanied by high-energy photons and electrons, which are absorbed over typically shorter distances of at most a few yards in solid matter. The primary shield (30 ft of earth at density of 1.8 g/cm^3) around the tunnel effectively reduces the dose equivalent from hadrons and accompanying photons and electrons to a small fraction of natural background. At a distance of 46 ft in heavy soil (density of 2.24 g/cm^3), the hadron dose equivalent is less than 0.001 mrem/yr (Volume IV, Appendix 10, Figure 10.1.2-4 Hadron Dose: Beam Absorber). The depth of the beam absorber and the annual dose equivalent from hadrons at the surface above the beam absorber are presented in Volume IV, Appendix 12, Table 10.1.3-3. This dose equivalent is based on the shielding of the soil and does not take into account the presence of the beam absorber.

Besides the strongly interacting hadrons, muons are produced in stopping the proton beam. A muon is a heavy electron, identical in all respects to an electron except in mass and the fact that it is unstable. It decays into an electron and a neutrino. Only a small portion of the radiation created in the SSC are muons (a few tenths of a percent). The muons, in contrast to the hadrons, photons, and electrons, interact very weakly with matter and may travel greater distance before they are stopped. The most energetic muons travel distances greater than a mile in earth. They are very strongly collimated along the direction of the primary proton beams (a narrow and straight beam), so the needed shielding would be confined to long, well-defined regions tangential to the circumference of the main ring, at the elevation of the beam plane and downstream of the primary beam absorbers (EIS Volume IV, Appendix 10, Section 10.1.2.3.A.1.b and Figures 10.1.2.-6,-7, and -8). The dose equivalent at the surface from muons is essentially zero for all sites because they are highly collimated in the forward direction at the elevation of the beam plane. An individual would have to be continuously underground standing next to the tunnel at the tunnel depth in order to receive the dose projected. Therefore, the probability of any individual of the general public receiving the annual dose equivalents derived for the assessment is very remote (Volume IV, Appendix 10, Section 10.1.3.1.A.2).

The general topography in the areas designated for beam absorbers would be at the proposed sites has been checked for topographical depressions that could bring the surface below tunnel depth. There appears to be no area at any of the proposed sites where it would be possible to reach tunnel depth without digging or excavating to that depth (EIS Volume I, Chapter 5, Section 5.1.6.2.A.1).

Specifically, at the Tennessee site the beam ejection point is 270 ft (density of 2.7 g/cm^3) below the surface. Therefore, the total annual dose equivalent from direct radiation (hadrons and muons) at the surface would be immeasurably small (less than 0.001 mrem/yr).

The annual hadron dose equivalent at the surface above the beam absorber for a depth of 270 ft is much less than 0.001 mrem/yr (EIS Volume IV, Appendix 10, Table 10.1.3-3 Annual dose Equivalent from Hadrons: Beam Absorber), considering that the dose equivalent from hadron at the surface for a depth of 46 ft (density of 2.24 g/cm³) is less than 0.001 mrem/yr (Volume IV, Appendix 10, Figure 10.1.2-4 Hadron Dose: Beam Absorber).

The muons would occur at approximately the beam depth of 270 ft. The annual muon dose equivalent at the depth of the beam plane, as determined at the boundary of the controlled zone downstream from the beam absorber, is 0.05 mrem (EIS Volume IV, Appendix 10, Table 10.1.3-5 Annual Dose Equivalent from Muons: Beam Absorber).

Overall radiation exposure to stratified fee residents (i.e., persons residing above the beam absorption areas is expected to be less than 0.001 mrem per year, an immeasurable amount. It is insignificant when one considers that the average individual receives about 360 mrem annually from background radiation (EIS Volume IV, Appendix 12, Section 12.2.1.1.A and Table 12.2.1-1).

0608.01

Although recent downward trends in unemployment are encouraging for the regional economy, the rate of growth in the economy is still relatively static compared to activity at the national level. See EIS Volume IV, Appendix 14, Section 14.1.3.6.

The passage suggesting Middle Tennessee's ability to attract and retain SSC operation-related newcomers is consistent with EIS Volume IV, Appendix 14, Section 14.1.3.6.E.5.

See Comment Response 0816.01 for a discussion of regional resources.

0608.02

Comments noted.

0609.01

Comment noted.

0609.02

Comments noted.

0610.01

The information provided in the comment on excess water and sewer capacity is consistent with data used to assess water supply and sewage treatment impacts in the EIS(See Volume I, Chapter 5; Volume IV, Appendix 7, Sections 7.1.3.6 and 7.2.3.6; and Appendix 10, Section 10.3.3).

0611.01

Comments noted

0612.01

The annual dose equivalent from muons at the depth of the interaction regions and at the control area boundary was presented in Volume IV, Appendix 10, Section 10.1.3.1.A.2.b, Table 10.1.3-6. The annual dose equivalent for the candidate sites ranges from 0.008 mrem to 7 mrem at depth of the beam plane. For Tennessee, the dose equivalent from muons of the interaction region at the depth of the beam plane is estimated to be 0.02 mrem/year, and the surface dose is less than 0.001 mrem/yr (Volume I, Chapter 5, Section 5.1.6.2.A). To receive the subsurface dose, the individual would have to remain continuously in the plane of the beam (underground) next to the controlled area boundary for one year. The minimum depth of the interaction region in Tennessee is 250 ft (76 m) which is located at K2 (Volume IV, Appendix 10, Table 10.1.3-1). The average annual effective dose equivalent in the U.S. population from background radiation is 360 mrem/yr (Volume IV, Appendix 12, Table 12.2.1-1). In Tennessee, the average background radiation is estimated to be 428 mrem/yr. The surface and subsurface dose equivalents are thus a small fraction of the background.

A check has been made of the general topography within several hundred meters of the areas where interaction regions would be at the proposed sites to see if there might be topographical depressions that would bring the surface below tunnel depth. There appears to be no area at any of the proposed sites where it would be possible to reach tunnel depth without digging or excavating to that depth (Volume I, Chapter 5, Section 5.1.6.2.A.1).

The dose equivalent of the beam abort area is discussed in the Comment Response 607.03.

0612.02

During operations of the SSC, the single event analogous to a "leak" would be an accidental loss of beam. Loss of beam represents the worst reasonably forseeable accident for SSC operations from both a radiation and a machine-damage point of view. Such an accident would not involve the ventilation shafts. A highly sophisticated monitoring system is incorporated in the design of the SSC to protect against damage to accelerator components and prevent radiation releases that would result from loss of beam. Such a system currently in use at Fermilab has proven to be both reliable and effective (see Volume IV, Appendix 12, Section 12.4.1). In the event that the protective system failed and a beam loss occurred, the impacts to groundwater would be minor. The off-site migration in groundwater of the primary SSC-generated radionuclides has been numerically modeled for a beam loss event. A comprehensive description of this analysis is provided in Volume IV, Appendix 12, Section 12.2.3.1.C. The radionuclide concentrations derived from the model for the Tennessee site indicate that the annual dose equivalent in a nearby well (50 m from the source) which is used for normal daily consumption of water for an entire year would be 0.0098 mrem/yr (see Volume IV, Appendix 12, Table 12.2.3-6). This represents only a small fraction of the EPA 4 mrem/yr drinking water standard and may be considered a small portion of the 300 mrem/yr received by the average individual from natural sources (Volume IV, Appendix 12, Section 12.2.1.A).

Any water which enters the tunnel will be removed and not allowed to accumulate. It is important for the life of the equipment (not safety considerations) to maintain lower humidity levels. Any water that is removed from active beam areas will be monitored for radioactivation products. If radionuclides are found, the water will be considered as radioactive and treated according to procedures established for proper disposal of radioactive material.

0612.03

See Comment Response 1278.11.

0612.04

See Comment Response 523.03.

0612.05

See Volume I, Chapter 2, and Chapter 3 (Section 3.1.2), and Volume III of the EIS for discussions of purpose and need for the project and the SSC site selection process, respectively. Comments concerning alternate use of funds are discussed in Comment Response 552.03.

0613.01

Design for spoils disposal at the construction site is to place the excavated material in smaller areas adjacent to the source. The existing topsoil would be removed from the area to receive spoils and stockpiled. The spoils would be graded to minimize erosion from rainwater. The spoils pile would be covered with the topsoil and seeded for revegetation. Immediately downstream from the spoils pile, a rainwater runoff retention pond would be constructed to detain the runoff long enough to allow sediment to settle out.

The locations for the spoils piles are currently as shown in the State proposal. These locations are subject to revision during final design if the current location is on or too near sink holes, entrances to caves, etc.

Water quality effects would be minimal if suggested mitigations as summarized above are employed. Addressing a specific concern expressed in the comment, phosphate-bearing limestones only occur on ridgetops in the site vicinity and are not expected to be encountered in any of the shaft or tunnel excavations. Consequently, none of this material should be in the spoils generated by the SSC project at the Tennessee site.

Spoils disposal impacts and mitigations are discussed in Volume IV, Appendix 10.

0613.02

See Comment Response 496.02.

0613.03

Comment noted.

0614.01

Comment noted.

0614.02

The National Environmental Policy Act requires the responsible Federal agency to prepare an Environmental Impact Statement for proposals for major actions that significantly affect the quality of the human environment. Because DOE is the Federal agency responsible for the SSC project, by law, they are required to prepare the EIS.

0614.03

Overall radiation exposure to stratified fee residents is expected to be less than 0.001 mrem/yr, an unmeasurable amount. It is insignificant when one considers that the average individual receives about 360 mrem annually from background radiation (see EIS Volume IV, Appendix 12, Section 12.2.1.1.A and Volume I, Chapter 4).

See Comment Response 1195.06 for additional information.

0614.04

See Volume IV, Appendix 12, Section 12.4, Health Impacts From Accidents. Even under a worst reasonably foreseeable accident, no significant radioactivity would be produced, and no evacuation or relocation would be necessary. During normal operations, there will not be a build-up of radioactivity in the public environment, and therefore no reason to relocate residents.

0614.05

The estimated annual radioactive waste disposal volume of 8,000 ft^3 for SSC operations is based on operating experience at other accelerators and in particular Fermilab. All of the SSC radioactive waste will be low-level Class A waste as defined by Title 10 of the Code of Federal Regulations Part 61. The average volume of low-level waste shipped per year from Fermilab from 1976 through 1986 was 7,650 ft^3. Because of the following factors, it is likely that the SSC will generate less low-level waste than the estimated 8,000 ft^3. A collider program such as the SSC generates considerably less activation products than a fixed target program such as that at Fermilab. Although the protons are accelerated to higher energies at the SSC, the number of protons accelerated per year at the SSC would be less than at Fermilab. The SSC would cycle two 20 TeV beams once per day while at Fermilab a single beam of .4 to .95 TeV is cycled every 20 seconds. Therefore, the activation potential for the SSC is estimated to be approximately 2/3 that of Fermilab. Another factor is that superconducting magnets tolerate only minimal losses(losses result in heat which will quench the SSC magnets). Radioactivation occurs from secondaries produced by losses, therefore, the fewer losses, the less radioactivation, and the less potential for radioactive waste generated(see Volume IV, Appendix 10).

Fermilab recently introduced a waste minimization program. This program has resulted in a volume reduction of approximately 20 to 1. This is not reflected in Fermilab's average waste generation of 7,650 ft^3 nor was there assumed to be any reduction in the volume of waste generated by the SSC.

It is the policy of Fermilab's radioactive waste management program to collect and process all radioactive wastes in a timely manner. This radioactive waste is stored only until enough is accumulated for a shipment to the disposal facility. The quantity of waste generated is the quantity of waste shipped except that the volume may be reduced by compaction, sorting, etc. Fermilab has a small inventory of materials which have been removed from their original location and are stored for future use. This is not waste as these components are valuable apparatus to be recycled. In addition to components, Fermilab has shielding blocks which contain radioactivity. Again, these blocks are not radioactive waste as they are an important and integral part of the Fermilab complex.

0614.06

Estimates of indirect tax revenue in Bedford County are incorrectly referred to in the comment as per capita tax increases for existing residents. These estimates were used to estimate additional tax revenue from SSC workers and their families only. The EIS public finance analysis assumed that tax revenue from existing residents would remain constant.

There was a typographical error in the Draft EIS regarding the loss of property taxes in Bedford County. Instead of an annual loss of $1.1 million, as published in Volume IV, Appendix 14, Section 14.1.3.6.D, the loss should be $0.1 million each year (see Errata for Appendix 14).

0615.01

Evaluations of anticipated operations of the SSC have already been conducted and, based on the experiences of Fermilab and CERN, there is considerable confidence in understanding the types of hazards that could exist at the new accelerator. The environmental safety and health implications of radioactivation resulting from SSC operations are summarized in EIS Volume I, Chapter 5, and are discussed at length in Volume IV, Appendices 10 and 12.

During operation of the SSC, the highest releases of radiation would occur during an accidental loss of beam. The radiological impacts from a beam loss are discussed in EIS Volume IV, Appendix 12, Section 12.4.1. A highly sophisticated monitoring system is incorporated in the design of the SSC to protect against damage to accelerator components and prevent radiation releases that would result from loss of beam. In the event that the protection system failed and a beam loss occurred, the extensive earth shielding surrounding the accelerator tunnel would serve to protect the public from radiation exposure. At the Tennessee site, the maximum radiation dose to an individual at the land surface above the point of beam loss is projected to be less than 0.001 mrem/yr (Volume IV, Appendix 12, Table 12.4.1-2). This represents only a small fraction of the 100 mrem/yr DOE limit and may be considered insignificant relative to the 300 mrem/yr received by the average individual from natural sources (Volume IV, Appendix 12, Table 12.2.1-1). Thus, even under the worst possible circumstances, direct radiation exposure to the public may be considered insignificant. The above considerations would apply equally to other potential receptors near the SSC, such as soil, crops, surface water supplies, etc.

