CHAPTER 5

MITIGATION MEASURES

5.0 MITIGATION MEASURES

This chapter summarizes the anticipated impacts followed by proposed mitigation measures that would be in place to reduce adverse impacts that could occur during construction, routine, and non-routine operation of the CISF.

5.1 Impact Summary

This section summarizes the environmental impacts that may result from the construction and operation of the CISF. Complete details of these potential impacts are provided in Chapter 4 of this ER.

5.1.1 Land Use

Land use impacts have been characterized in ER Section 4.1, Land Use Impacts. No substantial impacts would occur with regard to the following:

- Land-use impacts at the CISF, and impacts from any related federal action that may have cumulatively significant impacts
- Area and location of land that would be disturbed on either a long-term or short-term basis

Minor impacts related to erosion control on the CISF may occur, but would be short-term and limited. These potential impacts are discussed in ER Section 4.4, Water Resources Impacts.

5.1.2 Transportation

Transportation impacts have been characterized in ER Section 4.2, Transportation Impacts. With respect to construction-related transportation, no substantial impacts would occur. The analysis incorporated the following considerations:

- No new access road would be required on Texas State Highway 176 to provide access to the facility. An existing roadway on the WCS property would be extended north to the CISF.
- The transportation route and mode for conveying construction material to the facility currently exists.

- The increase in traffic from heavy haul vehicles and construction worker commuting would not substantially change traffic patterns.
- Impacts from construction transportation such as fugitive dust, scenic quality, and noise would be temporary.

Minor impacts related to construction traffic such as fugitive dust, noise, and emissions are discussed in ER Section 4.7. Additional information on noise impacts is contained in ER Section 3.7.

With respect to the transport of radioactive materials, no substantial impacts would occur. The analysis incorporated the following factors:

- Mode of transportation (truck, rail, or barge) and routes from the originating site to the CISF
- Estimated transportation distance from the originating site to the CISF
- Treatment and packaging procedures for radioactive wastes
- Radiological dose equivalents for public and workers from incident-free scenarios
- Potential impacts of operating transportation vehicles on the environment (e.g., fire from equipment sparking)

Impacts related to the transport of radioactive materials are addressed in ER Section 3.2. The materials that would be transported to and from the CISF are well within the scope of the environmental impacts previously evaluated by the NRC in its GEIS for continued storage of spent nuclear fuel, NUREG-2157 (NRC, 2014a). Because these impacts have been addressed in a previous NRC EIS, no additional mitigation measures are proposed.

5.1.3 Geology and Soils

The potential impacts to the geology and soils have been characterized in ER Section 4.3, Geology and Soils Impacts. No substantial impacts would occur from the following activities:

- Soil re-suspension, erosion, and disruption of natural drainage
- Excavations to be conducted during construction

Impacts to geology and soils would be limited to surface runoff due to routine operation and low annual rainfall. Construction activities may cause some short-term increases in soil erosion at the CISF.

5.1.4 Water Resources

The potential impacts to water resources have been characterized in ER Section 4.4, Water Resources Impacts. No substantial impacts are anticipated to the following:

- Surface water and groundwater quality
- Consumptive water uses (e.g., groundwater depletion) on other water users and adverse impacts on surface-oriented water users resulting from facility activities. Site groundwater would not be utilized for any reason, and therefore, should not be impacted by routine CISF operations. The CISF water supply would be obtained from the same local publicly owned water system sources as the existing operations.
- Hydrological system alterations or impacts
- Withdrawals and returns of ground and surface water
- Cumulative effects on water resources.

The CISF would not obtain any water from onsite surface or groundwater resources. Sanitary wastewater discharges would be made through sewerage to holding tanks and subsequently transported offsite to publicly owned treatment works. Storm water is not expected to contain any radiological effluents, and with a low annual rainfall, storm water runoff would be directed to natural drainage areas.

5.1.5 Ecological Resources

The potential impacts to ecological resources have been characterized in ER Section 4.5, Ecological Resources Impacts. No substantial impacts are anticipated from the following factors:

- Total area of land to be disturbed
- Area of disturbance for each habitat type
- Use of chemical herbicides, roadway maintenance, and mechanical clearing
- Areas to be used on a short-term basis during construction
- Communities or habitats that have been defined as rare or unique or that support threatened and endangered species

- Impacts of elevated construction equipment or structures on species (e.g., bird collisions, nesting areas)
- Impact on important biota

Based on database searches and site inventories conducted by qualified ecologists, impacts to ecological resources would be minimal due to the absence of habitat for threatened and endangered species on the land proposed for the CISF.

5.1.6 Air Quality

The potential impacts to the air quality have been characterized in ER Section 4.6, Air Quality Impacts. No substantial impacts from gaseous effluents would occur and visibility would not be impacted.

Impacts to air quality would be minimal. Construction and operational activities would result in interim increases in hydrocarbons and particulate matter due to vehicle emissions and dust. During construction activities, best practices would be employed to reduce and control dust emissions.

5.1.7 Noise

The potential impacts related to noise generated by the facility have been characterized in ER Section 4.7, Noise Impacts. No substantial impacts to sensitive receptors (e.g., hospitals, schools, residences, wildlife) from predicted typical noise levels at the facility perimeter are anticipated.

Noise levels would increase during construction and during operation of the CISF, but not to a level that would cause significant impact to nearby residents. The nearest residence is 6 km (3.8 mi) from the CISF.

5.1.8 Historic and Cultural Resources

The potential impacts to historic and cultural resources have been characterized in ER Section 4.8, Historic and Cultural Resource Impacts. The archeological APE consists of the 216.6-acre footprint of the proposed CISF. No archeological materials of any kind were observed within the APE during a survey conducted in May 2015, and no further work is recommended within the APE prior to construction of the proposed CISF. Since the area containing the proposed project footprint is devoid of any standing structures, the proposed project would not result in a direct impact to any non-archeological historic resources. The APE for indirect/visual impacts was defined as the area within a 1.6 km (1 mi) radius from the proposed project footprint. There do not appear to be any historic resources 45 years or older (dating to 1974 or earlier) within the 1.6 km (1 mi) indirect effects APE. The THC as well as the New Mexico Department of Cultural Affairs concurred that further cultural resource investigations are not warranted prior to construction.

5.1.9 Visual/Scenic Resources

The potential impacts to visual/scenic resources have been characterized in ER Section 4.9, Visual/Scenic Resources Impacts. The proposed CISF construction would be visible only from fairly close vantage points and would be less of an impact than the adjacent URENCO NEF, which lies between the denser population of viewers in Eunice, NM and the proposed CISF, where the largest component would be the cask handling building.

The SIA characterizes the proposed CISF location as having a modest scenic quality that is pleasant to regard for its rural, undeveloped nature, but not dramatic, unique, or rare (Cox McLain Environmental Consulting, 2015). Facilities geared towards resources extraction, the Lea County Landfill, and oil well pump jacks exist in the project area, in addition to the URENCO facility, which have an equal or higher impact on the visual landscape compared to the proposed new CISF activities at the WCS facility.

5.1.10 Socioeconomics

The potential socioeconomic impacts to the community have been characterized in ER Section 4.10, Socioeconomic Impacts and in Appendix A, *Socioeconomic Impacts of the Proposed Spent Nuclear Fuel Consolidated Interim Storage Facility Andrews, Texas*. No substantial negative impacts are anticipated on the area's:

- Population characteristics (e.g., ethnic groups and population density)
- Housing, health and social services, or educational and transportation resources
- Tax structure and distribution

The conclusions of the SIA showed positive direct, indirect, and final demand impacts to the economy for the construction and operation of the CISF. There would be no adverse direct impacts to the nearby communities. There would be minimal demands on local social resources and infrastructure to meet housing and other social infrastructure needs, based on the anticipated increases in employment for the CISF.

5.1.11 Environmental Justice

The potential impacts with respect to environmental justice have been characterized in the Environmental Justice section of the ER, Section 4.11. No substantial disproportionate impacts to low-income or minority persons are anticipated to result from the proposed project.

Based on the data analyzed and the NUREG-1748 guidance applicable to that analysis, WCS determined that no further evaluation of potential environmental justice concerns was necessary, as no Census Block Group within the 6.4 km (4 mi) radius, i.e., 128 km^2 (50 mi^2), of the CISF site contained a minority or low-income population exceeding the NUREG-1748 "20%" or "50%" criteria.

5.1.12 Public and Occupational Health

This section describes public and occupational health impacts from both nonradiological and radiological sources.

5.1.12.1 Nonradiological-Normal Operations

The potential impacts to public and occupational health for nonradiological sources have been characterized in ER Section 4.12.1, Nonradiological Impacts. No substantial impacts will exist to:

- Members of the public from nonradiological discharge of liquid or gaseous effluents to water or air
- Facility workers as a result of occupational exposure to nonradiological chemicals, effluents, or wastes
- Public and occupational health from cumulative impacts

Impacts to the public and workers from nonradiological gaseous and liquid effluents would be minimal.

5.1.12.2 Radiological-Normal Operations

This subsection describes public and occupational health impacts from radiological sources. It provides a brief description of the methods used to assess the pathways for exposure and a summary of the potential impacts described in section 4.12.2 of the ER.

5.1.12.2.1 Pathway Assessment

The potential for exposure to radiological sources included an assessment of pathways that could convey radioactive material to members of the public. Important ingestion pathways such as stored and fresh vegetables, milk, and meat, which were assumed to be grown or raised at the nearest resident location, were analyzed.

In addition, potential points or areas were characterized to identify the:

- Nearest CISF boundary
- Nearest full time resident
- Location of the average member of the critical group

There are no anticipated offsite releases to any surface waters or POTW.

5.1.12.2.2 Public and Occupational Exposure

The potential impacts to public and occupational health for radiological sources have been characterized in ER Section 4.12, Public and Occupational Health Impacts. No substantial impacts exist for the public (as determined by the critical group) or the workforce (based on radiological and chemical exposures) based on the average annual concentration of radioactive and hazardous materials in gaseous and liquid effluents and on reasonably foreseeable (i.e., credible) accidents with the potential to result in environmental releases.

Routine operations at the CISF would create only an incremental increase in the potential for radiological and nonradiological public and occupational exposure. Potential radiation exposure would be due to the storage of spent nuclear fuel and the presence of associated fission products onsite. There would be no chemical substances, airborne particulates, or gases or liquid effluents that could contribute to offsite exposure.

