5.0 MITIGATION MEASURES AND COMMITMENTS

This chapter identifies possible measures to mitigate potential environmental impacts from the proposed action, as required by Appendix A to Subpart A of 10 CFR 51. CEQ's regulation for implementing NEPA at 40 CFR 1500.2 (f) requires Federal agencies to "[u]se all practicable means consistent with the requirements of the NEPA and other essential considerations of national policy to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions on the quality of the human environment." The CEQ regulations (40 CFR 1508.20) note that mitigation activities include those that "(1) avoid the impact altogether by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) repair, rehabilitate, or restore the affected environment; (4) reduce or eliminate impacts over time by preservation or maintenance operations during the life of the action; or (5) compensate for the impact by replacing or substituting resources or environments." As such, mitigation measures are those actions or processes (e.g., process controls and management plans) that would be implemented to control and minimize potential impacts associated with the proposed IIFP facility.

IIFP must comply with applicable laws and regulations, including obtaining all required construction and operating permits, and decommissioning requirements. Chapter 5 summarizes the mitigation measures that were proposed by IIFP (IIFP, 2009). The proposed mitigation measures do not include environmental monitoring activities. Environmental monitoring activities are described in Chapter 6 (Environmental Measurements and Monitoring Programs). The NRC staff has reviewed the mitigation measures proposed by IIFP and has concluded that the mitigation measures would reduce or minimize impacts.

IIFP identified measures in its Environmental Report and in responses to Requests for Additional Information that would mitigate environmental impacts associated with the proposed action (IIFP, 2009; IIFP, 2011). Table 5-1 lists measures proposed to mitigate the impacts of construction. Table 5-2 lists measures proposed to mitigate the impacts of operations. These measures do not preclude additional mitigation that may be considered by IIFP based upon consultations with regulatory agencies other than NRC. In a letter to the NRC dated June 21, 2011, the NMGF recommended additional mitigation measures such as a noxious weed management plan, protective screening of all open stacks and vents to exclude birds or bats, and designing stormwater retention ponds to exclude wildlife or to provide a means of escape from the ponds. A copy of this letter is included in Appendix B Consultation / Coordination) of this EIS.

Table 5-1. Summary of Potential Mitigation Measures Proposed by IIFP for Construction (including preconstruction activities)

Impact Area	Activity	Mitigation Measures
Land Use	Land disturbance	• The construction footprint would be minimized to the extent possible. • After construction is complete, disturbed areas of the site would be stabilized with native, drought-resistant landscaping; and areas expected to handle regular vehicular and pedestrian traffic would be stabilized with pavement or gravel. • To the extent possible utilities would be placed within existing rights-of-way.
Historic and Cultural Resources	Disturbance of historic and cultural resources eligible for listing on the National Register of Historic Places (NRHP)	• In the event that human remains or items of archaeological significance were discovered during construction, IIFP would cease work in the area around the discovery and notify the NM SHPO and Native American Tribes, so that they could determine the appropriate measures to identify, evaluate, and treat these discoveries. • Avoidance and data collection are the two most common forms of mitigation for sites considered eligible based on NRHP. When possible, avoidance is the preferred alternative because the site is preserved in place and mitigation costs are minimized. When avoidance is not possible, data collection becomes the preferred alternative. Data collection proceeds after the sites have been determined eligible. A treatment plan would be submitted to the appropriate regulatory agencies. The plan would describe the expected data content of the sites and how data would be collected, analyzed, and reported. A treatment/mitigation plan would be developed by IIFP, if necessary.
Visual Resources	Change in visual character	• Native, drought-resistant landscaping would be used to limit visual impacts. • Disturbed areas would be promptly re-vegetated or covered
Water Resources	Runoff	• Stormwater would be controlled at the proposed facility during preconstruction and construction by complying with the NPDES Construction General Permit requirements and by applying BMPs as detailed in the Stormwater Pollution Prevention Plan. • Construction equipment would be in good repair and without visible leaks of oil, grease, or hydraulic fluid, and would be periodically maintained and inspected. • BMPs would be used for dust control associated with excavation and fill operations during construction. Water conservation would be considered when deciding how often dust suppression sprays would be applied. • Stone construction pads would be placed at entrance/exits where an unpaved construction access road intersects a publicly maintained road. • Stormwater basins would be designed to facilitate the prompt, systematic sampling of runoff in the event of any special needs.