Additional health impacts from non-radiological sources were assessed in the EIS (Volume I, Chapter 5, Section 5.1.6) and there is no indication that SSC activities will harm public health and welfare.

0615.02

Spoils disposal can amount to 56 trucks per day (average) at each disposal site. This is based upon trucks of 20-yd^3 capacity. The disposal sites are all new sites and none are at existing or proposed landfill sites (see Volume IV, Appendix 10).

Cooling tower blowdown is 300 gallons per minute for all 23 cooling towers. The excavated material and cooling tower blowdown water treatment for the selected site will be addressed in more detail in the Supplemental EIS.

0615.03

The beam pipe is a tube inside the collider tunnel in which the proton beam is confined. This is not like a pipe in which solid or liquid radioactive material is transferred but is more like the picture tube in a television. When a television is turned off, the electron beam is gone and the television is just a vacuum tube. The beam pipe does not contain any measurable amounts of tritium since the tube is evacuated and contains very few residual air molecules.

The beam absorber at the proposed Tennessee site would be approximately 270 ft below the surface (EIS Volume IV, Appendix 10, Table 10.1.3-1 Minimum Depth Of SSC At Proposed Sites). The beam tube from the ejection point to the beam absorber would be at this depth. Therefore, there would be no radiological impacts at the surface (Volume IV, Appendix 10, Table 10.1.3-3 Annual Dose Equivalent From Hadrons: Beam Absorber). The beam tube would be maintained for the life of the project. If there were a breach in the pipe, radioactive material would not leak into the environment as the beam tube is an evacuated tube, not a pipe filled with radioactive material.

0615.04

An explanation of the minimal acquisition and relocation procedures acceptable to the DOE is found in Volume 4, Appendix 4, 4.3, page 8. The selected state proposer group is responsible for all acquisition and relocation requirements. In Tennessee the designated authority for acquisition and relocation is Tennessee SSC Regional Authority (Volume 4, Appendix 4, Section 4.3.2.6, page 13).

0615.05

See Comment Response 880.04.

0615.06

Comments noted.

0615.07

As in any project, the construction phase may be unattractive for short periods of time. However, a great deal of care will be taken to attempt to make the project visually and aesthetically pleasing (see EIS Volume IV, Appendix 16). The six-acre service areas will be the size of a small business facility and will be five miles apart - too far to see one from the other at many sites. This is also true for the access shaft areas, which are much smaller than the service areas and two-and-one-half miles from each service area. The shafts are 20 ft and 30 ft in diameter. Spoils areas will be strategically placed and reclaimed to blend into the landscape. Much of the excavated limestone is planned to be used or sold for construction materials. In general, facilities on the ring should be visually pleasing and widely spaced. The largest concentration of structures, the campus area, should resemble a laboratory or small industrial park.

0615.08

See Comment Responses 710.01 and 880.04.

0615.09

Comments noted.

0616.01

See Comment Responses 523.03, 500.03, 496.03, 500.03, 505.02, and 542.06.

0616.02

The Snail Shell Cave that is known to be closest to any construction requiring blasting is a point 2,000 ft west of the high energy booster (EIS, Volume IV, Appendix 5, Section 5.6). At this distance, the vibrations from blasting should have been attenuated to a point far below that which causes damage to caves. If caves or caverns are discovered closer to a part of the conventional facilities to be constructed by blasting, vibrations at the cave would be monitored and blasting would be controlled to prevent any damage. Procedures would be similar to those listed in EIS Volume IV, Appendix 9, Section 9.2. Threatened and endangered species which could potentially be impacted were considered in the EIS, Volume IV, Appendix 5, Section 5.6.9.

0616.03

The sediment ponds will be designed and operated such that discharges from the ponds will cause as little downstream sedimentation as possible. During construction and operations, water pollutants, including oil and detergent, will be removed such that the discharges will comply with Federal and state water quality standards. Since karst features are expected to occur at the SSC site, and the water table is generally very shallow, the potential for contaminating the shallow groundwaters is high. Consequently, lining of the sedimentation ponds may be required to minimize groundwater quality impacts from potential seepage. Details will be determined as part of the final design and documented in the Supplemental EIS if the Tennessee site is selected. See also EIS Appendix IV, Volume 7, Sections 7.1.3.6 and 7.2.3.6.

The potential for SSC-related radionuclide contamination of groundwater supplies is discussed in Volume I, Chapter 5, and Volume IV, Appendix 12. The material contained therein can be summarized as follows: Off-site migration in groundwater of the important SSC-produced radionuclides has been numerically modelled for the worst reasonably foreseeable event (accidental loss of beam) for each affected SSC site alternative. A comprehensive description of this analysis is provided in Volume IV, Appendix 12, Section 12.2.3.1. The radionuclide concentrations derived from the model for the Tennessee site indicate that the annual dose equivalent in a nearby well (50 m from the source) which is used for normal daily consumption of water for an entire year would be 0.0098 mrem/yr (Volume IV, Appendix 12, Table 12.2.3-6), as compared with the EPA public drinking water standard of 4 mrem/yr.

One of the primary purposes of the beam absorption (abort) areas is to provide shielding for beams of noninteracting muons. These shielding requirements are discussed in Volume IV, Appendix 10, Section 10.1.2.3, and are covered in more technical detail in the SSC Environmental Radiation Shielding Task Force Report (SSC-SR-1026). Muons would be produced when the proton beam is brought to the beam absorbers. These particles are highly non-interactive and are, thus, very penetrating. They would pass through the beam absorber and may require relatively long stretches of earth shielding, but their travel would be confined to a narrow beam within a plane at the depth of the collider tunnel. The muons would stop and decay to harmless by-products (electrons and essentially non-interacting neutrinos) after about two microseconds (SSC-SR-1026). In order to receive the full 0.05 mrem/yr dose from muons at the Tennessee site (Volume IV, Appendix 10, Table 10.1.3-5), an individual would have to remain in a fixed position continuously for a year at the depth of the beam plane next to the downstream end of the beam absorber (Volume IV, Appendix 10, Section 10.1.3.1). This is a highly unlikely scenario, especially considering that the minimum depth for an absorber at the Tennessee site is 270 ft. Under realistic conditions, muon beams would pass under the land surface at considerable depths and decay almost instantly.

The disposition of cooling tower blowdown at the Tennessee site is discussed in Volume IV, Appendix 7, Section 7.1.3.6. The cooling water that serves as the source of blowdown would, by design, not be in direct contact with radiation and therefore would not contain any low-level radioactive waste. The handling and disposal of cooling tower blowdown is not expected to have an impact on surface water quality.

0616.04

The EIS addresses the sensitive nature of the Tennessee Cedar glade habitat in Volume IV, Appendix 11, Section 11.3.6.1.A. These areas are considered sensitive due to the potential presence of threatened and/or endemic or rare species. Red cedar harvesting which is a substantial local industry is the primary threat to disruption of these habitats. Detailed surveys of the location and species composition of sensitive habitats in the vicinity of the SSC sites including the Cedar glades in Tennessee were not conducted. Such surveys will be conducted as part of the site-specific supplement to the EIS and will be considered in final facility layout and design decisions.

0617.01

SSC construction and operations would be carried out such that impacts on quantity and quality of both surface and groundwater would be minimized.

With implementation of proposed impact mitigations for the Tennessee site, the unavoidable adverse impacts would be insignificant, except that some of the 350 wells within 1,000 ft of the tunnel or within the campus, buffer, and buried beam zone, and far cluster area would have to be abandoned. Should the Tennessee site be selected, a detailed plan indicating the exact number and location of wells to be abandoned will be developed.

A discussion of potential impacts and proposed mitigation measures is presented in the EIS Volume I, Chapter 5, Section 5.1.2. Comprehensive impact assessments are presented in Volume IV, Appendix 7.

0617.02

Ecological resources impact assessments for the Tennessee site are presented in the revised EIS Volume IV, Appendix 11, Section 11.3.6. Scenic and visual resources impact assessments for the Tennessee site are presented in Volume IV, Appendix 16, Section 16.3.6.

0617.03

The appearance of construction activities and the aboveground facilities for the SSC have been described in the EIS (Volume IV, Appendix 16, Section 16.3). The visual impact of these facilities on the Tennessee site has been addressed in Section 16.3.6 of that appendix.

0617.04

The potential for contamination of surface and groundwater supplies in the vicinity of the proposed Tennessee site from spoils pile leachate, cooling tower blowdown, and construction-related pollutants has been recognized and discussed in the EIS. Discharges to receiving waters from cooling or retention ponds will require NPDES permits from appropriate regulatory agencies. These permits would require monitoring of discharges for constituent values to prevent exceeding permitted levels. The effects of phosphates in spoils piles on water resources are specifically discussed in Volume I, Chapter 5, Section 5.1.1.2. Impacts from phosphate contamination would be expected to be minimal because of the low concentrations of phosphate minerals (if present) in Tennessee's Bigby/Cannon formation and overall small volumes of rock to be excavated from this geologic formation. In addition, Volume IV, Appendix 7 of the EIS provides a comprehensive analysis of SSC-related impacts to water resources at each site alternative and includes proposed mitigation measures designed to protect surface and groundwater supplies.

0617.05

Facilities E3 and F1 would adversely affect views from U.S. Highway 231/State Highway 10, a state-designated scenic parkway. EIS Volume IV, Appendix 16, Section 16.3.6.3 addresses the impacts and mitigation measures relative to these two facilities. Given the inconsistent landscape character along the highway noted in the referenced section, the proposed facilities while causing some minor adverse impacts would probably not significantly affect highway views. Measures to fully screen the facilities from view could be considered in detail in a Supplemental EIS, which would be prepared if the proposed Tennessee site is selected for the SSC.

0617.06

Several options may be considered to mitigate the unsightliness of the excavation spoils disposal areas. First, some of the excavated materials, which will be mostly limestone with some shaley and silty compounds, could be used as construction materials on site or sold for use elsewhere. If disposed of as spoils, the State of Tennessee proposes to deposit them at 35 sites along the collider ring; these sites would cover a total of 250 acres. See EIS Volume IV, Appendix 10, Section 10.2.3.6, and Volume IV, Appendix 7, Section 7.1.3.6.

The above scenario translates into an average size of about 7 acres and an average thickness of about 7 ft for each spoils deposit. Thus, on the average, none of the individual spoils deposits would be excessively large. The actual area and depth of each site would vary, depending on the topography and the volume of materials deposited at each site.

Only a few of the spoils sites would be seen from nearby residences. Most of the spoils sites would be screened by topography, trees, or structures. The unsightliness of the few that could be seen could be mitigated by removing the existing topsoil prior to depositing the spoils, covering the spoils with the topsoil after the end of disposal, and letting the topsoil revegetate itself naturally or replanting it (see Volume IV, Appendix 16, Section 16.3.6.3).

Leachates from the spoils caused by rainfall would contain primarily suspended sediments, dissolved solids, iron, and sulfur. Iron and sulfur originate from pyrite that occurs in minor amounts of shale in the excavated materials, which are mostly limestone. Leaching of these two substances could be minimized by mixing the shale with the limestone, since limestone has a high capacity for retaining these constituents. See Volume IV, Appendix 7.

Surface runoff and leachates from the spoils caused by rainfall could be collected in retention ponds at each disposal site in order to trap suspended sediments. See EIS Volume IV, Appendix 10, Section 10.2.3.6. Even with these mitigations, measurable impacts to surface water quality are likely.

The SSC could emit minor amounts of radiation to the environment, resulting from both its routine operations and from highly unlikely accidents. During SSC construction, naturally occurring radioactive elements in the excavated materials would contribute minor amounts of radiation to the environment. The radiation contribution of the SSC to cumulative adverse genetic and carcinogenic effects on the general population would be negligible. It is estimated to be only 1/1000 of one percent during SSC construction and 2/1000 of one percent during SSC operations compared to the contribution of existing background radiation (see Volume I, Chapter 5, Section 5.2.5). A summary is provided in Volume I, Chapter 5, Section 5.1.6.2 - note comparison with background radiation in Table 5.1.6-2 (background radiation and radiation contribution during SSC construction and operations). Detailed calculations of radiation aspects of the SSC are contained in Volume IV, Appendix 12.

0618.01

Population impacts in Rutherford County as a result of the SSC would be anticipated to peak at about 4,400 persons in 1992, with most expected to reside in Murfreesboro (see EIS Volume IV, Appendix 14, Table 14.1.3.6-6). School enrollment impacts would peak at about 1,000 students in the county (Volume IV, Appendix 14, Table 14.1.3.6-13). Results of the EIS public finance analysis for Rutherford County indicate that net fiscal impacts of the SSC would be negative for the first three years of the project, and positive thereafter (Volume IV, Appendix 14, Table 14.1.3.6-17).

Additional details of the socioeconomic impact analysis for Tennessee, including impacts relating to population, public services, and public finance, may be found in EIS Volume IV, Appendix 14, Section 14.1.3.6.

0618.02

The possibility of international collaboration and cost-sharing is discussed in the Invitation for Site Proposals and in Volume I, Chapter 3, Section 3.2.4.

0619.01

Comments noted.

0619.02

SSC operations result in radiation in several ways. Protons from hydrogen gas, which are confined to a beam pipe and not accessible to people, are accelerated to a very high speed (high energy). These protons in themselves are not radioactive because they are stable and do not decay; however, when they are accelerated to very high speeds, they can be classified as ionizing radiation because they are capable of forming ions when they hit material. (Ions are atoms or groups of atoms that have acquired a net electrical charge by gaining or losing an electron.) When these protons " hit" something, they produce additional ionizing radiation in the form of a spray of secondary particles (hadrons and muons). As a result of the proton beam or secondary spray interacting with an object, that object may become radioactive. This is called radioactivation.

