

WCS Consolidated Interim Spent Fuel  
Storage Facility  
Environmental Report  
  
(Public Version)

Docket Number 72-1050

Revision 0

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**WASTE CONTROL SPECIALISTS LLC**  
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**List of Abbreviations:**

| <b>Acronym</b> | <b>Long Form</b>                              |
|----------------|-----------------------------------------------|
| ACEC           | Area of Critical Environmental Concern        |
| AFCI           | AFCI Texas, LLC                               |
| ALARA          | As Low as Reasonably Achievable               |
| AMP            | Aging Management Program                      |
| APE            | Area of Potential Effects                     |
| AVLIS          | Atomic Vapor Laser Isotope Separation         |
| BLM            | Bureau of Land Management                     |
| BMP            | Best Management Practices                     |
| BTU            | British Thermal Unit                          |
| CAS            | Central Alarm Station                         |
| CDE            | Committed Dose Equivalent                     |
| CEDE           | Committed Effective Dose Equivalent           |
| CESQG          | Conditionally Exempt Small Quantity Generator |
| CFR            | Code of Federal Regulations                   |
| CGP            | Construction General Permit                   |
| CISF           | Consolidated Interim Storage Facility         |
| CMC            | Carlsbad Medical Center                       |
| CMEC           | Cox McLain Environmental Consulting, Inc.     |
| CoC            | Certificate of Compliance                     |
| CT             | Census Tract                                  |
| CTA            | Council of Texas Archaeologists               |
| CWF            | Compact Waste Disposal Facility               |
| D              | Absorbed Dose                                 |
| DART           | Days Away from Work Rate                      |
| dB             | Decibel                                       |
| DE             | Dose Equivalent                               |
| DHHS           | Department of Health and Human Services       |
| DOE            | Department of Energy                          |
| DOI            | Department of the Interior                    |
| DOT            | Department of Transportation                  |

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|         |                                                  |
|---------|--------------------------------------------------|
| ED      | Effective Dose                                   |
| EDE     | Effective Dose Equivalent                        |
| EIS     | Environmental Impact Statement                   |
| ELEA    | Eddy-Lea Energy Alliance                         |
| EMR     | Experience Modifier Rate                         |
| EPA     | Environmental Protection Agency                  |
| EPRI    | Electric Power Research Institute                |
| ER      | Environmental Report                             |
| ESA     | Environmental Site Assessment                    |
| FEIS    | Final Environmental Impact Statement             |
| FEMA    | Federal Emergency Management Agency              |
| FWF     | Federal Waste Disposal Facility                  |
| GAO     | Government Accountability Office                 |
| GEIS    | Generic Environmental Impact Statement           |
| GISF    | Generic Interim Storage Facility                 |
| H       | Equivalent Dose                                  |
| HSM     | Horizontal Storage Module                        |
| HSR9    | Health Service Region 9                          |
| HUD     | U.S. Department of Housing and Urban Development |
| IC NCDU | In-Cell Non-Containerized Disposal Unit          |
| ICRP    | International Commission on Radiation Protection |
| ISFSI   | Independent Spent Fuel Storage Installation      |
| ka      | thousand years ago                               |
| LLRW    | Low-Level Radioactive Waste                      |
| LRMC    | Lea Regional Medical Center                      |
| Ma      | million years ago                                |
| MDC     | Minimum Detectable Concentration                 |
| MTU     | metric tons of uranium                           |
| NAAQS   | National Ambient Air Quality Standards           |
| NBS     | National Bureau of Standards                     |
| NEF     | National Enrichment Facility                     |
| NEI     | Nuclear Energy Institute                         |

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|        |                                                      |
|--------|------------------------------------------------------|
| NEPA   | National Environmental Policy Act                    |
| NHPA   | National Historic Preservation Act                   |
| NMCRIS | New Mexico Cultural Resources Information System     |
| NOAA   | National Oceanic and Atmospheric Administration      |
| NOI    | Notice of Intent                                     |
| NPP    | Nuclear Power Plant                                  |
| NRC    | Nuclear Regulatory Commission                        |
| NRCS   | Natural Resources Conservation Service               |
| NRHP   | National Register of Historic Places                 |
| NWPA   | Nuclear Waste Policy Act                             |
| NWS    | National Weather Service                             |
| OCA    | Owner Controlled Area                                |
| OCAW   | Oil, Chemical and Atomic Workers International Union |
| OSE    | Office of the State Engineer                         |
| OSHM   | Official State Historical Markers                    |
| OSL    | Optically Stimulated Luminescent dosimeters          |
| PFS    | Private Fuel Storage                                 |
| POTW   | Publically Owned Treatment Works                     |
| QA     | Quality Assurance                                    |
| QC     | Quality Control                                      |
| QRA    | Quivira Research Associates                          |
| RBE    | Relative Biological Effect                           |
| RCRA   | Resource Conservation and Recovery Act               |
| REC    | Recognized Environmental Conditions                  |
| REMP   | Radiological Environmental Monitoring Program        |
| RML    | Radioactive Material Licenses                        |
| ROI    | Region of Interest                                   |
| RTHL   | Recorded Texas Historic Landmarks                    |
| SAL    | State Antiquities Landmarks                          |
| SAR    | Safety Analysis Report                               |
| SDWA   | Safe Drinking Water Act                              |
| SHPO   | State Historic Preservation Officer                  |

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|        |                                                          |
|--------|----------------------------------------------------------|
| SIA    | Socioeconomic Impact Assessment                          |
| SNF    | Spent Nuclear Fuel                                       |
| SONGS  | San Onofre Nuclear Generating Station                    |
| SPCC   | Spill Prevention, Control, and Countermeasures Plan      |
| STEERS | State of Texas Environmental Electronic Reporting System |
| SVBG   | Skull Valley Band of Goshute Indians                     |
| SWPPP  | Stormwater Pollution Prevention Plan                     |
| TARL   | Texas Archeological Research Laboratory                  |
| TCEQ   | Texas Commission on Environmental Quality                |
| TCR    | Texas Cancer Registry                                    |
| TEDE   | Total Effective Dose Equivalent                          |
| THC    | Texas Historical Commission                              |
| TLD    | Thermoluminescent Dosimeters                             |
| TNMR   | Texas and New Mexico Railway                             |
| TPDES  | Texas Pollution Discharge Elimination System             |
| TRC    | Total Recordable Case                                    |
| TSAR   | Technical Safety Analysis Report                         |
| TSCA   | Toxic Substance Control Act                              |
| USACE  | U.S. Army Corps of Engineers                             |
| USFWS  | U.S. Fish and Wildlife Service                           |
| USGS   | U.S. Geological Service                                  |
| UST    | Underground Storage Tanks                                |
| USW    | United Steelworkers Union                                |
| VCC    | Vertical Concrete Casks                                  |
| WCS    | Waste Control Specialists                                |
| WIPP   | Waste Isolation Pilot Plant                              |
| WQCC   | Water Quality Control Commission                         |
| WRCC   | Western Regional Climate Center                          |



**CONSOLIDATED INTERIM SPENT FUEL STORAGE FACILITY  
DOCKET NO. 72-1050**

**ENVIRONMENTAL REPORT**

**WASTE CONTROL SPECIALISTS LLC**  
ANDREWS COUNTY, TEXAS



**AMERICA'S NUCLEAR SOLUTION**

**CHAPTER 1**

**INTRODUCTION OF THE ENVIRONMENTAL REPORT**

**1.0 INTRODUCTION**

Waste Control Specialists LLC (WCS) has prepared a license application for a Consolidated Interim Storage Facility (CISF) for approval by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the requirements specified in Title 10 of the Code of Federal Regulations (CFR), Part 72, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor- Related Greater Than Class C Waste*. On the currently controlled WCS property of 5,666 ha (14,000 acres) in Andrews County, Texas the CISF would be constructed and operated on an approximately 41 ha (100 acre) initial footprint within an approximately 130 ha (320 acre) parcel where security would be maintained.

WCS has prepared this Environmental Report (ER) to evaluate the radiological and non-radiological impacts associated with the construction and operation of the CISF for Spent Nuclear Fuel (SNF) and Reactor-Related Greater than Class C Low-Level Radioactive Waste (LLRW) (henceforth referred to collectively as SNF) in Andrews County, Texas. WCS is currently requesting authorization to possess and store 5,000 Metric Tons of Uranium (MTUs), which includes a small quantity of mixed oxide fuel. If the requested license is issued by the NRC, WCS anticipates subsequently requesting an amendment to the license to request authorization to possess and store an additional 5,000 MTUs of SNF for each of seven subsequent expansion phases to be completed over the course of 20 years. Ultimately, WCS anticipates that 40,000 MTUs of SNF would be stored at the CISF upon completion of all eight phases. Therefore, this report analyzes the environmental impacts of possession and storage of 40,000 MTUs of SNF.

This ER was prepared to support a License Application for review and approval by the NRC pursuant to the requirements specified in 10 CFR Part 72.34 and in 10 CFR 51.61, *Environmental Report—Independent Spent Fuel Storage Installation (ISFSI) or Monitored Retrievable Storage Installation (MRS) license*. WCS prepared this ER consistent with the guidance provided in two regulatory documents:

- Regulatory Guide 3.50, *Standard Format and Content for A Specific License Application for an Independent Spent Fuel Storage Installation or Monitored Retrievable Storage Facility* (NRC, 2014c)
- NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NRC, 2003)

WCS anticipates that the NRC would issue the Final Environmental Impact Statement (FEIS) and License by June 2019. Phase 1 construction would begin after issuance of the license and after WCS successfully enters into a contract for storage with the U.S. Department of Energy (DOE). Construction is estimated to take approximately one year to complete. Both construction and preoperational testing are expected to be complete by December 2020. WCS anticipates continued storage for approximately 60 years or until a final geologic repository is licensed and operating in accordance with the Nuclear Waste Policy Act (NWPA) of 1982, as amended.

### History and Background

Since 1997, WCS has been licensed and authorized to treat, store, and dispose of certain types of radioactive materials at its facilities located in Andrews County, Texas. WCS is authorized to dispose of Class A, B, and C LLRW at the Texas Compact Waste Disposal Facility and the Federal Waste Disposal Facility (TCEQ, 2015a). WCS is also authorized to dispose of 11e.(2) byproduct materials at its Byproduct Material Disposal Facility (TCEQ, 2015b). These activities are regulated by the Texas Commission on Environmental Quality (TCEQ) under regulations determined to be compatible with NRC requirements, pursuant to Section 274 of the Atomic Energy Act of 1954, as amended.

The U.S. Congress enacted the NWPA of 1982 charging the DOE with developing a geologic repository for the disposal of SNF generated by commercial nuclear power plants located throughout the U.S. In 1987, Congress amended the NWPA to streamline and focus waste management on developing the geologic repository at Yucca Mountain, located in Nye County, Nevada. Pursuant to the NWPA, the DOE was responsible for licensing Yucca Mountain with operations beginning on January 31, 1998.

On July 23, 2002, President George W. Bush approved Congressional legislation designating Yucca Mountain as the final geologic repository intended for the disposal of commercial SNF and high level waste generated by the federal government. The DOE submitted a license application to the NRC for authorization to construct and operate Yucca Mountain. The NRC

reviewed the license application and issued a series of Safety Evaluation Reports addressing the long-term environmental performance of Yucca Mountain. However, much uncertainty remains as to whether or not the facility will open and begin accepting commercial SNF or high level waste for disposal.

In January 2010, President Barack Obama established the Blue Ribbon Commission on America's Nuclear Future. The Commission was directed by the Secretary of Energy to conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle and to recommend a new strategy. On January 26, 2012, the Blue Ribbon Commission issued a final report consisting of eight key recommendations. Of paramount importance to this licensing action was the Blue Ribbon Commission's recommendation to adopt a new consent-based approach to siting future nuclear waste management facilities in order to initiate prompt efforts to develop one or more consolidated storage facilities (Blue Ribbon Commission on America's Nuclear Future, 2012).

Development of the CISF has strong support from the state, regional, and local communities located in west Texas. In March 2014, Texas Governor Rick Perry called for a Texas solution for SNF generated at 6 reactor sites located in the state (Perry, 2014). On September 19, 2014, the Texas Radiation Advisory Board also issued a position stating it is in the state's best interest to request that the federal government consider Texas as a CISF site (TRAB, 2014). On January 20, 2015, the Andrews County Commissioners unanimously approved a resolution in support of establishing an Independent Spent Fuel Storage Installation (ISFSI) in Andrews County, Texas, for the consolidated interim storage of SNF and high level radioactive waste (Andrews County, 2015) (Attachment 1-1).

Governor Perry asked state leadership to consider the interim storage of SNF in Texas based on a study conducted by the TCEQ. The report, *Assessment of Texas' High Level Radioactive Waste Storage Options*, published in March 2014 states that interim storage of SNF would "Reduce the cost verses storage at 77 sites, increase safety and security, allow the DOE to take title to the SNF sooner and help the DOE to optimize the thermal loading of the HLW into the repository" (TCEQ, 2014) (Attachment 1-2).

The report prepared by TCEQ (2014) addressed the previous efforts by Private Fuel Storage to construct and operate an ISFSI licensed under 10 CFR 72 that was to be located on the Skull Valley Indian Reservation in Tooele County, Utah. While the NRC issued a license authorizing

construction and operation of the ISFSI in February 2006, actions by the Department of the Interior (regarding right-of-way for rail access to the site) and the Bureau of Indian Affairs (regarding uncertainties over land trust issues) precluded the facility from becoming operational (Federal Register, 2006).

The Private Fuel Storage facility was designed and licensed to store up to 40,000 MTUs of spent fuel in sealed metal casks (approximately 4,000 storage casks) for a term of 20 years. The environmental impacts for these major licensing actions were thoroughly evaluated and discussed in *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 the Goshute Indians and Related Transportation Facility in Tooele County, Utah*, NUREG-1714, published in December 2001 (NRC, 2001).

The NRC directed staff to develop a waste confidence decision and promulgated the Continued Storage Rule supported by an environmental impact statement (SRM-COMSECY-12-0016) (NRC, 2012). As such, the NRC completed a *Generic Environmental Impact Statement (GEIS) for Continued Storage of Spent Nuclear Fuel* (NUREG-2157) (NRC, 2014a) that addressed the impacts attributable to continued storage of SNF. The report was needed by the NRC to fulfill its responsibilities under the National Environmental Policy Act (NEPA) (NRC, 2014a). The environmental impacts evaluated 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.

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

### **1.1 Purpose And Need For The Proposed Action**

The DOE has not yet developed a permanent geologic repository that would allow for the disposal of commercial SNF at Yucca Mountain in Nye County, Nevada, as required under the NWPA. The DOE was required to open the repository and begin accepting SNF for disposal at Yucca Mountain on January 31, 1998. However, the earliest estimated time by which a permanent geologic repository could be licensed and operational is 2048. The only alternative

currently available to the commercial nuclear power utilities is to continue to store SNF at an ISFSI located at an existing operating commercial nuclear reactor or at an “away-from-reactor” storage facility.

At present, 3 power plants have been shutdown and 9 nuclear power plants across the U.S. have been decommissioned (referred to hence forth as 12 decommissioned shutdown sites) to levels that would allow for unrestricted release of the site in accordance with the NRC’s License Termination Rule (10 CFR 20, Subpart E). Even though the nuclear power plants, including the spent fuel pools have been dismantled and decommissioned, the SNF remains and continues to be stored in onsite ISFSIs. Many policymakers and stakeholders in the communities that host shutdown reactors want to have the SNF removed to complete decommissioning of the site and to allow for more beneficial uses of the land.

While decommissioning activities have been completed at 9 locations across the U.S. (except for removing the SNF from dry cask storage), other financial pressures are expected to cause utilities to begin decommissioning at other commercial nuclear reactors. A CISF is needed to ensure that the SNF at these commercial reactor sites can be safely removed so that the remaining lands can be returned to greenfield status. This point is further underscored with the announcement by other electric utilities of their plans to decommission additional commercial reactors located throughout the U.S.

The nuclear power utilities continue to remain responsible for the surveillance, maintenance, emergency preparedness, and physical security of the SNF stored at their ISFSI (unless otherwise exempted by the NRC). These activities are estimated to cost each of the utilities an estimated \$6 million per year (Blue Ribbon Commission on America's Nuclear Future, 2012).

Developing a CISF in Andrews County, Texas, would serve a national strategic need by providing for an orderly transfer of SNF from the twelve shut down reactors to a safer and more secure centralized storage location (NRC, 2003). Not only would the CISF serve the needs of the 12 shutdown reactors, it would also be available to serve the needs of the existing 99 operating commercial nuclear reactors in the U.S., including those located in Texas, until a permanent repository becomes available.

## 1.2 The Proposed Action

WCS is requesting authorization to construct and operate a CISF in Andrews County, Texas (Figure 1.2-1). The CISF would be located on approximately 130 ha (320 acres) of land just north of and adjacent to the WCS LLRW Disposal Facilities licensed by the TCEQ in accordance with Texas Radioactive Material License No. R04100 (TCEQ 2015a) (Figure 1.2-2).

WCS is requesting authorization to store up to 5,000 MTU in Phase 1, but has analyzed the environmental impacts of storing up to 40,000 MTU at the CISF. The major benefit of the proposed actions of the Proposed Action is authorizing the receipt of the SNF currently in storage at the shutdown decommissioned reactor facilities, thus returning the land at the reactor sites to greenfield status. After the land has been returned to greenfield status the communities that hosted the commercial reactor plants would gain additional benefits as the land could be redeveloped for other purposes. Additional benefits of the Proposed Action should the NRC authorize future construction of Phases 2 through 8 and to store additional SNF is that it would provide a regulatory path forward to receive SNF from other commercial reactors that may be decommissioned in the future, as well from operating commercial reactors prior to decommissioning. Providing a regulatory path forward as described in the Proposed Action would serve as an interim storage facility until a geologic repository can be opened.

WCS would use existing dry cask storage systems currently used at several operating commercial nuclear power plants in the U.S. and abroad. These dry cask storage systems store SNF inside of sealed canisters instead of in a spent fuel pool. These dry cask storage systems are safe and confine radioactive materials, thereby minimizing the potential release of radioactive contamination into the environment.

The dry cask storage systems that would be employed at the CISF are currently licensed by the NRC in accordance with 10 CFR Part 72 and therefore comply with the NRC requirements for the independent storage of SNF. WCS anticipates the SNF would be stored at the CISF for 60-100 years before a permanent geologic repository is opened consistent with the NRC's Continued Storage Rule.

The CISF will be decommissioned at the end of facility life in accordance with 10 CFR 20, Subpart E.

Below is the anticipated schedule for the construction and operation of the proposed CISF:

- Submit License Application on April 2016
- Receive license by June 2019
- Construction of Phase 1 of the CISF begins in September 2019
- WCS commences operations in December 2020

### **1.3 APPLICABLE REGULATORY REQUIREMENTS, PERMITS, AND REQUIRED CONSULTATIONS**

Construction and operation of the CISF in Andrews County, Texas, would require several environmental permits and related plans by various federal and state regulatory agencies. Pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (40 CFR 1500-1508) enabling regulations, consultations with other federal agencies may be required, e.g. U.S. Fish and Wildlife Service (USFWS). Comments and recommendations by any affected or responsible agencies are part of the review process by the NRC. WCS has letters prepared for participating agencies and do not anticipate any administrative delays.

#### **1.3.1 United States Government**

The following is a summary of federal agencies that would be involved in the environmental approvals and consultation process for resources in their jurisdiction for the CISF project construction and operations activities proposed by WCS.

##### **1.3.1.1 U.S. Nuclear Regulatory Commission**

The NRC is responsible for the review and licensing of SNF storage facilities in accordance with 10 CFR Part 72. Submittal of a comprehensive license application, including, among other things, a Safety Analysis Report (SAR) and ER that address safety and environmental issues, is required pursuant to 10 CFR Part 72. This ER and other required plans/documents are being submitted concurrently to the NRC for its review and approval.

The transportation of spent fuel from a commercial nuclear power plant to the CISF requires a transportation package that is approved and certified by the NRC in accordance with 10 CFR



Part 71. The Certificate of Compliance (CoC) ensures the transport packages are designed to maintain confinement of the SNF during shipping and ensure there will not be any radiological release caused by a severe hypothetical accident scenarios.

The storage/transportation system vendors providing the storage and transportation packages (e.g., AREVA and NAC) must submit applications to the NRC for review and approval of a storage system and transportation package in accordance with 10 CFR Parts 72 and 71, respectively. Upon approval of such applications, the NRC would issue a CoC for the specific designs.

#### **1.3.1.2 U.S. Fish and Wildlife Service**

The CISF site would be located within the known range of two species of concern: the Texas horned lizard and the dunes sagebrush lizard.

The Texas horned lizard (*Phrynosoma cornutum*) has been reported as present on, or near, the land proposed for the CISF by previous surveys. Suitable habitat is present throughout much of the study area, and it is likely that the species is widespread in the region, as reported by previous investigators.

The dunes sagebrush lizard (*Sceloporus arenicolus*) has been reported in the area northwest of the proposed CISF. Habitat characteristics favorable for the species include open sandy blowouts near shinnery oak (Texas Conservation Plan, 2011). Since such habitat was found in much of the study area, the species might occur in the area. However, within the study area, such areas of habitat are small and isolated from each other, so no estimate of actual distribution or abundance could be made on the basis of present surveys. Areas farther to the west, north, northeast, south, and southeast of the proposed CISF have the potential to be suitable habitat. A juvenile lizard, presumably of this species, was captured, photographed, and released from a sandy blowout location approximately 4 km (2.5 mi) southeast of the proposed CISF. The habitat in which the specimen was collected is a small blowout with shinnery oak, sand sage, and soapweed with sparse grasses present at the periphery.

A nomination has been submitted to the Bureau of Land Management (BLM) to designate two public land parcels within Lea County, New Mexico as an Area of Critical Environmental Concern (ACEC) for the lesser prairie chicken (*Tympanuchus pallidicinctus*). The nearest nominated ACEC straddles Lea and Eddy Counties and is about 48 km (30 mi) northwest of the

proposed CISF site. The other nominated ACEC, which is further north, borders the northwest corner of Lea County. Currently, the BLM is evaluating this nomination and expects to make a decision within the next several years (Texas Conservation Plan, 2011).

### **1.3.1.3 U.S. Department of Transportation**

Transportation of SNF is regulated under 49 CFR Part 173, Shippers – *General Requirements for Shipments and Packagings*. Other requirements pertaining to the transportation of material to WCS are:

- 49 CFR Part 171, General Information, Regulations, and Definitions
- 49 CFR Part 172, *Hazardous Materials Tables, Special Provisions, Hazardous Material Communication, Emergency Response Information, and Training Requirements*
- 49 CFR Part 177, *Carriage by Public Highway*
- 49 CFR Part 107 Subpart G (registration/fee to DOT as a person who offers or transports hazardous materials)

### **1.3.2 State of Texas**

At the state level, the environmental permitting of the CISF, which is located on WCS property, is primarily governed by the TCEQ. The following is a summary of environmental permitting activities to be undertaken with TCEQ.

#### **1.3.2.1 Surface Water Protection**

In order to protect jurisdictional waters from pollutants that could be conveyed in construction-related storm water runoff, TCEQ enabling regulations require construction projects disturbing five or more acres of soil to secure coverage under a Texas Pollutant Discharge Elimination System (TPDES) permit authorizing construction-related storm water discharges.

The Owner Controlled Area (OCA) at the CISF is approximately 130 ha (320 acres). The CISF would require removal of vegetation in areas both within and outside of the OCA. The majority of construction-related operations at the CISF would be performed inside of the OCA. In order to protect surface water from construction-related storm water runoff for large construction activities which disturb five or more acres, or are part of a larger common plan of development that would disturb five or more acres, the TCEQ regulates the proper disposition of storm water with the Construction General Permit (CGP TXR150000). The construction operator would file

and implement a Stormwater Pollution Prevention Plan (SWPPP) and a Notice of Intent (NOI) in accordance with CGP TXR150000.

Soil disturbing activities associated with construction of the CISF inside and outside the OCA include:

- 130 ha (320 acres) for the OCA, including all facility building and storage pads
- 2 ha (5 acres) for the rail side track
- 1.2 ha (3 acres) for construction of the 1.6 km (1 mi) long site access road
- 1.6 ha (4 acres) for a construction lay down area south of the CISF

Thus, approximately 134 ha (332 acres) of soil would be disturbed during construction of the CISF and ancillary facilities on the WCS site.