Table 5-1. Summary of Potential Mitigation Measures Proposed by IIFP for Construction (including preconstruction activities) (Continued)

Impact Area	Activity	Mitigation Measures

Water Resources (continued		• A spill control program would be implemented for accidental oil spills. An SPCC Plan would be prepared prior to the start of construction or prior to the storage of oil on site in excess of *de minimis* quantities and would contain the following information:
		  • Identification of potential significant sources of spills and a prediction of the direction and quantity of flow that would result from a spill from each source
		  • Identification of the containment-type or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion basins used at the facility to prevent discharged oil from reaching the surrounding environment
		  • Procedures for inspection of potential sources of spills and spill containment/diversion structures
		• As part of the SPCC Plan, other measures would include control of drainage of rain water from dike areas, containment of oil and diesel fuel in bulk storage tanks, above-ground tank integrity testing, and oil and diesel fuel transfer operational safeguards, as appropriate.
		• Sanitary wastes generated during site construction would be handled by portable systems until the plant sanitary waste treatment facility was available for use.

Air Quality	Fugitive dust and point-source releases of criteria pollutants	• Construction BMPs would minimize fugitive dust: Water or dust suppressants would be used to control dust on dirt roads. Water conservation will be considered when deciding how often dust suppression sprays would be applied. • Designate personnel to monitor dust emissions and direct increased watering where necessary. • Implement monitoring and inspection programs to identify equipment malfunction so that corrective action can be taken promptly. • Work practices would prevent or reduce air emissions releases. • Beds of open-bodied trucks transporting materials likely to give rise to airborne dust would be covered when in motion. • Construction equipment and related vehicles would be equipped with standard pollution control devices and maintained in good working order.
Geology, Minerals, and Soil	Soil disturbance	• Erosion impacts due to site clearing and grading would be mitigated by use of construction and erosion control BMPs. • The construction footprint would be minimized to the extent possible. • Disturbed soils would be stabilized by placing crushed stone on areas of concentrated runoff to reduce potential for erosion and sedimentation.

Table 5-1. Summary of Potential Mitigation Measures Proposed by IIFP for Construction (including preconstruction activities) (Continued)

Impact Area	Activity	Mitigation Measures
Geology, Minerals, and Soil (Continued)		• Earthen berms, dikes, and sediment fences would be installed as necessary to limit suspended solids in runoff. • Cleared areas not covered by structures or pavement would be stabilized by acceptable means as soon as practical. • Watering or dust suppressants would be used to control fugitive dust and prevent loss of topsoil. • The facility would be designed and constructed to collect surface runoff in temporary detention basins. • Standard drilling and blasting techniques, if required, would be used to minimize impacts to bedrock, reducing the potential for over-excavation and thereby minimizing damage to the surrounding rock. • Drainage culverts and ditches would be stabilized and lined with rock aggregate to reduce flow velocity and trap sediments. • Soil stockpiles would be constructed in a manner to reduce erosion. • Site slopes would be limited to a horizontal-to-vertical ratio of three to one. • Excavated materials would be reused whenever possible. • An SPCC Plan would be implemented.
Waste Management	Waste generation and management	• The quantities of waste generated would be minimized by collecting and sorting waste for recycling or disposal. • An assessment for each onsite waste storage area would be performed to identify and prevent potential accidental releases to the environment. • Onsite waste storage facilities would be monitored and inspected on an established schedule to detect any leaks or releases to the environment, so that corrective action could be taken promptly. • Waste that requires offsite storage, treatment, or disposal would be shipped to a licensed facility appropriate for the waste type and in compliance with State and Federal requirements.
Ecological Resources	Disturbance to plant and animal habitat	• The construction footprint would be minimized to the extent possible. • Site stabilization practices would be implemented to reduce the potential for soil erosion and deposition of sediment into down slope wildlife and aquatic habitats. • Unused open areas would be left undisturbed and managed for the benefit of wildlife.