5.1.12.3 Accidental Releases

All credible accident sequences were considered during the Safety Analysis performed for the facility, this information can be found in Section 1.4.3, *Accident Analysis*, of the SAR.

5.1.13 Waste Management

The potential impacts of waste generation and waste management have been characterized in ER Section 4.13, Waste Management Impacts. No substantial impacts would occur to:

- The public, due to the composition and disposal of solid, hazardous, radioactive and mixed wastes
- Facility workers, due to storage, processing, handling, and disposal of solid, hazardous, radioactive, and mixed wastes

Additionally, there would be no substantial cumulative impacts from waste generation and waste management.

Impacts related to waste management would be minimal.

5.2 MITIGATION

This section summarizes the mitigation measures to minimize any anticipated impacts that may result from the construction and operation of the CISF.

5.2.1 Land Use

The anticipated effects on the soil during construction activities would be limited to a potential short-term increase in soil erosion. However, the following proper construction BMPs would mitigate any impacts:

- Minimizing the construction footprint to the extent possible
- Limiting site slopes to a horizontal-vertical ratio of three to one or less
- Protecting undisturbed areas with silt fencing and straw bales as appropriate
- Using site stabilization practices, such as placing crushed stone on top of disturbed soil in areas of concentrated runoff, to reduce the potential for erosion and sedimentation

After construction is complete, the CISF would be stabilized with natural and low-water maintenance landscaping.

5.2.2 Transportation

Mitigation measures would be in place to minimize potential impacts of construction-related transportation activities. To control fugitive dust production, all reasonable precautions would be taken to prevent particulate matter from becoming airborne, including the following actions:

- Using water (controlled to minimize use) in clearing and grading operations and construction activities to control dust on dirt roads.
- Using adequate containment methods during excavation and/or other similar operations.

- Covering open-bodied trucks transporting materials that are likely to give rise to airborne dust when in motion.
- Promptly removing earthen or other materials from paved roads when such material has been deposited on the paved roads by trucking or earth moving equipment, water or wind erosion, or other means.
- Promptly stabilizing or covering bare areas once earth-moving activities are complete.
- Operating construction equipment and related vehicles with standard pollution control devices in good working order.
- Washing construction trucks with water (controlled to minimize use) only when required.
- Designating personnel to monitor dust emissions and to direct increased surface watering where necessary.
- Scheduling short-duration activities that may impact traffic (e.g., concrete trucks, multiple deliveries) to minimize traffic impacts, if such activities are required during the course of construction.
- Scheduling work shifts throughout the construction period to minimize impacts to traffic in the CISF vicinity.
- Encouraging car-pooling throughout the construction period to minimize impacts to traffic in the CISF vicinity.

5.2.3 Geology and Soils

Mitigation measures would be in place to minimize any potential impact on geology and soils. These include:

- Mitigating erosional impacts due to site clearing and grading with construction and erosion control BMPs (some of which are further described below).
- Using acceptable methods to stabilize disturbed soils during construction.
- Using earthen berms, dikes, and sediment fences as necessary during all phases of construction to limit suspended solids in runoff.
- Stabilizing cleared areas not covered by structures or pavement by acceptable means as soon as practical.
- Watering (controlled to minimize use) to control fugitive construction dust.

- Using standard drilling and blasting techniques, if required, to minimize impacts to bedrock, thereby reducing the potential for over-excavation, minimizing damage to the surrounding rock, and protecting adjacent surfaces that are intended to remain intact.
- Stabilizing drainage culverts and ditches by lining them with rock aggregate/rip-rap or creating berms with silt fencing/straw bales to reduce flow velocity and prohibit scouring.
- Stockpiling soil generated during construction in a manner that reduces erosion.
- Reusing excavated materials whenever possible.

5.2.4 Water Resources

Mitigation measures would be in place to minimize potential impact on water resources. As discussed in ER Section 4.4, Water Resources Impacts, there is little potential to impact any groundwater or surface water resources. Nonetheless, the following controls would be implemented:

- Maintenance of construction equipment in good repair without visible leaks of oil, greases, or hydraulic fluids.
- Use of BMPs to ensure that storm water runoff related to these activities would not be released into nearby areas.
- Use of BMPs for dust control associated with excavation and fill operations during construction.
- Use of silt fencing and/or sediment traps.
- Control of impacts to water quality during construction through compliance with the TPDES - Construction General Permit requirements and by applying BMPs as detailed in the CISF SWPPP.
- Berming all above ground diesel storage tanks.
- Handling sanitary wastes generated during CISF construction with portable systems until such time that plant sanitary facilities are available for site use. An adequate number of these portables systems would be provided.
- Requiring control of surface water runoff for activities covered by the TPDES Construction General Permit.

As a result of implementing these controls, no impacts are expected to surface or groundwater bodies.

The CISF is designed to minimize the usage of natural resources as shown by the following measures:

- Use of low-water consumption landscaping versus conventional landscaping to reduce water usage.
- Installation of low flow toilets, sinks, and showers to reduce water usage when compared to standard flow fixtures.
- Use of mops and self-contained cleaning machines for localized floor washing to reduce water usage, as compared to conventional washing with a hose twice per week.

5.2.5 Ecological Resources

Mitigation measures would be in place to minimize any potential impacts on ecological resources. CISF construction features include:

- Minimizing the construction footprint to the extent possible
- Using BMPs and site stabilization practices to reduce the potential for erosion and sedimentation.

Proposed wildlife management procedures to minimize impacts would include:

- Managing unused open areas, including areas of native grasses and shrubs, for the benefit of wildlife (i.e. leave undisturbed).
- Using native plant and grass species (i.e., low-water consuming plants and grasses) to re-vegetate disturbed areas to enhance wildlife habitat.
- Using animal-friendly fencing around the CISF so that wildlife cannot be injured or entangled in the CISF security fence.

In addition to the proposed wildlife management practices above, WCS would consider all recommendations of appropriate state and federal agencies, including the United States Fish and Wildlife Service and the Texas Parks and Wildlife Department.

5.2.6 Air Quality

Mitigation measures would be in place to minimize any potential impact on air quality. Specifically, construction phase BMPs would be used to minimize fugitive dusts.

Air concentrations of the Criteria Pollutants for vehicle emissions and fugitive dust would be below the NAAQS (CFR, 2003w) and thus would not require further mitigation measures.

5.2.7 Noise

Minimization of operational noise sources would be needed primarily during CISF construction and operations. Natural land contours, vegetation (such as scrub brush), and CISF buildings and structures would reduce the impact of equipment located outside of structures that could contribute to CISF noise levels. The buildings themselves would absorb the majority of the noise located within.

Noise from construction activities would have the highest sound levels, but the nearest home is located 6 km (3.8 mi) from the CISF. Due to the distance between the residence and the CISF, it is not expected that residents would perceive an increase in noise levels. All noise suppression systems on construction vehicles would be kept in proper operation.

5.2.8 Historical and Cultural Resources

To minimize any potential impact on historical and cultural resources, accidental discovery procedures would be in place. In the event that any inadvertent discovery of human remains or other item of archeological significance is made during construction, the facility would immediately cease construction activities in the area around the discovery and notify the THC (the SHPO), to make the determination of appropriate measures to identify, evaluate, and treat these discoveries.

5.2.9 Visual/Scenic Resources

Measures would be in place to minimize any potential impacts to visual and scenic resources. These include the following items:

- Use of accepted natural, low-water consumption landscaping techniques to limit any potential visual impacts. These techniques would incorporate, but not be limited to, the use of landscape plantings. As for aesthetically pleasing screening measures, planned landscape plantings would include indigenous vegetation.
- Prompt natural re-vegetation or covering of bare areas would be used to mitigate visual impacts due to construction activities.
- Minimization of any removal of natural barriers, screens or buffers.

5.2.10 Socioeconomics

Socioeconomic impacts from the project would largely be positive, and no displacements would be required by the proposed project. Therefore, no socioeconomic mitigation measures are required.

5.2.11 Environmental Justice

Given the lack of environmental justice impacts, no environmental justice mitigation measures are required. However, public involvement activities conducted for the CISF licensing would include wide outreach efforts to ensure full and fair participation by low-income and/or minority communities in the study area.

5.2.12 Public and Occupational Health

This section describes the avoidance, minimization, and mitigation measures to minimize public and occupational health impacts, from both nonradiological and radiological sources.

5.2.12.1 Non-Radiological – Normal Operations

Impacts to the public and workers from nonradiological gaseous and liquid effluents would be minimal. No specific mitigation measures for nonradiological impacts during normal operations are anticipated.

5.2.12.2 Radiological – Normal Operations

Mitigation measures to minimize radiological exposure and release are listed below. Radiological practices and procedures are in place to ensure compliance with WCS's Radiation Protection Program. This program is designed to achieve and maintain radiological exposure to levels that are ALARA. These measures include:

- Conducting routine facility radiation surveys to characterize potential radiological exposure.
- Monitoring of all radiation workers via the use of dosimeters to ensure that radiological doses remain within regulatory limits and are ALARA.
- Providing radiation dosimeters at the fence line boundary to measure potential exposure to any member of the general public.

5.2.12.3 Accident Releases

Mitigation measures would be in place to minimize any impact from a potential accidental release of radiological and/or nonradiological effluents. These measures include:

- An onsite and offsite emergency plan spelling out the immediate actions to take to mitigate the impact of any accidental release.
- Actions to contain sources of radiological or nonradiological effluents in such a manner as to mitigate the impact from an accidental release.

5.2.13 Waste Management

Mitigation measures would be in place to minimize the generation and potential impact of facility wastes. Solid and liquid wastes would be controlled in accordance with regulatory limits. Mitigation measures include:

- Prohibition against onsite disposal of waste at the CISF.
- Storage of waste in designated areas of the facility until an administrative limit is reached. When the administrative limit is reached, the waste would then be shipped offsite to the appropriate, adjacent, licensed LLRW treatment, storage and/or disposal facility.
- Disposal of all industrial and municipal wastes at offsite waste disposal facilities.
- Collection of different waste types in separate containers to minimize contamination of one waste type with another.
- Storage of hazardous wastes in designated areas in carefully labeled containers.
- Decontamination and/or re-use of radioactively contaminated wastes to reduce waste volume.
- Implementation of administrative procedures and practices that provide for the collection, temporary storage, processing, and disposal of categorized solid waste in accordance with regulatory requirements.
- Implementation of handling and treatment processes designed to limit wastes and effluents. Conduct sampling and monitoring to assure facility administrative and regulatory limits are not exceeded.
- Sampling and/or monitoring of solid wastes prior to offsite treatment and disposal.
- Recycling of construction debris to the extent possible.