The NOI would provide general information about the site such as name, location, dates, and other general information relevant to the nature of the construction activities. Provisional coverage under CGP TXR150000 begins seven days after the completed storm water permit application NOI is postmarked for delivery to the TCEQ or immediately if the completed NOI is submitted electronically using the State of Texas Environmental Electronic Reporting System (STEERS). However, prior to filing an NOI, the construction operator must complete development and preparation of the SWPPP for the permitted construction site according to the provisions of this general permit. The SWPPP must include appropriate controls and measures to reduce erosion and discharge of pollutants in stormwater runoff from the construction support activities. The construction operator must also ensure the proper posting at the construction site of the CGP TXR150000 General Permit required "Large Construction Site Notice".

Implementation of the SWPPP requirements would occur prior to any discharge and continue until permit termination. Within the SWPPP, there would be provisions outlining erosion and sediment controls, soil stabilization practices, structural controls, and other best management practices (BMPs) that would be employed during construction to protect offsite waters from adverse impacts from construction-related activities and mitigate any storm water runoff. The SWPPP would also outline maintenance and inspection requirements and identify BMPs for the effective management of storm water runoff.

The SWPPP would be maintained onsite throughout the construction process and would be updated as appropriate. This document would also be made available for review, upon request, to the TCEQ, NRC, and other authorized individuals.

Once construction has been completed, a separate TPDES permit is not required for the operation of the CISF since facility operations would not result in the discharge of process wastewater. In addition, facility operations are not subject to stormwater permit regulations.

A Spill Prevention, Control, and Countermeasures Plan (SPCC) may need to be developed since all diesel fuel storage tanks at the CISF would be placed above the ground. This fuel tank orientation may lead to the exceedance of the 40 CFR Part 112 SPCC permitting threshold, which would require the preparation of a SPCC plan prepared by a Professional Engineer. If an SPCC plan is required, it will be maintained onsite.

#### **1.3.2.2 Drinking Water and Groundwater Protection**

Drinking water needs for CISF construction activities are expected to be met by the purchase of offsite drinking water supplies. During operation activities drinking water needs are expected to be met by using the drinking water from the adjacent existing disposal facility's potable water system, with a secondary option to install a new potable water system dedicated to the CISF.

In the unlikely event that new well drilling is selected, all applicable Safe Drinking Water Act (SDWA) enabling regulations associated with treatment to ensure meeting National Primary Drinking Water Standards for non-transient, non-community drinking water systems would be met.

Sanitary wastewater generation during CISF construction is not expected as the use of portable toilets is likely, although use of sewage collection tanks, as planned for the operations phase is another option. During CISF operation it is expected that sanitary wastewater would be disposed of using two sewage collection tanks and underground digestion tanks similar to septic tanks but with no leach field. After testing the waste in the collection tanks to ensure release criteria in 30 TAC 336.359 and 30 TAC 336.215 are met, the sewage would be disposed of at a Texas Publicly Owned Treatment Works (POTW).

### **1.3.2.3 Preservation of Air Quality**

Construction and operations activities at the CISF are not expected to have any measurable impact on the local air quality since no significant criteria or hazardous air pollution emissions would occur. Gaseous criteria pollutant emissions at the CISF are limited to small propane space heating furnaces, a standby emergency diesel generator, a fire pump diesel engine, heavy haul trucks, cask transporters and workers' private vehicles.

Small space heating sources of air pollutants less than one million British Thermal Unit (BTU) per hour heat input are exempt from applicable air quality regulations. The emergency and fire pump diesel engines, which are non-construction stationary sources of air pollutants smaller than 150 kW and not operating more than 250 hours per year, would not trigger any new source review requirements. Moreover, the heavy haul trucks, transporters, and private vehicles are considered mobile sources, which are not regulated by the TCEQ.

Any potential air quality-related impacts associated with construction of the CISF would result from gaseous pollutant emissions from diesel-powered construction equipment and from fugitive dust emissions from excavation activities and construction equipment. However, for a project of this size, steps need to be taken to minimize fugitive dust emissions. Accordingly, a BMP Emissions Control Plan would be developed to provide assurance that fugitive dust emissions would be effectively managed and minimized throughout all of the construction phases of the project. This BMP Emission Control Plan would include dust control techniques, such as watering and/or chemical stabilization of potential dust sources. WCS would obtain from the TCEQ any required air permits to support construction and operations at the CISF.

There are no expected airborne effluents of radionuclides from normal operations at the CISF. Accordingly, airborne effluent monitoring should not be required.

Refrigerants used for air conditioning at the CISF would consist of Class II refrigerants (i.e., non-ozone depleting substances). Therefore, permits for Clean Air Act Title VI, Stratospheric Ozone Protection, relative to the usage and storage of refrigerants would not be required.

### **1.3.2.4 Pollution Prevention and Waste Management**

The CISF project is committed to pollution prevention practices and would incorporate all TCEQ pollution prevention goals, as identified in 30 TAC 335. Non-hazardous wastes from construction activities would be disposed of appropriately. During operations, the small

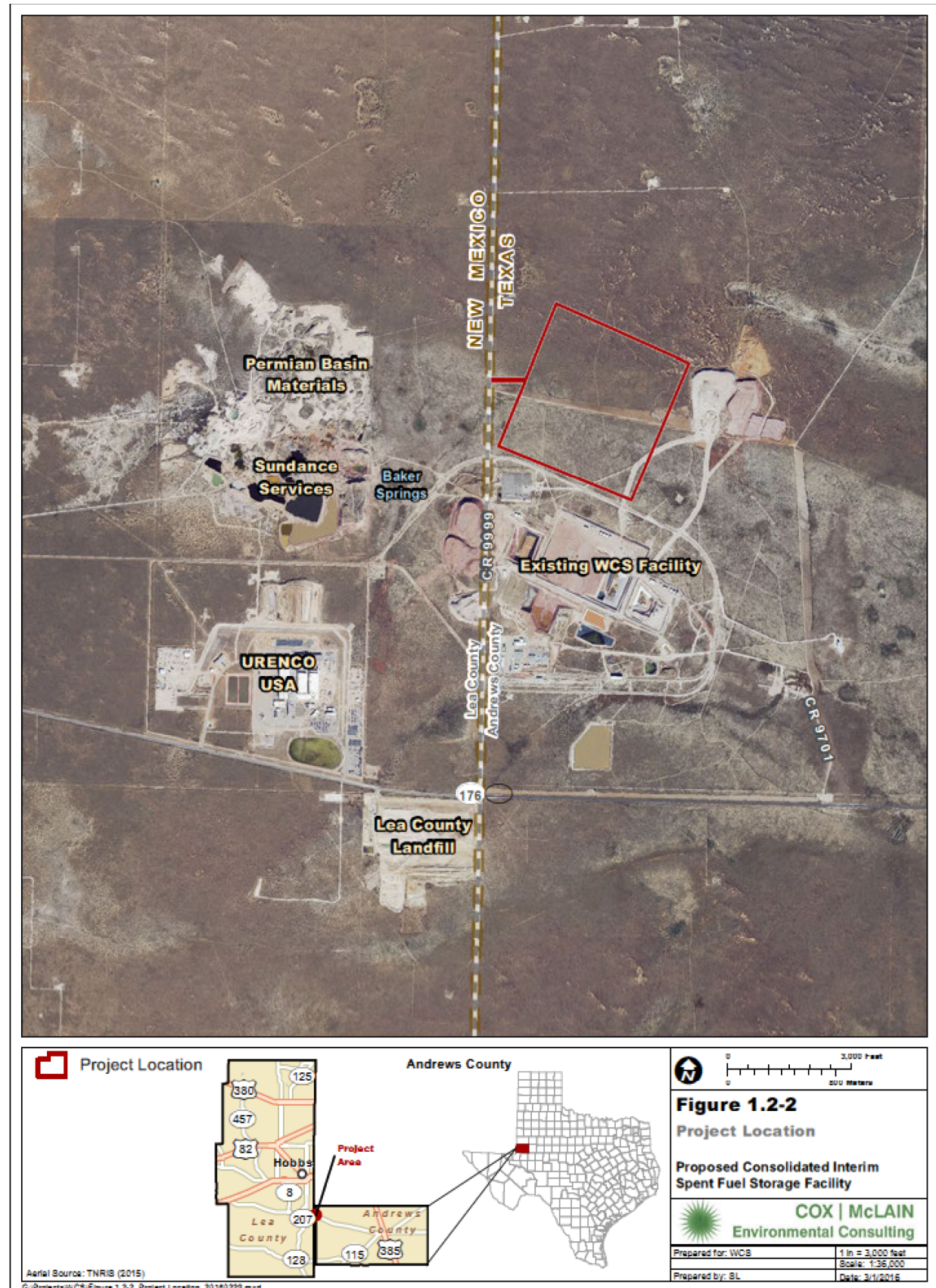
quantities of waste generated in the health physics lab and the potentially hazardous materials, such as lead, dye-penetrant materials (i.e., phosphorescent materials), hydraulic fluids, and miscellaneous lubricants used at the CISF, would be appropriately handled and disposed of. The small quantities of hazardous wastes that would be generated are expected to be much less than 100 kg/month. Thus, the CISF would qualify as a Conditionally Exempt Small Quantity Generator (CESQG). All hazardous wastes that are generated would be identified, stored, and disposed of in accordance with state and federal requirements applicable to CESQGs. Since the CISF design does not include Underground Storage Tanks (USTs), no UST registration with TCEQ would be required.

#### **1.3.2.5 Historic and Archeological Resources**

Because licensing of the CISF would be a federal action by NRC, Section 106 of the National Historic Preservation Act (NHPA) applies to the project. Coordination with the Texas Historical Commission (THC) and New Mexico State Historic Preservation Office (SHPO) has been completed for the CISF and a buffer area around the anticipated construction area. An archeological survey of the proposed facility was completed and no significant sites were identified within the area surveyed. Should the impacted area change, additional archeological investigations could be warranted. See the Socioeconomic Impact Assessment (SIA) and attachments, 2015 (Appendix A).









**CHAPTER 2**  
**ALTERNATIVES**

**2.0 INTRODUCTION**

This chapter describes the proposed action discussed in Section 1.2 of this ER and the alternatives to the proposed action. WCS evaluated reasonable alternatives to the Proposed Action to ensure consideration of alternate options in accordance with NEPA requirements.

Two alternatives, the No Action Alternative and the Proposed Action are analyzed in detail in this ER. Other alternatives that alter the design or location of the project were identified, but were ultimately not carried forward for detailed analysis. Those alternatives, and the reasons for eliminating them from detailed consideration, are presented in Section 2.4. The range of alternatives considered was based on the constraints of technical design requirements, the presence/absence of public and governmental support for a CISF, and on meeting the need to provide a safe option for storing SNF for 60-100 years or until a permanent geologic repository is licensed, constructed, and operating pursuant to the requirements of the NWPA.

This chapter also presents the potential cumulative impacts of past, present, and reasonably foreseeable future actions in the environs of the proposed action.

**2.1 No Action Alternative**

The no action alternative for WCS would be to not construct and operate the CISF. Under the no action alternative, the NRC would not approve the license application to construct and operate the proposed facility. Accordingly, WCS would be allowed to pursue other alternative uses for the land just north of its LLRW Disposal Facilities. Additionally, commercial reactor sites that have already undergone site-wide decommissioning would be required to continue storing SNF onsite until another away-from-reactor ISFSI is available or a permanent geologic repository is ultimately licensed, constructed, and operating. It is estimated that the earliest time by which a geological repository could become available for permanent disposal of SNF would be 2048.

Under the no action alternative, commercial reactors that have already undergone decommissioning would be required to operate their ISFSIs in accordance with regulatory and

license requirements and maintain a physical security program to ensure that the SNF remains adequately protected against potential malevolent acts.

Additionally, the shutdown decommissioned reactor sites would not be returned to a greenfield condition and the land could not be further developed in a manner that is most beneficial to the local communities. These local communities would be required to continue to host an ISFSI even if such action was not the preference of community members.

Existing commercial nuclear reactors that are currently operating would be required to construct new or expand existing ISFSIs to accommodate the need to store used fuel that is currently stored in spent fuel pools. As such, safety controls would be required by the NRC to protect against leaks and potential spent fuel fires. Additionally, the operational commercial reactors would similarly be required to expend resources to maintain their existing physical security programs to protect the used fuel from potential malevolent acts.

Under the No Action alternative, a decision by the NRC not to approve the WCS license would constitute inaction in response to the Commission's rulemaking on the Continued Storage of SNF and the recommendations from the President's Blue Ribbon Commission on America's Nuclear Future to promote efforts to develop one or more consolidated storage facilities in the U.S. The No Action alternative would not meet the purpose of and need for the proposed action (BRC, 2012).

## **2.2 PROPOSED ACTION**

The proposed action, as described in Section 1.2 of the ER, is the issuance of an NRC license under 10 CFR 72 authorizing the construction and operation of a CISF located on approximately 130 ha (320 acres) of land controlled by WCS in Andrews County, Texas. The proposed action continues the receipt, possession and storage of up to 40,000 MTU of SNF at the CISF.

### **2.2.1 Description of the Proposed Site**

The proposed site is located north of the LLRW Disposal Facility controlled by WCS, approximately 52 km (32 mi) west of Andrews, Texas. The protected area of the CISF comprises approximately 41 ha (100 acres) that will be encompassed by approximately 5,666 ha (14,000 acres) of land controlled by WCS. The center of the CISF is at latitude 32°27'09"

north and longitude 103°03'23" west. The facility and regional area of interest (the area within a 48 km [30 mi] radius around the proposed CISF site) are presented in Figure 2.2-1.

The CISF is located approximately 2 km (1.25 mi) north of Texas State Highway 176 and just east of the Texas/New Mexico state line and State Line Road, also designated Andrews County Road 9998. The topography is relatively flat and slopes gently upwards from Texas State Highway 176 towards the north. The elevations range from approximately 1,041 m (3,416 feet) to 1,065 m (3,496 feet) above msl.

A railroad loop encompasses the WCS site and is currently used to transport radioactive waste to the site. Shipments of used fuel will be routed eastward from Eunice, New Mexico to the CISF on the railroad loop which is controlled and maintained by WCS. Aerial views of WCS depicting the CISF location are provided in Figure 2.2-2. As shown in Figure 2.2-3, no highways or railroad lines cross the CISF site. There are also no pipelines crossing the CISF site. Maps showing rail access to the CISF are provided in Figures 2.2-4 and 2.2-5, and a proposed rail sidetrack into the CISF is shown in Figure 2.2-6. Additional information on the connected environmental impacts associated with SNF transport from shutdown decommissioned reactors, the transportation corridors, and the CISF rail spur can be found in Sections 3.2.1, 3.2.2 and 3.2.3 respectively.

Outside of the WCS footprint, industries include gravel and caliche mining, oil and gas production, landfill operations, cattle and ranching. Louisiana Energy Services operates the National Enrichment Facility (NEF) as URENCO, USA, about 1.6 km (1 mi) southwest of the site, under license by the NRC. Other businesses in proximity to the WCS property include Permian Basin Materials; Sundance, Inc.; and DD Landfarm located about 1.6 km (1 mi) northwest and west of the proposed CISF. The majority of the remaining land in the vicinity of the proposed CISF is used for ranching activities (livestock grazing), oil and gas production, or is unused land. The Lea County, New Mexico Landfill occupies approximately 16 ha (40 acres) and is located about 2 km (1.25 mi) south-southwest of the proposed CISF.

WCS currently operates a facility to store and treat hazardous waste, including mixed Class A, B, C, and Greater than Class C LLRW, regulated under the Resource Conservation and Recovery Act (RCRA). This facility also disposes of hazardous waste along with low activity radioactive waste that has been exempted by the TCEQ. WCS also operates a facility authorized to dispose of 11e.(2) byproduct materials. Additionally, WCS operates two facilities

authorized to dispose of Class A, B, and C LLRW. The two facilities are referred to as the Compact Waste Disposal Facility (CWF) and Federal Waste Disposal Facility (FWF). The CWF serves the Texas Compact (Texas and Vermont) and the FWF serves the DOE. Each of these facilities is located south of the CISF. A storage pad is located just to the northwest of FWF and is used to support waste storage and offloading operations.

The location where the CISF would be constructed is currently vacant, undeveloped land. It is located just east of the Texas State Line Road that separates Texas and New Mexico, on property controlled by WCS.

Just to the southwest of the proposed CISF are large spoil piles consisting of soils that were excavated by WCS to support construction of the 11e.(2) byproduct materials and hazardous waste landfill. These soils are currently used to support maintenance of the private roads controlled and used by WCS. In the future, WCS plans to use the soils to close the existing landfills. Electrical power lines currently traverse the area to the west of the proposed CISF in a north-south direction.

Baker Spring is located about 1.6 km (1 mi) to the southwest of the proposed CISF and is typically dry, except during periods of rain (Figure 2.2-7). It is currently sampled when water is present as part of WCS' Environmental Monitoring Program as required pursuant to Radioactive Material License No. R04100 issued by the TCEQ.

The nearest resident is located approximately 6 km (3.8 mi) to the west of the CISF, just east of Eunice, New Mexico. The center of Eunice is about 10 km (6 mi) west of the WCS site. The city of Hobbs, New Mexico had a population of approximately 34,122 persons in 2010 according to the U.S. Census Bureau and is located northwest of the CISF. Eunice, New Mexico had 2,922 persons in 2010. The city of Andrews, Texas, with a population of approximately 11,088 in 2010, is located approximately 52 km (32 mi) to the east/southeast of the CISF. The nearest, largest population center; Midland-Odessa, Texas is located to the southeast, about 103 km (64 mi) from the CISF with a population over 278,000 (Appendix A).

### **2.2.2 Description of the Facility**

The CISF would be constructed in eight phases over 20 years on approximately 130 ha (320 acres) of land just north of the CWF and FWF.

The CISF will include SNF storage systems licensed under 10 CFR 72, SNF storage pads, a Cask Handling Building used to offload spent nuclear fuel canisters licensed under 10 CFR 71, a Security And Administration Building, and a railroad side track. The complex may also include a concrete batch plant, if needed. More detailed descriptions of the facility components, as well as additional design features, can be found in Section 4.1, *Installation Design*, Section 1.2, *General Description of Installation*, and Section 1.3, *General Description of Systems and Operations* in the SAR.

### 2.2.2.1 SNF Storage Systems

Currently, the NRC has licensed and approved SNF storage systems owned by AREVA, NAC International, HOLTEC International, and EnergySolutions. Each of these systems is engineered to safely store spent fuel for 50 years or longer and this time can be extended almost indefinitely through rigorous inspections, aging management programs, maintenance, and re-licensing. SNF is stored horizontally in the AREVA systems, vertically in both the NAC International or Holtec International systems, and either horizontally or vertically in the EnergySolutions system.

Approximately 80% of the SNF (approximately 4,000 MTU) currently stored at 12 decommissioned shutdown sites is in either AREVA NUHOMS® or NAC International systems. WCS has teamed with AREVA and NAC International to provide a safe alternative to store up to 40,000 MTUs of SNF at the CISF. Both NUHOMS® and MAGNASTOR® systems owned by AREVA and NAC International, respectively, would be used for storing SNF at the CISF. The NRC has approved both of these SNF storage systems for use at existing commercial nuclear power plants located across the U.S. Additionally, both the NUHOMS® and MAGNASTOR® systems are licensed by the NRC for storage of SNF transported in canisters pursuant to the requirements in 10 CFR 71.

The NUHOMS® and MAGNASTOR® systems were selected for two primary reasons. First, AREVA and NAC International provided WCS with proprietary information about the storage systems, including the requirements and technical specifications. This level of detail is essential to preparing a detailed SAR and ER. Second, since these two systems account for 80% of the stored SNF, utilizing these systems is the best way for WCS to support DOE's mission to remove the SNF from 12 decommissioned shutdown sites located across the DOE's goal is presented in a report entitled, *Strategy for the Management and Disposal of Used Nuclear Fuel*

*and High Level Radioactive Waste* (DOE, 2013b). Removal of SNF at these commercial nuclear reactor sites is needed to complete the decommissioning and allow the former reactor facilities to be returned to a greenfield status.

A listing of the 12 decommissioned shutdown sites is provided in Table 2.2-1 (also see Figure 2.2-8).

**Table 2.2-1 Listing and Location of Shutdown Decommissioned Reactor sites**

| Site               | County            | State |
|--------------------|-------------------|-------|
| Big Rock Point     | Charlevoix County | MI    |
| Connecticut Yankee | Middlesex County  | CT    |
| Crystal River      | Citrus County     | FL    |
| Humboldt Bay       | Humboldt County   | CA    |
| Kewaunee           | Kewaunee County   | WI    |
| LaCrosse           | Vernon County     | WI    |
| Maine Yankee       | Lincoln County    | ME    |
| Rancho Seco        | Sacramento County | CA    |
| San Onofre         | San Diego County  | CA    |
| Trojan             | Columbia County   | OR    |
| Yankee Rowe        | Franklin County   | MA    |
| Zion               | Lake County       | IL    |

### 2.2.2.2 SNF Storage Pads

The SNF storage systems will be placed on a concrete storage pad. The CISF will have a total of eight phases. Each phase will encompass an area 107 m (350 feet) wide and 244 m (800 feet) long. Each phase is sized to hold approximately 5,000 MTU for a total facility capacity of 40,000 MTU when all eight phases are complete. Within each phase there will be a series of concrete storage pads and vehicle approach aprons. The concrete pads will be 46 to 91 cm (18 to 36 in) thick, depending on specific load conditions and design requirements.

Casks received from the different facilities will be stored separately, to accommodate the different types of storage systems, the characteristics of different fuel types received from the facilities, and different storage and inspection requirements.

### **2.2.2.3 Cask Handling Building**

The Cask Handling Building is where the SNF canisters will be transferred from rail cars onto transporters at WCS. The building will be approximately 46 m (150 feet) wide by 46 m (150 feet) long and will have a height of approximately 14 m (45 feet). Rail cars will enter on the west side of the building to be unloaded by an overhead 100-metric-ton crane. Once a rail car is unloaded, it will proceed forward and exit out the east side of the building. Adjacent to the rail track inside the building is space for cask staging and transporter loading. Once the transporter is loaded, it can exit the building and proceed to the appropriate storage module. The building will be tall enough to transfer casks for either horizontal or vertical storage modules. Areas are included in the building for radiological surveys of casks and transport vehicles and their cleaning and decontamination (in case contamination is discovered). Also placed in the Cask Handling Building are waste management areas and chemical storage areas for cleaning supplies needed to support these activities. There will be two 100-metric-ton overhead cranes inside the building to provide a redundant crane system for unloading casks. Preventative maintenance is performed on a regular basis on the overhead transfer cranes, transfer equipment, shipping casks, and other equipment in this building. Additional storage is provided for temporary staging of impact limiters and casks, as well as storage for maintenance tools and supplies.

### **2.2.2.4 Security and Administration Building**

The Security and Administration building is located along the west edge of the Protected Area. The western exterior wall of the building will be integral with the Protected Area fence. The single story building is divided into two major functions: security and administration. Included inside the security portion will be the surveillance and monitoring stations for the Central Alarm Station (CAS), access control, and the armory. Security personnel will monitor sensors and intrusion alarms, control employee access, process visitors into the CISF, and control rail and vehicle access to the WCS CISF facilities. The Administration portion of the building will contain offices for operations, maintenance, and material control personnel; administrative functions related to processing shipments; emergency equipment and operations; communication and tracking center/facility; training and visitor center; health physics area; records storage;

conference room; break room; and restroom facilities. Health physics will have areas in this building for operation and storage equipment and accumulation of small quantities of LLRW in a waste management area. Building dimensions are approximately 10 m (32 feet) wide by 38 m (125 feet) long of enclosed space. Specific areas of the building which house the CAS and other essential functions will be constructed with ballistic materials. Adjacent to the building will be two outdoor covered areas. The first outdoor area is outside of the Protected Area and provides a covered entrance to the Access Control portion of the building for workers and visitors. The second outdoor covered area is inside the Protected Area and provides shelter for the emergency backup generators for the facility.

#### **2.2.2.5 Railroad Side Track**

The CISF would be built adjacent to the existing WCS railroad access loop. The new side track will consist of approximately 7,000 feet of track for SNF deliveries to the CISF.

#### **2.2.2.6 Concrete Batch Plant (Optional)**

In the future, WCS may construct a concrete batch plant to facilitate storage module construction and future expansion of the site. An onsite batch plant provides operational efficiencies by making the precast concrete pieces onsite, rather than transporting them cross-country. The batch plant would be located near the southeast corner of the facility outside of the OCA Fence. Parking and waste management areas for storage of chemical reagents and additives necessary to achieve the correct concrete admixture specifications in support of operations and maintenance will likewise be outside of the OCA.