The proton beam and the secondary particles are called prompt radiation, since this form of radiation totally disappears when the SSC is turned off. After the accelerator is turned off, the residual radiation caused by radioactivation will persist for periods determined by the half-lives of the isotopes created in the collision. Many of the isotopes produced have short half-lives, but some last longer -- most notably tritium, with a half-life of 12.3 years (see Volume IV, Appendix 10, Section 10.1.2.3).

An evaluation of the effects of radiation on an individual must take into account several factors. For prompt radiation, the concern is if this radiation hits the individual. An analogy is the firing of very small bullets: if these bullets do not hit anyone, they do no physical damage. Therefore, the goal for protection from prompt radiation is to prevent it from hitting people. That can be accomplished by aiming radiation beams away from certain areas, excluding people from certain areas, or by providing material that absorbs or attenuates the radiation. By placing the SSC tunnel below ground and aligning the beam more or less horizontally, shielding is provided and people are prevented from residing in the beam plane.

Only a few yards of earth or concrete will stop all of the radiation between the beam of particles and someone or something located above the beam. Therefore, constructing the SSC deep underground prevents all radiation produced directly by the machine from reaching the surface. There are secondary effects, however. Operating the machine produces radioactivity in the air in both the tunnel and the experimental halls. When these are ventilated, this activity is released to the surroundings. The amounts have been calculated, and the results are reported in tables in Volume IV, Appendix 12. These tables show that radiation from this source is a small fraction of a percent of DOE-permitted standards, and are an even smaller percentage of natural background radiation.

0619.03

Comment noted.

0619.04

In terms of health risks to residents, the SSC will be sited, designed, constructed, and operated in strict conformance with applicable federal, state, and local environmental safety and health protection criteria, regulations, and standards to assure adequate protection of both the SSC workforce and the general public. The exposures from the SSC will be less than 1/1000 of the radiation that comes from outer space which is called cosmic radiation (EIS Volume I, Chapter 4, Section 4.6.1).

0619.05

The DOE will dispose of its toxic and hazardous wastes only at those facilities that meet applicable Federal, State, and local environmental regulations and criteria (see EIS Volume I, Chapter 5, Section 5.1.6 and Volume IV, Appendix 10).

For the proposed Tennessee site, surface water would provide the major source of water for SSC on-site use and for the SSC-caused population growth in the surrounding communities, during both construction and operations of the SSC. The proposal by the State of Tennessee indicated that sufficient surface water supplies exist for these purposes. Groundwater wells would provide a minor source of water, principally for new population settling in rural areas, and for the construction of two remote SSC service areas. See Volume IV, Appendix 7, Section 7.1.3.6.G and Sections 7.2.3.6.A.1, 7.2.3.6.A.5, 7.2.3.6.A.6 and 7.2.3.6.B.1.

The concern about off-site contamination of groundwater has been addressed in Volume I, Chapter 5; Volume IV, Appendix 10; and Volume IV, Appendix 12. The transport of radionuclides from the point of beam loss to a nearby well 50 m away would take approximately 8 yr for the sodium-22 to reach its maximum value at the well and approximately 18 yr for tritium. An individual using this well for normal daily consumption of water when the concentration of the radionuclides is at its maximum, would in a year's time receive a dose equivalent of 0.0098 mrem (see Volume IV, Appendix 12).

0620.01

Comments noted.

0621.01

Comments noted.

0622.01

Comment noted.

0623.01

The information presented on karst topography has been included in the discussions presented in the EIS Volume IV, Appendices 6 and 7. If the proposed Tennessee site is selected for the SSC, mitigations to adverse impacts would be addressed in the Supplemental EIS. See also Comment Response 503.03.

0624.01

The annual amount of energy (in the form of electricity) used by the SSC will be large by individual household standards, but small in terms of national standards (about 1/1000th of that now used). However, it is incremental to that now in use, and will indeed make a small contribution to any existing global warming problem, particularly where its production is from the burning of fossil fuels (see EIS Section on Cumulative Impacts, Volume I, Chapter 5, Section 5.2 and on Natural Depletable Resources, Chapter 5, Section 5.6).

0624.02

Comment noted.

0624.03

Comments noted. This document was published because, as a major federal action potentially significantly impacting the environment, the Superconducting Super Collider project must be preceded by an Environmental Impact Statement in compliance with the National Environmental Policy Act. See Volume III, Section 1.1.

0624.04

Comments regarding responsiveness and involvement of public officials are noted. See Comment Response 1435.03 for the SSC project impacts on prime and important farmland in Tennessee. The DOE is committed to full compliance with the Farmland Protection Policy Act which requires Federal agencies to minimize or eliminate the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that Federal programs are compatible with state, local government, and private programs to protect farmland (See Volume I, Chapter 6, Section 6.2.19). The DOE has consulted with the Soil Conservation Service to obtain estimates of prime and important farmland in the fee simple project area, as well as an estimate of prime and important farmland inventories in Bedford, Marshall, Rutherford, and Williamson Counties. Based on these estimates, less than one percent of the prime and important farmland inventory in the four counties would be permanently removed from production should the SSC be sited in Tennessee.

0625.01

Comments noted.

0625.02

Volume IV, Appendix 4 of the EIS describes the land requirements and the proposed processes for accomplishing the acquisitions and relocations. The proposing States have all agreed that the Federal acquisition laws will serve as a minimum standard (Volume IV, Appendix 4, Section 4.3.1). It is the responsibility of the States to acquire the SSC land requirements (Volume IV, Appendix 4, Section 4.1). The Tennessee SSC Regional Authority has been authorized to acquire the land proposed for the SSC site if Tennessee is selected (Volume IV, Appendix 4, Section 4.3.2.6).

Appendix G-(8) of the Invitation for Site Proposals (ISP) states: In the event that either the Superconducting Super Collider is not built on the property covered by this offer or the scope of the project is so reduced that a portion of the site is not required, the property covered by this offer, or any appropriate portion thereof, may revert to the Donor (the State), provided permanent improvements have not been constructed by the United States. Upon written mutual agreement of the facts stated above, the reversion shall occur at no cost to the Government.

0625.03

Comments noted.

0626.01

Comments noted.

0626.02

The potential impact of spoils from tunnel and shaft excavation is assessed in EIS Volume IV, Appendix 7, Section 7.2.3.6.A.4. Since karst features are expected to occur at the SSC site, and the water table is generally very shallow, the potential for contaminating the shallow groundwaters is high. As stated in the FEIS, with implementation of mitigative measures such as containment by dikes and retention ponds and installation of low-permeability liners beneath the ponds, the residual impact to groundwater quality is expected to be negligible. These mitigations would also help to control impacts to surface water quality as stated in Volume IV, Appendix 7, Section 7.1.3.6.F.

The spoils are natural material which does contain traces of radium. Radon will emanate from the spoils. At the Tennessee proposed site the radium content in the surface soil is higher than in the rock at tunnel depth (Volume I, Chapter 4, Section 4.6.1).

The EIS has been revised to reflect additional mitigations that could be implemented including fugitive dust controls such as soil stabilizing agents and water sprays (see Volume I, Chapter 5, Section 5.1.3.2) and the covering and revegetation of spoils disposal sites after spoils disposal activities are completed (see Volume IV, Appendix 10, Section 10.2.3.6.A.3).

0627.01

It is the policy of the DOE to comply with applicable laws and regulations and to operate its facilities in a safe and environmentally sound manner. The DOE is aware of, and sensitive to, the environmental problems at some of its sites which resulted from past practices, and is working to correct them.

The DOE has programs in place for environmental compliance and, as necessary, for environmental restoration at both referenced facilities. The SSC is a scientific instrument for research in high energy physics.

The Washington, D.C. area was not proposed as a site for the SSC. Proposed sites were submitted by States and organizations (see EIS Volume III, Chapter 1) and the DOE did not determine areas in which the site was proposed.

0627.02

As stated in Volume I, Chapter 2, Section 2.2, p.2-1, Need For The SSC, "There is a scientific need for such an understanding of nature.... Much of the knowledge gained regarding physical phenomena in recent years has been achieved through the use of high energy accelerators.... The discoveries gained from this research have deepened and broadened human understanding of the physical world." While it is difficult to predict the ultimate contribution of the SSC to society, the advances in science from existing accelerators are significant. The intent of the SSC project is neither to bankrupt nor poison the nation but to serve instead as a means for advancing mankind's understanding of the universe.

0628.01

Comment noted.

0629.01

The description of the shallow karst hydrologic system at the Tennessee site is consistent with discussion in EIS Volume IV, Appendix 5, Section 5.6.2.2. See Comment Response 500.03 regarding cave systems and potential of effects from SSC construction and operations.

0629.02

Regional resources is one of the six technical evaluation criteria used by the DOE in evaluating sites. Regional resources includes the availability of a regional industrial base and skilled labor pool to support construction and operation of an SSC. The level of unemployment was not one of the specific parameters included under this criterion. Unemployment rates, however, were used to estimate the amount of in-migration to each of the Regions of Influence and thus played an important role in the socioeconomic analysis described in Section 5.1.8 of the EIS.

Setting is also one of the six technical evaluation criteria used by the DOE in evaluating sites. The ability of the proposer to deliver defendable title for the proposed site is a parameter that was evaluated under this criterion. EIS Volume III Chapter 3 describes the results of the analysis performed on the Regional Resources and Setting criteria for each of the proposed sites.

0629.03

Comment noted.

0629.04

The Tennessee Region of Influence (ROI) unemployment rate in 1987 was the second lowest of the seven sites under consideration of SSC site development. The concern raised by this comment regarding the ability of the existing labor force to supply workers was addressed within the EIS analysis, since both the overall size of each ROI's labor force and their unemployment rates were determining factors used to estimate the amount of in-migration into each ROI. Additional information concerning the methodology and results of the EIS socioeconomic assessment is presented in the EIS in Volume IV, Appendix 14, Sections 14.1.2.3.A and 14.1.3.6.A, respectively.

Existing traffic conditions at the proposed Tennessee site are addressed in EIS Volume IV, Appendix 5, Section 5.6.11.2.A.1. Projected traffic during SSC construction and operations are discussed in Volume IV, Appendix 14, Section 14.2.1.3.F.1.b.

0630.01

Comment noted.

0630.02

Comment noted.

0630.03

See Comment Response 504.02.

0630.04

Comments noted.

0631.01

Comments noted.

0632.01

The new roads and upgrading proposed by the State and the impact of SSC on the traffic are discussed in EIS Volume IV, Appendix 14, Section 14.2.1.3.F.

0633.01

Comment noted.

0633.02

The dose equivalent of the beam abort area is discussed in Comment Response 607.03.

SSC is a machine built for the purpose of colliding two 20-TeV proton beams. The accelerated particles are protons, not electrons. Routine operations of the SSC will not produce any measurable radioactive contamination to the environment (see Volume I, Chapter 5, Section 5.1.6.2). The worst-case scenario is a loss of beam at a point along the collider tunnel, which would produce activation of soil (see Volume IV, Appendix 10). Although there has not been a loss-of-beam accident during operations of the superconductor accelerator (Tevatron) at Fermilab (see Volume I, Chapter 5, Section 5.1.6.3), an analysis was performed to evaluate the impacts if one were to occur at the SSC (see Volume IV, Appendix 12).

Radiation from the SSC will not harm trees. The radiation exposure from SSC operations has been calculated, and it is a very small fraction of the natural background radiation (see Volume I, Chapter 5, Section 5.1.6.2).

0633.03

A discussion of the impacts on local and State public finance can be found in EIS Volume IV, Appendix 14, Section 14.1.3.6.D. Regarding land acquisition needs, see Comment Response 880.04. The issue of the use of eminent domain is dependent upon State law. The question of whether or not the proposer has the authority of eminent domain is addressed in Volume IV, Appendix 4, Section 4.3.2.4. Questions concerning strategies and commitments by the State to mitigate local government infrastructure impacts should be directed to the appropriate State agency.

0633.04

Persons residing in the area of the SSC would not take on a risk of cancer that is measurably different than that experienced by other persons in the state. The potential cancer risks from operations of the SSC addressed in EIS Volume IV, Appendix 12. Tables 12.3.1-34 and 12.3.1-35 present the estimated fatal cancer risks to the general population and to an individual from airborne releases of radiation (air activation products from SSC operations and natural radon/radon progeny) from the key areas of the SSC, the interaction region and the service facilities. The methods for estimating risks are based on certain assumptions, such as that the population near the SSC has demographic characteristics and mortality experiences similar to the United States.

As a measure of health impact from the intake and/or exposure to the radionuclides, the fatal cancer rate (deaths/yr) in the exposed population is the mortality rates of all radionuclides from all exposure pathways for all cancers during the mean individual lifetime (70.7 yr) in 100,000 exposed population. For the Tennessee site the annual fatal cancer risk for a selected, maximally exposed individual is 0.0865 deaths/yr per 100,000, and for the collective population there could be 0.0230 deaths/yr per 100,000. The normal cancer death rate is 351 per yr per 100,000 with a lifetime risk of 180 deaths per 1,000 (American Cancer Society, Cancer Facts and Figures-1988, NY,NY). The individual and collective population risks from exposure to natural radon and its progeny represents the largest risks from airborne releases (see EIS Volume IV, Appendix 12, Tables 12.3.1-32 and 12.3.1-33). Radon is not produced by the SSC but is vented along with the air activation products when the tunnel is ventilated. These estimates indicate that negligible cancer risks will be present.