CHAPTER 6

ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

6.0 RADIOLOGICAL MONITORING

6.1 REGULATORY BASIS FOR RADIOLOGICAL MONITORING

The NRC requires, pursuant to 10 CFR 20, that licensees conduct surveys necessary to demonstrate compliance with these regulations and to demonstrate that the amount of radioactive material present in effluent from the facility has been kept as low as reasonably achievable (ALARA). In addition, pursuant to 10 CFR 72, the NRC requires that licensees submit annual reports specifying the quantities of the principal radionuclides released to unrestricted areas and other information needed to estimate the annual radiation dose to the public from facility operations. The NRC has also issued Regulatory Guide 4.15, *Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment* that reiterates that concentrations of hazardous materials in effluent must be controlled and that licensees must adhere to the ALARA principal such that there is no undue risk to the public health and safety at or beyond the proposed CISF boundary (NRC, 2006).

Moreover, the NRC, in 10 CFR §20.1301, requires each licensee to conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation. The dose in any unrestricted area from external sources may not exceed 0.002 rem (0.02 mSv) in any one hour.

6.2 ENVIRONMENTAL PATHWAYS

The only pathway for public exposure to radiation from routine operations at the CISF is external exposure at the uncontrolled boundary from the spent fuel casks stored on the pad. There is no air pathway because the casks are sealed by being welded shut. There is no potential for a liquid pathway because the spent fuel contains no liquid component and the casks are sealed to prevent any liquids from contacting the spent fuel assemblies. Any surface contamination on the stored casks is well below regulatory limits.

Though no pathways exist for exposures due to liquid effluents, administrative investigation and action levels are established for monitoring surface water runoff as an additional step in the radiation control process. Because the surface water drainage paths are normally dry, it is not possible to monitor runoff in a continuous or batch mode basis. Even if surface water were sampled, the radionuclide levels would likely be so low as to be statistically insignificant. Instead, quarterly soil sampling coupled with weekly/monthly radiological surveys on the casks and storage pad would be conducted.

There are no connections to municipal sewer systems. Onsite sewage would be routed to holding tanks, which are periodically pumped; the sewage would then be sent offsite for disposal in a POTW. Each holding tank would be periodically sampled (prior to pumping) and analyzed for relevant radionuclides.

6.3 RADIOLOGICAL MONITORING PROGRAM

The Radiological Monitoring Program includes the collection of data during pre-operational years in order to establish baseline radiological information that would be used in determining and evaluating potential impacts from CISF operations on the local environment. The Radiological Monitoring Program would be initiated at least one year prior to CISF operations. The early initiation of the Radiological Monitoring Program provides assurance that a sufficient environmental baseline has been established for the CISF before the arrival of the first cask shipment. Radionuclides in environmental media would be identified using technically appropriate, accurate, and sensitive analytical instruments (e.g., liquid scintillation or gamma/alpha spectrometry). Data collected during the operational years would be statistically compared to the baseline generated by the pre-operational data. Such comparisons provide a means of assessing the magnitude of potential radiological impacts on members of the public and in demonstrating compliance with applicable radiation protection standards.

Direct radiation in offsite areas emanating from fuel stored on the dry cask storage pad or resulting from cask handling operations is expected to be minimal, see Section 4.12.2 of this ER. However, TLDs or OSLs would be placed strategically around the CISF perimeter to measure these potential exposures and demonstrate regulatory compliance.

Detection of radionuclide impacts to surface water runoff would be conducted in a two-step process. First, all casks would be checked for surface contamination during weekly surveys and all storage pads would be checked for surface contamination during monthly surveys. Second, soil samples would be collected on a quarterly basis at the culverts leading to the CISF outfalls. Monitored radioactive contaminants exceeding the action levels, as established in written procedures, would cause an immediate investigation and would require corrective action to protect human health and prevent future recurrences.

During the course of facility operations, revisions to the Radiological Monitoring Program may be necessary and appropriate to assure reliable sampling and collection of environmental data. The rationale and actions behind such revisions to the program would be documented and reported to the NRC and other appropriate regulatory agency, as required. Sampling focuses on locations proximate to the facility, but may also include distant locations as control sites. Potential sample locations have been identified, but are subject to change based on NRC guidance, meteorological information, WCS' extensive experience in environmental sampling in the area, and current land use, see figure 6.1-1.

6.4 COMPLIANCE WITH REGULATORY REQUIREMENTS

Compliance with 10 CFR §20.1301 is demonstrated using a calculation of the TEDE to the individual who is likely to receive the highest dose in accordance with 10 CFR 20.1302(b)(1). Appropriate models, codes, and assumptions that accurately represent the facility, the site and the surrounding area support the determination of the TEDE by pathway analysis.

Compliance is demonstrated through boundary monitoring and environmental sampling data. If a potential release should occur, then routine operational environmental data would be used to assess the extent of the release.

The offsite impact from the CISF storage has been evaluated and is discussed in Section 4.12 of this ER. The conservative evaluation shows that an annual dose equivalent of < 0.011 mSv (11 mrem) is expected at the highest impacted area at the facility perimeter fence. Because the offsite dose equivalent rate from stored casks is expected to be very low and difficult to distinguish from the variance in normal background radiation beyond the CISF boundary, demonstration of compliance would rely on a system that combines direct dose equivalent measurements and computer modeling to extrapolate the measurements. The direct dose equivalent at offsite locations would be measured using TLD/OSL data from the highest impacted offsite areas.

Appropriate investigation and action levels are specified for CISF surface water runoff. Data analysis methods and criteria used in evaluating and reporting environmental sample results are appropriate and would indicate when an action level is being approached in time to take corrective actions.

6.5 QUALITY ASSURANCE

The Radiological Monitoring Program is included in the facility's QA program. Key parts of the program are the written procedures that ensure representative sampling; proper use of appropriate sampling methods and equipment; proper locations for sampling points; and proper handling, storage, transport, and analyses of environmental samples. In addition, written procedures ensure that sampling and measuring equipment are properly maintained and calibrated at regular intervals. Moreover, the Radiological Monitoring Program implementing procedures include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition. The instrument maintenance and calibration program is tailored to the given instrumentation, in accordance with manufacturers' recommendations.

A qualified independent laboratory would analyze environmental samples. Monitoring and sampling activities, laboratory analyses, and reporting of facility-related radioactivity in the environment would be conducted in accordance with industry-accepted and the NRC approved methodologies. Monitoring procedures would employ well-known analytical methods and instrumentation.

The QC procedures used by the laboratories performing the facility’s Radiological Monitoring Program would be adequate to validate the analytical results and would conform to the guidance in Regulatory Guide 4.15 (NRC, 2006). These QC procedures include the use of established standards such as those provided by the National Institute of Standards and Technology, as well as standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference.

WCS would ensure that any contractor laboratory used to analyze CISF samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. Examples of these third-party programs include but are not limited to: (1) Mixed Analyte Performance Evaluation Program; and (2) Analytics Inc., Environmental Radiochemistry Cross-Check Program. WCS would require that all radiological and non-radiological laboratory vendors be certified by the National Environmental Laboratory Accreditation Program or an equivalent state laboratory accreditation agency for the analytes being tested.

WCS would ensure that only individuals trained in accordance with written procedures will be permitted to calibrate analytical sampling equipment. Sampling equipment would be inspected for defects, obstructions, and cleanliness. Calibration intervals and methods would be developed based on applicable industry standards and in accordance with procedures.

The radiation monitoring program falls under the oversight of the WCS Radiation Safety Program. Therefore, it is subject to periodic audits conducted by facility QA personnel. Written procedures would be in place to ensure the collection of representative samples; use of appropriate sampling methods and equipment; proper locations for sampling points; and proper handling, storage, transport, and analyses of environmental samples. In addition, the facility’s written procedures also ensure that sampling and measuring equipment, including ancillary equipment, are properly maintained and calibrated at regular intervals, if required. Employees involved in implementation of this program will be trained in the program procedures.

6.6 REPORTING PROCEDURES

Reporting procedures would comply with the requirements of 10 CFR 72.44(d)(3) and the guidance specified in Regulatory Guide 4.16. Reports of the concentrations of any radionuclides released to unrestricted areas would be provided and would include the Minimum Detectable Concentration (MDC) for the analysis and the error for each data point.

Each year, WCS would submit a summary report of the environmental sampling program to the NRC, including all associated data as required by 10 CFR 72.44(d)(3). The report would include the types, numbers, and frequencies of environmental measurements and the identities and activity concentrations of facility-related nuclides found in environmental samples. The report would also include the MDC for the analyses and the error associated with each data point. Significant positive trends in activities, if any, would also be noted in the report, along with any adjustment to the program, unavailable samples, and deviation to the sampling program.

6.7 PHYSIOCHEMICAL MONITORING

Chemicals are not anticipated to be stored at the CISF and therefore, no physicochemical monitoring would be required.

6.8 ECOLOGICAL MONITORING

Ecological monitoring would not be required given that threatened or endangered species would not be impacted during construction, operation, and decommissioning of the CISF as discussed in Section 4.5.8.