#### **2.2.2.7 Monitoring Wells**

Located within the CISF OCA are eight monitoring wells associated with the adjacent WCS disposal facilities that are gauged periodically to check for the presence of water. Five of these wells are between the CISF OCA boundary and the CISF Protected Area Boundary and three are within the CISF Protected Area Boundary. Two of the five wells that are within the CISF Protected Area Boundary are within the footprint of a late-phase CISF storage cask array and will be removed or relocated as needed as the phased CISF project construction schedule progresses. There are no pipelines crossing the CISF. At the Security and Administration Building and at the Cask Handling Building, WCS will have underground sewage tank systems that discharge into above ground, grey water holding tanks with no onsite discharge. After



testing to ensure compliance with applicable limits, the wastewater from these holding tanks will be drained or pumped for removal to an offsite POTW. There are no plans for underground tanks at the CISF other than the underground sewage tanks.

#### **2.2.2.8 Waste Management**

Waste management impacts associated with the construction of and operations at the CISF are expected to be very low. The CISF will be designed to minimize the volumes of radiological waste generated during operations and at the time of license termination. The volumes of non-radiological solid waste will also be minimized to the extent practical. Descriptions of the sources and effluent systems for each of these waste streams are discussed in Section 3.12 of this report. Disposal plans, waste minimization practices, and related environmental impacts are discussed in Section 4.13 of this report and in Chapter 6 of the CISF SAR. Environmental impacts and mitigation measures for CISF facilities and associated operations are discussed in detail in Chapters 4 and 5 of this ER, respectively, whereas radiological monitoring is described in Chapter 6 of this ER. Sections 1.2, *General Description of Installation* and Section 1.3, *General Description of Systems and Operations* of the SAR provide additional details.

### **2.3 Process For Identifying Potential CISF Site Locations**

In order to identify potential locations for a CISF site, WCS conducted a rigorous search and screening process. WCS began by identifying a Region-of-Interest (ROI) consisting of a set of states that have the basic characteristics appropriate for a CISF site. This set of states was then narrowed down to states and counties that had explicitly expressed support for siting a CISF in their area. This resulted in the identification of four counties in two states that were subjected to a rigorous two-tier screening process evaluating 15 criteria ranging from local political support and land availability to operational considerations and environmental impacts. Ultimately, this process resulted in the identification of Andrews County, Texas as the site for the Proposed Action. The other Location Alternatives were eliminated from detailed analysis. Details are provided in this section.

#### **2.3.1 Site Selection Process: Region of Interest**

WCS began the site selection process required pursuant to NEPA by identifying seven states located in the more arid western regions of the U.S. The states considered included Arizona, California, Colorado, Nevada, New Mexico, Texas, and Utah. WCS believed that selecting

states with sparsely populated areas and relatively arid climates was an important step in the site selection process due to many of the concerns about storage of SNF previously raised by people in more densely populated areas. WCS also believed that a CISF should only be located in a state that has voiced its support for hosting such a facility. Of these seven states, only stakeholders in New Mexico and Texas have expressed an interest in hosting a CISF within their borders.

In March 2014, Texas Governor Rick Perry stated his support for siting a CISF in Texas. He directed the TCEQ to prepare a report addressing the challenges posed by the presence of SNF and other High Level Waste currently stored at the four commercial nuclear power reactors in Texas. On March 28, 2014, Governor Perry, in a letter to Lieutenant Governor David Dewhurst, voiced his support for storing SNF in Texas (Perry, 2014). He also forwarded the report prepared by the TCEQ entitled, *Assessment of Texas' High Level Radioactive Waste Storage Options* (TCEQ, 2014). The TCEQ recognized that—while SNF currently stored in Texas is safe—it is not an adequate long-term solution and that a program needed to be established in a community that was willing to host such a facility (TCEQ, 2014). The TCEQ suggested that “in looking at how to successfully site a facility, one should take into account current successfully sited and built radioactive waste disposal facilities such as the Waste Isolation Pilot Plant in New Mexico for transuranic waste and the Low Level Radioactive Waste Facility in Texas.” (TCEQ, 2014)

On April 10, 2015, New Mexico Governor Susana Martinez voiced her support for a consent-based approach to locate a CISF in southeastern New Mexico, Attachment 2-1 (Martinez, 2015). She stated that such a facility was necessary given that millions of dollars of taxpayer funds were currently being spent on monitoring and oversight of SNF each year, and millions more were expended in settlement payments related to waste disposition. Governor Martinez stated that such actions are carried out in communities that were not supportive of SNF storage. Governor Martinez referenced the work that had been conducted by the Eddy-Lea Energy Alliance (ELEA) in the southeastern portion of New Mexico. She noted that residents in that area of the state had a high level of understanding of the nuclear industry and its importance to our national security. Furthermore, Governor Martinez stated that a pre-existing strong scientific and nuclear operations workforce was present in the area, and that the dry, remote region was well-suited for an interim storage site.

### **2.3.2 Site Selection Process: Counties**

WCS identified 54 counties in west Texas and 2 counties in southeastern New Mexico that merited further consideration as potential locations for the CISF. When deciding where to locate a disposal facility for LLRW in 2003, the Texas legislature had limited its search to 53 counties in west Texas (West, Chisum and W. Smith, 2003). Among other attributes, these counties had an average rainfall of less than 51 cm (20 in) annually, were located at least 100 km (62 mi) from Mexico, and were located away from certain river segments in the state, (West, Chisum and W. Smith, 2003). The Texas legislature took this approach with the intent to open a disposal facility for Class A, B, and C LLRW, having previously failed to open the Sierra Blanca facility that would have been located near El Paso, Texas. The Sierra Blanca facility failed to be licensed due, in part, to opposition from the local community, as well as by the government of Mexico. WCS believed that finding a location with a willing host community was a critical early step to identifying a location that would be suitable for a CISF in Texas and that a supportive host community would be needed to support the successful licensing of its facility for disposal of Class A, B, and C LLRW.

WCS believed that selecting a county that had voiced its support was paramount to the successful licensing of a CISF. Of the 53 counties initially listed by the Texas legislature for siting a disposal facility for Class A, B, and C LLRW, only Andrews County has voiced its support for siting a CISF. The Texas legislature did not select Loving County as a potential candidate for hosting a disposal facility for Class A, B, and C LLRW because of its proximity to certain river segments of the Devils River and the Upper and Lower Pecos Rivers. However, Loving County has since expressed its willingness to host such a facility. For this reason, WCS included Loving County for further consideration as a potential location for the CISF.

In New Mexico, both Eddy and Lea Counties were selected for further consideration as a candidate site for the CISF. The local communities in both of these counties have expressed their strong support for hosting a CISF.

Thus, WCS narrowed the analysis of a potential CISF site to four counties (Figure 2.-1). Each of the four counties in Texas and New Mexico selected for further consideration are perceived to have the required general support at the state and community level consistent with the consent-based siting philosophy as recommended by the Blue Ribbon Commission on America's Nuclear Future. Residents in these communities strongly support the nuclear industry and are willing to host facilities that process, store, or dispose of radioactive waste. Nuclear facilities already present in these communities include the DOE's Waste Isolation Pilot Plant (WIPP)

(located in Eddy County, New Mexico), the NEF operated by URENCO USA (located in Lea County west of WCS' existing operations), and WCS' processing and disposal facilities in Andrews, Texas. This region of the U.S. is often referred to as "America's Nuclear Corridor".

### **2.3.3 Site Selection Process: Factors in the Two-Tiered Screening Process**

WCS developed a two-tiered screening process for evaluating each of the four counties for the purpose of identifying the preferred site location and suitable location alternatives. Under the first screening tier, five “Go: No Go” criteria were evaluated to determine whether any county should be excluded from further consideration. Criteria 1-5 comprised the first tier of the screening process: political support for the project, favorable seismological and geological characteristics, availability of rail access, land parcel size, and land availability. Each criterion was qualitatively scored for each of the four counties. Any county that scored a “No Go” for any of these five criteria would be excluded from further consideration.

After completing the first tier of evaluations, WCS used a second tier screening process to evaluate each of the four counties in more detail. Criteria 6 through 10 assessed Operational Needs and Criteria 11 through 15 assessed Environmental Considerations. For the second tier screening process, a score of 0 to 100 was assigned to multiple scoring factors for each criterion.

Descriptions of all criteria are provided below.

Criterion 1 assessed whether a county has adequate political support for a CISF, specifically whether the state and county governments had expressed an interest in siting a CISF.

Criterion 2 assessed the seismology and geology of the area to ensure that potential sites within each of the four counties were located in areas that were tectonically stable with favorable geologic characteristics.

Criterion 3 assessed the availability of rail access, which was determined to be important given the desire to transport SNF exclusively by rail. A county that could not support receipt of SNF exclusively by rail would require double handling of the SNF and additional adverse environmental impacts due to construction of the rail spur. The need to construct a spur less than 8 km (5 mi) long to connect to the rail line was considered a “Go”. Requiring transport by road or constructing a spur more than 8 km (5 mi) to a rail line was considered “acceptable”, but was not considered a substantial enough constraint to exclude the county from further consideration.

Criterion 4 assessed whether land parcels of adequate size were available in the area. Approximately 202 ha (500 acres) were expected to be required in order to provide a buffer zone around an area adequate for interim storage could store up to 40,000 MTUs of SNF.

Criterion 5 assessed whether or not the land was owned or required purchase from the current land owners.

Criterion 6 assessed the following variables on the availability of utilities:

- Electric Power Availability—This rating is based on the apparent relative availability and level of effort needed to construct electric power infrastructure needed by the CISF at the proposed site.
- Cellular and Data Towers (cell phone, internet)—It is desirable that existing service is available for dependable cell phone and internet services.
- Water Supply—It is desirable that groundwater or water from another source is readily available to provide ample water supply to the facility for both potable and processing uses.

Criterion 7 assessed the following variables, on construction labor force:

- Sufficient Labor Force—The local area has a sufficient pool of skilled construction labor to construct the facility on the desired schedule. Craft requirements include all major construction crafts (e.g., steelworkers, electricians, pipe fitters, operators, finishers, etc.).
- Competing Projects—No major construction projects of similar scope in the area will be competing for the same labor pool resources and thus substantially limit resource availability.
- Large Project Experience—To support project cost, schedule, and conformance to design basis, the CISF site applicant should possess the experience and technical qualifications needed to provide oversight of the planning and execution of a large nuclear facility construction project in accordance with ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*. A scoring of large nuclear facility construction project management experience for each site license applicant, owner, or operator is therefore provided.

Criterion 8 assessed the following variables, on operational labor force:

- Sufficient Labor Force—Sufficient supply of qualified labor that can readily be trained for operations, maintenance, technical support, and waste management.
- Multi-task Employees—Local labor rules do not prohibit or discourage multi-tasking of employees.
- Technical School/Training—Community has technical school, technical/community college, or local nuclear facility that is willing to provide candidates and training classes for the operations.
- Mature Nuclear Safety Culture—It is advantageous to safety if CISF operations, maintenance, technical support, and waste management personnel available in the area will be members of a pre-existing mature nuclear safety culture before, during, and at the start of CISF operations.
- Radiation Worker Staff—CISF site applicant pre-staffed with highly trained and experienced radiation workers (e.g., operations, maintenance, technical support, and waste management) who are permanent local residents.
- Health Physicist and Radiation Protection Organizations—It is highly desirable and significantly beneficial to as-low-as-is-reasonably-achievable (ALARA) planning and execution if the site chosen has a CISF applicant that has assembled and employed a functioning and proven team of experienced health physicists and radiation protection technicians that are established in the area as permanent local residents at CISF start-up. This need is profound due to both the importance of immediately achieving and maintaining dose ALARA and the difficulties of hiring and retaining high demand, talented employees in remote locations such as those under consideration for any CISF site.

Criterion 9 assessed the following variables on transportation routes:

- Site Railhead—It is desirable to have a railhead located at the site.
- Highway Access—Close proximity to controlled-access highways and/or interstate highways is desirable.
- Traffic Capacity—There should be traffic infrastructure for construction and operation activities, with minimal improvements required.
- Efficient Access—There should be optimal and efficient highway and rail access to support safe and reliable storage cask material, component, and other deliveries.

Criterion 10 assessed the following variables on amenities for the workforce:

- Housing—It is desirable that housing, hotels, and lodging be available for the work force, as well as recreational facilities.
- Schools—It is desirable for recruitment and retention of high quality scientific and technical CISF employees that the site selected allow for these workers to commute to residential areas in public school districts meeting state and federal accountability standards.
- Health Services—WCS will assess whether emergency room and routine medical care is reasonably available to CISF personnel, contractors, and visitors.
- Parks/Recreation/Culture—It is desirable that parks and recreational facilities be available in the CISF area for use by the workforce. It is also desirable that there be cultural activities at or near the area.

Criterion 11 assessed the following variables on environmental protection:

- Existing Site Characterization Data—It is highly preferable that site characterization surveys are available for hydrology, meteorology (rain, wind, tornadoes, temperatures, etc.), topography, archeology and protected species.
- Documentation of Presence/Absence of Contamination—It is highly preferable that the site have existing, well-documented site surveys and monitoring studies for radiological, chemical, and hazardous material contamination, and that the site not be contaminated.
- Neighboring Plume—Within the area that includes the site, it is highly preferable that no facility has existing release plumes (air or water) of hazardous material or radiation.
- Future Migration—The potential for future migration of contamination from adjoining or nearby sites should be negligible.
- No Rad Contamination—Site is not contaminated with radiological material in soil or groundwater to a level that would inhibit *licensing* or transfer of *property* with clear identification of liabilities.
- Not CERCLA or RCRA—Site is not identified as a CERCLA or RCRA site contaminated with hazardous wastes or materials.
- No Remediation Needed—Site does not have contamination that would require remediation prior to construction.
- Flood Plain—The site is not within the 500-year Flood Plain.
- Ponding—It is desirable that the natural site contours minimize the potential for localized flooding or ponding. Factors to consider include stream beds, natural and potential



runoffs, runoff from adjacent areas, storm drainage systems in place, and requirements for retention ponds.

- Protected species—The site should not be habitat for protected species (USFWS federally listed threatened or endangered species). Also, adjacent properties should have no areas designated as wildlife refuges, critical habitat, or vegetation such as rare plant species that would be adversely affected by the facility.
- Archeological and Cultural Resources—The site should have a low probability of containing archeological/cultural resources.
- Environmental Permits—Any new facility construction or operations should not be hindered by any existing environmental or other permit requirements in the area. Any required new CISF environmental permits, such as for wastewater management, should be obtainable.
- Environmental Justice—The site should have a low probability of disproportionate, adverse impacts to low-income or minority communities.

Criterion 12 assessed the following variables on discharge routes:

- Facility Discharges—Facility discharge and runoff controls can be economically implemented for minimal effect to the existing environment.
- Differentiation—For sites with extant nuclear facilities, facility discharges are readily identifiable from extant facility discharges.

Criterion 13 assessed the following variables on the proximity of hazardous operations:

- Hazardous Chemical Sites—WCS will consider the distance of the site from any facility storing, handling, or processing large quantities of hazardous chemicals.
- Gas Pipelines—WCS will consider the distance of the site from one or more large propane or natural gas pipelines.
- Airports—The site should not be located within 16 km (10 mi) of a commercial airport.
- Emergency Area—The site should be outside the general emergency area for any nearby hazardous operations facility (other than an extant nuclear-related facility).
- Air Quality—The site should not be located within 8 km (5 mi) of an operating/manufacturing facility that inhibits site air quality. In addition, the site should have high air quality. The site terrain should not limit air dispersal. Finally, the

surrounding community's air quality should be within regulatory requirements (“in attainment” of National Ambient Air Quality Standards [NAAQS]).

Criterion 14 assessed the following variables on ease of decommissioning:

- Ease of Decommissioning—Site characteristics (e.g., hydrology) do not negatively affect decommissioning activities.
- Adjacent Site's Medium/Long-Term Plans—It is desirable that planned major construction and heavy industrial activities in adjacent sites within 1.6 km (1 mi) of the site boundary are minimal over the reasonably anticipated period of CISF decommissioning.

Criterion 15 assessed the following variables on disposal of low-level waste:

- Availability to Disposal Options—Site-specific issues (e.g., availability/access to nearby facilities for disposal of low-level waste, transportation modes, etc.) do not impede disposal of low-level waste.
- Licenses and Permits—Prospective facility operator possesses the necessary Licenses and Permits for generation and storage of LLRW, RCRA, and low-level mixed waste or has the technical qualifications and means to obtain them.

### **2.3.4 Site Selection Process: Results for Andrews County, Texas**

This section presents the results of the analysis of the Andrews County, Texas location for each of the scoring criteria. Based on the results of the first tier screening process, Andrews County was carried forward for detailed evaluation of Operational Needs and Environmental Considerations (Criteria 6-15). Ultimately, based on evaluation of all criteria, Andrews County was identified as the preferred location for the Proposed Action.

#### **CRITERION 1—POLITICAL SUPPORT**

Andrews County in Texas has expressed support for a CISF facility. On January 20, 2015, the Andrews County Commissioners unanimously approved a resolution supporting siting a CISF in the county. Andrews County is considered a “Go” for political support.

#### **CRITERION 2—SEISMOLOGICAL AND GEOLOGICAL CHARACTERISTICS**

Several regional surveys have been conducted to support the siting of the WIPP, NEF, and WCS operations. These surveys demonstrated that Andrews County, Texas is tectonically stable and has suitable geological characteristics to site a CISF. Andrews County is considered a “Go” for seismological and geological characteristics.

#### CRITERION 3—AVAILABILITY OF RAIL ACCESS

Access via rail in Andrews County, Texas is excellent; an existing spur extends to the WCS property. Andrews County is considered a “Go” for availability of rail access.

#### CRITERION 4—LAND PARCEL SIZE

Over 5,666 ha (14,000 acres) are available for consideration at the WCS site in Andrews County. Andrews County is considered a “Go” for land parcel size.

#### CRITERION 5—LAND AVAILABILITY

The entire WCS property was evaluated to determine the best parcel of land to build the CISF in Andrews County, Texas. It was determined that sections 16 and 25 (Figure 2.3-2), consisting of approximately 486 ha (1,200 acres), represent the best parcels of land within the approximately 5,666 ha (14,000) acres of the WCS property. These sections of land are located close to the State Line Road between Texas and New Mexico and near the intersection of an existing private road running through the property, which would allow easy access for construction and operations. This parcel of land is also close to the rail line that already runs through the WCS property, which affords an opportunity to install a rail spur with minimal environmental impacts. Another characteristic these sections of land offer is that they are located just north of the LLRW FWF. Due to the low potential environmental impacts and low cost given the existing rail, these parcels of land with existing rail and road infrastructure represent the most feasible site location for the CISF in Andrews County, Texas. Therefore, sections 16 and 25 were evaluated in the screening process. Andrews County is considered a “Go” for land availability.

#### CRITERION 6—UTILITIES

Electric power is readily available at the Andrews County site. The electric transmission and distribution service provider, Oncor Electric Delivery Company LLC, upgraded the distribution lines into WCS during construction of the adjacent LLRW Disposal Facilities in 2011. Additionally, Oncor is further upgrading service as they have recently purchased the 138 KV

power lines running through WCS property parallel to (and adjacent to) the Texas-New Mexico state line and are installing a new substation about 2 km (1.25 mi) south of the Andrews County site. The WCS Communications tower allows sitewide cellphone service and high speed internet and landline communications. A 15 cm (6 in) water line currently providing the WCS facilities with water from the City of Eunice will provide sufficient water for construction and operations, although water from WCS wells or other sources may be used for construction water as needed.

#### CRITERION 7—CONSTRUCTION LABOR FORCE

Labor support for construction of the CISF in Andrews County should be fully available within the ROI unless a large concurrent construction project becomes competitive for the same resources. The contracting of construction companies from outside of the region, such as from Albuquerque, New Mexico; Lubbock, Texas; and El Paso, Texas, is common practice in west Texas and southeastern New Mexico, so the prospective CISF licensee should be able to find and contract an adequately skilled labor pool to construct the facility on the desired schedule even if another construction project were to interfere with local contracting. The Andrews county site operator, WCS, having licensed and constructed the CWF and the FWF, has essential experience planning, contracting, and executing a project such as CISF site construction from beginning to end. In order to support project cost and schedule, as well as conformance to design basis, regulatory requirements, and license conditions, the CISF site licensee/applicant should possess an appropriate degree of experience and technical qualifications needed to provide rigorous oversight of the planning and execution of a large nuclear facility construction project (e.g., in accordance with ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*). WCS has been operating under applicable NQA-1 requirements since 1997 and successfully completed construction of the Low Level Disposal Facilities (CWF and FWF) in accordance with all regulatory requirements and license conditions under intense regulatory review.

#### CRITERION 8—OPERATIONAL LABOR FORCE

Operations labor force considerations for the Andrews County CISF operator would be virtually identical to those at a southeastern New Mexico CISF. Most CISF operations workers for the site in Andrews County will need to be degreed, technical, and highly trained workers hired from outside of the ROI or hired away from one of the nuclear-related facilities in the region for initial

CISF operations. For long term hiring, major universities and other post-secondary schools are located in Midland-Odessa and Lubbock, while a local junior college in Hobbs is available to assist with training and qualification of workers. Given that the Andrews County site is in west Texas, where workers have not joined unions, the labor environment is favorable to multi-tasking of employees.

The Andrews County CISF operator has a staff of experienced radiation workers, radiation protection technicians, and health physicists it has established to create a stable organization of permanent resident employees. Additionally, WCS has worked many years to inculcate and mature a nuclear safety culture in operations, maintenance, technical support, and waste management personnel that will be highly advantageous during and at the start of CISF operations at the Andrews County CISF.

#### CRITERION 9—TRANSPORT ROUTES

A dedicated WCS-controlled rail loop encircles the WCS waste management facilities. The proposed CISF is to be built north of and adjacent to the existing WCS railroad access loop. A new side track will extend northwest to run east and west on the CISF Pad through the Cask Handling Building to provide for optimal and safe rail delivery of spent fuel and associated materials.

Texas State Highway 176, approximately 2 km (1.25 mi) south of the Andrews County site, provides for efficient movement of operations and construction traffic. Approximately 6 km (4 mi) to the west on Texas State Highway 176 is divided New Mexico Highway 18 in New Mexico; Interstate 20 is another 105 km (65 mi) south from there. Approximately 55 km (32 mi) to the east on Texas State Highway 176 is divided U.S. Highway 385; Interstate 20 at Odessa, Texas is another 68 km (42 mi) south from there.

#### CRITERION 10—AMENITIES FOR WORKFORCE

Workforce amenities for an Andrews County CISF site would share many characteristics with the proposed Lea County CISF because the proposed Andrews County CISF is on the Texas-New Mexico border 10 km (6 mi) east of central Eunice, New Mexico. A number of hotels/motels and restaurants are located in Hobbs, New Mexico about 37 km (23 mi) from the site by road and in Andrews, Texas, approximately 55 km (32 mi) east of the site by road.

WCS experience has shown that about half of the workforce will choose to live in New Mexico and half in Texas. Housing for the operations workforce would also mostly be in Andrews, Eunice, and Hobbs, with a few in Midland and Odessa. Although the housing market is generally tight in these cities, CISF personnel at this site should be able to locate suitable housing in a timely manner in Andrews or Hobbs due to the relatively small size of the operational workforce and current downturn in oil and gas exploration.

Public schools in Andrews and Hobbs are rated as average with Andrews having the better ratings of the two. Medical facilities include the Permian Regional Medical Facility which is a general medical and surgical hospital in Andrews, Texas, with 44 beds. Larger advanced full service hospitals are in Midland and Odessa Texas. Midland Memorial Hospital (MMH) is a general medical and surgical hospital in Midland, Texas, with 229 beds. Survey data for the latest year available shows that 61,164 patients visited MMH's emergency room. The hospital had a total of 10,542 admissions. Its physicians performed 3,707 inpatient and 5,883 outpatient surgeries. In Odessa, Texas, Medical Center Hospital is a general medical and surgical hospital with 326 beds. It is also a teaching hospital. Survey data for the latest year available shows that 51,487 patients visited the hospital's emergency room. The hospital had a total of 13,658 admissions. Its physicians performed 3,570 inpatient and 4,888 outpatient surgeries. Lea Regional Medical Center (LRMC) in Hobbs, New Mexico is a 201-bed, acute care facility providing complete care - from cardiac care and pediatrics to mental health and outpatient surgery.