0633.05

The DOE recognized that there could be an impact from the loss of property due to construction of the SSC. See EIS Volume 1, Chapter 5, Section 5.1.8.5, Quality of Life/Social Well-Being. One key affected societal group discussed includes suburban and rural residents whose property would be required for the SSC. As noted in EIS Volume I, Chapter 5, Section 5.1.8, regions affected by the SSC with potentially the highest number of relocations would also be in areas in which replacement accommodations would be most available. Compensation policies for relocated residences are discussed in Volume IV, Appendix 4 of the EIS.

0634.01

Comments noted.

0635.01

Assessment of the number of wells that may have to be closed at the Tennessee site was not consistently presented in the DEIS and is significantly lower than the numbers referenced in the comment. See Comment Response 502.02. See Comment Response 497.02 regarding replacement of water supplies lost due to the SSC.

0635.02

SSC-related in-migration would indeed lead to increased demands on Rutherford County infrastructure. EIS considers the impacts on public services in EIS Volume IV, Appendix 14, Section 14.1.3.6.C, focusing upon public education, public safety, and public health and welfare. However, hiring additional personnel for work within the current public services infrastructure would maintain current levels of service. Impacts on Rutherford County roads and utilities are discussed in Volume IV, Appendix 14, Sections 14.2.1.3.F and 1.4.2.2.3.F. Despite decreased levels of service, SSC-related impacts on roads and utilities should be negligible. SSC-related impacts on water and waste disposal are examined in Volume IV, Appendix VII, Sections 7.1.3.6 and 7.2.3.6, but not at the county level. At the higher levels of aggregation employed major impacts are not anticipated.

0635.03

The excavated materials would be hauled to the disposal site, covered with topsoil, and the area would be revegetated. No garbage would be mixed with excavated materials, nor would there be any standing water which would serve as a breeding place for mosquitos. Therefore insecticides would not need to be applied.

0635.04

There was a typographical error in the section of the DEIS dealing with Rutherford County property tax loss. Instead of an annual loss of $1.4 million, as published in Volume IV, Appendix 14, Table 14.1.3.6-17, the loss should be $0.1 million each year. Deficits would still occur in 1989 and 1990, but they would be $1.0 million less than the DEIS indicates. Beginning in 1991, county jurisdictions would cumulatively receive a surplus which would be $1.0 million greater than that estimated in the EIS.

Corrections are reflected in the Errata for Volume IV, Appendix 14.

0635.05

Even though the SSC will conduct experiments with high energy protons, the radiation associated with the absorption areas is understood, and plans have been made to provide adequate shielding to keep exposures on the ground surface to levels that are safe and as low as reasonably achievable (ALARA).

See Comment Response 607.03 for a description of the beam absorption areas and the associated health impacts.

0636.01

Comments noted.

0636.02

Comment noted.

0636.03

Comments noted.

0636.04

Comments noted.

0636.05

Comments noted.

0637.01

Comments noted.

0638.01

Comments noted.

0639.01

Comments noted.

0640.01

Comments noted.

0641.01

Comments noted.

0642.01

A discussion of current public school conditions, and an analysis of potential impacts related to SSC development are presented at the county and Region of Influence levels for the proposed Tennessee site (see Volume IV, Appendix 5, Section 5.6.11.1.C, and Volume IV, Appendix 14, Section 14.1.3.6.C, respectively). The EIS does not examine public education for individual communities.

0643.01

Comments noted.

0644.01

EIS Volume IV, Appendix 10, Section 10.1.2.3.A.1 supports the comment on the attenuation (stopping) of hadrons in 30 to 40 ft of soil. Potential effects on wells as a result of accidental beam loss are discussed in Volume IV, Appendix 14.

0645.01

As stated in Section 5.1.8 of the EIS, the construction and operation of the SSC would provide over 9,400 direct, indirect and induced employment in the Tennessee Region of Influence.

0646.01

Comment noted.

0646.02

Comment noted. Land use and socioeconomic concerns from potential impacts of SSC construction in Tennessee were addressed in EIS Volume IV, Appendix 5, Section 5.6.10 and Appendix 14, Section 14.1.3.6.

0646.03

The purpose and need for the SSC are discussed in EIS Volume I, Chapter 2. EIS Volume I, Chapter 1, Section 1.4 summarizes the environmental consequences of the SSC. The DOE is committed to listening to and addressing the concerns of the individuals residing in the vicinity of the proposed sites.

0647.01

Comments noted.

0648.01

The purpose and need for the proposed action are discussed in the EIS Volume I, Chapter 2. See also Comment Response 880.04 regarding land acquisition.

0648.02

A Supplemental EIS will be completed for the selected site which will, along with final design, determine the exact placement of structures and required relocations/displacements.

Funding requirements and source identification for the SSC are outside the scope of the EIS; funding will be determined by Congress.

0648.03

SSC siting requirements and the DOE site location methodology as presented in the DEIS, Volume III totally independent of any other DOE project considerations. There is no relationship between siting the SSC and the MRS.

0648.04

Comment noted.

0648.05

The radiological impact of the SSC is estimated with series of very conservative assumptions. Radiological impacts are discussed in Volume IV, Appendix 5, Section 5.1.6.1. The potential pathways for radiation exposure include (1) direct radiation, (2) air activation products from beam loss, (3) radon and its progeny, (4) neutron skyshine, (5) aquatic pathways for normal operation and accidental scenario, (6) transportation of low-level radioactive waste. The estimations are also based on the operating experience of existing high energy accelerators such as Fermilab and CERN. It allows us to estimate the source terms with reasonable confidence and high degree of accuracy. Detailed descriptions of the methodologies and assumptions used in performing the dose estimation are described in Volume IV, Appendices 10 and 12. The health impacts of the SSC are over-estimated as a result of conservatism in assumptions.

0648.06

Comment noted.

0649.01

See Comment Response 522.03.

0649.02

The caves are described in Volume IV, Appendix 5, Section 5.6.1.5. The SSC project would actually enhance the educational value of the caves because, before construction, there will need to be careful studies of the caves to assure that the SSC construction causes minimal change to the existing cave biota and hydrology. These studies will contribute greatly to the scientific knowledge about cave systems. See Comment Responses 522.07 and 522.25.

0649.03

Comment noted.

0650.01

Land acquisition and relocation is the responsibility of the proposer (Volume IV, Appendix 4, Section 4.1). Proposers have all agreed to comply as a minimum standard to the federal acquisition laws (91-646 and 10 CFR 1039 and 51 FR 7000). Questions concerning the proposer's SSC land acquisition strategies and commitments should be directed to the appropriate State agency (Volume IV, Appendix 4, Section 4.3.2).

The cumulative net fiscal impact to all local government jurisdictions in Rutherford County would be negative during the first two years of project activity but would be positive thereafter (Volume IV, Appendix 14, Section 14.1.3.6.D).

Because the present overdrafting would be increased by project-related water withdrawals and because the aquifers are the major supply aquifers in the area, the SSC impact in the area of the proposed Tennessee site is considered to be measurable.

0651.01

Comment noted.

0651.02

For the proposed Tennessee site, surface water would provide the major source of water for SSC on-site use and for the SSC-caused population growth in the surrounding communities, during both construction and operations of the SSC. Availability of surface water is described in EIS Volume IV, Appendix 7, Section 7.1.3.6. Groundwater would provide a minor source of water, principally for new population settling in rural areas. Thus, the impact on existing water wells from SSC related groundwater use is expected to be negligible. See EIS Volume IV, Appendix 7, Section 7.2.3.6.

0652.01

See Comment Response 991.02. EIS Volume IV, Appendix 3 specifies what will be done with the SSC when its useful life is finished. The SSC is not expected to be outmoded or obsolete before it is complete; it will be the forefront machine in high energy physics for the foreseeable future. It will be fully capable of performing its designated mission when it is finished, and technological progress that occurs while it is being built would be studied to see if it can be incorporated. The alternative of delaying construction of the SSC is addressed in the EIS Volume I, Chapter 3.

0652.02

Comment noted.

0653.01

EIS Volume IV, Appendix 4 confirms that less acquisition of private land would be required in Arizona than at the other proposed sites. The statement on ecological impact is consistent with Volume IV, Appendix 11.

Environmental impacts of land acquisition and other project activities are one of several site-selection criteria identified in the Invitation for Site Proposals, as summarized in Volume III.

0653.02

EIS Volume IV, Appendix 1, Section 1.2.1.10 states the sources of electric power proposed by the State are a mix of nuclear, coal, gas, and hydroelectric sources. While the Arizona proposal mentions the potential use of solar energy for the SSC, no definite proposal was provided for such use.

Regarding air quality, please refer to Comment Responses 428.15 and 428.22 wherein more representative site carbon monoxide data were incorporated into the EIS.

Regarding the Pacific Rim, the potential for earthquakes at the proposed Arizona site is discussed in Volume IV, Appendix 5, Section 5.1.1.5. The area surrounding the Arizona site has the lowest seismic activity in the western United States.

0653.03

The highway improvements planned or proposed in the vicinity of the SSC site are discussed in EIS Volume IV, Appendix 14, Section 14.2.1.3. The methods for financing the improvements are not discussed for any proposed SSC site.

The EIS states in Volume IV, Appendix 5, Section 5.1.11.2.A.1 that an extensive system of beltways and arterials was planned in Maricopa County to supplement the existing highway network. Because those planned highways will be located in the Phoenix metropolitan area, they are not expected to affect the general access to the proposed site area.

The information provided in the EIS for Phoenix Sky Harbor Airport generally follows the format used for all the sites. The aviation delay figures were confirmed in September 1988. They represent the latest information available from the Federal Aviation Administration and provide a consistent means of comparing existing conditions among airports near proposed sites.

The EIS presents only a brief discussion of general aviation fields, because these airports would not be significantly impacted by the SSC. The information on the general aviation fields provided by commenter is noted.

0653.04

Reference to Lake and Williams air force bases has been included in the Errata to the EIS Volume IV, Appendix 5, Section 5.1.11.2.A.3. No impacts are expected on these air bases.

0654.01

The DOE has determined that the data represented in the EIS is sufficient to support a siting decision. See Volume I for a discussion of the need for a supplement to the EIS prior to a decision on construction and operation following the site selection decision.

0654.02

See Comment Response 428.93.

0654.03

Volume I, Chapter 4, Table 4-17 lists only those species that have been specified as potentially present by the U.S. Fish and Wildlife Service in their letters of consultation to the DOE (Attachment A to Volume IV, Appendix 11). The potential for the occasional presence of the bald eagle and the peregrine falcon is addressed in Volume I, Chapter 5, Section 5.1.5.2.A and Volume IV, Appendix 11, Section 11.3.1.2 of the EIS.

The following revisions have been made to the EIS:

1. Volume I, Chapter 4, Table 4-17 has been corrected to properly identify the Gila monster as a Category 2 candidate species.

2. Wiggin's cholla is now identified as a Category 2 species (rather than Category 3) in Volume IV, Appendix 11, Section 11.3.1.2; its status as a species under review has also been addressed.

3. The status of Swainson's hawk as a migrant has been corrected in Volume I, Chapter 4, Table 4-17 and Volume IV, Appendix 11, Section 11.3.1.2.

0654.04

The phrase has been deleted from Volume 1, Chapter 4.

0654.05

The sentence in question has been deleted from the text in Volume IV, Appendix 11, Section 11.3.1.

0654.06

Present and future development of private land near the SSC project has been addressed in Volume IV, Appendix 5, Section 5.1.10.2.B.1, p.103. Privately held land in the project area is limited primarily to the near cluster area, including the campus and injector sites, but development is related mostly to ranching activities which do not noticeably detract from the overall natural appearance of the lands.

Of concern regarding the campus and injector would be the visual impact on views from the crests of the Southern Maricopa Mountains. The town nearest the SSC is Maricopa, about 22 mi from the nearest crests of those mountains and too distant to be especially noticeable. Mobile is closer, about 9.5 mi, but is smaller than Maricopa. Interstate 8 is to the south of the Maricopa Mountains and is not in the views potentially affected by the Campus and Injector. In this context, the scale and extent of buildings associated with the Campus and Injector would catch and hold considerable attention. The facilities would be about 4.5 mi away in an area not noticeably modified by man and would detract from the sense of remoteness key to the views experienced from the slopes and crests of the Maricopa Mountains.

The scenic and visual resources assessment does not specifically refer to the nearby town and freeway. However, it does mention that the aggregate of the facilities would be distracting to dominant in the the currently undeveloped setting. See EIS Volume IV, Appendix 16, Section 16.3.1.3.9.

0655.01

See Comment Responses 428.11 and 428.129.

0655.02

In connection with the statement regarding alleged duplications involving the Estrella freeway, see Comment Responses 428.11 and 428.129.

According to the railroad alignment shown on the plans dated March 15, 1988, and submitted to the DOE by the State of Arizona, only 1 mi out of the 6-mi total length of proposed new track would be located within fee simple areas.

0655.03

The data presented in the EIS (Volume IV, Appendix 5, Table 5.1.11-6), show low traffic volume on Maricopa-Gila Bend Road. The DOE agrees that the proposed road upgrading would have minimal impact on a small number of vehicles.

0655.04

The information in the EIS Volume IV, Appendix 14, Section 14.2.1, is based on proposal information received before March 30, 1988. The DOE proposed a modified road access plan to mitigate some of the impacts resulting from the original State proposal. The State later proposed revisions using the Freeman interchange to connect with the ring access road in a similar manner as that proposed in the modified road access plan. With this revision, the impact on I-8 traffic would be minimal. Data presented in Appendix 14 also shows that the level of service for I-8 will be 'A' through the year 2000.