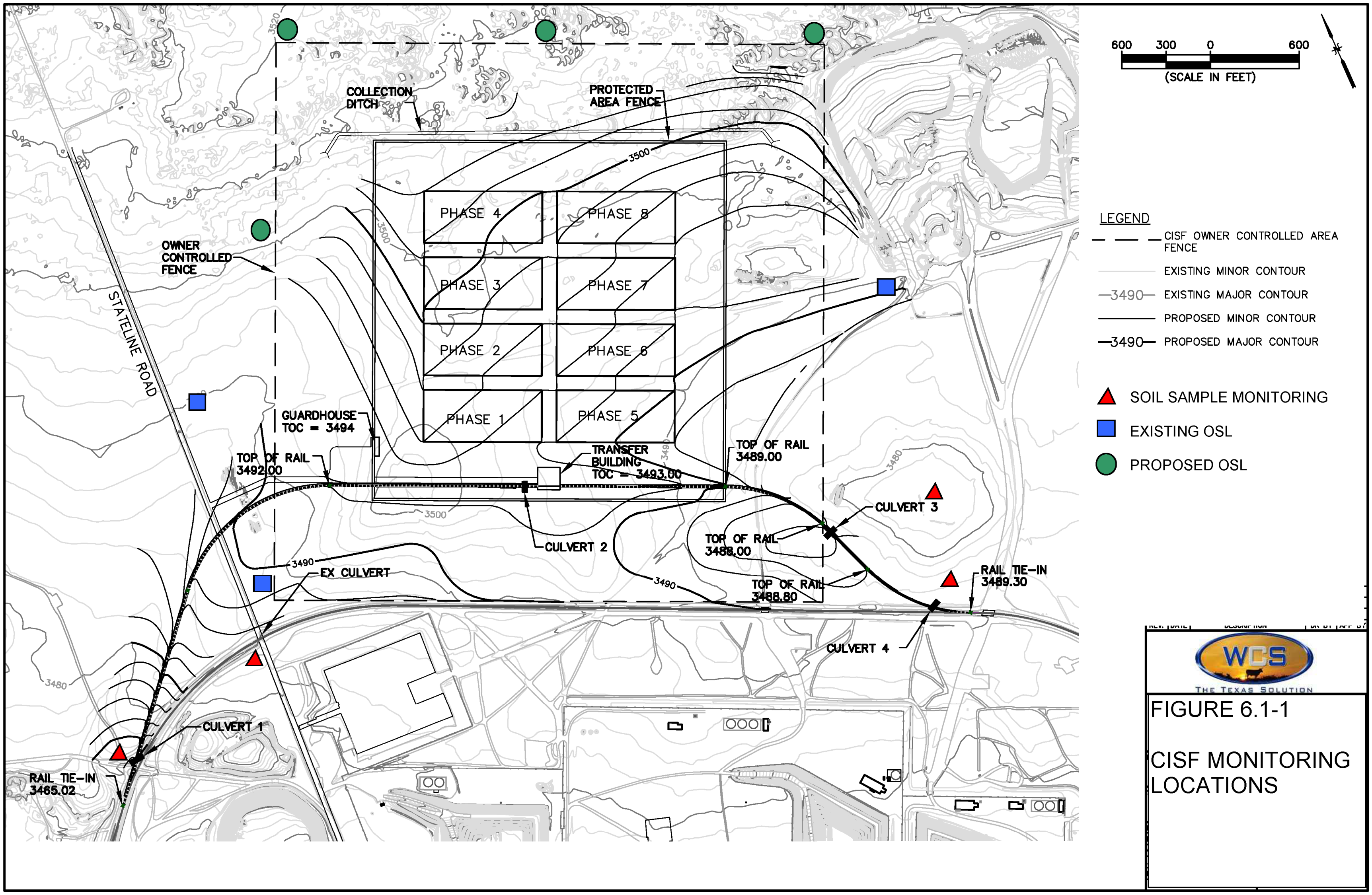

FIGURE 6.1-1

CISF MONITORING LOCATIONS

Proprietary Information on This Page
Withheld Pursuant to 10 CFR 2.390

7.1 BACKGROUND

The successful construction and operation of the proposed action has the potential to greatly reduce U.S. government expenditures for the storage and management of spent nuclear fuel, prior to the development of a permanent disposal site. The Nuclear Waste Policy Act of 1982 (NWPA) obligated the federal government to dispose of spent fuel from the nation's nuclear power plants. Additionally, the Act provided a mechanism to fund disposition of commercial spent nuclear fuel in the form of payments by utilities into the Nuclear Waste Fund. The NWF also receives taxpayer payments from the Department of Defense for defense-related waste that will go into a repository, including spent nuclear fuel from the U.S. Navy. Under the NWPA, utilities signed contracts with the Department of Energy (DOE) and paid annual fees into the Nuclear Waste Fund in exchange for a federal commitment to begin accepting spent fuel for disposal by January 31, 1998. This funding structure was intended to ensure that commercial nuclear generators (and their ratepayers) - not taxpayers – would pay the necessary monies (upfront) to construct and operate storage and disposal facilities. Beginning in 1983, monies were collected from electricity consumers, as part of their monthly bill, and deposited into the Nuclear Waste Fund. According to the Nuclear Waste Fund's 2015 Financial Audit Statement, the net value of the fund was $37.4 billion.

The NWPA also created a process for establishing a permanent, underground repository by the mid-1990s. Congress assigned responsibility to the DOE to site, construct, operate, and close a repository for the disposal of spent nuclear fuel. In December 1987, Congress amended the NWPA to designate Yucca Mountain, Nevada as the permanent repository site for the nation's nuclear waste. In 2010, the Obama Administration stopped the Yucca Mountain license review and empaneled a study commission to recommend a new policy for the long-term management of spent nuclear fuel and high-level radioactive waste. In January 2012, the Blue Ribbon Commission on America's Nuclear Future published its final recommendations to the Secretary of Energy. In January 2013, the DOE issued its used fuel management strategy to implement the Blue Ribbon Commission's recommendations.

As a consequence of federal actions (and inaction), there is presently no disposal site for tens of thousands of metric tons of spent nuclear fuel and high-level radioactive waste, no alternate site to Yucca Mountain, and a continued obligation for the disposal of spent nuclear fuel by the federal government. The unfulfilled federal obligation to dispose of spent nuclear fuel has become an increasingly expensive liability for nuclear power plant operators. Since 1998, when the NWPA committed the federal government to dispose of spent nuclear fuel, operators of nuclear plants have had to retain, store, and manage spent nuclear fuel on-site. A recent DOE estimate of the federal government's liability for these costs was $21.4 billion through 2071. This figure was an increase from a 2006 estimate of $6.9 billion, which assumed that the permanent storage of spent nuclear fuel would be complete in 2055 (Government Accountability Office [GAO], 2014).

As the expense of ongoing storage of spent nuclear fuel has compounded for nuclear power plant operators, it has become common practice for them to either file lawsuits against the federal government or to negotiate for reimbursement of their storage costs. The reimbursements come from the U.S. Department of Treasury's Judgment Fund, which is used to pay for judgments against the United States. The Judgment Fund is permanent, has an indefinite appropriation, and is exempt from annual congressional approval. The payments are made to the plant operators because of the DOE's partial breach of contract, stemming from its failure to take possession of spent fuel (starting Jan. 31, 1998), as required by the NWPA and the Standard Contract it signed with utilities. According to an article in The National Law Journal, in 2015 alone, the federal government paid approximately $650 million to utility companies for expenses related to storing spent fuel. The same article estimates that the total expenditure over the past five years has been $4 billion (Greene, 2015). Similarly, the Congressional Budget Office reported in their December 2015 testimony before the U.S. House Subcommittee on Environment and the Economy (part of the Committee on Energy and Commerce), that $4.3 billion in damages have been paid out of the taxpayer-funded U.S. Judgment Fund to date, and that remaining liabilities will total $23.7 billion, even if legislation and sufficient appropriations are enacted that will enable the DOE to begin accepting waste within the next 10 years (Congressional Budget Office, 2015). Further delays in implementing an interim storage site beyond 2025 will increase this liability, which will ultimately be borne by the nation's taxpayers.

In late 2013, a federal court ruled that the DOE must stop collecting fees for nuclear spent fuel disposal, until it again complies with the NWPA (as it is currently written) or until Congress enacts an alternate waste management plan (National Association of Regulatory Utility Commissioners v. United States Department of Energy, 2013). Substantial concerns also exist regarding the future of the Nuclear Waste Fund, given the entanglement of budget rules and reimbursement issues facing the fund.

Proprietary Information on Pages 7-4 through 7-27
Withheld Pursuant to 10 CFR 2.390

7.4 DISCUSSION AND SUMMARY

7.4.1 Proposed Action Alternative

Implementation of the proposed action is assumed to create a number of economic benefits, two of which were quantifiable with existing information. The first quantifiable benefit would be the avoided reimbursements to power plant operators for storing spent fuel the government is obligated to dispose of under the NWPA. Because the federal government does not have a storage or disposal facility for spent nuclear fuel, the DOE has been successfully sued by plant operators to reimburse them for their storage costs. The estimated benefit of the proposed action was measured as the cost of continuing to reimburse operators of shutdown plants for storing spent nuclear fuel over the next 40 years under a "no action" scenario and subtracting the reduced reimbursement schedule, if the CISF is built. Based upon the very conservative assumptions in this benefit-cost analysis, the proposed action would create a benefit to the federal government of $5,401,062,500 (not discounted), as shown in Table 7.4-1. The second quantifiable benefit was the value of land at shutdown nuclear power plants that is currently undevelopable. The overall value of land that could be returned to an economic use, if the site's spent fuel was removed, was estimated to be worth $1,278,263,000 (not discounted). The total economic benefits from implementing the proposed action are $6,679,325,000 (not discounted).

Proprietary Information on Pages 7-29 through 7-44
Withheld Pursuant to 10 CFR 2.390

CHAPTER 8

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

8.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

8.1 Unavoidable Adverse Environmental Impacts

Section 102(2)(C)(ii) of NEPA requires that an EIS include information about any adverse environmental effects that cannot be avoided if the proposal is implemented.

8.1.1 Geology, Minerals, and Soils

Unavoidable soil erosion from both wind and water will occur during construction activities. Dust control and stormwater control measures, as well as revegetation of disturbed areas, will minimize soil erosion. With these mitigations, the resulting levels of soil erosion by wind and water should be similar to the levels that currently exist in Andrews County.

Disturbing the existing soil profile and using aggregate in construction are unavoidable adverse impacts of the proposed action. However, only a very small amount of soil is permanently lost in project construction, and aggregate materials could be recovered after decommissioning. Economic mineral resources located beneath the CISF would be unavailable for exploitation during the life of the project. These impacts, however, would be small.

8.1.2 Water Resources

Unavoidable impacts to surface water are not a concern since there are no surface waters near the facility; however, there may be increased stormwater runoff from the CISF due to the presence of impervious surfaces (e.g., buildings, asphalt, concrete, etc.). Such runoff would be directed to natural drainage networks and controlled under the appropriate permits.

No unavoidable adverse impacts on groundwater are expected as a result of construction or operation of the CISF because the groundwater beneath the facility is neither of the proper quality nor quantity to be used. Therefore of potable water may be brought in from the existing potable water system at WCS.