There are multiple well-maintained parks in the city and county of Andrews. Lakeside Park in northwest Andrews provides opportunities for fishing, jogging, and barbequing with grills and picnic tables. The new City of Andrews Water Park attracts visitors from neighboring counties in west Texas and New Mexico. The Andrews golf course is also a local attraction. Lubbock, Midland, and Odessa each boast symphony orchestras, museums and multiple movie theaters. Three national parks are available to CISF employees: two to the west of the Andrews County site and one to the south. Carlsbad Caverns National Park in New Mexico and Guadalupe Mountains National Park in Texas are both southwest of Carlsbad. These facilities offer recreational activities including rafting, spelunking, hiking, and backpacking. Big Bend National Park is about three and one-half hours south of Andrews on U.S. Highway 385. Limited local recreational and cultural activities are also available in Hobbs (e.g., Harry McAdams State Park).

CRITERION 11—ENVIRONMENTAL PROTECTION

The proposed Andrews County CISF site is adjacent and contiguous to WCS' LLRW Disposal Facilities, which is among the most thoroughly characterized sites in the world. The WCS site has been under a monitoring plan to detect the release of trace amounts of radiological and hazardous chemical constituents since it was permitted and licensed in 1997. No contamination of any kind has been detected near the proposed CISF site.

The site is not in a flood zone. There is no potential for flooding or ponding because, although the site is basically flat, within the proposed CISF footprint is a topographic high promoting very good drainage in every direction away from the facility. There are no natural perennial water features near the site. However, there is an ephemeral playa to the east of the site and Baker Spring southwest of the site. Historically, Baker Spring was known as a spring as well as the site of historical excavation of gravel and caprock materials that are present above the red bed clay. In recent years Baker Spring has been mostly ephemeral and dry, with water ponding during rain events in an excavation into the red beds at the base of the spring. Baker Spring has not supported an aquatic ecosystem for monitoring purposes for many years. A "fish pond" at the Permian Basin Materials Gravel Pit to the west of the site is an artificial surface water feature because it is manmade and because it is artificially recharged by transfer of water captured in excavated areas of the quarry and by pumping of groundwater, if encountered, from quarry excavations.

The climate at the site supports efficient construction and operations with delays due to inclement weather being very unlikely or short and very infrequent. Precipitation data from the WCS application for a license to authorize near-surface land disposal of LLRW, Appendix 2.3.1: Meteorological and Climatology Data, was used to describe site climate. The climate data presented is for January 2000 through December 2005 (WCS, 2007). Onsite measured air temperatures during this period were consistent with an annual pattern of high summer temperatures and low fall (and winter) temperatures. The highest and lowest temperatures recorded onsite were 107.9 °F and 3.7 °F, respectively. The mean monthly average temperatures onsite ranged from 82.0 °F in July to 42.2 °F in December. The lowest and highest relative humidity values recorded are from 30% in April to 84% in October (WCS, 2007). The average monthly relative humidity ranged from 50% in April to 70% in October. The average annual rainfall at the proposed site was 40.1 cm (15.8 in) and the maximum site rainfall amount recorded for a 24-hour period was 11.3 cm (4.45 in). Minimum and maximum monthly rainfall

totals recorded for this period were 0.25 and 22.4 cm (0.1 and 8.8 in), respectively. Average annual totals for the January 2000 through December 2005 were 38.9 cm (15.3 in) for Andrews, 40.6 cm (16.0 in) for Hobbs, and 35.6 cm (14.0 in) for Midland. The data clearly demonstrate an annual rainfall in the region of less than 51 cm (20 in). The maximum 24-hour maximum rainfall amounts recorded at the three stations were 19.3, 19.1, and 12.2 cm (7.6, 7.5, and 4.8 in) for Andrews, Hobbs, and Midland, respectively. By comparison, the 24-hour, 100-year storm event for the region, as calculated by The National Oceanic and Atmospheric Administration (NOAA), is 15.5 cm (6.1 in) (Miller, 1973). Annual snowfall averages were recorded at 8.6, 13.0, and 10.4 cm (3.4, 5.1, and 4.1 in) for Andrews, Hobbs, and Midland, respectively.

Wind direction measured onsite is primarily from the south, south-southeast, and south-southwest, with the greatest percentage from the south. These sectors together account for 28.5% of hourly average wind data for the period. The next most frequent wind directions are east-northeast, northeast, and east, accounting for 17.2%. Average wind speeds varied very little from month to month. The strongest average winds during the monitoring period were from the southerly directions with average wind speeds of 8 to 11.5 mph. The highest one-hour wind speeds occurred during September, blowing from the south-southeast direction. The highest recorded one-hour wind speeds were 32.8 and 43.6 mph at the 2 m (6.5 ft) and 10 m (33 ft) height, respectively. Sand or dust storms typically occur in the winter or early spring when rotors (horizontal vortices) generated by strong westerly winds blowing across the region touch the ground. Most episodes of dust prevail for only six hours or less, when visibility is restricted to less than 0.8 km (0.5 mi). Statistical information is lacking on seasonal distribution intensity and duration of dust storms for the region. Recent data recorded in Lubbock, Texas (177 km [110 mi] northeast of the site) indicates blowing dust occurred an average of 12 times in the spring and 9 times during the remainder of the year (Bomar, 1995). Two F2 Class (wind speed from 113 to 157 mph) tornadoes have been recorded in Andrews County, Texas from 1880 through 1989 (Grazulis, 1993). According to data reported by NOAA, two F2 Class and eight F1 Class (wind speed from 73 to 112 mph) tornadoes have been recorded in Andrews County since 1950.

As part of the WCS application for a license to authorize near-surface land disposal of LLRW, Appendix 11.9.2: Ecological Baseline Assessment was used to describe site potential to adversely affect rare, threatened or endangered species and habitats (WCS, 2007). The assessment was performed during 2006. The dominant plant species on the site are native. However, several native species are considered invasive; their presence onsite is the result of



previous range/livestock grazing. These invasive species include honey mesquite and prickly pear. There are also several exotic forb species on the site, such as Russian thistle, but they were absent where the soil surface has not been disturbed and would likely not invade ungrazed grassland locations. Invertebrates were sampled using sweep nets and pit traps. Most were identified to family. One amphibian, the Texas toad (*Bufo speciosus*), was observed during the assessment in surface water areas created by runoff water released onto the surface. No permanent surface waters were on or within 5 km (3.1 mi) of the site. Eight reptile species were recorded during the assessment. Texas horned lizards (*Phrynosoma cornutum*) were observed at several locations on and near the site. This species is listed as threatened in Texas and is the Texas State Reptile. It is protected by the State of Texas because of shrinking populations due to fire and loss of habitat and was observed at several locations on and around the then-proposed LLRW facility. Fifty-three species of birds were observed during the assessment in the course of baseline ecological surveys. All of these are known to occur in similar habitats throughout the region. Analysis of seasonal data indicated that most were migrants. Small mammal trapping was conducted. Mammal species observed during the assessment included a kangaroo rat, wood rat, desert cottontail, black-tailed jackrabbit, mule deer, and coyote. No federally threatened or endangered species were observed during surveys (USFWS, 2016).

The Socioeconomic information below is from Sections 1.1.3 and 1.1.6 of the *Socioeconomic Impacts of the Proposed Spent Nuclear Fuel Consolidated Interim Storage Facility Andrews County, Texas* report (Appendix A). Based on U.S. Census Bureau data in 2010, the minority populations of counties within the project area ROI were as follows: Andrews County was 52.1% minority; Gaines County was 39.4% minority; Winkler County was 57.5% minority; Ector County was 58.9% minority; and Lea County, New Mexico was 57.0% minority. By comparison, the percentages at the state level were 59.5% (New Mexico) and 44.3% (Texas). The city closest to the WCS facility is Eunice, New Mexico, which had a minority population of 49.9% in 2010. Hispanic or Latino populations are the largest percentages of minorities within the ROI, ranging from 36.6% of the population in Gaines County to 53.8% in Winkler County. Black or African American populations had the next-largest share, with percentages ranging from 0.9 to 5.6%, depending on the location.

According to 2009–2013 county-level American Community Survey data, the highest median household income for the ROI was in Andrews County (\$57,825); at the city level, Jal, New Mexico in Lea County had the lowest median household income of \$48,790. Within the three census tracts (CT) in Andrews, Texas, the median household incomes ranged from \$61,719

(CT 9504) to \$88,250 (CT 9501). Ector County has one census tract and the median household income is \$36,927. Seminole, Texas, has two census tracts and median household incomes were \$46,512 (CT 9503) and \$64,024 (CT 9502), respectively. Winkler County, Texas, has one census tract and the median household income is \$49,583. Jal, Lea County, New Mexico, has 15 census tracts within the ROI. Median household incomes ranged \$29,882 in CT 3 to \$108,922 in CT 7.03.

The U.S. Census Bureau uses an income threshold that varies by family size and composition to determine who is in poverty. If the family's total income is less than the family's threshold, then the family and every individual is considered in poverty. The preliminary estimate of the poverty threshold for 2014 for a family of four is \$24,221. The final 2014 thresholds were released in September 2015 and that threshold was \$24,036 (Appendix A). U.S. Department of Health and Human Services (DHHS) also publishes a poverty guideline. For comparison purposes, the 2015 DHHS poverty guideline is \$24,250 for a family of four. The median household incomes for all the counties and cities within the ROI are above the poverty thresholds established by the U.S. Census Bureau and the DHHS.

The Socioeconomic information below is from Sections 1.1.10.1 and 1.1.10.2 of the *Socioeconomic Impacts of the Proposed Spent Nuclear Fuel Consolidated Interim Storage Facility Andrews County, Texas* report (Appendix A). Based on U.S. Census Bureau data, the percentages of the population considered to be minority for the two block groups within the 6.4 km (4-mi) radius are 37.3% and 31.9%. The NRC guidance states that if the minority percentage in the relevant block groups exceeds 50%, or if the minority percentage in the relevant block groups is more than 20 percentage points greater than the state or county percentages, environmental justice should be considered in greater detail. The minority percentages for the relevant block groups are below 50% and are also each lower than the respective county and state in which the block group is located.

The 2014 Poverty Thresholds (the most recent data available) were obtained from the U.S. Census Bureau and compared to the median household income for the block groups within the 6.4 km (4 mi) radius, based on data from the 2009–2013 ACS. The median household income levels were conservatively compared to the highest Census poverty threshold (\$52,685), as the Census presents several thresholds for varying family sizes and characteristics. The median household incomes for the relevant block groups are above the *highest* 2014 Census poverty threshold. In 2014 dollars, these numbers would be even higher.

Data from the 2009–2013 ACS was collected regarding the percentage of households living below the poverty level in the relevant block groups and for the reference geographies. Neither of the block groups have greater than 50% of the households with incomes below the poverty level. Furthermore, the percentages of households with incomes below the poverty level are lower in the block groups than in the reference geographies, and therefore do not exceed the 20% criterion. Furthermore, no minority or low-income populations were identified within the 6.4 km (4 mi) study area. Based on the foregoing, further environmental justice analysis is not necessary.

An intensive pedestrian archeological field survey carried out in 2015 concluded that no archeological materials were observed within the 87.7 ha (216.6 acre) area of potential effects.

Range and brush fires that may occur should not pose a substantial danger to a CISF at the Andrews County site due to the relative sparseness of vegetation and facility design. The area is predominately desert scrub and trees are absent. Desert range land will burn but does not support a sufficient fuel load to sustain a major fire.

#### CRITERION 12—DISCHARGE ROUTES

There is minimal chance of future contamination from adjacent facilities due to inherent facility design, safe conduct of operations, and early detection from environmental monitoring programs. The NEF to the southwest of the site is strictly regulated by the NRC and is operated under detailed procedures with multiple barriers to any radiological release. WCS LLRW Disposal Facilities and Storage and Processing Facility (TSDF) are regulated by TCEQ and the U.S. Environmental Protection Agency (EPA) but are designed and operated the same way as the NEF.

#### CRITERION 13—PROXIMITY OF HAZARDOUS OPERATIONS/HIGH-RISK FACILITIES

There are no facilities handling large quantities of hazardous materials, chemicals, or other material in proximity to the site. NEF handles Uranium Hexafluoride but manages it in a manner that minimizes risk to a CISF at the site.

There are no major propane pipelines that pose a danger to the proposed CISF.

Air quality at the site is very good; it is not in a non-attainment zone. The distance to the nearest commercial airport, Lea County Regional Airport, is approximately 40 km (25 mi).

CRITERION 14—EASE OF DECOMMISSIONING

Construction, operations and decommissioning at the proposed CISF will be easily coordinated with the same ongoing activities at the adjacent WCS facilities by proper scheduling of shipments and phased activities. The large area of WCS property surrounding the CISF site provides for multiple supporting laydown areas and construction access roads that may be needed to support these efforts.

CRITERION 15—DISPOSAL OF LOW-LEVEL WASTE

The adjacent LLRW Disposal Facility virtually eliminates high transportation costs for CISF-generated LLRW and the CISF operator already possesses the necessary permits and license to dispose of CISF LLRW, mixed waste, and hazardous waste. This advantage, along with the elimination of waste transportation costs, should prove to be highly cost-effective at the time of decommissioning if the FWF remains open at CISF decommissioning time.

**2.3.5 Site Selection Process: Results for Loving County, Texas**

WCS evaluated a potential site to construct and operate a CISF in Loving County, Texas because of the community's willingness to support hosting such a facility and due to the many positive siting and environmental characteristics present in Loving County, Texas. WCS based the evaluation on readily available information and interviews with local county officials. One potential tract of land has been identified as a potential candidate site for constructing and operating a CISF in the northwestern portion of Loving County on the border with Lea County, New Mexico.

CRITERION 1—POLITICAL SUPPORT

In Texas, Loving County has expressed support for a CISF facility. On February 11, 2013, the Commissioner's Court of Loving County approved a resolution that called for, among other things, identifying a potential site for constructing and maintaining a storage facility for SNF on an interim basis. The Loving County Commissioner's Court resolution noted that the State of Texas, operating through the General Land Office/School Land Board on behalf of the Texas Permanent School Fund had executed a "Letter of Intent" to negotiate a lease of state-owned land with AFCI for the purpose of identifying a potential site for the CISF. WCS assumes that a similar agreement for constructing a CISF could also be reached with Loving County. Loving County is considered a "Go" for political support.

CRITERION 2—SEISMOLOGICAL AND GEOLOGICAL CHARACTERISTICS

Several regional surveys have been conducted to support the siting of the WIPP, NEF, and WCS operations. These surveys demonstrated that Loving County, Texas is tectonically stable and has suitable geological characteristics to site a CISF. Loving County is considered a "Go" for seismological and geological characteristics.



CRITERION 3—AVAILABILITY OF RAIL ACCESS

A facility supporting interim storage in Loving County would require a rail spur more than 8 km (5 mi) long or transport by road from the nearest rail lines in either Monahans, Texas or from Carlsbad, New Mexico. Loving County, Texas was considered “Acceptable” for availability of rail access.

CRITERION 4—LAND PARCEL SIZE

In Loving County, Texas, approximately 405 ha (1,000 acres) of land intended for interim storage of SNF was considered by AFCI Texas, LLC (AFCI). Loving County is considered a “Go” for land parcel size.

CRITERION 5—LAND AVAILABILITY

Loving County, Texas, is a sparsely populated area in the western portion of the state. The land is used primarily for oil and gas development and ranching. AFCI had identified a parcel of land, approximately 405 ha (1,000 acres) in size, for constructing and operating a CISF in the northwest portion of Loving County, Texas. However, the land owners were opposed to selling the land for the purpose of constructing and operating a CISF because the natural resources (oil and gas) underlying the proposed site were considered more valuable than the benefits of a facility that would store SNF (Kirk, 2015). As such, Loving County was only ranked as “acceptable” because adequate land is available and the current land owners could change their positions if the CISF became a more realistic and lucrative prospect at a later date. Loving County is considered “Acceptable” for land availability.

CRITERION 6—UTILITIES

Utilities at the proposed site in Loving County would be available, but would require considerable development. Oncor Electric Delivery Company LLC, provides power lines within the region, but new lines and a substation would be needed to serve the CISF. Both cellular and land-based telephone services in the region were also available in the county but would require further development. Water from the Pecos aquifer, which underlies the proposed site, would be available to support the project.

CRITERION 7—CONSTRUCTION LABOR FORCE

The availability of construction labor for the potential Loving County CISF would be comparable to Andrews County, Texas or Lea or Eddy counties, New Mexico. The population in Loving County was listed as 82 in the 2010 Census, making it the least populated county in the U.S. However, contracting with construction companies from outside the region in Albuquerque, New Mexico; Lubbock, Texas; and El Paso, Texas, is common practice in southeastern New Mexico and west Texas, so the prospective licensee should be able to contract an adequate skilled labor pool to construct the facility on the desired schedule even if another construction project were to interfere with local contracting.

The importance of controlling the planning, contracting, and execution of a project such as CISF site construction from the beginning cannot be overstated. In order to support project cost and schedule, as well as conformance to design basis, regulatory requirements, and license conditions, the CISF site licensee/applicant should possess an appropriate degree of experience and technical qualifications needed to provide rigorous oversight of the planning and execution of a large nuclear facility construction project (e.g., in accordance with ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*). A scoring of large facility construction project management experience for each site license applicant/owner/operator is therefore provided, see Table 2.3-2.

CRITERION 8—OPERATIONAL LABOR FORCE

Operations labor force considerations for a potential Loving County CISF would be virtually identical to those at an Andrews County or Lea or Eddy counties, New Mexico CISF. Most CISF operations workers for the site in Loving County will need to be degreed, technical, and highly trained workers hired from outside of the ROI or hired away from one of the nuclear-related facilities in the region for initial CISF operations. For long-term hiring, major universities and other post-secondary schools are located in Midland-Odessa and Lubbock, while a local junior college in Hobbs, New Mexico is available to assist with training and qualification of workers. Given the proximity of the Loving County site to the WIPP, where many workers have joined the United Steelworkers Union (USW) and the Oil, Chemical and Atomic Workers International Union (OCAW), labor rules may be established at this site that prohibit or discourage multi-tasking of these employees.



Experienced radiation protection technicians can be hired from outside of the region but there is a high turn-over rate in remote locations for these employees who are in high demand across the country. Finding and retaining the required qualified and experienced health physicists needed to establish a fully functioning and reliable Health Physics Organization at the Lea County site is likely to be challenging and would take some time to establish a stable organization of permanent resident health physicist employees. It is highly advantageous to safety if CISF operations, maintenance, technical support, and waste management personnel available in the area will already be members of a pre-existing mature nuclear safety culture before, during and at the start of CISF operations.

#### Criterion 9—TRANSPORT ROUTES

There is currently no rail access to the proposed Loving County CISF. The nearest rail line is located in Monahans, Texas. This criterion is one of the least favorable for locating a CISF in Loving County, Texas. Construction of a rail line over 64 km (40 mi) in length would be required to support the transport of SNF to the proposed Loving County CISF. Otherwise, construction of a transfer station and significant upgrades would be required to transport SNF by heavy haul truck from Monahans, Texas to the Loving County CISF. Providing for the transportation infrastructure at a CISF in Loving County is most challenging when compared to those that already exist in Andrews County, Texas or Eddy and Lea counties, New Mexico.

#### CRITERION 10—AMENITIES FOR WORKFORCE

The county seat and only community in Loving County is Mentone, Texas. As previously discussed, the 2010 Consensus reported the population in Loving County at 82 residents, making it the least populated county in the U.S. Providing housing, temporary or otherwise, needed to accommodate a labor force needed during construction would be challenging. Housing for the operations workforce could be acquired in Carlsbad, New Mexico located approximately 113 km (70 mi) north of Mentone, or Monahans, Texas approximately 81 km (50 mi) to the southeast. The 2010 Census listed the populations of Carlsbad, New Mexico and Monahans, Texas at 26,138 and 6,953 residents, respectively. CISF personnel could find suitable housing, given the small size of the operational workforce.

Public schools were consolidated with those in nearby Winkler County, Texas. The Loving-Wink Independent School District provides education to students from pre-kindergarten through grade 12.

The Winkler County Memorial Hospital is the nearest hospital; it is located approximately 42 km (26 mi) to the east in Wink, Texas. Larger medical facilities are also provided in Odessa, Texas and Carlsbad, New Mexico. Medical facilities at both locations are approximately 113 km (70 mi) to the east and north, respectively.

There are three state parks and three national facilities that would be available to CISF employees in the vicinity of the Loving County site. Living Desert State Park is in Carlsbad; Brantley Lake State Park is northwest of Carlsbad on the Pecos River; and Bottomless Lakes State Park, also on the Pecos River, is east of Roswell. Bitter Lake National Wildlife Refuge is also east of Roswell and Carlsbad Caverns and Guadalupe Mountains National Parks are southwest of Carlsbad. These facilities offer some recreational and cultural activities, including boating and water activities on Lake Carlsbad and the Pecos River, hiking and backpacking in the nearby Guadalupe Mountains, and Carlsbad Caverns National Park. Other local amenities include a local museum, community theater, and community concert and art associations. Limited local recreational and cultural activities are also available in Hobbs (e.g., Harry McAdams State Park) and in Odessa-Midland, (e.g., golf, professional minor league baseball, rodeos, museums, art galleries, symphony, and theatres). Since the site is not located near a large population base, amenities are limited.

#### CRITERION 11—ENVIRONMENTAL PROTECTION

There are no existing surveys for the proposed site in Loving County. Additional characterization would be required to support a CISF license application for the proposed site. The proposed site is not believed to be contaminated by previous use. However, since the land is used for oil and gas exploration and development, additional surveys would be needed. No known RCRA or CERCLA sites have been identified and no known groundwater plumes have been identified at the proposed site.

Based on FEMA flood insurance maps, no 100-year floodplains are anticipated to cross the site boundary.

#### CRITERION 12—DISCHARGE ROUTES

Stormwater is the only anticipated discharge at the facility and stormwater runoff could be directed to a natural drainage network. All septic waste could be collected in above ground

tanks and periodically pumped and discharged at a POTW facility. No radiological effluents are anticipated.

Wastewater from a CISF should be chemically and radiologically distinguishable from pre-existing oilfield waste contamination at the site. Monitoring for approximately 1 year would be required in order to establish a baseline prior to site development in order to differentiate an accidental release from the CISF.

#### CRITERION 13—PROXIMITY OF HAZARDOUS OPERATIONS/HIGH RISK FACILITIES

Loving County is sparsely populated and has very little industry other than the oil and gas field industry. There are several compressor stations, oil and gas pipelines, and pump jacks in Loving County. There are no hazardous chemical sites within a 16 km (10 mi) radius of the site. There are no airports within a 16 km (10 mi) radius of the site. The nearest international airport is Midland Odessa Air and Space Port which is over 161 km (100 mi) from the site. There are no (air pollutant) non-attainment areas in the vicinity.

#### CRITERION 14—EASE OF DECOMMISSIONING

The natural site characteristics (climate, hydrology, etc.) at the Loving County site can be expected to support efficient decommissioning activities during decommissioning. There are no known future projects for the site vicinity that could add additional impacts to decommissioning the proposed facilities.

#### CRITERION 15—DISPOSAL OF LOW-LEVEL WASTE

There is ready access to the WCS LLRW disposal facilities located approximately 106 km (65 mi) from where the Loving County CISF would be located. WCS provides a location for LLRW disposal at both its LLRW Disposal Facility and its RCRA Landfill. To store and ship these wastes, the Loving County site licensee would have to hire and build a waste management staff capable of demonstrating the technical qualifications required to obtain the appropriate LLRW licenses and authorizations for generating, storing, and transporting CISF-generated wastes.

### **2.3.6 Site Selection Process: Results for Lea County, New Mexico**

WCS evaluated a potential site to construct and operate a CISF in Lea County, New Mexico due to the many positive siting and environmental characteristics present in the area. WCS based the evaluation on readily available information.

CRITERION 1—POLITICAL SUPPORT

Lea County is considered a “Go” for political support.

CRITERION 2—SEISMOLOGICAL AND GEOLOGICAL CHARACTERISTICS

Several regional surveys have been conducted to support the siting of the WIPP, NEF, and WCS operations. These surveys demonstrated that Lea County is tectonically stable and has suitable geological characteristics to site a CISF. Lea County is considered a “Go” for seismological and geological characteristics.

CRITERION 3—AVAILABILITY OF RAIL ACCESS

Access via rail to Lea County is suitable for constructing and operating a CISF. Lea County is considered a “Go” for availability of rail access.

CRITERION 4—LAND PARCEL SIZE

Approximately 405 ha (1,000 acres) of land was purchased by the ELEA Project Area in Lea County, New Mexico and would be available for the CISF. Lea County is considered a “Go” for land parcel size.

CRITERION 5—LAND AVAILABILITY

Lea County is considered a “Go” for land availability.

CRITERION 6—UTILITIES

Utilities at the site in Lea County are in need of some development. Numerous power transmission lines exist within the region but new lines and a substation would be needed to serve the CISF at the site.