0655.05

The Estrella Freeway and access roads are discussed in EIS Volume IV, Appendix 14, Section 14.2.1.3.A.

The EIS identifies the worst potential impact by projecting non-SSC traffic growth on the existing roads, estimating the worst-case SSC traffic, and considering only the committed improvements. This impact might be reduced by considering improvements such as the Estrella Freeway (see Volume I, Chapter 3, Section 3.6). The impact analysis assumed a four-lane road between the Vekol interchange with Interstate 8 and the campus area.

The two-lane road proposed by the State for temporary access to the north along the proposed Estrella Freeway corridor was considered to be a change to the Arizona proposal and therefore was not addressed in the EIS.

0655.06

Figure 14.2.1-1 (EIS Volume IV, Appendix 14, Section 14.2.1.3.A) presents improvements considered in the analysis of the SSC impacts on traffic. Please see Comment Response 655.05.

0655.07

Closing of the railroad during roadway construction is mentioned in EIS Volume IV, Appendix 14, Section 14.2.1.3A.2.a as the worst potential impact in this area. This could be prevented by proper planning and mitigations by the construction contractor in consultation with the state and the railroad.

It is also acknowledged that traffic volume, the SSC schedule, and other pertinent information should be considered before deciding between the use of grade crossing and grade separation. The decision on the type of rail crossing will be made during detail design and will be addressed in the Supplemental EIS if the Arizona site is selected.

0656.01

Comment noted.

0656.02

As stated in EIS Volume I, Chapter 3, Table 3-3, there are two other states that offer the cross ring tie-line addressed in this comment.

Statements made in the second paragraph of the comment are consistent with the EIS, Volume IV, Appendix 5, Section 5.1.11.2.B.1.e and Appendix 14, Section 14.2.2.3.A.1.

See Comment Responses 428.96, 428.116, and 428.117. EIS Volume IV, Appendix 14, Section 14.2.2.3 A.1.a.3 shows that the utility's plans and schedules would be impacted by the addition of the SSC to its system. The last sentence states, "Based on information in the planning documents, such revisions [to the APS transmission and generation construction schedules] appear reasonable." This states that changes to the planned construction schedules would satisfy the SSC power requirements.

Statements made in the fourth paragraph of the comment are consistent with EIS Volume IV, Appendix 14, Section 14.2.2.3.A.1.a.

0657.01

Volume IV, Appendix 14, Section 14.2.2.3 A, shows that APS does not plan to have sufficient excess generation capacity, under its current resource plan, to meet the additional load of the SSC. If the SSC is sited in Arizona, APS could modify its current resource plan to be able to meet the additional load and maintain its desired reserve level. This flexibility of planning is stated in Volume IV, Appendix 14, Section 14.2.2.2 C. See also Comment Response 428.96.

0658.01

Comment noted.

0658.02

It is true that the amount of detailed information submitted to the DOE varied by State. However, the EIS was not prepared solely on the basis of data made available to the DOE preparers by individual State proposers. See Comment Response 13.02.

0658.03

See Comment Response 13.02.

0658.04

See Comment Response 1486.03, first paragraph.

0658.05

The DOE has carefully examined the environmental impacts of the SSC as it would be implemented at each of the seven site alternatives.

0658.06

The EIS presents the projected impacts and the mitigation measures which could be utilized to minimize those impacts. The Supplemental EIS will address in more detail the impacts and potential mitigations for the selected site.

The DOE has required all proposers to certify that they will comply with Federal acquisition and relocation laws (Public Law 91-646 and 10 CFR 1039, 51 CFR 7000), at a minimum (see EIS Volume IV, Appendix 4, Section 4.3.1). Questions concerning the proposer's authority to provide financial mitigation should be directed to the appropriate State agency (see Volume IV, Appendix 4, Section 4.3.2).

EIS Volume I, Chapter 5, Section 5.1.5.1 also addresses potential mitigation activities which could be applied to reduce impacts of the SSC on a particular resource area. The benefits of these mitigations would extend into surrounding areas and their residents. Questions regarding the proposer's authority to mitigate impacts from the SSC should be directed to the appropriate State agency.

This comment incorrectly notes the number of necessary relocations in Arizona, which DOE has determined to be six. Consideration of risk of litigation is the responsibility of the proposing State.

0658.07

This observation is consistent with Volume IV, Appendix 11. See Comment Response 974.01.

0658.08

The waste treatment and disposal facilities are discussed in Volume IV, Appendix 10, Section 10.3.3.

0658.09

It should be noted that the areas containing the Maricopa Mountains have not as yet been designated as Wilderness Study Areas. There is the possibility that the presence of the SSC in the area may act to slow some of the development, such as residential expansion, since a portion of the area would be acquired for the SSC. Impacts to some of the pristine natural areas from off-road vehicles and general human encroachment may increase, as noted in the comment. These uses would continue to be considered as part of the BLM's multiple use program (see Volume IV, Appendix 5). See Comment Responses 428.10 and 428.128.

0658.10

See Comment Response 428.05.

0658.11

Comments noted.

0658.12

See Comment Response 428.10.

0658.13

See Comment Response 428.11.

0658.14

See Comment Response 428.12.

0658.15

See Comment Response 428.13.

0658.16

See Comment Response 428.93, which contains a revision to the EIS regarding the Arizona Native Plant Law.

0658.17

See Comment Responses 428.15 and 428.22.

0658.18

See Comment Response 428.15. The contradiction has been corrected.

0658.19

See Comment Response 428.12.

0658.20

The Arizona SSC site is in the Sonoran Desert section of the Basin and Range physiographic province. All of the sites are described in EIS Volume I, Chapter 4, Table 4-1 in terms of Fenneman's (1938) division of distinctive sections within larger physiographic provinces.

0658.21

See Comment Response 428.17.

0658.22

See Comment Response 0428.17, which says: "The terms older fanglomerate and younger fanglomerate are now used in the EIS as in the site proposal."

0658.23

See Comment Response 428.19.

0658.24

See Comment Response 428.20.

0658.25

See Comment Response 428.21.

0658.26

See Comment Response 428.22.

0658.27

The observation is correct. See the revised Volume I, Chapter 4, Table 4-15 and Section 4.6.2.1. Also see the correction in the Errata to Volume IV, Appendix 5, Section 5.7.7.1.

0658.28

See Comment Response 428.23.

0658.29

See Comment Response 428.24.

0658.30

See Comment Response 428.25.

0658.31

See Comment Response 428.26.

0658.32

See Comment Response 428.27.

0658.33

See Comment Response 428.28.

0658.34

The term "ecotype" is used in the EIS because it was carefully selected as a relatively short term, instead of a phrase or more complicated term, to represent a type of ecosystem or plant and animal association. This short descriptive word appears many times in the EIS representing the divergent types and numbers of ecological systems which are accounted for among the seven BQL sites.

See Comment Response 428.29.

0658.35

See Comment Response 428.30.

0658.36

As stated in EIS Volume I, Chapter 4, Section 4.7.4.1, a number of Federally listed species are or may be in the vicinity of the proposed SSC sites. This information was obtained from regional offices of the USFWS following consultation in accordance with the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543). The analysis of species' presence or absence was also based on a preliminary understanding of their habitat requirements and the quality of the habitat present at the sites. Based on information provided by the Bureau of Land Management following preparation of the DEIS, Tumamoc globeberry has been observed in the Vekol Valley south of Interstate 8 in Maricopa County. This area is in the vicinity of the southern extension of the ring. This information has been added to the revised EIS in Volume I, Chapter 4, Section 4.7.4.1, and Chapter 5, Section 5.1.5.2.A and in Volume IV, Appendix 11, Section 11.3.1.2. The table on p. 4-50 of the DEIS is accurate with respect to the State of Arizona.

0658.37

Based on information provided by the Bureau of Land Management following preparation of the DEIS, Tumamoc globeberry has been observed in the Vekol Valley south of Interstate 8 in Maricopa County. This is in the vicinity of the southern extension of the ring. This information has been added to the revised EIS in Volume I, Chapter 4, Section 4.7.4.1 and Chapter 5, Section 5.1.5.2.A, and in Volume IV, Appendix 11, Section 11.3.1.2.

0658.38

The Gila monster's status as a Category 2 species has been corrected in the FEIS Volume I, Chapter 4, Table 4-17.

0658.39

The EIS (Volume I, Chapter 4, Section 4.7.4.1) has been revised to indicate that portions of the proposed SSC project, particularly area E7, are located within the habitat range of the desert tortoise.

0658.40

The DOE agrees that there are a number of reasons, including those noted by the commenter, that determine the number of protected species within a given area of a State. Volume I, Chapter 4, Section 4.7.4.2 has been revised including the addition of a sentence which reads: "These differences are primarily due to the content of individual State laws, as well as differences in numbers of rare species." However, since the intent of the section is to establish the expected existing condition, i.e., how many different state-protected species may be present, no change has been made to the text.

0658.41

Volume I, Chapter 4, Section 4.7.3.1, first paragraph, first sentence has been revised to read: "The Arizona site, as well as large expanses of the surrounding desert, support populations of two State-threatened species, the desert tortoise and the desert bighorn sheep."

The rest of the paragraph has been revised as suggested by the commenter. Statements referring to riparian woodlands have been changed to indicate the presence of less well-developed xeroriparian woodlands.

0658.42

The first sentence, second paragraph of Volume I, Chapter 4, Section 4.7.5.1 has been revised as suggested.

0658.43

The sentence has been revised to read: "... and the species occurs throughout the Sonoran region of the southwestern United States and Mexico."

0658.44

See Comment Response 428.38.

0658.45

See Comment Response 428.12.

0658.46

See Comment Response 428.12.

0658.47

See Comment Response 428.41.

0658.48

See Comment Response 428.42.

0658.49

See Comment Response 428.22.

0658.50

See Comment Response 428.44.

0658.51

Changed patterns of off-road vehicle use due to the SSC at the Arizona site are indicated in EIS Volume I, Chapter 4, Section 4.7.6. Assessment of the effects of such changes on wildlife depends upon final project design and design of access control policy and procedures; this impact would be addressed in a supplemental EIS.

0658.52

See Comment Response 428.46.

0658.53

See Comment Response 428.93.

0658.54

See Comment Response 658.39.

0658.55

Based on recent information provided by the BLM, Volume I, Chapter 5, Section 5.1.5.2.A has been revised to indicate that the closest known populations of Tumamoc globeberry occur in the Vekol Valley south of I-8 in the vicinity of the southern portion of the ring. Recent surveys conducted by the BLM, however, failed to find individual plants at any of the proposed surface facilities. If Arizona is the selected site, detailed field surveys of areas to be disturbed would be conducted to confirm the presence or absence of the species, if necessary, based on continuing consultation with the U.S. Fish and Wildlife Service under the Endangered Species Act.

0658.56

A statement has been added to EIS Volume I, Chapter 5, Section 5.1.5.2.A indicating that the night-blooming cereus is uncommon throughout its range.

0658.57

EIS Volume IV, Appendix 11, Section 11.3.1.4 and Volume I, Chapter 5, Section 5.1.5.4.A state that construction and operation of the SSC "may" not "will" cause an increase in reptile and cacti collection above the present level. Any possible increase in harvesting due to increased access to the area provided by the SSC may be balanced somewhat by institutional controls on access.

0658.58

See Comment Response 428.52.

0658.59

See Comment Response 428.53.

0658.60

See Comment Response 428.54.

0658.61

See Comment Response 428.55.

0658.62

See Comment Response 428.56.

0658.63

See Comment Response 428.05.

0658.64

See Comment Response 428.15.

0658.65

Popularity can be defined in a number of ways. One way to measure it would be to analyze visitor use in the subject area and compare it to visitor use for similar types of recreation opportunities in the general vicinity. Visitation data for the Butterfield Stage Memorial, Northern Maricopa Mountains, and Southern Maricopa Mountains WSAs are listed in Table 3-4 ("Existing and Projected Visitor Use"), p.66, Lower Gila South Final Wilderness Environmental Impact Statement; USDOI-BLM, Phoenix District Office, 1987. Motorized and non-motorized recreation use total 2,000, 1,500, and 300 visitor-days respectively for these three WSAs. Compared to the other WSAs evaluated in the EIS cited, the Butterfield Stage Memorial WSA ranked first in visitor use, with the Northern Maricopa WSA tied for second. These two WSAs accounted for 35 percent of the total use of all subject 12 WSAs. The Southern Maricopa Mountains WSA is one of the four least visited areas.

A further indication of popularity is that the Butterfield Stage Memorial and Northern Maricopa Mountains WSAs are considered by the BLM to be prime use areas for a local ORV organization, with vehicle ways into the Northern Maricopa Mountains showing signs of continuous use. (USDOI-BLM, 1976).

0658.66

See Comment Response 428.60.

0658.67

See Comment Response 428.61.

0658.68

See Comment Response 428.62.

0658.69

See Comment Response 428.124.

0658.70

See Comment Response 428.65.

0658.71

See Comment Response 428.63.

0658.72

Volume IV, Appendix 5, Figure 5.5.1-2 has been revised to conform to the standards of capitalization of the rules of stratigraphic nomenclature. The fault symbol has been removed, and the maximum thickness of Quaternary alluvium is corrected to 20 ft.

0658.73

EIS Volume IV, Appendix 5, Table 5.1.1-1 has been corrected to conform to the standards for capitalization of the rules of stratigraphic nomenclature. The age of the Tertiary units has been deleted to be consistent with similar tables for the other sites. The comments column has been clarified as suggested.

0658.74

The text of Volume IV, Appendix 5, Section 5.1.1.2 has been corrected in the Errata to Appendix 5.

0658.75

See Comment Response 428.66.

0658.76

See Comment Response 428.126.