8.1.3 Air Quality

Unavoidable impacts to air quality from construction and decommissioning of the CISF would be associated with earth moving activities that create airborne dust. Through the use of adequate control measures, such as treating disturbed areas with dust suppressants, the potential impacts to air quality due to suspended particulate matter would be minimal.

8.1.4 Ecological Resources

The CISF would eventually require the commitment of 130 ha (320 acres) for the life of the facility. The loss of wildlife habitat in these areas would be unavoidable. In areas lost for the life of the project, the existing vegetation, with the exception of invasive annuals, would not be restored unless revegetation is undertaken as part of decommissioning and closure of the CISF.

Currently, this land is sparsely vegetated and supports a low amount of wildlife. Small areas of animal habitat would be unavoidably lost in the disturbed areas during construction activities. It is likely that individual animals of less mobile species would be lost during construction.

The impacts to vegetation and wildlife are expected to be small, especially considering the other available land areas in west Texas and southeastern New Mexico that are comparable to the potentially affected area.

8.1.5 Socioeconomic and Community Resources

Because of the size of the regional employment force and the relatively small number of workers to be employed on the proposed project, no adverse socioeconomic impacts are expected.

8.1.6 Cultural Resources

Based on available data, construction, operation, and decommissioning of the CISF would have no adverse impacts on historic properties. In the unlikely event that buried cultural resource sites or artifacts are encountered during construction activities, the significance and potential for adverse impacts would be evaluated at that time.

8.1.7 Human Health Impacts

The impacts of radiation from the casks during transport and storage at the CISF cannot be avoided. However, the radiation doses that would occur as a result of the proposed action are well below NRC regulatory limits specified in 10 CFR 20 and represent a small fraction of the existing background levels of radiation. Thus, the radiological health risk is considered to be small.

8.2 OTHER IMPACTS

8.2.1 Noise

Increased noise will accompany construction, operation, and decommissioning of the proposed CISF; however, the anticipated noise levels will not create adverse impacts.

8.2.2 Scenic Qualities

Because the proposed CISF will be located next to the current WCS facility and URENCO, the impacts to scenic qualities would be minimal.

8.2.3 Recreation

There are no recreational facilities near the site other than a small picnic area along Texas State Highway 176 that is not visible from the CISF. There would be no adverse impacts to recreational activities in the vicinity of the CISF.

8.3 GENERIC ENVIRONMENTAL IMPACT STATEMENT

The NRC completed a *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel* (NUREG-2157) that addressed, among other things, the unavoidable adverse environmental impacts attributable to continued storage of SNF (NRC, 2014a). WCS is proposing an operational time period of 40 years. However, the environmental impacts analyzed in NUREG-2157 include those related to short-term (60 years), long-term (an additional 100 years), and indefinite storage of SNF at existing commercial nuclear power plants, as well as at an “away-from-reactor” storage facility. The NRC has concluded that the most likely outcome is that a repository will become available to accept SNF within the short-term timeframe, or about 60 years after the end of the reactor’s licensed life for operation.

For an “away-from-reactor” storage facility such as the CISF, the NRC concluded in its GEIS that the unavoidable adverse environmental impacts for each resource area were small except for air quality, terrestrial ecology, aesthetics, waste management, and transportation; the impacts to these resources could range from small to moderate. Socioeconomic impacts would range from small to beneficial and large. Historic and cultural impacts could be small, moderate, or large, depending on a variety of local conditions. The potential moderate impacts to air quality, terrestrial wildlife, and transportation were based on construction-related potential fugitive dust emissions, terrestrial wildlife direct and indirect mortalities, and temporary construction traffic impacts. The potential moderate impacts to aesthetics and waste management were based on noticeable changes to the viewshed from constructing a new ISFSI. The volume of nonhazardous solid waste generated by assumed ISFSI and dry transfer system replacement activities would be minimal. Potential large positive impacts to socioeconomics would be due to local economic tax revenue increases from the CISF. The GEIS’ potential large impacts to historic and cultural and special status species apply to assumed site-specific circumstances at an away-from-reactor ISFSI involving the presence of these resources during construction activities and the absence of effective protection measures. Specifically, these potential historic and cultural impacts vary depending on whether resources are present, the extent of proposed land disturbance, and whether the licensee has management plans and procedures in place that are protective of historic and cultural resources. For the WCS CISF, the land disturbance area is relatively small and the impact on threatened or endangered species is very small. WCS has implemented management plans to be protective of the ecology.

In developing NUREG-2157, NRC referred to the previous environmental analyses that supported issuance of the FEIS for the PFS facility in Toole, Utah. In that FEIS, the NRC concluded that issuance of a license to PFS authorizing construction and operation of an ISFSI in Toole County, Utah, would not result in significant impacts adverse to the environment.

Overall, the unavoidable adverse environmental impacts of the CISF are very small, except for the socioeconomic impact, which has been determined to be moderate to large and beneficial rather than adverse.

No cultural resources impacts are anticipated based on the work done for the WCS site. Aesthetic impacts would be low because the facility would not be built in an undeveloped area, but would be screened by existing buildings at the current plant site. Although some wildlife could be impacted, there are no impacts to threatened or endangered species are anticipated. In addition, measures have been put in place in the management plan to prevent adverse impacts. One area where it seems clear that impacts would occur would be land use, geology, and soils within the physical footprint of the CISF since it is currently undeveloped. For those impacts, mitigation would not be necessary.

8.3.1 Irreversible and Irretrievable Commitments of Resources

Section 102(2)(C)(v) of NEPA requires that an EIS include information about irreversible and irretrievable commitments of resources that would occur if the proposed actions were implemented. The NRC guidance in NUREG−1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*, defines an irreversible commitment as the commitment of environmental resources that cannot be restored (NRC, 2003). In addition, an irretrievable commitment refers to the commitment of material resources that once used cannot be recycled or restored for other uses by practical means.

For an away-from-reactor ISFSI, the NRC concluded in its GEIS that there would be no irreversible and irretrievable commitments of resources during continued storage for most resources. However, impacts on land use, aesthetics, historic and cultural resources, waste management, and transportation would result in irreversible and irretrievable commitments. As finite resources, the loss of historic and cultural resources would constitute irreversible and irretrievable impacts. For the indefinite storage timeframe, land and visual resources allocated for SNF storage would be committed in perpetuity as continued operations would preempt other productive land uses and permanently affect the viewshed. Waste-management activities involving waste treatment, storage, and disposal would result in the irreversible commitment of capacity for waste disposal. Transportation activities would involve the irreversible and irretrievable commitment of resources, including vehicle fuel for commuting workers and shipping activities.

Certain activities associated with the proposed CISF, especially those involving construction of ISFSI facilities and the operation of heavy equipment would result in the irreversible commitment of certain fuels, energy, building materials, capacity for waste disposal, and process materials. Because an ISFSI would be in operation for as long as 60 years under the license renewal scenario, land commitments for the ISFSI could be protracted, but not irreversible or irretrievable assuming the facility is closed, decommissioned, and dismantled at the end of its life.

8.4 SHORT-TERM AND LONG-TERM IMPACTS

The proposed initial operating period for the CISF is 40 years with a possible license extension of 20 years for an extended operating period of 60 years. Assuming the facility is closed and decommissioned at the end of the 60-year license period, the impacts from the facility would be short-term (i.e., no more than 60 years). Impacts during the short term would be limited to small impacts on land use and air quality related to dust and fossil fuel emissions. Long-term impacts could result if the CISF lifetime were extended indefinitely or if the facility were not decommissioned at the end of its life as is planned.

8.5 Short-term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Section 102(2)(C)(iv) of NEPA requires that an EIS include information about the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. The NRC guidance in NUREG−1748 (NRC, 2003) further clarifies that the short-term use period represents the period of the action under review and the long-term productivity period represents the period extending beyond the end of the action under review.

The proposed CISF would occupy land that is presently undeveloped rangeland. A limited amount of grazing currently occurs on this land. This land does not have any other current agricultural or productive uses. The use of this land for the proposed project would reduce the amount of such land available, but the reduction would not be a significant amount. The proposed project would replace this land with an industrial development which has its own infrastructure. The addition of such infrastructure to the area would increase the productivity and usefulness of the land far above its current use and could potentially increase the opportunities for further economic development in the area.

In the Waste Confidence GEIS, NRC examined the relationship of short-term uses and long-term productivity and concluded that the maximum impact on long-term productivity of the land occupied by an ISFSI would result if the CISF is not dismantled after the short-term storage period ends (NRC, 2013). Under the indefinite storage scenario, therefore, the loss of productivity in the location would be indefinite and other productive uses of the site would be foregone. Long-term productivity of those lands needed for waste disposal would also be impacted.

Once storage ends and the decommissioning is complete, the NRC license may be terminated and the site would be available for other uses. Other potential long-term impacts on productivity include the commitment of land and consumption of disposal capacity necessary to meet waste disposal needs. This commitment of land for disposal would remove land from other productive use. A small contribution to greenhouse gas emissions would add to the atmospheric burden of emissions that could contribute to potential long-term impacts. Impacts to long-term productivity can be eliminated under the short-term storage scenario once the ISFSI operations cease and the associated facilities are decommissioned.

Though greenhouse gas emissions of the CISF proposal would be very small, those emissions could contribute to long-term impacts associated with climate change (NRC, 2013).

CHAPTER 9

LIST OF REFERENCES

Abel, D. (2013). Its nuclear plant shut, Maine town full of regret: Wiscasset, Maine, long in economic depths. The Globe. Publised on September 18, 2013.

ACS. (2014). (American Cancer Society). Cancer Facts and Figures 2014. Available at: http://www.cancer.org/acs/groups/content/@research/documents/webcontent/acspc-042151.pdf.

Andrews County. (2015). Commissioners Court of Andrews County, Texas. *A Resolution in Support of Establishing a Site in Andrews County for Consolidated Interim Storage of Spent Fuel and High-Level Radioactive Waste* . Andrews, TX: Approved January 20, 2015.

Bally, A.W., C.R. Scotese, and M.I. Ross. (1989). North America; Plate-Tectonic Setting and Tectonic Elements in The Geology of North America-An Overview: Volume A, Decade of North American Geology, p. 1-15, Geological Society of America, Boulder, Colorado.