No potable groundwater is known to exist in the immediate vicinity of the site. However, the City of Carlsbad owns and operates Double Eagle Water System, located near Maljamar, New Mexico in northwestern Lea County. The Double Eagle Water System is supplied by groundwater pumped from 11 wells completed in the Ogallala Formation. The first 18 km (16 mi) segment of the pipeline carrying water from these wells to the WIPP facility has a 61 cm (24 in) diameter and runs to Highway 62/180. Previous research indicates a facility at the site will be able to tap into the Double Eagle Water System which is 4.8 km (3 mi) west of the site. This

source of water is adequate for construction and operation of the CISF. However, the approximately 4.8 km (3 mi) long pipeline extension, requiring a federal right-of-way, would be needed to convey the water from the 61 cm (24 in) WIPP line to the site.

A communications tower that could possibly be used to provide cell phone and data service is located in the southwest corner of the site.

#### CRITERION 7—CONSTRUCTION LABOR FORCE

Construction labor force considerations for a potential Lea County CISF would be virtually identical to those at an Eddy County CISF. Labor support for construction of the CISF in Lea County should be fully available within the ROI unless a large concurrent construction project becomes competitive for the same resources. The contracting of construction companies from outside of the region, such as from Albuquerque, New Mexico; Lubbock, Texas; and El Paso, Texas, is common practice in southeastern New Mexico and west Texas, so the prospective CISF licensee should be able to find and contract with an adequately skilled construction labor pool to construct the facility on the desired schedule even if another construction project were to interfere with local contracting.

The importance of controlling the planning, contracting, and execution of a project such as CISF site construction from the beginning cannot be overstated. In order to support project cost and schedule, as well as conformance to design basis, regulatory requirements, and license conditions, the CISF site licensee/applicant should possess an appropriate degree of experience and technical qualifications needed to provide rigorous oversight of the planning and execution of a large nuclear facility construction project (e.g., in accordance with ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*). A scoring of large facility construction project management experience for each license applicant/owner/operator is therefore provided, see Table 2.3-2.

#### CRITERION 8—OPERATIONAL LABOR FORCE

Operations labor force considerations for a potential Lea County CISF would be virtually identical to those at an Andrews County and Eddy County CISF. Most CISF operations workers for the site in Lea County will need to be degreed, technical, and highly trained workers hired from outside the ROI or hired away from one of the nuclear-related facilities in the region for initial CISF operations. For long term hiring, major universities and other post-secondary

schools are located in Midland-Odessa and Lubbock, and a local junior college in Hobbs is available to assist with training and qualification of workers. Given the proximity of the Lea County site to the WIPP, where many workers have joined the USW and the OCAW, labor rules may be established at this site that prohibit or discourage multi-tasking of these employees.

Experienced radiation protection technicians can be hired from outside of the region but there is a high turn-over rate in remote locations for these employees who are in high demand across the country. Finding and retaining the required qualified and experienced health physicists needed to establish a fully functioning and reliable Health Physics Organization at the Lea County site is likely to be challenging and would take some time to establish a stable organization of permanent resident health physicist employees. It is highly advantageous to safety if CISF operations, maintenance, technical support, and waste management personnel available in the area will be members of a pre-existing mature nuclear safety culture before, during, and at the start of CISF operations.

#### CRITERION 9—TRANSPORT ROUTES

There is currently no rail access to the Lea county site but an industrial railroad lies 4.8 km (3 mi) to the west. The railroad is currently serving local potash mines by transporting ore to refineries and finished product to markets, refineries, and the agricultural sector. A new rail spur would have to be built to connect the railroad to a new railhead at the site, which would also have to be constructed. Construction of the new rail spur would be across public lands and would be along right-of-way to be obtained from state and federal agencies; the route would also likely require additional NEPA analysis for right-of-way on federal lands.

Highway 62/180 serving the site is a well-established, well-maintained radioactive waste transportation corridor established by the DOE for shipping transuranic mixed waste to the WIPP. It is a major 4-lane, divided, federal highway that runs within 0.8 km (0.5 mi) of the site, from both of the nearby major population centers (Carlsbad and Hobbs). Improvements from the highway into the site would need to be made but with the improvements efficient access for construction and operations traffic could be readily achieved.

#### CRITERION 10—AMENITIES FOR WORKFORCE:

Workforce amenities for a potential Lea County CISF would be very much like those at an Eddy County CISF. A number of hotels/motels and restaurants are located in Hobbs, New Mexico, 52

km (32 mi) to the east of the site and 55 km (34 mi) west of the site in Carlsbad, New Mexico. Housing for the operations workforce would also mostly be in Hobbs and Carlsbad. Larger population centers are Roswell, New Mexico, 119 km (74 mi) to the northwest; Odessa, Texas, 148 km (92 mi) to the southeast; and Midland, Texas, also to the southeast at a distance of 166 km (103 mi). The nearest large population center is El Paso, Texas (population 563,662), approximately 306 km (190 mi) southwest of the site. Although the housing market is generally tight in these locations, CISF personnel at this site should be able to locate suitable housing in a timely manner due to the relatively small size of the operational workforce.

Public schools in Carlsbad and Hobbs are rated as average. Carlsbad has the better ratings of the two.

Medical facilities include Carlsbad Medical Center (CMC) which is a full-service, 127-bed community-oriented hospital providing medical, surgical, and restorative patient care at the main center and two medical office buildings, the Pecos Valley Medical Complex and the Southwest Medical Complex. Carlsbad Medical Center's larger sister facility is LRMC in Hobbs, New Mexico, a 201-bed, acute care facility providing complete care from cardiac care and pediatrics to mental health and outpatient surgery.

There are three state parks and three national facilities that would be available to CISF employees in the vicinity of the Lea County site. Living Desert State Park is in Carlsbad; Brantley Lake State Park is northwest of Carlsbad on the Pecos River; and Bottomless Lakes State Park, also on the Pecos River, is east of Roswell. Bitter Lake National Wildlife Refuge is east of Roswell and Carlsbad Caverns and Guadalupe Mountains National Parks are southwest of Carlsbad. These facilities offer some recreational and cultural activities, including boating and water activities on Lake Carlsbad and the Pecos River, hiking and backpacking in the nearby Guadalupe Mountains, and Carlsbad Caverns National Park. Other amenities include a local museum, community theater, and community concert and art associations. Limited local recreational and cultural activities are also available in Hobbs (e.g., Harry McAdams State Park) and in Odessa-Midland (e.g., golf, professional minor league baseball, rodeos, museums, art galleries, symphony, and theatres). Since the site is not located near a large population base, amenities are limited.



CRITERION 11—ENVIRONMENTAL PROTECTION

A Phase I Environmental Site Assessment (ESA) of the site was performed by the ELEA (Attachment 2-2). In Appendix 2G, Attachment 2-2, a full report is provided. The purpose of the ESA was to identify Recognized Environmental Conditions (RECs) in connection with the Subject Property, to the extent feasible, pursuant to the processes prescribed in the ASTM Practice E 1527-05 entitled *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM Standard), the EPA Rule entitled, *Standards and Practices for All Appropriate Inquiries: Final Rule* (AAI Rule, 40 CFR Part 312) and professional judgment. The ASTM Standard defines RECs as “the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws.” A limited Phase II sampling regime investigated contamination from the two known oil-field related waste disposal areas within and immediately adjacent to the prospective Lea County CISF with only one water sample and one soil sample taken elsewhere within the boundary of the prospective CISF.

Results of lab analyses indicate soil, surface water, and groundwater have been impacted by oilfield waste disposal in the area. In general, the data indicate that organic, metal, and radiological impacts to soil appear to be localized to the immediate vicinity of the two primary (oilfield-related) disposal sites. Although total petroleum hydrocarbons in three soil samples from the Pollution Control Inc. disposal facility averaged over five hundred times the standard of 100 mg/kg, no volatile or semi-volatile organic compounds, pesticides, or PCBs were detected in any soil or water samples taken. There is potential that hazardous or NORM waste was disposed of in the area where oil field solids have been landfilled.

Radium 226 and radium 228 were detected in all water samples. New Mexico Water Quality Control Commission (WQCC) standards for radium 226 were exceeded in three samples; radium 228 standards were exceeded in two samples. The site is situated in an area where the potential for impacts to groundwater from surface contamination appears to be low due to hydrogeological properties. The limited drilling and testing performed at the site indicates that the base of the alluvium at the top of the Triassic shale bedrock, or the shallowest and most susceptible potential water-bearing zone, is dry. Further, groundwater in the shallow alluvium

elsewhere in the vicinity of the site is too mineralized to qualify for protection under the WQCC regulatory framework. Other potential water-bearing zones beneath the site are approximately 122 m (400 feet) beneath the top of the relatively impermeable shale bedrock; these zones have very low susceptibility to any impacts from surface sources at the site. The highest areas of soil contamination are localized to the oilfield disposal sites and impacted areas identified as RECs in the Phase I ESA. Soil sampling results confirmed that areas of high contamination from oilfield waste disposal sites appear to be localized at these facilities. These areas within the proposed property boundary are excluded from the site construction zone.

Therefore, results of those Phase I and limited Phase II investigations suggest that the Lea County site, minus the areas excluded from the site construction zone due to contamination from oil-field waste, may be suitable for the proposed facilities. However, other potential environmental concerns at the site were identified in attachment 2-2 as follows: "The property has been associated with oil and gas exploration and development with numerous plugged oil or gas wells located on the property. Based on the age of the wells (1940s through the 1980s) the pits associated with these wells were likely not lined or closed properly and are potential sources of contamination; commercial brine disposal operations as well as past oil production operations have resulted in discharges of large quantities of brine into Laguna Gatuna. This may have caused an increase of salinity of any fresh water present in the subsurface or created brine groundwater saturation beneath the site." (ELEA, 2007)

Further characterization appears to be appropriate considering that it is desirable to ensure that: (a) the CISF site does not have contamination that would require remediation prior to construction, (b) no facility is in the area of the CISF site with an existing release plume (air or water) of hazardous material or radiation release that includes the site, (c) any future migration of contamination from adjoining or nearby sites into the area of the CISF site is negligible, and (d) the CISF site is not contaminated with radiological material in soil or groundwater to a level that would inhibit licensing or transfer of property with clear identification of liabilities. There are no listings of the site on the National Priorities List or on the Federal Comprehensive Environmental Response, Compensation and Liability Information System. There are no known concerns that would prevent the federal, state, and local regulatory and permitting requirements from being fulfilled for the construction of a CISF at the site. Other facilities and uses can be accommodated while using the site for construction of a CISF. An abandoned waterline that crosses the site is constructed of concrete pipe and poses no environmental risk for relocation.

The Lea County site topography indicates the terrain in the survey area is nearly level and topographic relief is low, with a total of only about 20 m (66 feet). The highest area (about 1,081 m [3,546 feet]) is along the south edge of the two sections and the low point is in the northwest corner of section 13 (approximately 1,061 m [3,480 feet]). Hydrology is such that the site is naturally drained, does not lie in a 100- or 500-year flood plain and does not have the potential for ponding except where Laguna Gatuna occupies the southeastern portion of the site. The area contains no perennial streams, and the only bodies of water in or around the site are ephemeral playas. No important surface water or groundwater features or aquatic or riparian habitats or wetlands are located at the site.

The site climate is well-suited to support CISF construction and operations, being typical of a semi-arid region, with generally mild temperatures, low precipitation and humidity, and a high evaporation rate.

Range and brush fires that may occur should not pose a significant danger to a CISF at this site due to the relative sparseness of vegetation and facility design. The area is predominately desert scrub and trees are absent. Desert range land will burn but does not support a sufficient fuel load to sustain a major fire.

Climate and meteorological characterization data relating to the site is available in Section 2.2 of Attachment 2-2. Climate information from Hobbs, New Mexico obtained from the Western Regional Climate Center was used for this characterization. In addition, NOAA Local Climatological Data recorded at Midland-Odessa Regional Airport, Texas and at Roswell, New Mexico, were used. Use of the Hobbs, Midland-Odessa, and Roswell observations for a general description of the meteorological conditions at the site was deemed appropriate as they are all located within the same region and have similar climates. Midland-Odessa is the closest first-order National Weather Service (NWS) station to the site. These same sources could be used to update the site's meteorological characterization data.

An archeological and cultural resources field survey has not been performed at the Lea County site. A literature and archival search to establish baseline data for cultural resources that were already identified for the 421 ha (1,040 acre) site and within a 9.7 km (6 mi) zone around the site was performed by Quivira Research Associates (QRA). QRA's complete report, *Cultural Resources in the Eddy-Lea Energy Alliance Project Area, Lea County, New Mexico, March 31,*

2007, is Appendix 2D of Reference 4-28-07 ELEA Letter to DOE (ELEA, 2007). QRA's report predicts:

- "Site densities of 23 or slightly more sites per square mi (640 ac) are indicated by the single large (717 ac) block survey in the 6-mi radius around the project area.
- Most sites will probably be small (8000 sq m/1.7 ac), but larger sites are a definite possibility.
- Approximately two-thirds of newly discovered sites will be determined eligible for listing on the National Register (NR), which will require avoidance or data recovery.
- The NR-eligibility of approximately one-fourth will be undetermined and will require testing or, if historic, appropriate historical research such as literature and archival reviews, interviewing, etc. A few sites will be determined ineligible for listing on the NR at the time of survey."

Attachment 2-2 Section 2.6 and Appendix 2.B provide descriptions of the ecological resources, including protected species information collected about the Lea County site based on a review of the available literature, consultation with wildlife biologists with expertise in regional habitat, and data identified in the ecological field surveys of the site that were conducted in March 2007. Two conclusions of this research were that: no important or unique terrestrial habitats are situated within the site, and no threatened or endangered species or their critical habitats were identified within the site. However, since the 2007 ecological field surveys of the site were conducted, the USFWS has listed two of the bird species observed at the site, the Least Tern, *Sterna antillarum* and the Western Snowy Plover, *Charadrius alexandrinus nivosus* as an endangered species and threatened species, respectively. This includes their range in New Mexico. Concerning the plover, in ELEA Appendix 2.B, *Ecologic Component*, the author opines "the observation of two western snowy plovers along the western edge of Laguna Gatuna was of particular interest. This species is a highly imperiled shorebird that in New Mexico nests in playa lakes and salt flats in the southeastern part of the state (Page et al. 1995). This area appears to not be a significant wintering area for the species (Page et al. 1995), so the plovers observed were probably migrating through or staying to breed in the area. Without making additional visits to the site during the breeding season, it is impossible to say if these birds were migrating or already on their breeding territories. Additional visits should be made during the breeding season (peak incubation period is April or May) to determine how the species is using the site" (ELEA, 2007) (Page G.W., 1995). An updated study of the site for continued presence of these species would be appropriate.

Demographic information for the Lea County site area indicates that there is little likelihood of disparate (environmental justice) impacts due to the CISF facilities. This conclusion is based on the fact that, although there are census tracts within the 81 km (50 mi) radius that have minority percentages exceeding 64%, they are confined to urban areas that are at least 48 km (30 mi) from the site. Consequently, minority inhabitants share the same hypothetical risks as their non-minority neighbors, irrespective of concentric geographic distance from the site.

#### CRITERION 12—DISCHARGE ROUTES

The letter in Attachment 2-2 states that “A permit is required for facilities that discharge an aggregate waste water of more than 2,000 gallons per day to septic systems. A permit may also be required for discharges to surface impoundments such as evaporative basins. It is likely the facility will require a ground water discharge permit. The nearby NEF recently received a ground water discharge permit for discharges to evaporative basins and domestic treatment facilities. The nearby WIPP project is permitted for a facultative sewage treatment facility and the treatment of industrial waste water in lined evaporation ponds. It is anticipated that this facility will be able to obtain this permit” (ELEA, 2007). Wastewater from a CISF should be chemically and radiologically distinguishable from pre-existing oilfield waste contamination at the site.

#### CRITERION 13—PROXIMITY OF HAZARDOUS OPERATIONS/HIGH-RISK FACILITIES

Concerning the proximity of facilities with hazardous operations that could impact the site, there are no major airports within 15 km (10 mi) of the site. However, an abandoned landing strip (305 m [1,000 feet] long) is located 8 km (5 mi) west of the site. There are 12 industrial facilities (“potentially hazardous facilities”) located within 8 km (5 mi) of the site boundary. The industrial facilities consist of four compressor stations, one booster station, two gas plants, two potash mines, one major natural gas transmission pipeline, one hydrocarbon remediation landfarm, and one industrial solid waste landfill. There are no (air pollutant) non-attainment areas in the vicinity.

#### CRITERION 14—EASE OF DECOMMISSIONING

The natural site characteristics (climate, hydrology, etc.) at the Lea County site can be expected to support efficient decommissioning activities during decommissioning. There are no known future projects for the site vicinity that could add additional impacts to decommissioning the proposed facilities.

CRITERION 15—DISPOSAL OF LOW-LEVEL WASTE

There is ready access to the WCS LLRW disposal facilities 10 km (6 mi) east of Eunice, New Mexico. To store and ship these wastes, the Lea County site licensee would have to hire and build a waste management staff capable of demonstrating the technical qualifications required to obtain the appropriate LLRW licenses and authorizations for generating, storing, and transporting CISF-generated wastes.

**2.3.7 Site Selection Process: Results for Eddy County, New Mexico**

WCS evaluated the Eddy County, New Mexico site using the NEF ER and the Technical Memorandum prepared for WCS by Cox|McLain Environmental Consulting, Inc. (CMEC) and by collecting remotely available data from a variety of sources (NEF, 2005) (WCS, 2007). The proposed site in Eddy County is bordered on the south by the DOE's WIPP. The main access road to the facility is on the southeastern edge of the proposed site. The site is buffered from residential areas. The closest town is Loving, New Mexico, which is approximately 29 km (18 mi) from the site. Two ranches are within 16 km (10 mi) of the site. The property readily supports a rectangular 600 x 800 m (1,969 x 2,625 ft) plant footprint and also supports the rectangular footprint for the expanded plant. It is assumed that the site is owned by the DOE and surrounded by BLM lands.

The approximately 405 ha (1,000 acre) site study area is located in a sparsely populated region of southeastern New Mexico. As of 2013, there are 11 permanent residents living within 16 km (10 mi) of the site, mostly associated with ranching. The majority of the population living within 81 km (50 mi) of the site is concentrated in and around Carlsbad, Hobbs, Eunice, Loving, Jal, Lovington, and Artesia, New Mexico. The nearest community is the village of Loving, approximately 29 km (18 mi) west-southwest of the site. The site is bordered on the west by a string of oil wells and their associated pads and access roads. The southern half of the site is bisected by an access road and the entire site is located within the DOE's WIPP off-limits area. WIPP is the nation's first underground repository permitted to safely and permanently dispose of transuranic radioactive waste, radioactive waste, and mixed waste generated from defense activities and programs (DOE, 2014).

CRITERION 1—POLITICAL SUPPORT

In New Mexico, an Eddy County resolution supporting interim storage of SNF was passed on September 3, 2013 (Resolution of Called Commissioner's Court Proceeding, 2013). Eddy County is considered a "Go" for political support.

#### CRITERION 2—SEISMOLOGICAL AND GEOLOGICAL CHARACTERISTICS

Several regional surveys have been conducted to support the siting of the WIPP, NEF, and WCS operations. These surveys demonstrated that Eddy County is tectonically stable and has suitable geological characteristics to site an interim storage facility. Eddy County is considered a "Go" for seismological and geological characteristics.

#### CRITERION 3—AVAILABILITY OF RAIL ACCESS

Eddy County is considered a "Go" for rail access.

#### CRITERION 4—LAND PARCEL SIZE

A site comprising over 202 ha (500 acres) in Eddy County, New Mexico, in close proximity to DOE's WIPP, is considered suitable for siting a CISF. Eddy County is considered a "Go" for land parcel size.

#### CRITERION 5—LAND AVAILABILITY

The entire site is located within the DOE's WIPP off-limits area. Eddy County is considered a "Go" for land availability.

#### CRITERION 6—UTILITIES

The electric energy provider near the Eddy County site is Xcel Energy and their service area includes the proposed project site. Xcel currently has a 115 KV power line located near the project area. Though Xcel provides electric utility services to the nearby WIPP site, installation of new supporting infrastructure, including a substation, would be required to make use of the 115 KV power line to serve a CISF at the site (Cox McLain Environmental Consulting, 2015).

Since the Eddy County site is adjacent to the WIPP, it should be able to make use of the Carlsbad City Water System providing water to the WIPP site through a water main. The water utility provider in the area is Double Eagle Water Systems, operated by the city of Carlsbad. Groundwater is the only source for the utility, and every water well has a unique storage and

pipeline system. This utility has a total storage capacity of 16 million gallons in four reservoirs. The city water line follows the WIPP North Access Road that crosses the southeast corner of the proposed Eddy County site. A line from this water main could be extended to provide an adequate water supply for the proposed CISF. A communications tower exists a few hundred yards to the northeast of the WIPP. This tower could potentially be used for cellular and data transmission to support construction and operations at the proposed CISF site.



CRITERION 7—CONSTRUCTION LABOR FORCE

Construction labor force considerations for a potential Eddy County CISF would be virtually identical to those at a LEA County CISF. Labor support for construction of the CISF in Lea County should be fully available within the ROI unless a large concurrent construction project becomes competitive for the same resources. The contracting of construction companies from outside of the region, such as from Albuquerque, New Mexico; Lubbock, Texas; and El Paso, Texas, is common practice in southeastern New Mexico and west Texas, so the prospective CISF licensee should be able to find and contract an adequately skilled construction labor pool to construct the facility on the desired schedule even if another construction project were to interfere. However, the importance of controlling the planning, contracting, and execution of a project such as CISF site construction from the beginning cannot be overstated. In order to support project cost and schedule, as well as conformance to design basis, regulatory requirements, and license conditions, the CISF site licensee/applicant should possess an appropriate degree of experience and technical qualifications needed to provide rigorous oversight of the planning and execution of a large nuclear facility construction project (e.g., in accordance with ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*). A scoring of large nuclear facility construction project management experience for each site license applicant/owner/operator is therefore provided.

CRITERION 8—OPERATIONAL LABOR FORCE

Operations labor force considerations for a potential Eddy County CISF would be virtually identical to those at a LEA County CISF. Most CISF operations workers for the site in Eddy County will need to be degreed or highly trained technical workers hired from outside of the ROI or hired away from one of the nuclear-related facilities in the region for initial CISF operations. In Carlsbad there is a university, other post-secondary schools, and a technology training center that could provide specialized technical resources. For four year and post-graduate degrees not available locally, major universities and other post-secondary schools are located in Midland-Odessa and Lubbock. There is an additional local junior college in Hobbs available to assist with training and qualification of workers.

Given the proximity of the Eddy County site to the WIPP, where many workers have joined the USW and the OCAW, labor rules may be established at this site that prohibit or discourage multi-tasking of these employees. Experienced radiation protection technicians can be hired

from outside of the region but there is a high turn-over rate in remote locations for these employees who are in high demand across the country. Finding and retaining the required qualified and experienced health physicists needed to establish a fully functioning and reliable Health Physics Organization at the Eddy County site is likely to prove even more difficult and could it take many years to establish a stable organization of permanent resident health physicist employees. It is highly advantageous to safety if CISF operations, maintenance, technical support, and waste management personnel available in the area will already be members of a pre-existing mature nuclear safety culture before, during, and at the start of CISF operations.

#### CRITERION 9—TRANSPORT ROUTES

The potential Eddy County site is approximately 0.8 km (0.5 mi) from a spur that services the WIPP and leads into Loving, New Mexico. The rail line in the area dates to the 1930s, and was constructed to service potash mines, later coming under control of the Atchison Topeka and Santa Fe Railroad and then the Burlington Northern & Santa Fe Railroad. The 13.4 km (8.3 mi) spur was constructed in 1983-1984 for the WIPP site and used for transport of materials for construction of the facility. The WIPP intended to use the rail line for transport of nuclear waste, but later decided to truck the materials instead because of the higher cost for dedicated rail service and the need for carrier assurance of transit times. The WIPP rail spur was placed in reserved status in 1997, meaning that regular maintenance was discontinued. (Cox McLain Environmental Consulting, 2015).

The WIPP North Access Road (Louis Whitlock Road) is a paved, two-lane, undivided facility that borders the site on the east and connects to a 4-lane, controlled-access highway (US 62/180) approximately 21 km (13 mi) north of the site. The US 285/Pecos Highway can be accessed by traveling approximately 43 km (26.7 mi) southeast along New Mexico Highway 128/31. These existing routes and roads to the site should provide adequate traffic capacity for additional CISF construction and operations traffic/load, with minimal improvements required.