0658.77

Geoengineering data have been included because they support discussions elsewhere in the EIS of the following:

- site-specific engineering adaptations (or the lack thereof) that are results of site geotechnical conditions
- excavation methods and dimensions, particularly with respect to cut-and-cover excavations, which would result in surface disturbance and could lead to secondary environmental impacts
- impacts to the project costs resulting from site-specific adaptations to underground conditions.

The additional specific comments regarding the EIS discussion of geo-engineering characteristics at the Arizona site are covered in Comment Responses 428.67, 658.78, 658.79, 658.81, 658.82, 658.83, and 658.84.

0658.78

The bullet list has been corrected in the Errata for Volume IV, Appendix 5.

0658.79

Section 5.1.1.4 and Table 5.1.1-3 of Volume IV, Appendix 5 have been revised to reflect available data on Recent alluvium (see Errata). Soft clays, unconsolidated sands, and collapse-susceptible soils do occur in similar environments to the site, thereby warranting mention in the EIS.

0658.80

See Comment Response 428.67.

0658.81

The paragraph has been revised in the Errata for Volume IV, Appendix 5.

0658.82

Outcrops of diorite and granite have been mapped in and adjacent to the booster/injector area; it would be incorrect to say they are not expected. Geo-engineering characteristics of granitic rocks are presented in Volume IV, Appendix 5, Table 5.1.1-4.

In addition, the words "or granite" have been added to Volume IV, Appendix 5 in the Errata so that the fourth sentence of the third paragraph on p. 11 reads "Minor quartz diorite or granite may be found at the booster/injector facilities area."

0658.83

The referenced section is discussing geotechnical properties and the reader is referred to the preceding two paragraphs and tables that describe these properties. The examples of intrusions, weathering, fractured and sheared zones in granitic rocks, and sedimentary interbeds in the volcanic rocks imply changes that are either discretely bounded or occur over very short distances, inches to feet.

0658.84

The fourth bullet has been deleted in the Errata for Volume IV, Appendix 5, Section 5.1.1.4, p. 14.

0658.85

See Comment Response 428.68.

0658.86

See Comment Response 428.69.

0658.87

See Comment Response 428.70.

0658.88

See Comment Response 428.71.

0658.89

See Comment Response 428.72.

0658.90

See Comment Response 428.73.

0658.91

See Comment Response 428.74.

0658.92

See Comment Response 428.75.

0658.93

See Comment Response 428.76.

0658.94

The map is correct. See Comment Response 428.77.

0658.95

See Comment Response 428.78.

0658.96

In Volume IV, Appendix 5, Section 5.1.9.1.A, third paragraph, item 2 has been deleted from the text, and the rest of the items have been renumbered accordingly. This change can be found in the Errata for Volume IV, Appendix 5.

0658.97

The description of the desert ecosystems present at the Arizona proposed site is adequate and has been verified through site visits and available literature (see EIS Volume IV, Appendix 5). After the final site is selected, the assessment of impacts at specific SSC facilities in the Supplemental EIS will be based on a more detailed evaluation of conditions at each location around the ring.

0658.98

The phrase has been deleted entirely, rather than revised, in the Errata for Volume IV, Appendix 5. The DOE does not agree with the suggested revision. Costs for reclamation of desert habitats in Arizona are extremely variable depending on whether irrigation is included.

0658.99

See Comment Response 658.34.

0658.100

The comment is consistent with the EIS text. See EIS Volume IV, Appendix 5, Section 5.1.9.2.

0658.101

The references for EIS Volume IV, Appendix 5, Section 5.1.9.2, are included in the Errata for Appendix 5. They include all citations used in the text.

0658.102

The text of EIS Volume IV, Appendix 5, Section 5.1.9.2.A.1, has been modified in the Errata section of Appendix 5 to indicate that at lower elevations the association (which includes mesquite and ironwood) is dominated by palo verde, shrubs, and cacti.

0658.103

The word "few" has been deleted from the text. The phrase "are dominated by" has been replaced by "included." These changes appear in the Errata for Volume IV, Appendix 5.

0658.104

At this time, prior to the selection of the actual site, the DOE believes the level of detail provided in the text is adequate. Should Arizona be selected for the SSC, more detailed descriptions of vegetation communities will be incorporated in the Supplemental EIS.

0658.105

Volume IV, Appendix 5, Section 5.1.9.2.B.3 has been corrected in the Errata for Volume IV, Appendix 5 to delete reference to the porcupine as a predator.

0658.106

All ecological references cited in Volume IV, Appendix 5 for Arizona have been included in the Errata for Volume IV, Appendix 5.

0658.107

The statements made by the Commenter concerning the Swainson's hawk are generally correct. However, some color phases of Swainson's hawk and red-tailed hawk are very similar, sometimes making field identification difficult. The two species are also taxonomically closely related. In addition, the adaptability of the red-tailed hawk, a known habitat generalist, allows it to exploit a wide range of nesting habitats, including relatively treeless grasslands.

0658.108

See Comment Response 658.106

0658.109

See Comment Response 1036.02.

0658.110

See Comment Response 658.36.

0658.111

See Comment Response 428.92.

0658.112

See Comment Response 428.93.

0658.113

See Comment Response 428.94.

0658.114

See Comment Response 428.12.

0658.115

See Comment Response 428.96.

0658.116

See Comment Response 428.97.

0658.117

See Comment Response 428.98.

0658.118

See Comment Response 428.99.

0658.119

The suggested wording change has been incorporated into the FEIS.

0658.120

See Comment Response 428.100.

0658.121

See Comment Response 428.127.

0658.122

The reference to "ill-defined channels" has been removed from Volume IV, Appendix 7.

0658.123

See Comment Response 428.101.

0658.124

This has been corrected in the Errata for Appendix 8 of the EIS.

0658.125

See Comment Response 428.15.

0658.126

See Comment Response 428.15 and 428.22. Air quality data were not used to develop the SSC emissions inventory. The data referred to in the comment were wind speed, silt content, etc.

0658.127

See Comment Response 428.105.

0658.128

See Comment Response 428.22. The table has been revised.

0658.129

A correction has been made in the EIS Volume IV, Appendix 10, Section 10.3.3.1.A.1: "The method of sewage treatment proposed by the State of Arizona is acceptable to the Arizona Department of Environmental Quality (ADEQ)."

As per the Invitation for State Proposals Attachment 1, a primary, secondary, and tertiary treatment plant would be provided at the main campus.

0658.130

The statement in question has been deleted from Volume IV, Appendix 11, Section 11.3.1.

0658.131

See Comment Response 658.55.

0658.132

See Comment Response 428.109.

0658.133

See Comment Response 428.78.

0658.134

Possible measures being considered to mitigate construction and operations impacts on the desert tortoise have been revised in EIS Volume IV, Appendix 11. If Arizona is chosen as the selected site more specific mitigation measure will be discussed in the Supplemental EIS.

0658.135

The second sentence of Volume IV, Appendix 11, Section 11.3.1.3 has bee changed to include the term "xeroriparian" in place of "riparian."

0658.136

EIS Volume IV, Appendix 11, Section 11.3.1.4 and Volume I, Section 5.1.5.4.A state that construction and operation of the SSC "may," not "will," cause a reptile and cacti collection above the present level. Any possible increase in harvesting due to increased access to the area provided by the SSC may be balanced somewhat by institutional controls on access.

0658.137

The spelling of saguaro has been corrected in Volume IV, Appendix 11, Section 11.3.1.4 of the EIS.

0658.138

See Comment Responses 655.03, 655.04, 655.05 and 655.06.

0658.139

See Comment Response 655.07.

0658.140

See Comment Response 428.116

0658.141

See Comment Response 428.117.

0658.142

See Comment Responses 428.116 and 428.118.

0658.143

See Comment Response 428.119.

0658.144

See Comment Response 428.120.

0658.145

See Comment Response 428.121.

0658.146

See Comment Response 428.121.

0658.147

See Comment Response 834.05.

0658.148

Comments noted.

0659.01

Comments noted.

0660.01

The ISP provided a description of various criteria which were evaluated in determining the risks of completing the SSC within the cost and schedule parameters stated. All sites have been analyzed on the basis of similar construction schedules. After the site is selected, and final design is completed, specific construction schedules will be determined by the authorized annual DOE construction budget for the SSC and final design criteria.

0661.01

The wetlands assessment presented in the EIS has been revised to include the most current information on wetlands location, type, and quality (see Volume I, Chapter 5, Section 5.1.5.4 and Volume IV, Appendix 11, Sections 11.2.2 and 11.3). A conservative estimate of the amount of wetlands that may be affected by construction and operations of the SSC at any site is approximately 190 acres. Once a site is selected and final design is approached, plans to mitigate wetlands impacts will be developed in consultation with the U.S. Army Corps of Engineers (or State-delegated authority) as required by Section 404 of the Clean Water Act. Most wetlands would be avoided by realignment of site facilities and/or environmentally sound location of surface structures.

The DOE agrees that the Arizona site meets all criteria in the ISP. The fact that the site was named to the BQL and is considered as an alternative in this EIS confirms this. See EIS Volume III for a discussion of the DOE's site solicitation and selection process.

0662.01

Comment noted.

0662.02

The socioeconomic analysis presented in the EIS makes an explicit distinction between "otherwise natural development" in the Arizona Region of Influence (Volume IV, Appendix 5a, Section 5.1.11), and impacts associated with the SSC (Volume IV, Appendix 14, Section 14.1.3). Impacts were assessed by evaluating project-related changes in light of anticipated development in the region without the SSC.

The term "benefit" is avoided in the socioeconomic portions of the EIS, as are other such terms which embody value judgments. However, the recent and continuing rapid population growth of the ROI is acknowledged. Recent population growth during the period 1970-1980 is discussed in Volume I, Chapter 4, Section 4.9. Population increases related to the SSC are discussed in Volume I, Chapter 5, Section 5.1.8.2. SSC-related increases in employment and earnings in the ROI, and increased revenues in the region are evaluated in terms of this growth.

0662.03

The information on new developments, including the planned new community near I-10, new hazardous waste facility, and existing utilities is generally consistent with EIS Volume IV, Appendix 5, Section 5.1.11.2 and Appendix 14, Sections 14.2.1.3.A and 14.2.2.3.A.

0662.04

The EIS does state that the SSC structures might be visually incongruous with the landscape of the Arizona site (see EIS Volume IV, Appendix 16, Section 16.1.3.

The proposed Arizona site is relatively pristine across most of the area to be enclosed by the ring, except for features noted in Volume IV, Appendix 5, Section 5.1.13.2.D. The most important scenic resources are those within the Wilderness Study Areas, especially the upper bajadas, slopes, and crests of the mountains. Of less importance are the lands to the east, including the site for the campus and injector areas. However, views of the eastern lands are appreciated from higher points in the southern Maricopas by a few recreationists.

Architectural treatment was suggested as a potential mitigation, in conjunction with a number of other measures, to reduce the visual impact of several of the outlying SSC structures along the northeast quadrant of the upper arc, the far cluster, and the lower arc. See Volume IV, Appendix 16, Section 16.3.1.3. However, the mass of buildings and infrastructure is such for the campus and injector facilities, that the aggregate of structures could not be concealed. Their obtrusiveness could be reduced by careful design, as suggested in the comment.

Regarding planned projects in the area of Mobile: applications for Special Use Permits for two oil refineries at Mobile have been approved by Maricopa County. One of the two applicants has requested an amendment to its permit, and that proposal is still pending. Applications for building permits have not been submitted by the proponents of either project and there are no assurances that either project will be built. Moreover, the sites for the refineries are 9.5 mi from the nearest sensitive viewing positions (the slopes and crests of the Southern Maricopa Mountains). The extensive facilities of the SSC would be only 4 mi away from those positions and would render the visual consequence of the comparatively distant refineries irrelevant.

The waste facility mentioned is the Butterfield Station Facility Landfill, planned to occur about 1 mi north of Mobile. The site is 11.8 mi from the viewing positions noted. Given its distance and the proximity of the site for the campus and injector, the waste facility would also be of comparatively little visual consequence to those hiking in the southern Maricopa Mountains.

0662.05

The observations regarding the location of the SSC project in three WSAs is consistent with the analyses presented in Volume IV, Appendix 5, Section 5.1.10.2. Other comments regarding the State's belief that the SSC project can act as a perimeter useful in protecting the area are noted; however if Arizona were the selected site, such an assertion would be analyzed as part of a Supplemental EIS.

0663.01

Comment noted.

0664.01

Air monitoring data from the States' proposal was only used if it could be verified through independent means. The data mentioned in the comment was only taken for a period of 2-1/2 months, not a full year, as the State ADEQ data.

After site selection, the most recent, representative data will be used for the air quality assessment in the Supplemental EIS. The carbon monoxide data from Sierra Estrella Sailport was incorporated into the EIS. See also Comment Response 428.22.

0664.02

See Comment Response 428.15. Carbon monoxide data from the Sierra Estrella Sailport have been included in the analysis.

0664.03

Comment noted. These data were not used in the EIS because they do not represent one year of sampling. The EPA has the discretion to accept shorter monitoring periods, but that approval had not been provided with these data. After site selection, the most recent representative data will be used for the air quality assessment in the Supplemental EIS.

0665.01

Comment noted.

0665.02

The text has been modified to incorporate the alternative of using Central Arizona Project (CAP) water as a source of water for industrial use during SSC operations (see EIS Volume I, Chapter 5, Section 5.1.2.4, and Volume IV, Appendix 7, Sections 7.1.3.1 and 7.2.3.1).