Bebout, D.G. and Meador, K.J. (1985). Regional Cross Sections-Central Basin Platform, West Texas: The University of Texas at Austin, Bureau of Economic Geology, 4 p., 11 plates.

Blandford, T. D. (2003). Groundwater Availability of the Southern Ogallala Aquifer in Texas and New Mexico: Numerical Simulations through 2050: Texas Water Development Board Draft Report, p. 160.

BLM. (1984). (Bureau of Land Management, U.S. Department of the Interior). *Visual Resource Management* . Washington, DC: BLM Manual Handbook H-8400, Rel. 8-24.

BLM. (1986). (Bureau of Land Management, U.S. Department of the Interior). *Visual Resource Inventory* . Washington, DC: BLM Manual HandbookH-8410-1, Rel. 8-28.

Boice, J., Nakamura, N., Niwa, O., Nakamura, S., & Yoshida, K. a. (2010). Meeting Report: Low Dose Rate Epidemiology of High Background Radiation Areas. *Radiat Res 173:849-854* .

Bomar, G. (1995). *Texas Weather* . Austin, Texas: 2nd Edition. Univeristy of Texas Press. Published in 1995.

Bosman, J. (2015). Retrieved from Rural Wisconsin Community Laments Nuclear Power Plant’s Closure. The New York Times. Published August 11, 2015: http://nyti.ms/1Tkt5Ex

Bradley, R.G., and S. Kalaswad. (2003). The Groundwater Resources of the Dockum Aquifer in Texas: Texas Water Development Board Report 359, p. 73.

BRC. (2012). (Blue Ribbon Commission on America's Nuclear Future) Report to the Secretary of Energy. Published in January 2012.

Broncaccio, D. (2013). Yankee Rowe closing took 15 years, $608 million. The Recorder. Publised August 27, 2013.

Brune, G. (1981). *Springs of Texas* . Volume I. Texas A&M University Press, College Station.

Clean Air Act. (1970).

Clean Water Act. (1970).

CMEC. (2015). (Cox McLain Environmental Consulting). Environmental Technical Memorandum Proposed Spent Nuclear Fuel Consolidated Interim Storage Facility Eddy County, New Mexico. Dated July 24, 2015.

Connecticut Yankee. (2016). *About CY*. Retrieved February 22, 2016, from http://www.connyankee.com/html/about_cy.html

Content, T. (2015). A $457 million difference of opinion over the Kewaunee nuclear plant. Journal Sentinel. Publised September 4, 2015.

Cronin, J. (1969). Groundwater in the Ogallala Formation in the Southern High Plains of Texas and New Mexico: U.S. *U.S. Geological Survey Hydrological Investigations* . HA-330, p. 9.

Dick-Peddie, W. (1993). New Mexico Vegetation. Past, Present and Furture. . Albuquerque, NM: University of New Mexico Press.

DOE. (2002). (Department of Energy). *Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* . Published in February 2002.

DOE. (2013a, June). (U.S. Departement of Energy). *A Project Concept for Nuclear Fuels Storage and Transportation* . FCRD-NFST-2013-000132, Rev. 1: Dated June 15, 2013.

DOE. (2012). *(U.S. Department of Energy)*. Retrieved from Illness and Injury Surveillance Program Worker Health at a Glance, 2000-2009: http://www.hss.energy.gov/healthsafety/WSHP/epi/surv/.

DOE. (2013b). (U.S. Department of Energy). *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste* . Issused on January 11, 2013.

DOE. (2004, March). (U.S. Department of Energy). Office of Civilian Radioactive Waste Management. The Nuclear Waste Policy Act of 1982. Washington, DC.

DOE. (2013). (U.S. Department of Energy). Office of Fuel Cycle and Research Development. *A Project Concept for Nuclear Fuels Storage and Transportation* . FCRD-NFST-2013-000132 Rev. 1. Issued on June 15, 2013.

DOE. (2014). Preliminary Evaluation of Removing Used Nuclear Fuel from Shutdown Sites Rev. 1. Dated October 1, 2014.

DOL. (2013). (U.S. Department of Labor). Retrieved from Bureau of Labor Statistics. http://www.bls.gov/iif/oshwc/osh/os/pr136tx.pdf.

DOT (2014) (U. S. Department of Transportation). Federal Railroad Administration, National Transportation Statistics, 2014

DOT (2015) (U. S Department of Transportation). Department of Transportation Statistics, Transportation Statistics Annual Report, 2015

Dutton, A. (1995). Groundwater Isotopic Evidence for Paleorecharge in U.S. High Plains Aquifers:. *Quaternary Research* . 43, p. 221-231.

Dutton, A.R., and W.W. Simpkins. (1986). Hydrogeochemistry and Water Resources of the Triassic Lower Dockum Group in the Texas Panhandle and Eastern New Mexico: University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 161, p. 51.

ELEA. (2007). (Eddy Lea Energy Alliance, LLC) . *Final Detailed Siting Report Eddy-Lea Siting Study Grant No. DE-FG07-07ID14799* . Dated April 28, 2007.

Environmental Law Institute. (1999). A Guidebook for Brownfield Property Owners. http://www.eli.org/sites/default/files/eli-pubs/d9.11.pdf .

EPA. (1995). (Environmental Protection Agency) . *Compilation of Air Pollutant Emission Factors* . Volume 1, Stationary Point and Area Sources. Fifth Edition AP-42: Published in January 1995.

EPA. (1973). (Environmental Protection Agency). *Public Health and Welfare Criteria for Noise* . EPA/ONAC 550/9-74-004.

EPA. (1988). (Environmental Protection Agency). *Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion* . Federal Guidance Report 11, EPA-520/1-88-020.

EPA. (1993). (Environmental Protection Agency). *External Exposure to Radionuclides in Air, Water, and Soil* . Federal Guidance Report 12, EPA-402-R-93-081.

EPA. (1974). Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* . EPA/ONAC 550/9-74-004.

EPA. (2016). *U.S. Environmental Protection Agency*. Retrieved from AIr Emission Sources: http://www3.epa.gov/air/emissions/where.htm

EPRI. (2009). (Electric Power Research Institute). *Cost Estimate for an Away-From-Reactor Generic Interim Storage Facility (GISF) for Spent Nuclear Fuel* . Report No. 1018722. Electric Power Research Institute: Palo Alto, CA.

Federal Register. (2006, February 28). Notice of Issuance of Materials License Snm-2513 for the Private Fuel Storage Facility. *Federal Register Volume 71, Number 39* . Published on February 28, 2006.

Freidman, J. P. (2006). Nuclear Waste Disposal: A Taxing Real Estate Issue. Real Estate Issues. Published in Summer 2006, pages 5-13.

Galley, J. (1958). Oil and Geology in the Permian Basin of Texas and New Mexico,. *Habitat of Oil:* . American Association of Petroleum Geologists, p. 395-446.

GAO. (2012). (U.S. Government Accountability Office). *Spent Nuclear Fuel: Accumulating Quantities at Commercial Reactors, Present Storage, and Other Challenges* . Report GAO-12-797. United States Government Accountability Office: Washington, D.C.

GAO. (2014). (U.S. Government Accountability Office). *Spent Nuclear Fuel Management: Outreach Needed to Help Gain Public Acceptance for Federal Activities that Address Liability* . Report GAO-15-141. United States Government Accountability Office: Washington, D.C.

Grazulis, T. (1993). *Significant Tornadoes, 1680-1991* . Environmental Films. Published in July 1993.

Greene, J. (2016). Prime Examples of Wasteful Spending. *The National Law Journal* . January 18, 2016.

Gustavson, T. (1980). Faulting and Salt Dissolution,. *Geology and Geohydrology of the Palo Duro Basin, Texas Panhandle, A Report on the Progress of Nuclear Waste Isolation Feasibility Studies (1979)* . The University of Texas at Austin, Bureau of Economic Geology Circular 80-7.

Hills, J. (1963). Late Paleozoic Tectonics and Mountain Ranges, Western Texas to Southern Colorado,. *American Association of Petroleum Geologists Bulletin* . vol. 47, p. 1709-1725.

Hills, J. (1985). Structural Evolution of the Permian Basin of West Texas and New Mexico, in Structure and Tectonics of Trans-Pecos Texas. *West Texas Geological Society, Field Conference Publication* . 85-81, p. 89-99.

Holzworth, G. (1972). Mixing heights, wind speeds, and potential for urban air pollution throughout the contiguous United States. Office of Air Prog. pub. AP-101,USEPA, RTP, NC.

Howland, M. (2002). The Legacy of Contamination and the Redevelopment of Inner-City Industrial Districts. http://smartgrowth.umd.edu/assets/howland_contamination_2002.pdf.

Howland, M. (2010). The Private Market for Brownfield Properties. *Cityscape: A Journal of Policy Development and Research* . 12 (3), 37-54.

HUD. (1985). (U.S. Department of Housing and Urban Development). *The Noise Guidebook* . HUD-953-CPD.

ICRP. (1959). (International Commission on Radiation Protection). *Report of Committee II on Permissible Dose for Internal Radiation* . ICRP Publication 2, Pergamon Press, Oxford.

ICRP. (1979). (International Commission on Radiation Protection). *Limits for Intakes by Workers* . Pergamon Press, Oxford: ICRP Publication 30, Part 1.

ICRP. (1980). (International Commission on Radiation Protection). *Limits for Intakes by Workers* . Pergamon Press, Oxford: ICRP Publication 30, Part 1.

ICRP. (1981). (International Commission on Radiation Protection). *Limits for Intakes by Workers* . Pergamon Press, Oxford: ICRP Publication 30 Part 3.

ICRP. (1991). (International Commission on Radiation Protection). *1990 Recommendations of the International Commission on Radiological Protection* . Pergamon Press, Oxford: ICRP Publication 60.

ICRP. (1996). (International Commission on Radiation Protection). *Age-Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5, Compilation of Ingestion and Inhalation Dose Coefficients* . Pergamon Press, Oxford: ICRP Publication 72.

Institute, N. E. (2015). Retrieved from Policy Brief:Nuclear Energy Industry Supports a Sustainable, Integrated Used Nuclear Fuel Management : http://www.nei.org/Prints?printpath=/Master-Document-Folder/Backgrounders/Policy-Briefs/Nuclear-Energy-Industry-Supports-a-Sustainable,-In&classname=custom.document&pNm=PolicyBriefs

Jablon, S., Hrubec, Z., & and Boice Jr, J. (1991). Cancer in Populations Living Near Nuclear Facilities: A Survey of Mortality Nationwide and Incidence in Two States. JAMA. 265(11):1403-1408.