#### CRITERION 10—AMENITIES FOR WORKFORCE

Workforce amenities for a potential Eddy County CISF would be very much like those at a Lea County CISF. A number of hotels/motels and restaurants are located in Carlsbad, New Mexico, 60 km (37 mi) west of the site by road, and Hobbs, New Mexico, approximately 84 km (52 mi) northeast of the site by road. Housing for the operations workforce would also mostly be in

Carlsbad, Hobbs, or one of the several smaller towns in the area. Larger population centers in the area are Odessa, Texas, approximately 216 km (134 mi) to the southeast of the site by road and Midland, Texas, located approximately 241 km (150 mi) to the southeast. The nearest large population center is El Paso, Texas (population 563,662), approximately 435 km (270 mi) southwest of the site by road. Although the housing market is generally tight in all these locations, CISF personnel at this site should be able to locate suitable housing in a timely manner due to the relatively small size of the operational workforce. Public schools in Carlsbad and Hobbs are rated as average with Carlsbad having the better ratings of the two.

Medical facilities include CMC which is a full-service, 127-bed community-oriented hospital providing medical, surgical, and restorative patient care at the main facility and two medical office buildings, the Pecos Valley Medical Complex and the Southwest Medical Complex. CMC's larger sister facility is LRMC in Hobbs, New Mexico. LRMC is a 201-bed, acute care facility providing complete care from cardiac care and pediatrics to mental health and outpatient surgery.

There are three state parks and three national facilities that would be available to CISF employees in the vicinity of the Lea County site. Living Desert State Park is in Carlsbad; Brantley Lake State Park is northwest of Carlsbad on the Pecos River; and Bottomless Lakes State Park, also on the Pecos River, is east of Roswell. Bitter Lake National Wildlife Refuge is also east of Roswell and Carlsbad Caverns and Guadalupe Mountains National Parks are southwest of Carlsbad. These facilities offer some recreational and cultural activities including boating and water activities on Lake Carlsbad and the Pecos River, hiking and backpacking in the nearby Guadalupe Mountains, and Carlsbad Caverns National Park. Other amenities include a local museum, community theater, and community concert and art associations. Limited local recreational and cultural activities are also available in Hobbs (e.g., Harry McAdams State Park) and in Odessa-Midland (e.g., golf, professional minor league baseball, rodeos, museums, art galleries, symphony, and theatres). Since the site is not located near a large population base, amenities are limited.

#### CRITERION 11—ENVIRONMENTAL PROTECTION

According to the NEF ER (NEF, 2005), there are no existing surveys for the Eddy County site. However, the extensive amount of data collected from the WIPP facility (adjacent to the site) should be applicable to the site because of the homogeneity of the landscape and

environmental conditions in the area. Additional characterization would be required to support a CISF license application for the Eddy County site. Environmental data consolidated from a variety of sources and incorporated into the CMEC Technical Memorandum were used for evaluation of environmental considerations for the Eddy County site.

The proposed project area is located between approximately 1,024 and 1,049 m (3,360 and 3,440 feet) above the median sea level between the site's lowest and highest points, respectively. The slope runs downward towards the northwest corner of the project area. The Livingston Ridge is located just east of the site within 3.2 km (2 mi) (Cox McLain Environmental Consulting, 2015).

No water features appear to be present on the property. There are no perennial streams on the site. At its nearest point, the Pecos River is about 21 km (13 mi) southwest of the site boundary. The drainage area of the Pecos River at this location is approximately 49,210 square km (19,000 square mi). A few small creeks and draws are the only westward flowing tributaries of the Pecos River within 32 km (20 mi) north or south of the site. The Hill Tank Draw drainage area is the most prominent drainage feature near the site. The drainage area is about 10.4 square km (4 square mi) with an average channel slope of 1 to 100, and drainage westward into the Nash Draw. Two years of U.S. Geological Service (USGS) observations showed only four flow events. The USGS estimates that the flow rate for these events was under 0.06 cubic m (2 cubic feet) per second (Cox McLain Environmental Consulting, 2015). According to topographic maps, the site would drain northwest towards the Livingston Ridge, which is approximately 2.4 km (1.5 mi) from the site. From there, surface water discharge would join the many draws and channels that transverse the ridge and subsequently pool and evaporate under normal conditions once reaching the flat expanse west of the ridgeline.

The climate is semiarid, with a mean annual precipitation of about 31 cm (12 in), a mean annual runoff of from 0.25 to 0.5 cm (0.1 to 0.2 in), and a mean annual pan evaporation of more than 254 cm (100 in). More than 90% of the mean annual precipitation at the site is lost by evapotranspiration. On a mean monthly basis, evapotranspiration at the site greatly exceeds the available rainfall; however, intense local thunderstorms may produce runoff and percolation. The maximum recorded 24-hour precipitation at Carlsbad was 13 cm (5.12 in) in August 1916. The predicted maximum 6-hour, 100-year precipitation event for the site is 9.1 cm (3.6 in) and is most likely to occur during summer. Most of the annual precipitation in the area comes as a result of very violent spring and early summer thunderstorms. These are usually accompanied

by excessive rainfall over limited areas, and sometimes hail. Due to the flat nature of the terrain, local flooding occurs, but is of short duration. Tornadoes are occasionally sighted. During late winter and early spring, blowing dust occurs frequently. The flat plains of the area with only grass as vegetation offer little resistance to the strong winds. The sky is occasionally obscured by dust but during most storms, visibility ranges from 1.6 to 4.8 km (1 to 3 mi). Daytime temperatures are hot in summer, but there is a large diurnal range of temperature and most nights are comfortable. The temperature drops below 32 °F in the fall about mid-November and the last temperature below 32 °F in spring is in early April, on average. Winters are characterized by frequent cold periods followed by rapid warming. Cold frontal passages are often followed by chilly weather for two or three days. Cloudiness is at a minimum. Summers are hot and dry with numerous small convective showers (Cox McLain Environmental Consulting, 2015).

The prevailing wind direction in this area is from the southeast. This, together with the upslope flow of the terrain from the same direction, causes occasional low cloudiness and drizzle during winter and spring months. Snow is infrequent. Maximum temperatures during summer months frequently are from 2 to 6 °F cooler than those at places 160 km (100 mi) southeast, due to the cooling effect of the upslope winds (Cox McLain Environmental Consulting, 2015).

The project area is located in an arid climate within the Chihuahuan Desert Grassland region. Due to low precipitation, there is little ground cover, and dominant species include black, blue, and sideoats grama; dropseeds; bush muhly; and tobosa (EPA, 2006). Scattered creosotebush, as well as prickly pear and cholla cacti are also present (EPA, 2006). Soils information for the project area was obtained from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA, 2015). Four soil series underlie the project:

- BA, Berino loamy fine sand, 0 to 3% slopes
- BB, Berino complex, 0 to 3% slopes, eroded
- KM, Kermit-Berino fine sands, 0 to 3% slopes
- Protected Area, Pajarito loamy fine sand, 0 to 3% slopes, eroded

Each soil series profile consists of loamy fine sand and/or fine sandy loam with a parent material of mixed alluvium and/or eolian sands. There are no hydric soils located on the site.

Several Groundwater-bearing zones have been identified and studied at and near the site. Limited amounts of potable water are found in the middle Dewey Lake Redbeds Formation and the overlying Triassic Dockum group in the southern part of the site. Two water-bearing units, the Culebra Dolomite and the Magenta Dolomite, occur in the Rustler Formation and produce brackish to saline water at and in the vicinity of the site. Another very low-transmissivity, saline water-bearing zone occurs at the Rustler–Salado Formation contact. There are three recorded Office of the State Engineer (OSE) wells located in the project area. (Cox McLain Environmental Consulting, 2015)

The Eddy County site adjoins the DOE WIPP site. No protected properties other than the WIPP site are near the Eddy County site. Although the WIPP facility is not licensed by the NRC, the facility went through stringent NEPA and regulatory permitting processes prior to initiating underground disposal of transuranic wastes. Environmental sampling was conducted as part of the WIPP monitoring and permitting process, and there is no indication of hazardous or radioactive contamination. Environmental monitoring, including soil sampling, is performed annually along the southern edge of the proposed site, adjoining the WIPP, and north, northeast, and northwest of the site. There are no known air or groundwater plumes within 3.2 km (2 mi) of the site, and no future migration is anticipated from the nearby WIPP site.

The current and historical use of the Eddy County site was/is as range land for grazing. No hazardous or radioactive contamination was found during environmental sampling conducted as part of the WIPP permitting process. Additionally, none has been found during the ongoing WIPP environmental monitoring, including soil sampling, performed annually along the southern edge of the proposed site (adjoining the WIPP), as well as to the north, northeast, and northwest of the site. There are no known air or groundwater plumes within 3.2 km (2 mi) of the site, and no future migration is anticipated from the nearby WIPP site.

There are no FEMA flood insurance maps for the project area; the nearest map is approximately 7.2 km (4.5 mi) west-southwest of the project location. Based on the nearest available FEMA flood insurance maps, no 100-year floodplains are anticipated to cross the site boundary. The maximum recorded flood on the Pecos River occurred near the town of Malaga, New Mexico, on August 23, 1966, with a discharge of 3,390 cubic m (120,000 cubic feet) per second and a stage elevation of about 896 m (2,938 feet) above msl (Cox McLain Environmental Consulting, 2015). The general ground elevation in the vicinity of the surface facilities (approximately 1,036 m [3,400 feet] above msl) is about 152 m (500 feet) above the river bed and over 122 m (400

feet) above the maximum recorded historical flood elevation. The project would not be anticipated to increase the base flood elevation to a level that would violate applicable floodplain regulations.

There are no existing protected species surveys for the Eddy County site. Existing information from the WIPP (NEF, 2005) indicate that no protected species occur on the WIPP site. Given the homogeneity of the landscape between the proposed site and the WIPP site and the narrow habitat requirements for the protected species known to occur in Eddy County, it is unlikely that protected species occur on The Eddy County site. Existing surveys for the WIPP (adjacent to the site) indicate that there is a high likelihood for archeological isolated occurrences in the general area. Studies at the WIPP site and other studies in the area have found an average of one isolated occurrence every 18 ha (45 acres); no significant or potentially significant sites were found. There are no existing archeological or cultural resource surveys for the Eddy County site. Existing information from the adjacent WIPP facility should be applicable to the site, given the extensive amount of data collected and homogeneity of the landscape in the area. Characterization of the site archeological and cultural resources would be required to support a CISF license application.

According to lists of threatened, endangered, and candidate species maintained by the USFWS and the New Mexico Department of Game and Fish, 16 federally listed species and 30 state-listed species have the potential to occur in Eddy County, New Mexico. Federally listed species of potential occurrence include 8 birds, 2 fish, 1 mollusk, and 5 plants. State-listed species of potential occurrence include 1 mammal, 15 birds, 6 reptiles, 6 fish, and 2 mollusks. According to the New Mexico Rare Plant List, 27 rare plants have the potential to occur in Eddy County, 3 of which are federally listed endangered. Lists of rare, threatened, and endangered species of potential occurrence in Eddy County are included in the Environmental Technical Memorandum prepared for WCS by Cox McLain Environmental Consulting (Cox McLain Environmental Consulting, 2015).

Critical habitat for two species, gypsum wild-buckwheat (*Eriogonum gypsophilum*) and Pecos bluntnose shiner (*Notropis simus pecosensis*), is designated in Eddy County (USFWS, 2016b); however, the project is not located within the critical habitat areas. According to aerial photography, the site consists mainly of undeveloped desert brushland with a few well pads and an access road crossing through it. No water features appear to be present on the property. Based on this, no fish or mollusk species would be anticipated to occur on the site. A field

habitat assessment would be necessary for the site in order to determine potential impacts to listed species.

NPDES permits for construction-related stormwater discharge, industrial stormwater discharge, and possibly for facility discharge will be required. There are no identified impediments, and obtaining an NPDES permit for this site should be readily achievable through the EPA; the State of New Mexico does not administer the NPDES program. There are no wetlands or other waters of the U.S. on the site. Neither a Clean Water Act Section 404 permit nor a State Section 401 Water Quality Certification will be required to construct on the site.

Within the boundaries of the proposed project area, there are three water wells administered by the New Mexico OSE. Two of those wells are owned by the DOE and the third well is owned by Sandia National Laboratories. The project area also has an old petroleum well administered by the Oil Conservation Division of the New Mexico Department of Energy, Minerals, and Natural Resources. That particular well has long been out of operation. No air permits, hazardous waste permits, nor wastewater discharge permits could be located within the proposed project area. There are also no discharge routes located within the project area.

The site is adjacent to an existing radiological hazard but that facility (the WIPP) does not handle uranium hexafluoride (UF<sub>6</sub>). The proposed project will provide a new radiological hazard to the area through the handling of a different source of radiation. The proposed site is in an area designated for buildings designed for 112 km/hr (70 mi/hr) winds. Data collected for the WIPP indicate the area has potential for violent convectional storms. The WIPP SAR indicates a recurrence interval for 132 km/hr (82 mi/hr) winds of every 100 years in southeastern New Mexico, although no winds of this speed or greater velocity have been recorded. Tornado frequency has been estimated as 1 in every 1,235 years (WIPP, 2003). There is no significant fire hazard. The area is predominately desert scrub, and trees are absent. Desert range land will burn but does not support a sufficient fuel load to sustain a major fire. The site topography and soil characteristics do not promote ponding. The topography is level, and there is no potential for rock/mud slides.

Data collected for the WIPP site (NEF, 2005) included an 80 km (50 mi) ROI, which encompassed the adjacent Eddy County site. Within the designated ROI, the percentage of Hispanics and the percentage of persons living below poverty level were above the national



average and the state averages for New Mexico and Texas. The relative isolation of the proposed facility should reduce the potential for impacts to these population groups.

#### CRITERION 12—DISCHARGE ROUTES

There are no existing NPDES-permitted discharges at the proposed site. Control and discharge of stormwater runoff from the site or into a lined, evaporative retention pond should be manageable. There are no existing radiological waste streams that may need to be differentiated from the site waste stream. The only discharge from the adjacent WIPP site is to lined, evaporative sewage lagoons.

#### CRITERION 13—PROXIMITY OF HAZARDOUS OPERATIONS/HIGH-RISK FACILITIES

The site is adjacent to an existing radiological hazard but that facility (the WIPP) does not handle spent nuclear fuel. The proposed project would provide a new radiological hazard to the area through the handling of a different source of radiation. There are no facilities storing or handling large quantities of hazardous chemicals within 8 km (5 mi). However, the adjacent WIPP site handles large quantities of transuranic wastes. There are no major propane pipelines within 3.2 km (2 mi) of the site, although a high-pressure gas line runs through the WIPP site, approximately 0.8 km (0.5 mi) south of the site. There are no commercial airports within 16 km (10 mi), and the site is not located in a general emergency area. The proposed site is in an attainment zone. The only facility nearby is the WIPP, and it is not expected to affect the permitting effort for the site. Other than the WIPP facility, there are no facilities within 8 km (5 mi) that would provide a nearby air emissions source that could potentially affect air quality.

#### CRITERION 14—EASE OF DECOMMISSIONING

The natural site characteristics (climate, hydrology, etc.) at the Lea County site can be expected to support efficient decontamination and decommissioning activities. There are no known future projects for the site vicinity that could add additional impacts to decommissioning the proposed facilities.

#### CRITERION 15—DISPOSAL OF LOW-LEVEL WASTE

There is ready access to the WCS LLRW disposal facilities 10 km (6 mi) east of Eunice, New Mexico. To store and ship these wastes the Eddy County site licensee will have to hire and build a waste management staff capable of demonstrating the technical qualifications required to

obtain the appropriate LLRW licenses and authorizations for generating, storing, and transporting CISF-generated wastes.

**2.3.8 Site Selection Process: Summary of Scores**

WCS explored four possible locations to construct and operate a CISF. One of these locations, the WCS property in Andrews County, Texas, ultimately became the Proposed Action, as described in Section 2.2 of this ER. The remaining three locations were not carried forward for detailed analysis based on their scores for the screening criteria.

The four locations were first evaluated using the first tier of five “Go: No Go” screening criteria. All four counties received “Go” or “Acceptable” ratings for all five criteria (Table 2.3-1). Therefore, all four locations were advanced to the second tier of screening.

**Table 2.3-1 First Tier Go: No Go Screening Criteria**

|                       | FIRST PHASE SCREENING MATRIX     |                                       |                               |                                    |                                  |
|-----------------------|----------------------------------|---------------------------------------|-------------------------------|------------------------------------|----------------------------------|
| Location              | Criterion 1<br>Political Support | Criterion 2<br>Seismology/<br>Geology | Criterion 3<br>Rail<br>Access | Criterion 4<br>Land Parcel<br>Size | Criterion 5<br>Land Availability |
| Andrews County,<br>TX | Go                               | Go                                    | Go                            | Go                                 | Go                               |
| Loving County, TX     | Go                               | Go                                    | Acceptable                    | Go                                 | Acceptable                       |
| Lea County, NM        | Go                               | Go                                    | Go                            | Go                                 | Go                               |
| Eddy County, NM       | Go                               | Go                                    | Go                            | Go                                 | Go                               |

Results of the second tier of screening, which evaluated the operational considerations and environmental impacts at each location, are shown in Tables 2.3-2 through 2.3-4.

**Table 2.3-2 Second Phase Screening Matrix: Operational Criteria Scoring Summary**

| Operational Criteria                         | Weight % | Sub-Criteria                                           | Andrews County | Loving County | Lea County   | Eddy County  |
|----------------------------------------------|----------|--------------------------------------------------------|----------------|---------------|--------------|--------------|
| Criterion 6 - Utilities                      | 100      | Electric Power Availability                            | 10             | 3             | 7            | 7            |
|                                              | 80       | Cellular and Data Towers                               | 10             | 3             | 8            | 8            |
|                                              | 100      | Water Supply                                           | 10             | 5             | 8            | 10           |
| Criterion 7 - Construction Labor Force       | 100      | Sufficient Labor Force                                 | 10             | 10            | 10           | 10           |
|                                              | 50       | Competing Projects/Sites                               | 10             | 10            | 10           | 10           |
|                                              | 90       | Large Project Experience                               | 10             | 10            | 10           | 10           |
| Criterion 8 - Operational Labor Force        | 100      | Sufficient Labor Force                                 | 8              | 5             | 7            | 7            |
|                                              | 80       | Multi-Task Employees                                   | 8              | 5             | 7            | 7            |
|                                              | 80       | Technical School/training                              | 9              | 3             | 9            | 9            |
|                                              | 100      | Mature Nuclear Safety Culture                          | 10             | 1             | 8            | 8            |
|                                              | 100      | Radiation Worker Staff                                 | 10             | 1             | 8            | 8            |
|                                              | 100      | Health Physicist and Radiation Protection Organization | 10             | 1             | 8            | 8            |
| Criterion 9 - Transport Routes               | 100      | Site Railhead                                          | 9              | 0             | 6            | 8            |
|                                              | 90       | Access to Highways                                     | 10             | 3             | 10           | 10           |
|                                              | 90       | Traffic Capacity                                       | 10             | 3             | 10           | 10           |
|                                              | 90       | Efficient Access                                       | 8              | 3             | 8            | 8            |
| Criterion 10 - Amenities for Workforce       | 100      | Housing                                                | 9              | 3             | 10           | 9            |
|                                              | 100      | Schools                                                | 10             | 10            | 10           | 10           |
|                                              | 100      | Health Services                                        | 10             | 5             | 10           | 10           |
|                                              | 80       | Parks/Recreation                                       | 9              | 5             | 9            | 10           |
|                                              |          | <b>Score</b>                                           | <b>174.0</b>   | <b>78.9</b>   | <b>157.6</b> | <b>161.4</b> |
| *Total weight for operational criteria is 80 |          |                                                        |                |               |              |              |

**Table 2.3-3 Second Phase Screening Matrix: Environmental Selection Scoring Summary**

| Criterion*                                                            | Weight % | Sub-Criteria                                      | Andrews County | Loving County | Lea County   | Eddy County  |
|-----------------------------------------------------------------------|----------|---------------------------------------------------|----------------|---------------|--------------|--------------|
| Criterion 11 - Environmental Protection                               | 100      | Existing Site Characterization Data               | 10             | 1             | 6            | 6            |
|                                                                       | 100      | Documentation                                     | 10             | 3             | 9            | 5            |
|                                                                       | 100      | Neighboring Plume                                 | 10             | 10            | 8            | 10           |
|                                                                       | 100      | Future Migration                                  | 10             | 10            | 8            | 10           |
|                                                                       | 100      | No RAD Contamination                              | 10             | 10            | 10           | 10           |
|                                                                       | 100      | Not CERCLA or RCRA                                | 10             | 10            | 10           | 10           |
|                                                                       | 100      | No Remediation needed                             | 10             | 10            | 10           | 10           |
|                                                                       | 100      | Flood Plain                                       | 10             | 10            | 10           | 10           |
|                                                                       | 50       | Ponding                                           | 10             | 10            | 10           | 10           |
|                                                                       | 100      | Protected Species                                 | 10             | 10            | 8            | 10           |
|                                                                       | 100      | Archeological and Cultural Resources              | 10             | 5             | 5            | 5            |
|                                                                       | 80       | Environmental Permits                             | 10             | 10            | 10           | 10           |
|                                                                       | 100      | Environmental Justice                             | 10             | 7             | 7            | 7            |
| Criterion 12 - Discharge Routes                                       | 50       | Facility Discharge                                | 10             | 10            | 10           | 10           |
|                                                                       | 50       | Differentiation                                   | 9              | 10            | 10           | 10           |
| Criterion 13 - Proximity of Hazardous Operations/High-Risk Facilities | 90       | Hazardous Chemical Sites                          | 8              | 10            | 10           | 10           |
|                                                                       | 80       | Gas Pipelines                                     | 10             | 10            | 8            | 8            |
|                                                                       | 70       | Airports                                          | 10             | 10            | 10           | 10           |
|                                                                       | 70       | Emergency Area                                    | 8              | 10            | 10           | 10           |
|                                                                       | 80       | Air Quality                                       | 10             | 10            | 10           | 10           |
| Criterion 14 - Ease of Decommissioning                                | 50       | Ease of Decommissioning                           | 10             | 10            | 10           | 10           |
|                                                                       | 25       | Adjacent Site's Medium/Long-Term Plans            | 8              | 10            | 10           | 10           |
| Criterion 15 - Disposal of LLRW                                       | 100      | Proximity to and Availability of Disposal Options | 10             | 8             | 8            | 8            |
|                                                                       |          | <b>Score</b>                                      | <b>185.3</b>   | <b>163.5</b>  | <b>166.9</b> | <b>168.9</b> |
| *Total weight for environmental criteria is 100                       |          |                                                   |                |               |              |              |

**Table 2.3-4 Second Phase Screening Matrix: Overall Scoring**

| <b>Criteria</b>              | <b>Weight %</b> | <b>Andrews County, TX</b> | <b>Loving County, TX</b> | <b>Lea County, NM</b> | <b>Eddy County, NM</b> |
|------------------------------|-----------------|---------------------------|--------------------------|-----------------------|------------------------|
| Siting                       | 100             | 157.4                     | 124.5                    | 147.5                 | 142.5                  |
| Environmental Considerations | 100             | 185.3                     | 163.5                    | 166.9                 | 168.9                  |
| Operational Considerations   | 80              | 174                       | 78.9                     | 157.6                 | 161.4                  |
| <b>Score</b>                 |                 | <b>481.9</b>              | <b>351.1</b>             | <b>440.5</b>          | <b>440.5</b>           |

## 2.4 Alternatives Considered But Eliminated

Alternatives to the proposed design that alter the design or the location of the project were identified. Ultimately, none were carried forward for detailed analysis. The range of reasonable design and location alternatives considered and the reasons for eliminating them from detailed analysis are presented here.

### 2.4.1 Design Alternative

Currently, the NRC has licensed and approved SNF storage systems owned by AREVA, NAC International, HOLTEC International, and EnergySolutions. WCS has teamed with AREVA and NAC International to use their systems to store SNF at the CISF and use of these systems is analyzed as part of the Proposed Action. A potential design alternative would be to use the Holtec International and EnergySolutions systems. WCS considered this alternative.

In order for the Holtec International and EnergySolutions systems to be considered as a viable alternative to the Proposed Action, WCS would need access to information about the characteristics of the SNF within the casks, the technical specifications of the casks, and the inspection requirements for those systems. Currently, Holtec International and EnergySolutions have declined to partner with WCS and have not provided that proprietary information to WCS. Without that information, WCS cannot prepare a detailed site plan, SAR, or impacts analysis. The requirements of the different storage systems could necessitate a different site layout,

handling procedures for transport, or different inspection schedules, to name just a few potential variables.