A generalized estimate of water-level drawdown impacts from project groundwater pumping in North Vekol Valley is presented in Volume I, Chapter 5, Section 5.1.2.4. A measurable water level decline in the vicinity of project supply wells, including windmill-driven stock tanks, is anticipated. The limited present groundwater use in the vicinity of the wells suggests a negligible impact to water use. The potential for a groundwater overdraft condition remains.

0665.03

The presentation of water use estimates for the SSC has been revised from those presented in the DEIS. The EIS reflects an estimated operational or long-term water requirement of 2,175 acre-ft/yr or an equivalent continuous pumping rate of 1,350 gal/min. The higher water use estimates included in a limited number of places in the DEIS (e.g., Volume I, Chapter 3, Table 3-8) were derived from the ISP and have been superseded. There is no planned acceleration of water use during operations.

Drawdown of the water table will occur as a result of groundwater withdrawals for the SSC construction and operations at the proposed Arizona site, estimated at several tens of feet locally (immediately adjacent to the wells) and a few feet over a larger region. Due to the depth to the water table and the nature of the aquifer geologic structure, no or only negligible subsidence is expected. See EIS Volume IV, Appendix 7, Section 7.2.3.1.

0665.04

Detailed evaluations of conservation practices and other detailed mitigation measures will be addressed in the Supplemental EIS. During detailed design, practices will be incorporated into final design.

0665.05

If the Arizona site should be selected detailed site data would be collected and alternative methods of waste disposal evaluated in order to avoid or minimize adverse impacts on groundwater quality. These evaluations would include detailed computations to quantitatively demonstrate the lack or magnitude of the expected percolation from all disposal sites and the resulting impact, if any, on groundwater quality.

See also EIS Volume IV, Appendix 7, Section 7.2.3.1.A.4.b.3.

0665.06

EIS Volume IV, Appendix 11, Section 11.3.1.2 indicates that, although impacts of construction and operation noises and human presence on the desert bighorn would be negative at first, limited research has shown that the bighorns may become acclimated in time. Because the desert bighorn is an important species that is also listed as threatened by the Arizona Game and Fish Commission, the DOE intends to issue a Supplemental EIS which will evaluate and incorporate appropriate mitigative measures to reduce adverse impacts to this and other species should Arizona be the selected site (see EIS Volume I, Chapter 3, Section 3.6).

0665.07

Mitigation of impacts to the desert tortoise have been revised in Volume I, Chapter 5, Section 5.1.5.1.B.1 and Volume IV, Appendix 11, Section 11.3.1.2, to include additional measures that could be effective for the tortoise population in the site vicinity. The DOE will conduct more detailed studies on the desert tortoise in the event the proposed Arizona site is selected. Mitigation measures suggested in the EIS would be evaluated during the SSC design phase and evaluated in the Supplemental EIS.

U.S. Fish & Wildlife Service and Bureau of Land Management consultation would continue.

0665.08

Volume I, Chapter 5, Section 5.1.5.1.B.1 has been revised to be in agreement with the comment.

0665.09

Volume I, Chapter 5 and Volume IV, Appendix 4, Section 5.1.5.1.B.1 has been revised to indicate that natural desertscaping and native plants would be used and, where possible, recovered topsoil would be reapplied to the surface.

0665.10

Because of its status as a candidate species, the night-blooming cereus would be evaluated under Section 7 (of the Endangered Species Act) consultation between the DOE and the USFWS. More thorough studies of all listed and candidate species would be conducted if the proposed Arizona site is selected for further investigation, and consultation would likely result in the adoption of appropriate mitigative measures. Moreover, the night-blooming cereus along with other cacti and selected native species are regulated under the Arizona Native Plant Law. These species may be removed under permit, but replanting and revegetation are desirable measures of protecting the species.

As indicated in EIS Volume IV, Appendix 11, Section 11.3.1.2, post-EIS surveys have located Tumamoc globeberry in the vicinity of the proposed Arizona site. In the event the site is selected, site-specific surveys would be conducted at all areas to be disturbed by construction activities. Results of these surveys would be reported in the Supplemental EIS.

0665.11

If the Arizona SSC site is selected, additional surveys could be needed of yet-to-be-defined ancillary and construction areas involving potential ground disturbance. Evaluations would be completed for all recorded archaeological and historic sites in order to identify cultural resources within the project area that are eligible for listing on the National Register. All cultural resource management procedures would be completed in accordance with a Memorandum of Agreement (MOA) between the DOE, the Arizona State Historic Preservation Officer (SHPO) and the Bureau of Land Management (see Volume IV, Appendix 15). Mitigation measures would be developed to appropriately mitigate impacts to significant cultural resources, and these will be discussed in detail in the Supplemental EIS.

0665.12

If the proposed Arizona site is selected, additional biological surveys would be conducted in all areas likely to be affected by construction and operations of the facility. The primary objective of these surveys would be to determine the presence of sensitive habitats and species and to evaluate potential impacts. The impact assessment, along with input resulting from consultations with State and Federal agencies, would then become part of planning and design in order to avoid or minimize adverse impacts. Mitigation of impacts to the desert tortoise and desert bighorn, as well as to other protected and sensitive species, would be a priority in project development.

The subject three Wilderness Study Areas are also described as a land use topic in EIS Volume IV, Appendix 5, Section 5.1.10.2. The discussion covers the regulatory status of the areas, their wilderness character, and recreational use.

See Comment Response 1516.40 for a discussion of land areas affected by project development. The data presented were assembled after those reported in the DEIS Volume I, Chapter 3, Table 3-7. This table has been corrected as part of the Errata to the Volume.

0666.01

See Comment Response 816.01.

0668.01

Comment noted.

0669.01

Water use and related impacts at the proposed Texas site are assessed in FEIS Volume IV, Appendix 7, Sections 7.1.3.7 and 7.2.3.7. The FEIS recognizes that an overdraft condition exists for the regional aquifers and that the combined on-site and off-site water use of the SSC and project-induced population growth would contribute measurably, but not significantly, to that overdraft, during both construction and operations. The FEIS also acknowledges plans by community water system for increased reliance on surface water sources. See also Comment Response 224.04.

0670.01

Comments noted. The 464 acres of prime and important farmland in EIS Volume I, Chapter 3, Table 3-7 of the DEIS is incorrect, as is the 2,000 acres listed as prime farmland in Chapter 4, Table 4-23. Both tables are corrected in Volume I of the FEIS; the estimate of 4,198 acres of important farmland has been incorporated into Volume I of the FEIS, and is noted in the errata for Volume IV, Appendices 5 and 13.

The Soil Conservation Service provided an estimate of zero prime and 4,198 acres of important farmland in the fee simple area of the proposed Colorado site. Of this inventory, it is estimated that 819 acres of important farmland would be permanently converted by SSC surface facilities should the Colorado site be selected. This new figure is also incorporated in Volume I of the FEIS and in the errata for Volume IV, Appendices 5 and 13.

The combination of prime and important farmland was useful for evaluation of the seven proposed sites. If appropriate, reanalysis of specific acreages would be done in a separate site-specific supplemental EIS should Colorado be the selected site.

See also Comment Response 565.01.

0671.01

Comments noted.

0672.01

Comments noted.

0672.02

Comments noted.

0672.03

Comments noted.

0672.04

Comment noted.

0673.01

The comments concerning public input into the preparation of the EIS are consistent with EIS Volume I, Chapter 1, Section 1.6.

Environmental and ecological impacts are addressed in EIS Volume I, Chapter 5.

The Denver Stapleton International Airport and the proposed new airport are addressed in Comment Response 1420.04.

Impacts to schools in the proposed Colorado SSC site area are addressed in EIS Volume IV, Appendix 14, Section 14.1.3.2.C.

0674.01

Comments noted.

0675.01

Comments noted.

0675.02

Wyoming is not within the Region of Influence for the proposed Colorado site. The cooperation between the States of Wyoming and Colorado is noted; however, no specific changes would result in the socioeconomic analyses.

0675.03

See Comment Response 816.01.

0679.01

The comment is consistent with the discussion in Volume I, Chapter 4, and Volume IV, Appendix 5.

See also Comment Response 1126.05.

0680.01

Comment noted.

0680.02

Comment noted.

0681.01

See Comment Response 686.01.

0681.02

The new two-lane highway is proposed by the State of Colorado to provide a direct road between Denver and the SSC and to minimize SSC-induced traffic on the existing roads. The State of Colorado would be responsible for planning and constructing the proposed highway should the Colorado site be selected.

0681.03

Sources of water supply proposed for the SSC in Colorado are described in detail in EIS Volume IV, Appendix 7, Sections 7.1.3.2 and 7.2.3.2. Water for the campus area will be provided by the Morgan County Quality Water District and will be derived from existing wells in their system (Hay Gulch well field and wells along South Platte River). Water for the remote service areas around the ring will be provided by purchase of existing groundwater rights (and perhaps wells). Consequently, no new groundwater withdrawals should occur within the sand hills area of the proposed site. The amount of water use estimated for the project is listed in Volume IV, Appendix 7, Section 7.1.3.

0681.04

See Comment Response 565.01. For information on prime farmlands on the impact of project roads on the proposed Colorado site, see EIS Volume I, Chapter 3, Section 3.4.2 and Chapter 5, Section 5.1.8.6, and Volume IV, Appendix 14.

0681.05

Comment noted.

0682.01

Due to their distance from the proposed Colorado SSC site, coupled with the probable westward orientation of socioeconomic impacts (toward metropolitan Denver), counties within the State of Wyoming were not included in the Colorado Region of Influence (see Volume IV, Appendix 14, Section 14.1.3.2).

The support of the State of Wyoming, as part of a broader regional setting for the SSC, is acknowledged.

0683.01

The comments on community support by principal opinion sectors of area communities have been noted and included in Volume IIA of this document. It should be noted that the research reported in the study referred to in the comment indicates that of those sampled (not a representative sample) there was overwhelming support of the economic development that would result from the SSC project. In addition, it should be noted that the research indicated that small town atmosphere, rural environment, and service and facilities were the primary reasons why leaders liked their place of residence. The research report also indicated that local impacts expected to occur included: "(1) an increased number of "rowdy" transients in the community (11 percent) who would strain the local resources of the law enforcement agencies (23 percent); (2) an increased demand on the community's social services (22 percent); and (3) an increase in traffic (34 percent), pollution, noise, danger to children near streets, and increased road maintenance costs."

The telephone survey conducted in 1987 of 306 randomly selected registered voters that indicated "seventy-four percent of those that had read or heard about the SSC favored the building of it in eastern Colorado" has been noted.

In reference to public attitudes to the SSC project in Colorado, there were several sources of information available. These included the following:

- Colorado proposal with the survey of community leaders and the telephone survey of Colorado voters
- DOE EIS Scoping Meetings
- Site visits including areas of special concern
- DOE public meetings on the DEIS

All of this information has been made available to the DOE decision-makers involved with site selection activities. The DOE is aware of the existence of a variety of opinions concerning the potential of siting the SSC at any of the alternative sites. All comments, both individual or made as organized, collective expressions, are fully assessed and become an official part of the NEPA-EIS process.

065107003318831

0683.02

The EIS states that although "boom" conditions may occur in local communities due to the SSC, problems associated with "bust" conditions probably would not occur (EIS Volume IV, Appendix 14, Section 14.1.3.2.E). It is quite possible that specific impacts will differ between communities, due both to varying effects of the SSC, and varying approaches to accommodating these effects.

Past experience in dealing with growth is important in coping effectively with future growth. However, the portions of the Colorado Region of Influence (ROI) anticipated to receive the most dramatic SSC-related impacts have not recently experienced growth of the magnitude or duration expected to accompany this project. This lack of similar experience includes the Pawnee Power Plant construction and operations, as discussed in the first paragraph of Comment Response 1515.213.

In general, the effects of rapid growth in the Colorado ROI and primary impact counties are not anticipated to be negative. Volume IV, Appendix 14, Section 14.1.3.2.E states this conclusion: "Adverse social impacts should be temporary, and conditions are likely to become improved in the long run over what they would be without the SSC."

0684.01

No approved facility currently exists in Colorado for the disposal of hazardous wastes. Colorado hazardous waste generators must ship their waste products to out-of-state disposal sites. Construction is about to begin on a hazardous water disposal facility about 7 mi west of Last Chance, Colorado, that will be approximately 5 mi from the southern radius of the SSC ring. It is claimed to be the first hazardous waste disposal facility in U.S. to complete the permitting process under RCRA regulations. Operation of this state-of-the-art facility is expected to begin in late 1989 (EIS Volume IV, Appendix 5, Section 5.2.8).

Hazardous waste generated by the SSC would be collected, treated, and stored in accordance with RCRA regulations. When sufficient quantities have accumulated, the material would be shipped to an approved (RCRA) disposal facility (EIS Volume IV, Appendix 10, Section 10.1.3.2). The choice of hazardous waste sites for the SSC would likely be made by a competitive bidding process. Thus, the nearest waste site may not necessarily be chosen for disposal of SSC waste products.

The various Federal permits, licenses, and other entitlements that may be required in implementing the SSC proposal in each state are discussed in the EIS Volume I, Chapter 6. A requirement of some of these permits would involve the monitoring of groundwater and surface water in the vicinity of the SSC.

0686.01

Zero prime and 819 acres of important farmland, as defined by the U.S. Soil Conservation Service would be permanently converted by the SSC project at the proposed Colorado site. Volume I, Chapter 3, Section 3.7.11 of the EIS states that while there are appreciable acreages of prime and important farmlands that would be converted, in none of the proposed states does this acreage represent more than one percent of the State inventory. This amount is small and well below the annual average of such lands taken out of production as a result of urban development.