Jablon, S., Hrubec, Z., Boice Jr, J., & and Stone, B. (1990). Cancer in Populations Living Near Nuclear Facilities. Public Health Service, U.S. Department of Health and Human Services. Bethesda, Maryland: NIH Publication 90-874.

Jackson, T. O. (2001). The Effect of Previous Environmental Contamination on Industrial Real Estate Prices. The Appraisal Journal, 200-210.

Jones, I. (2001). Cenozoic Pecos Alluvium Aquifer. *Aquifers of West Texas* . Texas WatDevelopment Board Report 356, ed. R.E. Mace, W.F. Mullican III, and E.S. Angle, p. 120-134.

Joyce, E. (2015). Solar Project Planned at Former California Nuclear Power Plant Site. Capital Public Radio. September 10, 2015.

Kirk, J. S. (2015, August 27). Teleconference with Judge Skeet Jones on Loving County, Texas Site.

Learn, S. (2011). Transfer spent fuel at Trojan closed nuclear plant to interim site, commission says. The Oregonian. Published on August 01, 2011.

Lehman, T. (1994b). Save the Dockum Group!: West Texas Geological Society. Bulletin 34(4), p. 5-10.

Lehman, T. (1994a). The Saga of the Dockum Group and the Case of the Texas/New Mexico Boundary Fault: New Mexico Bureau of Mines and Mineral Resources. Bulletin 150, p. 37-51.

Libow, G. (2001). Land Sale for Power Plant Stalled. Tribune Digital – The Courant. October 12, 2001.

Louisiana Energy Services, LLC. (2012). Annual Radiological Environmental Monitoring Program (REMP) Report. NRC Docket No. 70-3103. Dated March 22, 2012.

Louisiana Energy Services, LLC. (2011). Annual Radiological Environmental Monitoring Program (REMP) Repot. NRC Docket No. 70-31 03. Dated March 31, 2011.

Louisiana Energy Services, LLC. (2010). Annual Radiological Environmental Monitoring Program (REMP) Report. NRC Docket No. 70-3101. Dated March 29, 2010.

Louisiana Energy Services, LLC. (2009). National Enrichment Facility. Annual Radiological Environmental Monitoring Program (REMP) Report. NRC Docket No. 70-3103. Dated April 03, 2009.

Mace, R. (2001). Aquifers of West Texas: An Overview. *Aquifers of West Texas* . Texas Water Development Board Report 356, ed. R.E. Mace, W.F. Mullican III, and E.S. Angle, p. 1-16.

Martinez, S. (2015). Governor Martinez letter to U.S. Department of Energy. New Mexico: Dated April 10, 2015.

Massachusetts Institute of Technology. (2011). The Future of the Nuclear Fuel Cycle: An Interdisciplinary MIT Study.

Massey, M., & and Dunn, B. (2000). Survey for Active Lesser Praire-Chicken Leks: Spring 2000 Revised Report November 1, 2000, New Mexico Department of Game and Fish Project W-104-R-40.

McGowen, J. G. (1979). Depositional Framework of the Lower Dockum Group (Triassic) Texas Panhandle: The University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 97, 60 p.

Mehras, Steven J., Ralph E. Best, Steven B. Ross, Kenneth A. Buxton, Jeffery L. England, Paule E. McConnell, Lawrence M. Massaro, and. (2014). *Preliminary Evaluation of Removing Used Nuclear Fuel from Shutdown Sites: Fuel Cycle Research & Development* . U.S. Department of Energy – Nuclear Fuels Storage and Transportation Planning Project: Washington, D.C.

Miller, J. F. (1973). Precipitation-Frequency Atlas of the Western United States, NOAA Atlas 2, National Weather Service. Silver Spring, Maryland.

Mooney, W.D. and L.W. Braile. (1989). The Seismic Structure of the Continental Crust and Upper Mantel of North America in The Geology of North America – An Overview: Volume A, Decade of North American Geology: Geological Society of America, Boulder, CO, p. 39-52.

Mullican, W. I. (1997). Playas and Recharge of the Ogallala Aquifer on the Southern High Plains of Texas-An Examination Using Numerical Techniques: The University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 242, p. 72.

NAS. (1999). (National Academy of Sciences). *Committee on Health Risks of Exposure to Radon. (BEIR VI).* Washington, DC: National Academies Press.

National Environmental Policy Act of 1969. (n.d.).

National Historic Preservation Act of 1966. (n.d.).

National Research Council. (2006). *Committee on the Biological Effects of Ionizing Radiation, (BEIR VII)* . Washington, D.C: National Academies Press.

Nativ, R. and G.N. Gutierrez. (1988). Hydrochemistry of Cretaceous Aquifers, Texas Panhandle and Eastern New Mexico: The University of Texas at Austin, Bureau of Economic Geology Geological Circular 88-3, p. 32.

Nativ, R. (1988). Hydrogeology and Hydrochemistry of the Ogallala Aquifer, Southern High Plains, Texas Panhandle and Eastern New Mexico: The University of Texas at Austin, Bureau of Economic Geology Report of Investigations No. 177, p. 64.

NBS. (1959). (National Bureau of Standards). *Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure.* U.S. Department of Commerce. National Bureau of Standards Handbook 69.

NCI. (2012). (National Cancer Institute). *No Excuses Mortality Risk Found in Countries with Nuclear Facilities-Fact Sheet.* U.S. Department of Health and Human Services, National Institute of Health. Available at: http://dceg.cancer.gov/about/organization/programs-ebp/reb/fact-sheet-mortality-risk.

NCRP. (2009). (National Council on Radiation Protection and Measures). *Ionizing Radiation Exposure of the Population of the United States* . NCRP Report 160.

NEF. (2005). National Enrichment Facility. *URENCO Environmental Report* . Published in April 2005.

Nicholson, A., Jr., and A. Clebsch, Jr. (1961). Geology and Ground-Water Conditions in Southern Lea County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Ground-Water Report 6, Socorro, New Mexico, p. 123.

NMDCA. (2015). (New Mexico Department of Cultural Affairs). *New Mexico Cultural Resources Information System (NMCRIS). DCA Historic Preservation* . Available at: https://nmcris.dca.state.nm.us. Accessed on June 8, 2015.

NMSHPO. (2015). (New Mexico State Historic Preservation Office). *Consolidated Interim Spent Fuel Storage Facility* . (HPD log 101784). Dated August 12, 2015.

NOAA. (2004). (National Oceanic and Atmospheric Administration). *Annual Climatological Summary for Midland TX and Hobbs NM, Climate Data Online, National Centers for Environmental Information* . Ashville, NC.

NOAA. (2016). (National Oceanic and Atmospheric Administration). url http://www.noaa.gov/.

NRC. (1977). (Nuclear Regulatory Commission). *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes* . NUREG-0170. Docket No. PR-71, 73 (40 FR 23768): Published in December 1977.

NRC. (2001). (Nuclear Regulatory Commission). *Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah* . NUREG 1714: Published in December 2001.

NRC. (2003, August). (Nuclear Regulatory Commission). *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* . NUREG-1748: Published in August 2003.

NRC. (2005). (Nuclear Regulatory Commission). *Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico* . NUREG-1790: Published in June 2005.

NRC. (2014a, September). (Nuclear Regulatory Commission). *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel* . NUREG-2157, published in September 2014.

NRC. (2014b, January). (Nuclear Regulatory Commission). *Spent Fuel Transportation Risk Assessment* . NUREG-2125: Published in January 2014.

NRC. (2014c, January). (Nuclear Regulatory Commission). *Standard Format and Content for a License Application for an Independent Spent Fuel* . Regulatory Guide 3.50. Published in January 2014.

NRC. (2014d). (Nuclear Regulatory Commission). *Waste Confidence Generic Environmental Impact Statement* . NUREG 2157. p.8-9 and 8-10. Published in September 2013.

NRC. (2016). *(Nuclear Regulatory Commission)*. Retrieved February 21, 2016, from Frequently Asked Questions about Reactor Decommissioning: http://www.nrc.gov/waste/decommissioning/faq.html#2

NRC. (2016). *(Nuclear Regulatory Commission)*. Retrieved February 19, 2016, from Locations of Power Reactor Sites Undergoing Decommissioning: http://www.nrc.gov/info-finder/decommissioning/power-reactor/

NRC. (2006). (Nuclear Regulatory Commission) Proposed Revision 2 of Regulatory Guide 4.15. *Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) - Effluent Streams and teh Environment* . Dated: February 1979.

NRC. (2012). (Nuclear Regulatory Commission) SRM-COMSECY-12-0016. *Approach for Addressing Policy Issues Resulting from Court Decision to Vacate Waste Confidence Decision and Rule* . Dated: September 6, 2012.

(NRC, 1996) NRC. (1996). (Nuclear Regulatory Commission). *Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Main Report.* NUREG 1437, Volume 1: Published in May 1996.

Nuclear Energy Institute. (2016). Retrieved from Issues & Policy: http://www.nei.org/issues-policy/nuclear-waste-management/disposal

Nuclear Regulatory Commission. (2015). Retrieved from Backgrounder on Decommissioning Nuclear Power Plants: http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html

Nuclear Waste Policy Act of 1982. (n.d.).

Ortega, I., Bryant, F., Petit, R., & and Rylander, K. (1997). *Ecological Assessment of the Low Level Repository.* Andrews, TX: Final Report.

Otto, G. (1989). A National Survey of Naturally Occurring Radioactive Materials (NORM) in Petroleum Producing and Gas Processing Facilities. Dallas, TX: American Petroleum Institute, p. 265.

Page G.W., J.S. Warriner, J.C. Warriner, and P.W.C. Paton. (1995). A. Poole and F. Gill, eds. *The Birds of North America, No.154* . The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union, Washington, D.C.

Page, W. G. and H. Rabinowitz. (1993). Unsiting Nuclear Power Plants: Decommissioning Risks and Their Land Use Context. Journal of the American Planning Association. 59: 473-481.

Pasqualetti, Martin J. and K. David Pijawka. (1996). Unsiting Nuclear Power Plants: Decommissioning Risks and Their Land Use Context. Professional Geographer, 48(1), 57-69.