Without access to detailed technical information for the Holtec International and EnergySolutions systems, WCS is unable to prepare a sufficiently detailed plan incorporating these systems; therefore, WCS cannot evaluate the potential impacts from such an alternative. Because of these constraints, the Design Alternative was not carried forward for detailed analysis.

#### **2.4.2 Location Alternatives**

The Proposed Action in Andrews County, Texas, was identified through the process conducted by WCS to evaluate a range of possible locations for a CISF site.

WCS supports the Blue Ribbon Commission's recommendation to only site a CISF in a state and community willing to host such a facility. WCS' success in licensing the nation's first LLRW disposal facility since Congress enacted the Low-Level Radioactive Waste Policy Act of 1980, as amended in 1985, was predicated on the tremendous support provided by Texas, the regional and local communities in west Texas, Andrews County, and southeastern New Mexico. WCS agrees with the findings of the Blue Ribbon Commission (BRC, 2012) that many of the failures to site nuclear and radioactive waste disposal facilities, including the proposed repository at Yucca Mountain, Nevada, are directly attributable to the failure to garner the support of the host state and local communities. Accordingly, WCS developed a site selection process geared to identify a ROI focused upon states and communities that have expressed their willingness to host an interim storage facility. A summary of this process is provided immediately below; details of the process are provided in the following sections.

The evaluations of alternate site locations started with seven states in the southwestern U.S. These seven were chosen based on their low population and arid or semi-arid climates. The states considered included Arizona, California, Colorado, Nevada, New Mexico, Texas, and Utah.

WCS screened out five of the seven states for further consideration due to the lack of political or community support for hosting an SNF storage facility—consistent with the recommendations from the BRC. This included elimination of a potential site on the Skull Valley Band of Goshute Indians (SVBG) reservation. Since their license is effective until February 21, 2026, SVBG

contacted WCS on April 28, 2015 about acquisition and transfer of the licenses to WCS (Attachment 2-1). WCS met with the executive committee of the SVBG on September 29, 2015 to discuss acquiring the license that was approved by the NRC authorizing Private Fuel Storage (PFS) to store SNF on its reservation in Utah. Despite the availability of the existing license, this potential location was not carried forward for detailed analysis due to the lack of state and community support needed to transfer important lands required for successful operations of an away-from-reactor SNF CISF. The states eliminated from further analysis included Arizona, California, Colorado, Nevada, and Utah.

Texas and New Mexico voiced their strong support for hosting a CISF and therefore were selected for further screening.

In west Texas, 54 counties were initially considered based on criteria established by the State of Texas for siting a disposal facility for Class A, B, and C LLRW. WCS then selected for further review the specific counties in Texas that had expressed a willingness to host a CISF. As such, WCS selected Andrews and Loving counties, Texas, for further consideration in site-selection screening. In New Mexico, strong community and political support for a CISF were present in two counties: Lea and Eddy counties. Therefore, these two counties were considered as possible alternate locations for the CISF site. All other states and counties were eliminated from further consideration.

Subsequently, an environmental screening analysis and an operational screening analysis were performed on the four counties (Andrews and Loving counties in Texas and Lea and Eddy counties in New Mexico) to determine the one that would best support the CISF with the least amount of impacts. Through these two screening phases, these four locations were scored to show a quantitative outcome to compare each location.

Ultimately, the alternative site locations that were considered but eliminated from detailed analysis were Loving County, Texas; Lea County, New Mexico; and Eddy County, New Mexico. These sites were eliminated because the final scores for Andrews County, Texas were the highest—the Andrews County site had the fewest environmental and operational impacts. The most important operational impacts that contributed to the low score of the eliminated site locations were the availability of utilities, the established local labor culture, and the absence of a site railhead. Andrews County scored the highest in these areas with respect to the operational impacts. Moreover, Andrews County did not score below a 10 in any of the



environmental protection categories. Through this screening processes, it was determined that Andrews County was the superior site location and no other location could reasonably serve as the location for the CISF site. Thus, the other three alternative site locations were eliminated from detailed analysis.

## **2.5 Summary of the No Action Alternative, Proposed Action Alternative, and Eliminated Alternatives**

Under the No Action Alternative, the license would not be approved and the CISF would not be built. The shutdown, decommissioned and operating commercial reactor sites would be required to operate an ISFSI on their current property. In this alternative the shutdown, decommissioned commercial reactors would not be able to return to a greenfield condition, causing a disadvantage for the local communities because this land will not be available for further economic development. This alternative does not support the communities' needs or the recommendations from the President's Blue Ribbon Commission on America's Nuclear Future.

Under the Proposed Action, WCS will construct and operate a CISF on 130 ha (320 acres) of the existing WCS property of approximately 5,666 ha (14,000 acres) in Andrews County, Texas. The SNF that is now being stored at the reactor sites will be shipped by rail to WCS for storage for 60–100 years, until a permanent repository is opened.

The potential Design Alternative would use different SNF storage systems. As discussed in Section 2.4.1, without access to detailed technical information for the Holtec International and EnergySolutions systems, WCS is unable to prepare a sufficiently detailed plan incorporating these systems. Therefore, WCS cannot evaluate the potential impacts from such an alternative. Because of these constraints, the Design Alternative was not carried forward for detailed analysis.

As discussed in Section 2.3, WCS reviewed four counties located in west Texas and southwest New Mexico that have strong state and community support for the construction and operation of a CISF: Andrews and Loving counties in Texas and Eddy and Lea counties in New Mexico. WCS analyzed and scored each county for operational considerations and environmental considerations (see Tables 2.3-1 through 2.3-4). Each county was carefully analyzed based on the 15 different criteria and scored based on the information available (Attachment 2-3). These analyses led to the overall scores shown in Table 2.3-4. Based on this analysis, the Andrew

County, Texas location was identified as the preferred location and the other three locations were eliminated from detailed analysis.

Thus, based on a consideration of the available design and location alternatives, only the No Action and Proposed Action alternatives were carried forward for detailed analysis; all other alternatives were eliminated from detailed analysis. Table 2.5-1 provides a summary of the operational, environmental, and state and community support factors for the No Action, Proposed Action, and alternatives eliminated from detailed analysis.

**Table 2.5-1 Comparison of the No Action Alternative, Proposed Action Alternative, and Alternatives Eliminated from Detailed Analysis**

|                                                | Alternative                            | Operational Impacts Considerations                                                                | Environmental Impacts Considerations                     | State and Community Support                                                                                    |
|------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Alternatives to be Analyzed                    | No Action                              | Would need to license each site to store spent fuel onsite until a permanent repository is opened | Would need to analyze environmental aspects at each site | Each site would need community support; goes against recommendations of the President's Blue Ribbon Commission |
|                                                | Proposed Action:<br>Andrews County, TX | Scored highest with 174.0                                                                         | Scored highest with 185.3                                | Has state and community support to construct and operate the CISF                                              |
| Alternatives Eliminated from Detailed Analysis | Design Alternative                     | Information unavailable, could not be assessed                                                    | Information unavailable, could not be assessed           | Lacks state and community support; has support of SVBG                                                         |
|                                                | Location Alternative:<br>PFS, Utah     | License was authorized by the NRC                                                                 | License was authorized by the NRC                        | BLM does not support; State of Utah government and senators do not support                                     |
|                                                | Location Alternative:<br>Loving, TX    | Lowest score with 78.9                                                                            | Lowest score with 163.5                                  | Has state and local support                                                                                    |
|                                                | Location                               | Scored third highest                                                                              | Scored third highest                                     | Has state and local support                                                                                    |

|  |                                               |                                     |                                     |                             |
|--|-----------------------------------------------|-------------------------------------|-------------------------------------|-----------------------------|
|  | <b>Alternative:<br/>Lea, NM</b>               | with 157.6                          | with 166.9                          |                             |
|  | <b>Location<br/>Alternative:<br/>Eddy, NM</b> | Scored second<br>highest with 161.4 | Scored second<br>highest with 168.9 | Has state and local support |

## 2.6 Cumulative Effects

WCS evaluated the cumulative effects that would occur when the proposed action to license, construct, and operate a CISF is added to the past, present, and reasonably foreseeable developments that may occur at other nearby facilities within a 48 km (30 mi) radius. The purpose of this analysis is to assess the cumulative or incremental environmental impacts from past, current, and potential facilities and activities that could present the potential for cumulative environmental impacts. WCS evaluated the cumulative impacts for storing 40,000 MTUs of SNF for the next 60 years.

The types of cumulative environmental impacts attributable to storing 40,000 MTUs of SNF were addressed by the NRC in the NUREG-1714 report titled, *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 the Goshute Indians and Related Transportation Facility in Tooele County, Utah* (NRC, 2001). The types of cumulative environmental effects analyzed by the NRC for the project in Tooele County, Utah, are comparable to those anticipated at the CISF.

The proposed CISF would be constructed adjacent to the NEF uranium facility that supports the commercial nuclear industry and is licensed by the NRC pursuant to the requirements in 10 CFR 70. The cumulative impacts from the NEF to other nearby facilities were previously evaluated by the NRC. The results from this analysis included the impacts from WCS located approximately 1.6 km (1 mi) to the east; Permian Basin Materials, a quarry located just north of NEF; the Lea County landfill which is across New Mexico Highway 234, approximately 1.6 km (1 mi) to the south; and Sundance Industries "produced water" treatment facility that is adjacent to Permian Basin Materials. The NEF reported that the cumulative effects with the greatest likelihood of occurring were to air quality and noise during construction of this facility that has since been completed.

The impacts to air quality and increased noise attributable to the NEF have been considerably reduced since major construction at the NEF has been completed. The results from this analysis were reported in the NUREG 1790 report titled, *Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico* (NRC, 2005).

The most substantial cumulative impacts are expected to occur during construction and operation of the proposed CISF in Andrews County. These impacts may combine with other

proposed construction projects in the area, such as expansion of the WCS–controlled CWF and FWF, to create local cumulative impacts. These cumulative impacts may affect air quality during construction of the CISF and may combine with impacts from operations at Permian Basin Materials and from the manufacture of concrete at WCS’ existing batch plant, which supports operations at WCS’ LLRW disposal operations. The combined cumulative impacts from these operations are expected to be small.

Other non-radiological cumulative impacts attributable to construction of the CISF involve the competition for and use of aggregate, crushed rock, and other mineral resources. The expansion of the WCS–controlled FWF and CWF will have a minimal cumulative impact on the demand for these resources and it should be noted that the cumulative impacts for the complete buildout of the CWF and FWF have been reviewed and approved by the TCEQ. However, currently there are no other known projects planned for this area of Andrews County for the period during which WCS plans to start construction. Further, due to the abundance of these materials in the area, the potential for adverse cumulative impacts to geological resources is anticipated to be small.

The environmental impacts from WCS’ LLRW Disposal Facilities were also evaluated by the TCEQ. The results of the analysis were reported by TCEQ in a report titled, *Draft Environmental and Safety Analysis of a Proposed Low-Level Radioactive Waste Disposal Facility in Andrews County, Texas* (TCEQ, 2008).

The radiological environmental impacts attributable to operations at the WCS LLRW Disposal Facility have been well below the radiation protection standards established by the TCEQ. Since operations at this facility began in 2012, the highest effective radiation dose to a member of the public was conservatively estimated at 0.057 mSv/yr (5.7 mrem/yr). (WCS, 2013)

A review of the Radiological Environmental Monitoring Program (REMP) Reports was conducted to assess the cumulative impacts to the ROI attributable to operations at the NEF from September 2006 through December 2011. Information contained in the REMP prepared by NEF provided a summary of potential radiological effluent releases to the environment, ambient levels of gamma and neutron radiation measurement, and other environmental media from 2006 through 2011. Results reported by NEF concluded that no releases of radioactive material occurred and that the radiological impacts to the environment from uranium enrichment

operations were consistent with those of the natural environment, and well below those permissible pursuant to 10 CFR 20.1301. (LES, 2009) (LES, 2010) (LES, 2011) (LES, 2012).

The radiological impacts associated with storing up to 40,000 MTUs of SNF at the CISF were estimated at 0.011 mSv/yr (11 mrem/yr). The cumulative radiological impacts from all regional sources of radiation are well below the 1 mSv/yr (100 mrem/yr) radiation protection standard for individual members of the public established in 10 CFR 20.1301.

A non-local cumulative impact is the cumulative dose to the public associated with transporting radioactive materials in commerce. Both the NRC and the TCEQ evaluated the environmental impacts attributable to transportation at the NEF and WCS LLRW Disposal Facility, respectively (NEF, 2005) (TCEQ, 2008). The number of annual shipments transported by highway in the analysis by NEF was estimated at 1,500. Approximately 1,026 shipments by highway and 96 shipments by rail were received in 2015 to support operations at WCS. In comparison, WCS anticipates that no more than 200 shipments of SNF would be received annually at the CISF.

The maximum individual dose of radiation that any individual member of the public would receive from a single shipment of SNF along any of the three transportation routes, Figure 2.6-1, was estimated at 0.0179  $\mu$ Sv (1.79E-3 mRem). The maximum collective dose for transporting 200 shipments of SNF per year along any of the three transportation routes was estimated at 0.4 person-Sv (40 person-Rem).

The cumulative environmental effects are not expected to be significant and represent a small fraction of the limits established by federal and state regulatory agencies. The cumulative effects will be offset by the positive cumulative effects provided by increased employment opportunities and increases in the local tax base and revenues.

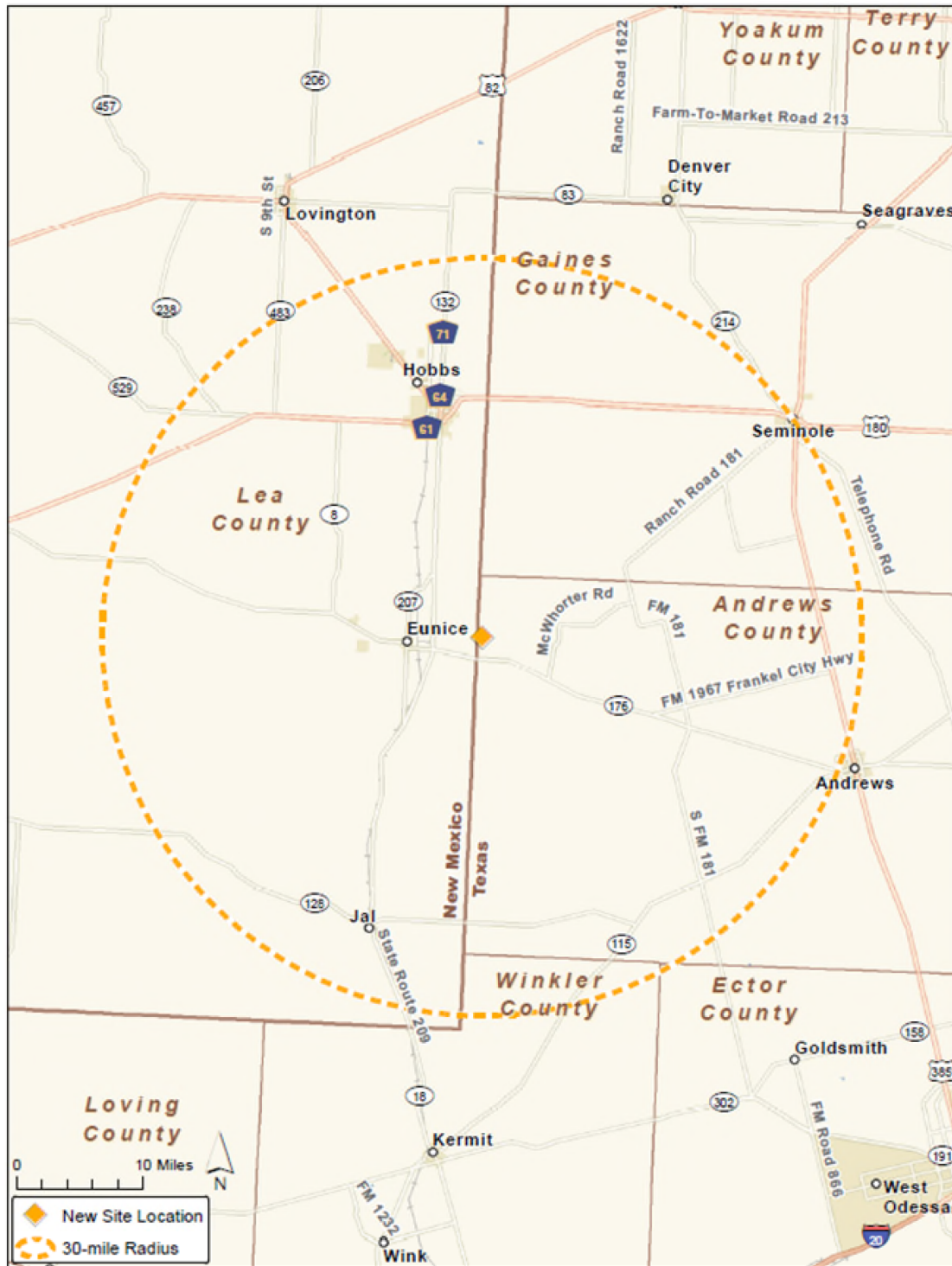


Figure 2.2-1  
Region of Interest Within 30 Mile Radius of the CISF



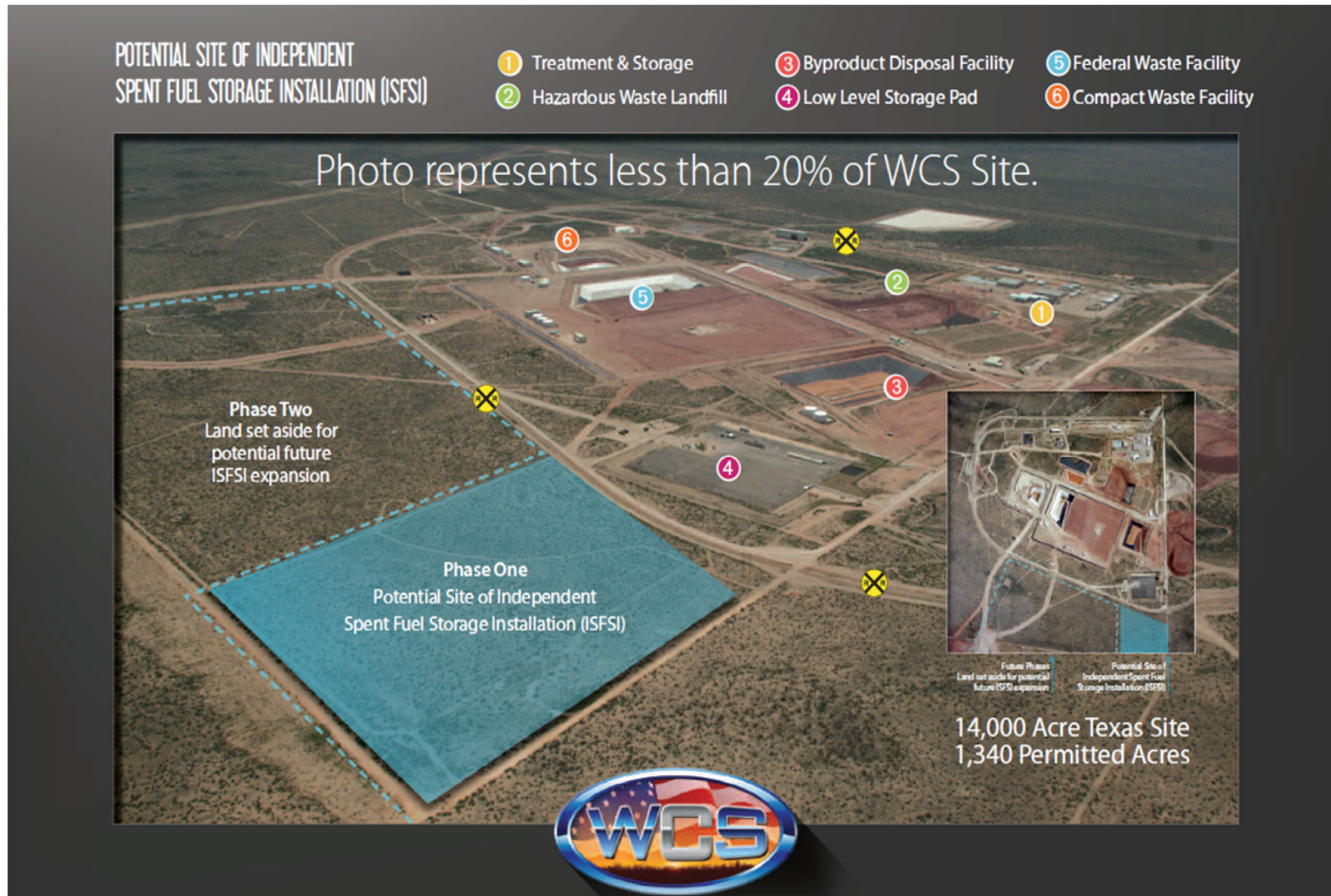
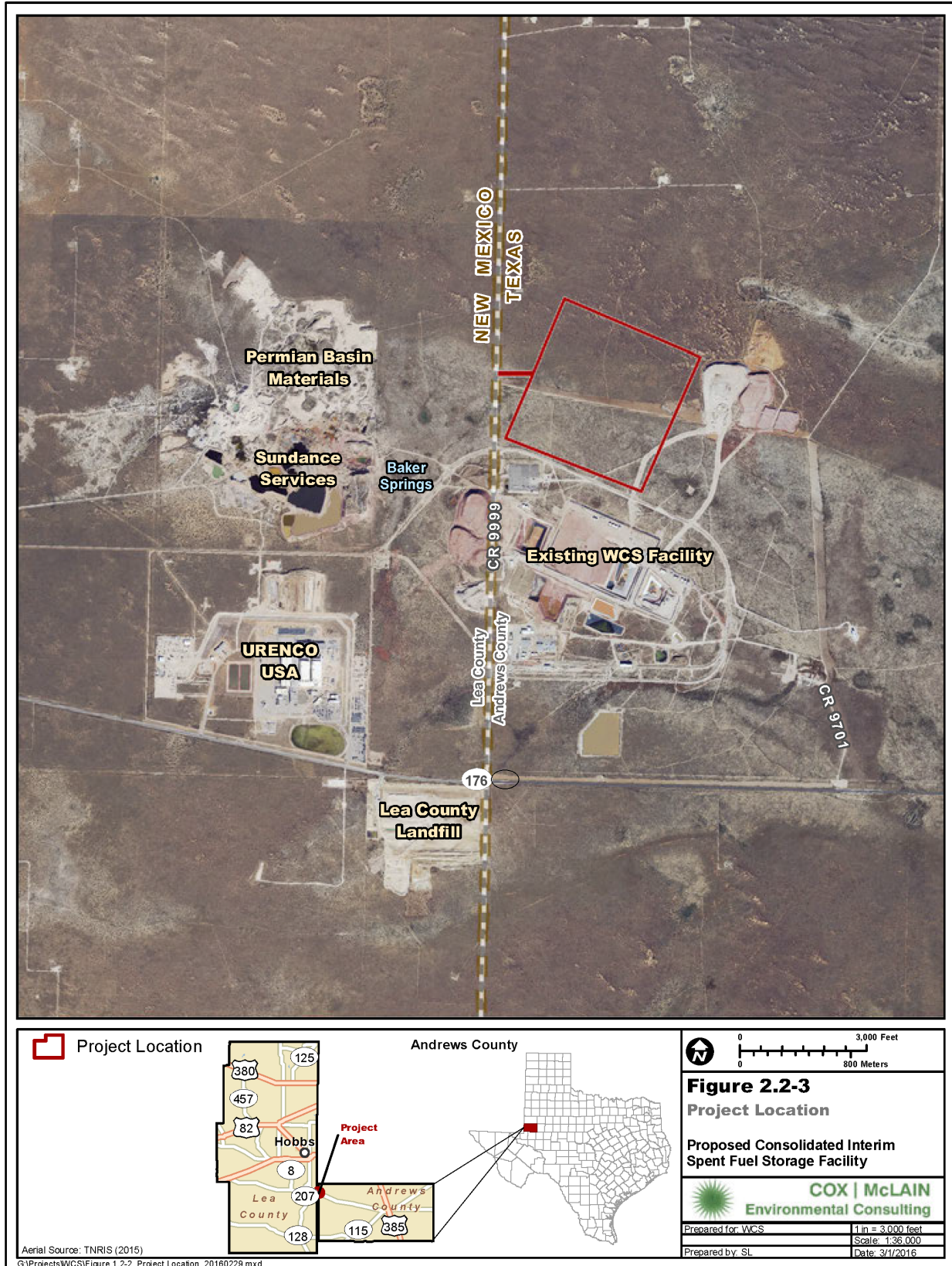
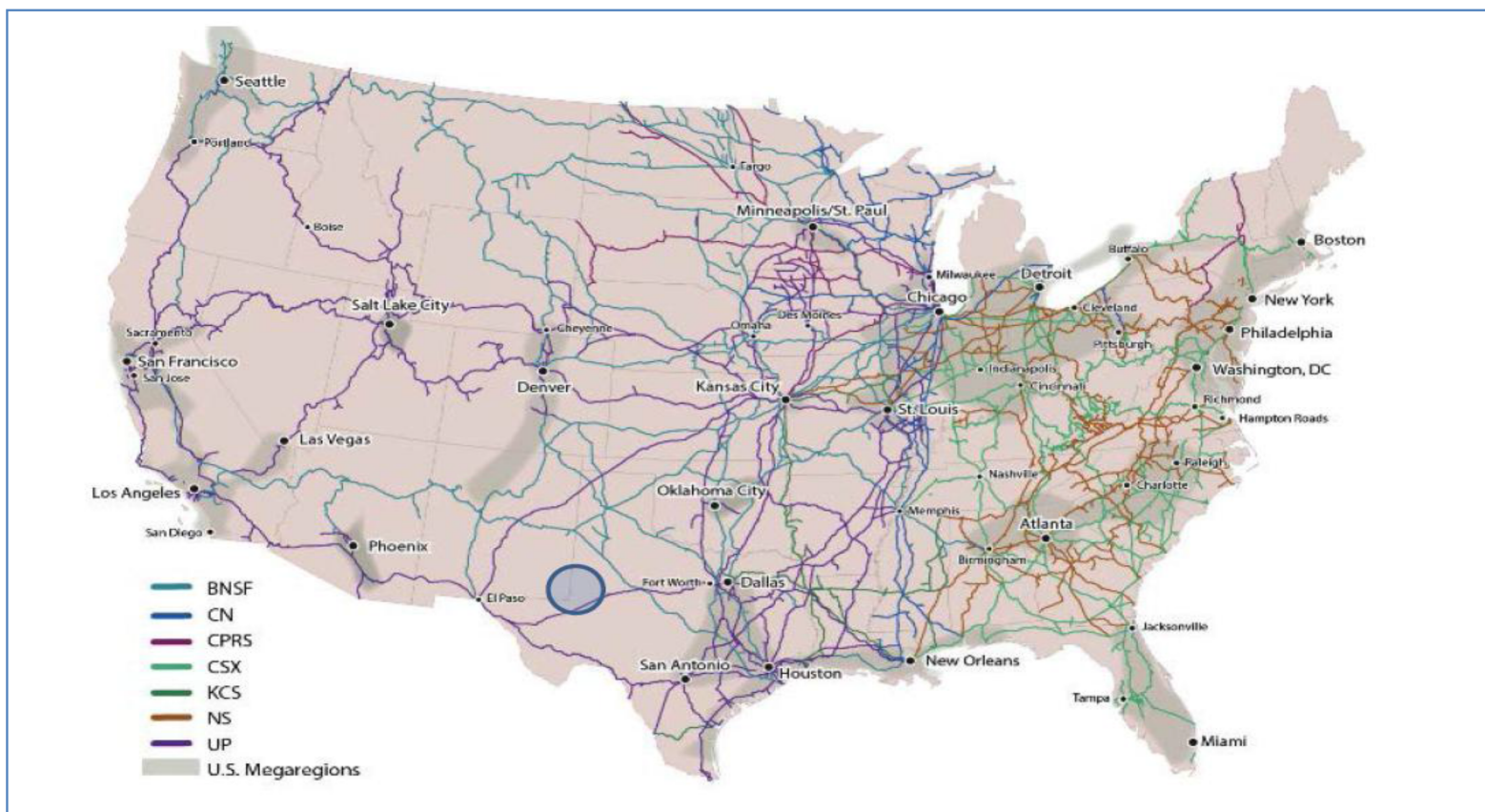