0686.02

The new 60-mi east-west access road is part of the proposal made by the State of Colorado. Information regarding this project is included in a report prepared by the Colorado Department of Highways entitled "Environmental Overview for Proposed Access Roads, Superconducting Super Collider Project," dated February 29, 1988, and noted in Volume I, Chapter 4, Section 4.9.2 and Volume IV, Appendix 5a, Section 5.2.10 of the EIS.

0686.03

The comment is correct with respect to the acquisition of water for the Colorado SSC site. Tradeoffs would be involved in using the supply of available water for the SSC and associated population growth, instead of for other purposes, including agricultural. See discussions in the EIS Volume IV, Appendix 7, Sections 7.1.3.2 and 7.2.3.2.

0686.04

See Comment Response 736.02.

0686.05

Discussion of climatology for the Colorado site appears in the EIS Volume I, Chapter 4, Section 4.3 and in Volume IV, Appendix 5, Section 5.2.3. The Colorado site proposal indicated that snowstorms were responsible for three closures of I-70 during the last three winters. These closures averaged 10 hr. The site proposal also noted that only one work shift at Pawnee Generating Station was unable to arrive on time due to snowstorms. The DOE will prepare emergency plans for the SSC facility. Civil disasters are included in these plans, and notification, provisions for on-site emerging lodging, etc., may be made depending on specific site conditions.

0687.01

Comments noted.

0688.01

Comment noted.

0688.02

See Comment Response 597.01, second paragraph.

0688.03

See Comment Response 577.02.

0688.04

The conclusion presented in the EIS regarding the potential for compounding adverse SSC-related impacts due to cumulative effects of nearby projects (Volume IV Appendix 14, Section 14.1.3.8.B) would not change with a modified schedule for the Two Forks Water Project.

It is possible that if the Colorado site were chosen for the SSC, more workers than projected ultimately may choose to reside in the Denver area. SSC-related population impacts were allocated to different places in the Colorado Region of Influence based upon a model that generates the most likely distribution of workers. Given numerous characteristics of the region, including current populations of various places and travel times from these places to the proposed SSC site, the population distribution reported in the EIS is the most probable (Volume IV, Appendix 14, Table 14.1.3.2-6).

0688.05

See Comment Response 384.02.

0688.06

The comments were included in Volume IV, Appendix 3, Section 3.1 of the EIS. Also, see Comment Response 522.10.

0692.01

The city of Wiggins, CO is not considered individually in the EIS examination of impacts associated with housing, public services, quality of life (see Volume IV, Appendix 14, Section 14.1.3.2), or water (see Volume IV, Appendix 7, Section 7.1.3.2.G). The impacts on this particular community would be included in the EIS at a more aggregated level within Morgan County.

0693.01

Water level/overdraft effects related to SSC construction and operations at the proposed Colorado site are assessed in EIS Volume IV, Appendix 7, Section 7.2.3.2. Contrary to the comment, the EIS projects a negligible impact on local groundwater levels related to SSC construction water withdrawals. See also the discussion of projected impacts on air quality (in particular, emissions during construction) in Volume IV, Appendix 8, Section 8.4.2.

0694.01

Comments noted.

0695.01

Comments noted.

0696.01

Comment noted.

0697.01

The estimated annual cost of power for the operational phase of the SSC, which was used for the cost estimate in Volume IV, Appendix 2 was $45 million.

The power for the North Carolina site would be supplied by Duke Power Co. (Duke) and Carolina Power and Light Co. (CP&L) (Volume IV, Appendix 14) and would come from the existing electrical power distribution network which is supplied by a combination of nuclear, fossil fuel, and hydroelectric generating facilities. Duke and CP&L have ample current and projected reserve margins for the SSC.

0697.02

See Comment Response 697.01.

0697.03

The SSC would use 200 MW of power directly and approximately 25 MW of power for secondary load. If the North Carolina site is selected, the power is planned to come from a source jointly provided by Duke Power Company and Carolina Power and Light Company, as shown in EIS Volume IV, Appendix 14, Section 14.2.2.3.E.1.a. The cost of power was included in the cost estimates prepared for Volume IV, Appendix 2.

Electrical load impacts to Duke Power Company and Carolina Power and Light due to SSC-induced secondary population growth are addressed in EIS Volume IV, Appendix 14, Section 14.2.2.3.E.1.b. Secondary cost impacts to existing utility customer are discussed in general terms in EIS Volume IV, Appendix 14, Section 14.2.2.2.c.

Once a utility has made the investment in a nuclear power plant, it usually operates the plant at full capacity whenever possible. Therefore the SSC load is not expected to impact the amount of power generated by nuclear power plants or the amount of radioactive wastes produced.

See Comment Response 1548.78 concerning secondary environmental impacts resulting from the generation of SSC power by conventional power plants.

0697.04

In the event that either the SSC is not built on the property provided to DOE by the State or the scope of the project is so reduced that a portion of the site is not required, the property donated by State, or any appropriate portion thereof, would revert to the State provided, that permanent improvements have not been constructed by the United States.

The comments concerning DOE budget matters are considered to be outside the scope of this EIS.

0697.05

The No Action Alternative was discussed in Volume I, Chapter 3, Section 3.3. It states: "The impacts of implementing the no action alternatives at any of the site alternatives represent a continuation of the current conditions and trends." By definition, this means that no land, homes, communities or natural resources would be disturbed for the SSC; no funds would be spent for construction or operation; and no water would be used for construction or operation.

0697.06

See Comment Response 0013.02. The Carolina Power and Light Roxboro (coal-fired) and Harris (nuclear) power plants are located within approximately 50 mi of the proposed North Carolina site as discussed in EIS Volume IV, Appendix 5, Section 5.5.11.2.B.1.d.

0697.07

The costs for water and power used over the operating life of the SSC facility are covered in Volume IV, Appendix 2, Section 2.2.2.3, and 2.4.

The water costs are based upon an estimated "consumption" of 345 acre-ft during the construction and preoperations phase of the project and an estimated annual consumption of 1,775 acre-ft during the operations phase.

The electrical costs are based upon an estimated average power utilization that ranges from 1 MW to 36 MW annually during the construction and preoperations phase, and a maximum average demand of 116 MW annually during the operations phase.

0697.08

Site-specific project cost estimates include site and infrastructure adjustments, including costs for waste disposal, sewage treatment, and new and upgraded roads (EIS Volume IV, Appendix 2).

An on-site landfill is assumed in EIS Volume IV, Appendix 10, Section 10.3.3.2.E.

0697.09

The effects from an accidental spill of liquid helium and/or liquid nitrogen are discussed in the EIS Volume IV, Appendix 12, Section 12.4.2. Radioactive waste disposal is addressed the DEIS Volume IV, Appendix 10, Section 10.1.3.1, parts D-3, D-4 and E.

0698.01

Comments noted.

0698.02

The extent to which local infrastructure was considered in selecting the BQL sites is addressed in Comment Response 816.01.

The observations regarding impacts to the quality of education which would result if the SSC were sited in North Carolina are noted. The socioeconomic impact of the SSC on local public services, including education, was assessed in EIS Volume I, Chapter 5, Section 5.1.8, and Volume IV, Appendix 14, Section 14.1.3.5.

The DOE agrees that Fermilab has had an excellent compliance record with environmental regulations. Regarding potential radiological impacts from the SSC, see Comment Response 996.01.

Regarding disposal of low-level radioactive waste, see Comment Response 524.04.

Regarding relocation of property owners, see Comment Response 880.04.

0698.03

Comments noted.

0698.04

The observations are consistent with the data used to prepare the EIS (see EIS Appendix 5, Section 5.5.1).

0698.05

Land use analyses and impact assessments are provided in Volume IV, Appendix 5c, Sections 5.5.10.1 and 5.5.10.2 and in Volume IV, Appendix 13, Sections 13.1.3.5. and 13.1.4.E. Table 13-5 presents an assessment of land use/zoning changes by SSC project facility type. As expected, some project facilities are associated with greater land use impacts than others.

Noise impacts during construction at the North Carolina site are discussed at the summary level in Volume I, Chapter 5, Section 5.1.4 and in Volume IV, Appendix 9. Analysis presented in Chapter 5 indicates that 136 people currently live in areas which will have (during the 24 h/d activities supporting the tunnel boring machine at E and F sites) a day-night average sound level of between 70 and 75 dBA, and 705 people currently live in areas which will have a day-night average sound level of between 60 and 70 dBA. Regional vibration sources are discussed in Volume IV, Appendix 5, Section 5.5.5. Data presented by the North Carolina site proposer organization do not indicate deflections in excess of the criteria delineated in the Invitation for Site Proposals.

Relocation requirements cited are consistent with what has been presented in Volume IV, Appendix 4, Section 4.4. Comments on land acquisition strategies and commitments have been noted.

0698.06

Should North Carolina be selected as the site for the SSC, detailed studies intended to aid in minimizing impacts to wildlife will take place and will be described in the Supplemental EIS.

The comment states that no significant archaeological or paleontological sites, and no Native American sacred sites would be affected and only one historic building is located within the proposed project area. However, field studies have not been undertaken to thoroughly identify cultural and paleontological sites.

See Comment Response 570.01.

0698.07

These comments are consistent, in general, with the information presented in Appendix 7.

0698.08

Comment noted.

0698.09

Comment noted.

0699.01

The SSC will have some adverse impacts on wildlife wherever it is located. However, the impacts may not be as great as suggested in the comment. Only a small percentage of the surface area will actually be developed. Beyond the impacts of construction, a site-specific mitigation plan in a supplemental EIS would be developed following final design of the SSC to enhance wildlife and native plant populations in many areas.

0699.02

It is important to note that most of the SSC facility will be underground. The actual area of permanent surface loss will be a small percentage of the total area disturbed. In North Carolina a total of 1,914 acres would be disturbed during project construction, and approximately 1,107 acres of this area would be permanently occupied by buildings and support facilities (Volume I, Chapter 3, Table 3-2). Human activities would be restricted to specific locations on the premises so that encroachment impacts would not be severe. Impacts to wildlife are addressed in Volume I, Chapter 5, Section 5.1.5, and in greater detail in Volume IV, Appendix 11, Section 11.3.5.

0699.03

Mitigative measures would be taken if required to prevent damage to species such as the Roanoke bass. For example, construction of sediment retention structures and replacement of ground cover would reduce runoff, erosion, and sedimentation in nearby streams and would help to preserve habitats for sensitive species (see EIS Volume I, Chapter 3, Section 3.6.4).

0699.04

The proposal from the State of North Carolina contains two alternatives for spoils disposal: disposal at 17 sites around the ring or sale/donation of spoils to local producers of aggregate. If the second alternative or a combination of both were used, the amount of spoils at spoils sites could be reduced. It is true that new spoils areas may not be attractive to wildlife; under proper conditions, however, spoils sites can be revegetated and become available habitat to wildlife, even though wildlife may be different from the original wildlife mix. Detailed plans for potential mitigation must await final siting of facilities and will be reviewed in the site-specific Supplemental EIS for the selected site. The DOE would coordinate mitigative measures planning with the selected State's environmental agencies.

0699.05

It is acknowledged that there will be an influx of population into the area if North Carolina were selected as the SSC site.

It is also true that new housing could result in loss of habitat for wildlife and that some of the population moving into the area would be hunters.

0700.01

Please refer to Comment Response 729.02. A detailed discussion of public finances in Durham County is found in Volume IV, Appendix 14, Section 14.1.3.5.D. Additionally, Table 14.1.3.5-11 in Volume IV, Appendix 14, Section 14.1.3.5.C summarizes the potential impacts of SSC development on public services, including public education, in Durham County. Projected enrollment increases attributable to the SSC amount to 906 students in 1992 and 968 students in 2000.

0700.02

The additional number of students, and consequently teachers, due to SSC-related growth shown in EIS Volume I, Chapter 3, Table 3-7 refers to the impact in the entire 20-county North Carolina Region of Influence (ROI). Within the three-county primary impact area, 1,159 additional students are projected, which will require 64 additional teachers. Estimates of the SSC-related fiscal impact to local jurisdictions in each of the North Carolina primary impact counties are presented in Volume IV, Appendix 14, Section 14.1.3.5.D; these figures include impacts to school districts. Net fiscal impacts in the primary impact counties are projected to be negative during the first few years of construction, and positive thereafter.

The $4.6 million referred to in the comment is the estimate of the greatest annual cumulative capital expenditure by local jurisdictions in Durham County during the life of the SSC -- occurring in 1991 (Volume IV, Appendix 14, Table 14.1.3.5-15). This expenditure includes some of the costs associated with school capital infrastructure needs in the county. Further capital expenditures would be made in other years to provide additional infrastructure to accommodate in-migrants to the county.

0700.03

Current student/teacher ratios, as well as SSC-related impacts to public services (including public education), are examined for the North Carolina Region of Influence (ROI) and for individual primary impact counties (Durham, Granville, and Person Counties) within the ROI (see Volume IV, Appendix 5, Section 5.5.11.1.C, and Volume IV, Appendix 14, Section 14.1.3.5.C, respectively). The examination of issues related to education incorporates the most recently published data from the North Carolina Board of Education (1987), which presented public school enrollments and personnel for the 1986-87 school year. The EIS states that if Durham and Person County school enrollments were to increase due to SSC development, local public school districts would likely have to respond by adding instructional and support staff and, in some cases, by expanding facilities to maintain current service levels and to meet the increased demand.

0700.04

The comment concurs with the EIS in that expansion of public school facilities and employment in North Carolina would likely be needed to meet the increased demand associated with SSC development (Volume IV, Appendix 14, Section 14.1.3.5.C). Although a long lead time often is necessary to enable expansion of facilities to keep up with growth, increases in instructional employment responding to SSC-related enrollment increases could be used to maintain current levels of educational service until additional infrastructure is in place.