Patchin, P. (1994). *Contaminated Properties and the Sales Comparison Approach* . The Appraisal Journal. Published in July 1994: page 402-409.

Penn, I. (2013). Duke Energy announces closing of Crystal River nuclear power plant. Tampa Bay Times. Published on February 05, 2013.

Perry, G. R. (2014). Letter to Governor Dewhurst and Speaker Straus. TX: dated March 28, 2014.

Peyton, C. (1999). Rancho Seco – 10 years after pulling the plug: A recharged SMUD seeing better times. Sacramento Bee. Published on June 06, 1999.

Resolution of Called Commissioner's Court Proceeding (The Commissioner's Court of Loving County, Texas February 11, 2013).

Richardson, W. (2013, February 6). *U.S. Pays Maine Yankee nearly $82 million; money will benefit Maine ratepayers*. Retrieved from Bangor Daily News: http://bangordailynews.com/2013/02/06/business/maine-yankee-collects-81-million-in-waste--suit-company-says-money-will-benefit-ratepayers/

TCEQ. (2008). (Texas Commission on Environmental Quality). *Draft Environmental and Safety Analysis of a Proposed Low-Level Radioactive Waste Disposal Facility* . Andrews, TX: Dated August 2008.

TCEQ. (2014). (Texas Commission on Environmental Quality). *Assessment of Texas's High Level Radioactive Waste Storage Options* . Published in March 2014.

TCEQ. (2015a). (Texas Commission on Environmental Quality). *Radioactive Material License R04100 Low Level* . Amendment 29. Issued in December 2015.

TCEQ. (2015b). (Texas Commission on Environmental Quality). *Radioactive Material License No. R05807* . Amendment 09. Issued in January.

TDSHS. (2014). (Texas Department of State Health Services). *2014 Selected Cancer Facts Health Service Region (HSR) 9* . Available at: file:///C:/Users/krmeyer/Downloads/HSRegion09.pdf.

Terry Dynamics Incoporated. (1993, March). RCRA Permit Application for a Hazardous Waste Storage, Treatment and Disposal Facility Andrews, Texas. Section VI Geology Report. Project No. 92-152.

Texas Conservation Plan. (2011). Texas Conservation Plan for the Dunes Sagebrush Lizard. Published on September 27, 2011.

THC. (2015). (Texas Historical Commission). *Texas Archeological Sites Atlas. Texas Archeological Research Laboratory and the Texas Historical Commision* . Retrieved from: http://nueces.thc.state.tx.us. Accessed April 22, 2015.

The Recorder. (2015, June 19). Retrieved from Entergy Allowed to Dip into Decommissioning Fund: http://www.recorder.com/readerservices/businessxml/17394635-95/entergy-allowed-to-dip-into-decommissioning-fund

TPWD. (2016). Retrieved March 3, 2016, from (Texas Parks and Wildlife Department). Annotated County Lists of Rare Species. Andrews County. (last revision 1/5/2015).: http://www.tpwd.state.tx.us/gis/ris/es/

TRAB. (2014). (Texas Radiation Advisory Board). Texas Commission on Environmental Quality Program Report. Report for September 19, 2014.

TRAGIS. (n.d.). *Transportation Routing Analysis GIS*. Retrieved from https://webTRAGIS.ornl.gov

UNSCEAR. (2008). (United Nations Scientific Committee on the Effects of Atomic Radiation). *Report Vol. 1 Sources of Ionizing Radiation. United Nations Scientific Committee on the Effects of Atomic Radiation. Report to the General Assembly, with Scientific Annexes* .

USDA. (2015). U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), Web Soil Survey Website Application (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx).

U.S. Environmental Protection Agency (USEPA) Western Ecology Division, Ecoregion of New Mexico 2006, ftp://ftp.epa.gov/wed/ecoregions/nm/nm_front.pdf

UNSCEAR. (2013). (United Nations Scientific Committee on the Effects of Atomic Radiation). *Sources, Effects, and Risks of Ionizing Radiation. Volume 1* . Report to the General Assembly, Scientific Annex A. .

USFWS. (2016a, January). (U.S. Fish & Wildlife Service). *Conserving the Nature of America* . Retrievec from U.S. Fish & Wildlife Service: http://www.fws.gov/.

USFWS. (2016b). (U.S. Fish and Wildlife Service). *Species by Project Area Report* . Retrieved from U.S. Fish and Wildlife Service: http://www.fws.gov/endangered/.

USGS. (1999). (U.S. Geological Survey). *Naturally Occuring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment-An Issue for the Energy Industry* . U.S. Geological Survey Fact Sheet 0142-99, Version 1.0. Septeember: Available at: http://neic.usgs.gov/.

Wald, M. L. (2014). Energy Department Told to Stop Collecting Nuclear Waste Fee. The New York Times, published on November 20, 2013, p. A20.

WCS. (2007). (Waste Control Specialists LLC). *Application for License to Authorize Near Surface Land Disposal of Low-Level Radioactive Waste* . Dated March 2007.

WCS. (2011). (Waste Control Specialists LLC). *Low-Level Radioactive Waste Disposal Facility Pre-Operational Environmental Monitoring Report* . Dated July 11, 2011.

WCS. (2013). (Waste Control Specialists LLC). *Semi-Annual/Annual Radiological Environmental Monitoring Plan Report for January to December 2012* . Andrews, TX: Dated March 28, 2013.

WCS. (2014). (Waste Control Specialists LLC). *All Facilities Annual/Semi-Annual Radiological Environmental Monitoring Report, January 1-December 31, 2013* . Andrews, TX: Dated March 28, 2014.

WCS. (2015). (Waste Control Specialists LLC). *All Facilities Annual/Semi-Annual Radiological Environmental Monitoring Report January 1-December 31, 3014* . Andrews, TX: Dated March 30, 2015.

Weiner, R. H. (2013). RADTRAN 6/RadCat 6 User Guide, SAND2013-8095. Sandia National Laboratories. Section 8. Albuquerque, NM.

Weiner, R. K. (2014). *RADTRAN 6 Technical Manual SAND2013-0780* . Albuquerque, NM: Sandia National Laboratories.

West, Chisum and W. Smith. (2003). House Research Organization Bill Analysis HB 1567. Dated April 22, 2003.

(Wichmann, 2003) Wichmann, Erich (2003): *Abschätzung positiver gesundheitlicher Auswirkungen durch den Einsatz von Partikelfiltern bei Dieselfahrzeugen in Deutschland.* Umweltbundesamt Berlin. Report 2352, insbesondere Seite 32 zu Mortalität (PDF; 610 kB).

WIPP. (2003). *Safety Analysis Report.* Dated January 24, 2003.

WRCC. (2015). (Western Regional Climate Center). Retreived from Western Regional Climate Center: www.wrcc.dri.edu.

Wright, W. (1979). Petroleum Geology of the Permian Basin: West Texas Geological Society Publication 79-71, 98 p.

Yancey, K. E. (2015, July 2). Nuclear plant value dispute likely headed to court. *Kewaunee County Star-News* .

Yankee, M. (2016). *Maine Yankee Decommissioning Overview*. Retrieved February 22, 2016, from http://www.maineyankee.com/overview/default.htm

CHAPTER 10

LIST OF PREPARERS

10.0 List of Preparers

The organizations and individuals listed below are the principal contributors to the preparation of this ER.

10.1 Waste Control Specialists LLC

J. Scott Kirk, CHP
Vice President of Licensing & Regulatory Affairs

Renee Murdock, MBA
Regulatory Compliance Analyst

Miranda Vesely
Regulatory Compliance Analyst

Roy King
Manager of Facility Compliance

Annette Haynes
Senior Project Manager

Ben Mason, P.E.
Director of Engineering

Jenny Caldwell, P.G.
Geologist

Jay Cartwright
Director of Health and Radiation Safety and Radiation Safety Officer

Travis Matthews
Health Physicist

Sheila Parker
Director of Environmental

John Hultman
Geologist

Richard Wyckoff
Environmental Manager

10.2 Jacobi Consulting

L. Richard Jacobi, P.E., J.D
Consultant

10.3 Easton Consulting

Earl Easton
Transportation Consultant

10.4 AREVA

Michael McMahon
Vice President

Jack Boshoven
Senior Project Engineer

10.5 NAC International Inc.

Jeff Dargis
Project Manager

10.6 Risk Assessment Corporation

John Till, Ph.D.
President

Helen Grogan, Ph.D.
Senior Technical Director

Kathleen Meyer, Ph.D.
Environmental Science Specialist

Justin Mohler, MS
Data Program Manager

Art Rood, MS
Data Analyst and Environmental Manager

James Rocco
GIS Specialist

10.7 Cox|McLain Environmental Consulting, Inc.

Michael Bomba, Ph.D.
Senior Economist

Bob Bryant
Word Processor/Editor

Chris Dayton, Ph.D., RPA
Senior Archeologist

Sara Laurence
GIS Analyst

Tom Ludwig, MLA
Environmental Scientist

Jesus Mares
Environmental Scientist

L. Ashley McLain, AICP
Senior Planner, Socioeconomics Task Manager

Emily F. Reed
Historian

Haley Rush, MA, RPA
Project Archeologist/Lab Director

Steven Schooler, MA
Archeologist

Heather Stettler, Ph.D., RPA
Technical Editor

David M. Young
Senior Project Manager

Courtney H. Filer, AICP
Senior Planner

10.8 Boston Government Services

Ruth Weiner, Ph.D.
Transportation Consultant

10.9 AECOM

Ivan Wong
Principal Seismologist/Vice-President

Patricia Thomas, Ph.D.
Senior Earthquake Engineer

Mark Dober
Project Seismologist

Melanie Walling, Ph.D.
Senior Earthquake Engineer

Jacqueline Bott
Senior Seismologist

Eliza Nemser, Ph.D.
Senior Seismic Geologist

Melinda Lee
Project Administrator

Katrina Anderson
Nuclear Quality Assurance Manager

10.10 Pacific Engineering & Analysis

Walter Silva, Ph.D.
Principal Seismologist

Bob Darragh, Ph.D.
Senior Seismologist

10.11 University of Texas

Kenneth H. Stokoe, Ph.D.
Department of Civil Engineering

10.12 Cook Joyce Inc.

Cathy McGee, P.E.
President