Figure 2.2-2  
Aerial Photograph of the WCS Site, including CISF

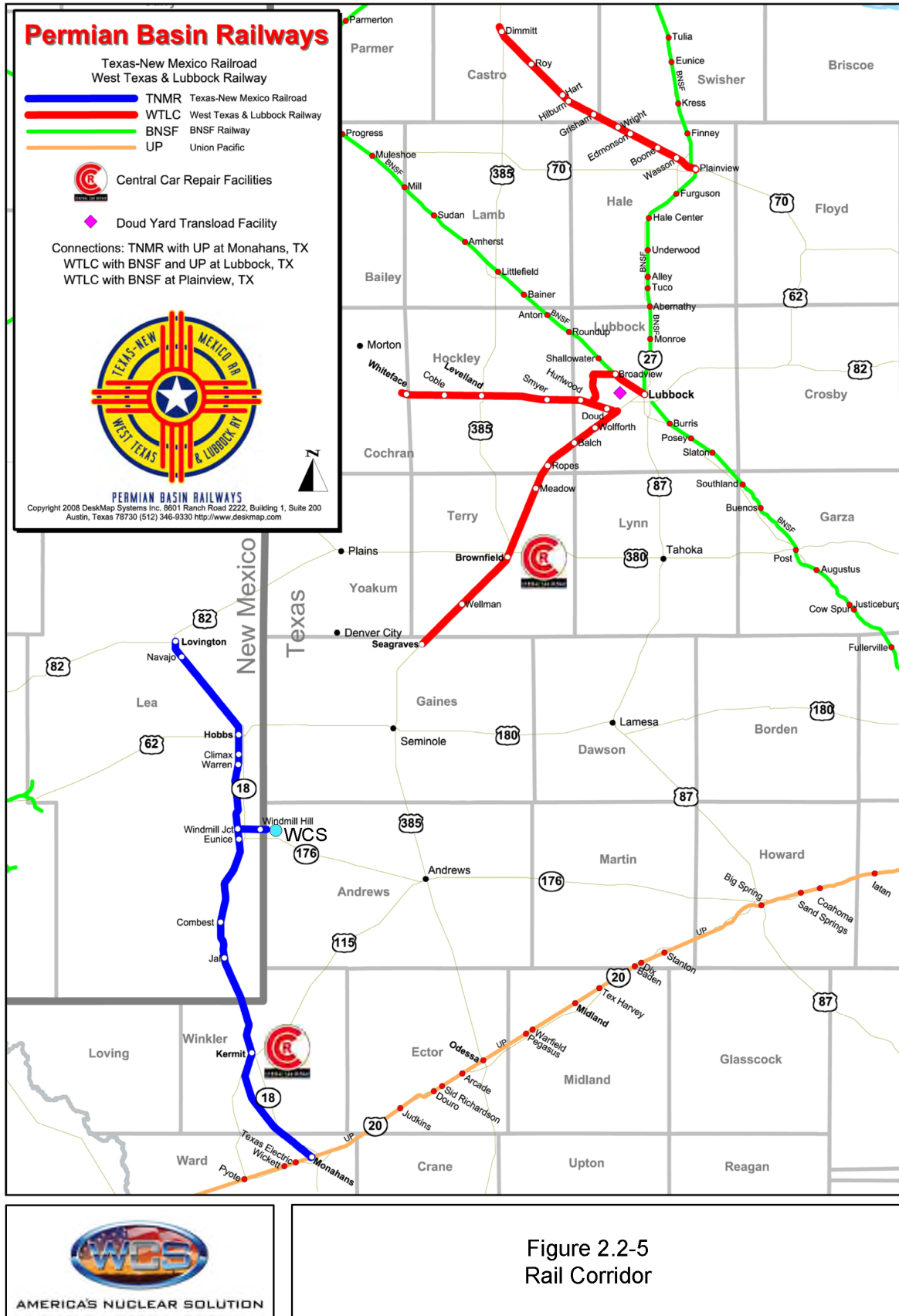






|                                            |                                    |                                                                                                       |
|--------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------|
| <p>Title:</p> <p><b>RAIL LINES MAP</b></p> | <p>Figure:</p> <p><b>2.2-4</b></p> | <p>Date:</p> <p>11/16/2015</p> <p>Scale:</p> <p>NONE</p> <div data-bbox="1549 1101 1793 1222"> </div> |
|--------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------|





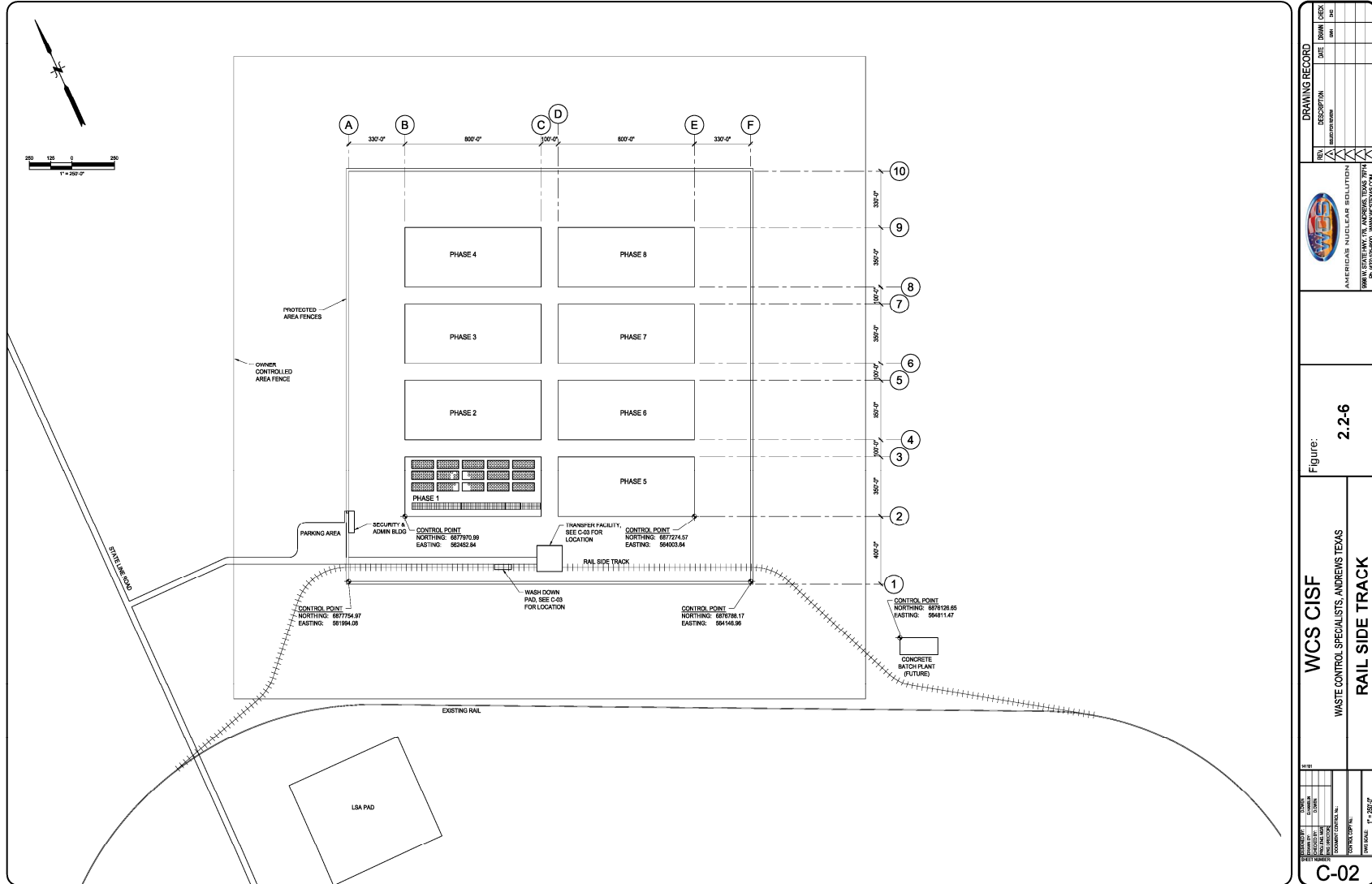
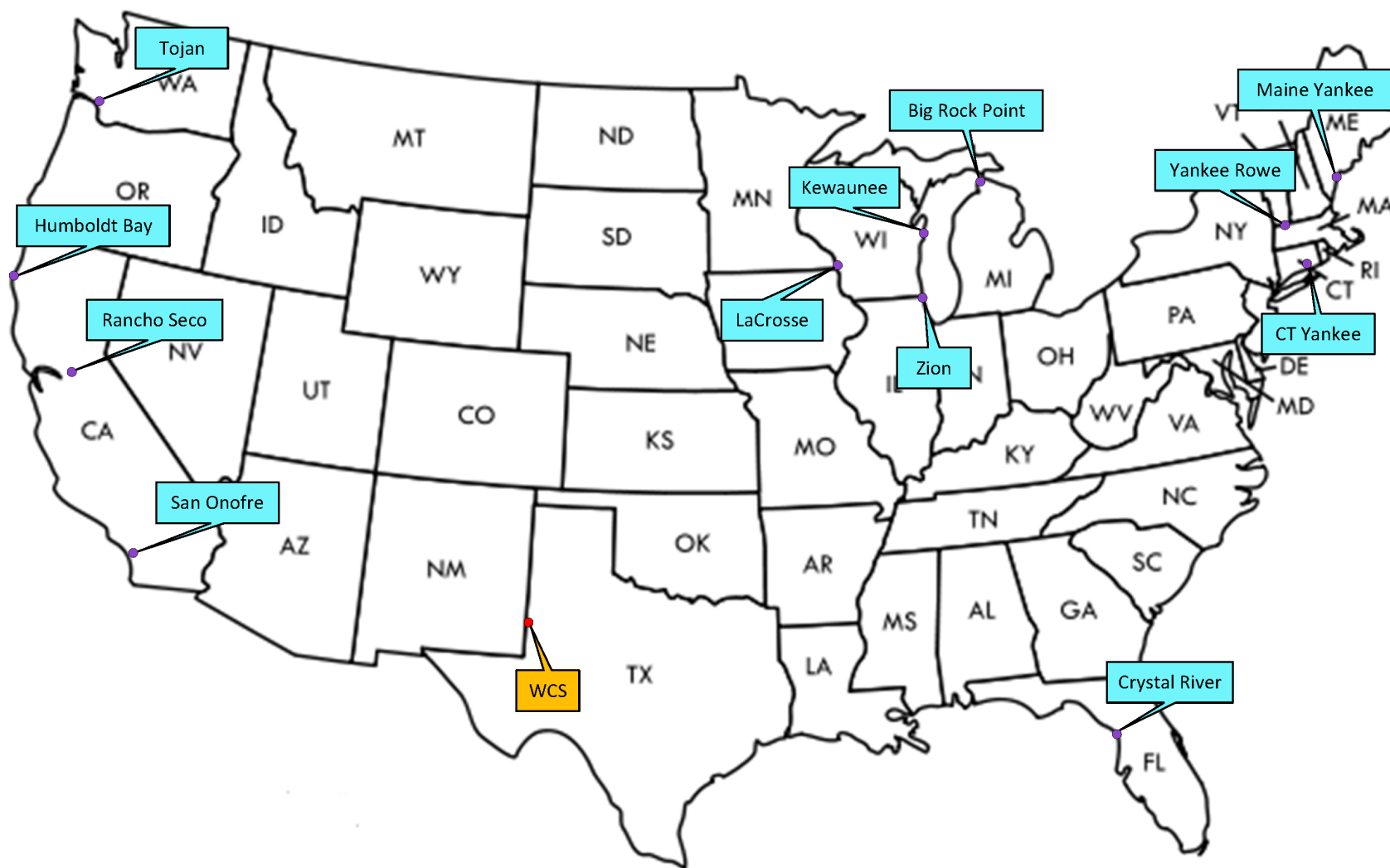




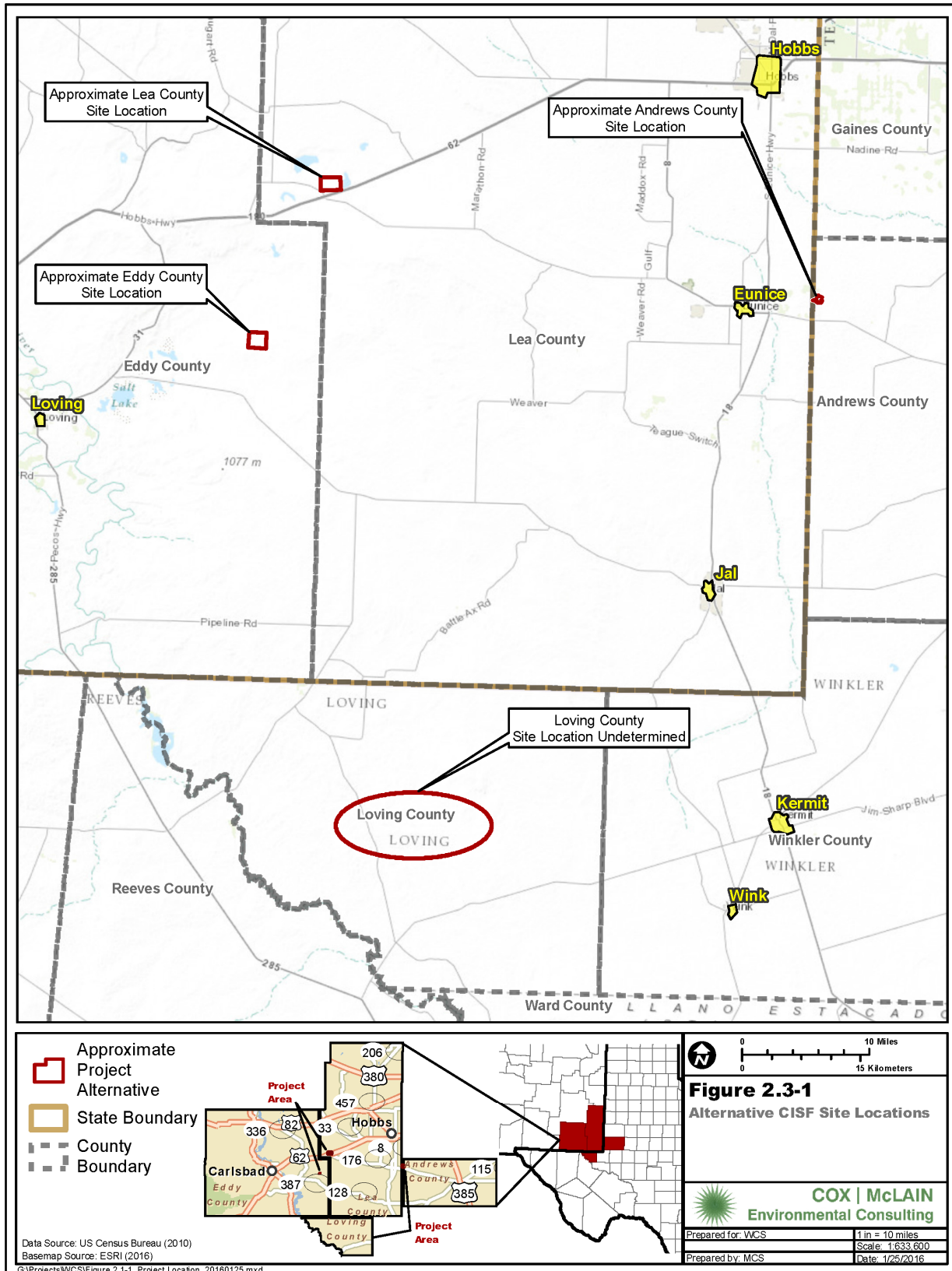
Figure 2.2-7  
Baker Springs Photograph

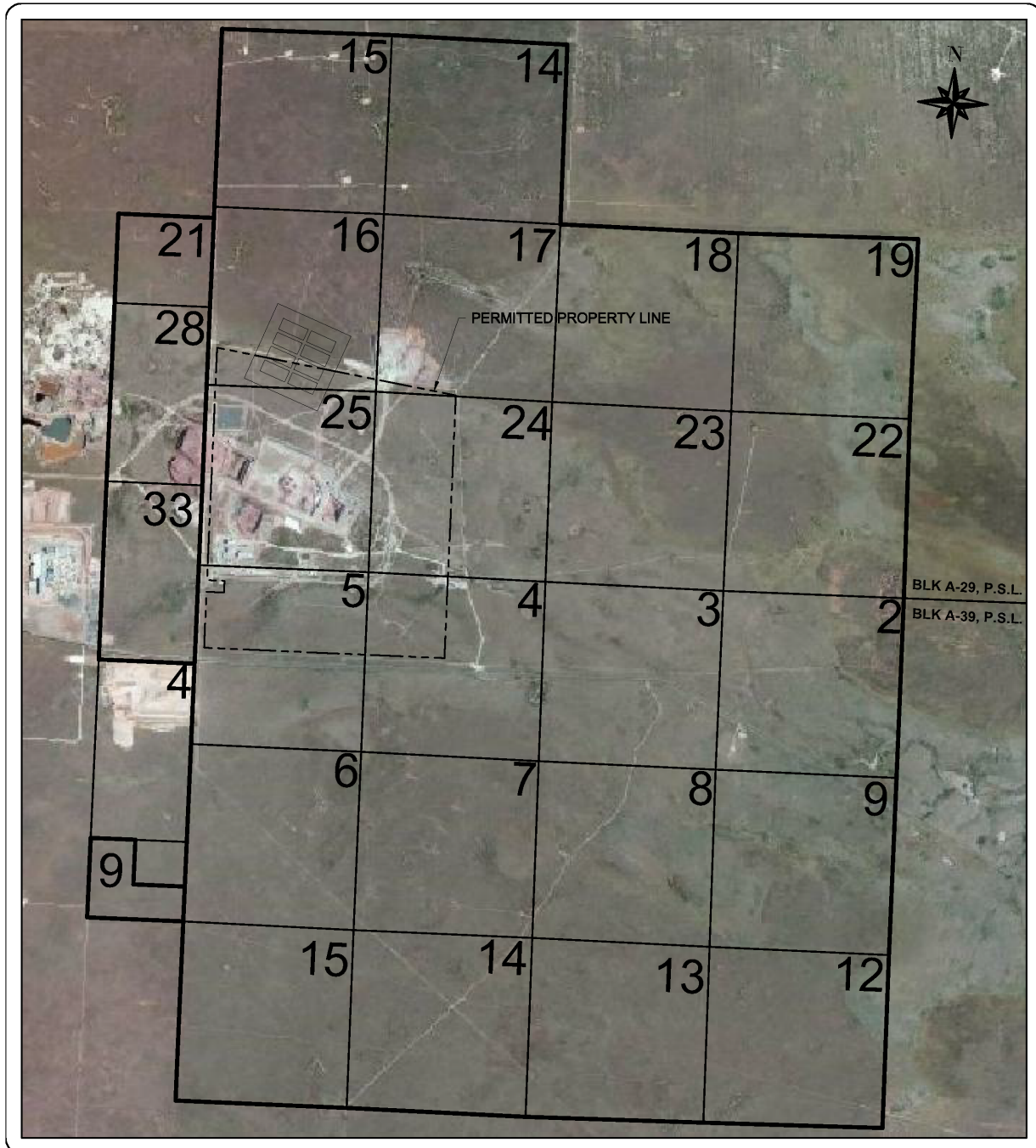




AMERICA'S NUCLEAR SOLUTION

Figure 2.2-8  
Location of Decommissioned Reactor Sites and WCS





| REV. | DESCRIPTION | DATE |
|------|-------------|------|
| A    | -           | -    |
|      |             |      |
|      |             |      |
|      |             |      |
|      |             |      |
|      |             |      |

|                       |
|-----------------------|
| PROJECT:              |
| SECTION DETERMINATION |
| DRAWING:              |
| FIGURE 2.3-2          |

|                                                                                                                                                                                            |              |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|
| <br><b>THE TEXAS SOLUTION</b><br>WASTE CONTROL SPECIALISTS LLC<br>P.O. BOX 1129<br>ANDREWS, TX. 79714 | DRAWN BY:    | UO       |
|                                                                                                                                                                                            | CHECKED BY:  | BM       |
|                                                                                                                                                                                            | DATE:        | 12/15/15 |
|                                                                                                                                                                                            | SCALE:       | NTA      |
|                                                                                                                                                                                            | FILE:        | N/A      |
|                                                                                                                                                                                            | DRAWING NO.: | N/A      |
|                                                                                                                                                                                            | PROJECT NO.: | N/A      |





Title:

Figure 2.6-1  
Transportation Routes



Explanation:

- Maine Yankee to WCS
- WCS to Yucca Mountain
- San Onofre to WCS