Table 5-1. Summary of Potential Mitigation Measures Proposed by IIFP for Construction (including preconstruction activities) (Continued)

Impact Area	Activity	Mitigation Measures
Ecological Resources	Disturbance to plant and animal habitat (continued)	• Security lighting for all ground level facilities and equipment would be directed downward. • The use of native plant species in disturbed areas for revegetation would enhance and maximize the opportunity for native wildlife habitat to be reestablished at the site. • No herbicides would be used during construction

Transportation	Dust deposition on roadways	• To control fugitive dust production, reasonable precautions would be taken to prevent particulate matter from becoming airborne, including the following actions:
		  • Use water or dust-suppressants to control dust on dirt roads and in clearing and grading operations and construction activities. Water conservation would be considered when deciding how often dust suppression sprays would be applied.
		  • Adequate containment methods would be used during excavation.
		  • Open-bodied trucks transporting materials likely to give rise to airborne dust would be covered when in motion.
		  • Disturbed areas would be stabilized or covered promptly once earth moving activities are completed.
		  • Construction equipment and related vehicles would be operated with standard pollution control devices maintained in good working order.
		  • Designated personnel would be assigned to monitor dust emissions and increase watering or application of dust suppressants where necessary.

	Traffic	• During the course of construction, short-duration activities (e.g., concrete and other construction material deliveries) would be scheduled to minimize traffic impacts. • Work shifts would be implemented during construction to minimize impacts to traffic.
Noise	Operation of construction vehicles	• Heavy truck and earth moving equipment usage would be prohibited after twilight and during early morning hours. • Noise suppression systems (mufflers) on construction vehicles would be kept in proper operation. • When possible, quiet equipment or methods to minimize noise emissions would be utilized during an activity. • When possible and practical, equipment with internal combustion engines would be operated at the lowest operating speed to minimize noise emissions. • Engine housing doors would be closed during operation of the equipment to reduce noise emissions from the engine. • Equipment engine idling would be avoided to the extent possible.

Table 5-1. Summary of Potential Mitigation Measures Proposed by IIFP for Construction (including preconstruction activities) (Continued)

Impact Area	Activity	Mitigation Measures
Public and Occupational Health	Hazardous materials worker safety	• Integrated Safety Management System program and procedures would be adhered to. • All construction personnel would be required to take safety training and IIFP and all construction contractors would ensure that OSHA practices for construction are implemented and followed.

Source: IIFP, 2009; IFP 2011

Table 5-2. Summary of Potential Mitigation Measures Proposed by IIFP for Operations

Impact Area	Activity	Mitigation Measures
Land Use		No mitigation measures necessary
Geology, Minerals, and Soil	Materials storage	• Aboveground storage tanks would be constructed of appropriate materials according to industry standards and applicable regulations and appropriate measures for spill containment would be installed. • Tanks storing petroleum products and hazardous chemicals would be equipped with secondary containment. • Routine visual inspections and preventive maintenance would be conducted. • Spill cleanup materials would be stored in the areas of fuel line and tank hose connections and maintained in good working order. • Contaminated soils would be sampled, analyzed, and managed in accordance with NRC, State, and other Federal requirements. • An SPCC plan would be developed and implemented.
Water Resources	Runoff	• All aboveground petroleum storage tanks would be surrounded by berms to contain spills or leaks. • Routine visual inspections and preventive maintenance would be conducted. • Any hazardous materials would be handled by approved methods and hazardous wastes would be shipped offsite to licensed disposal sites. • The facility's liquid effluent collection and treatment system would provide a means to control liquid waste within the plant, including the collection, evaporation, and minimization of liquid wastes for disposal. • Radioactive liquid effluent releases to the evaporative tank would be maintained at concentrations below 10 CFR 20 uncontrolled release limits.

Table 5-2. Summary of Potential Mitigation Measures Proposed by IIFP for Operations (Continued)

Impact Area	Activity	Mitigation Measures
Water Resources (Continued)		• Control of surface water runoff would be required for activities as required by the NPDES General Permit. • Stormwater and effluent sampling would be conducted as required by the NPDES permit to protect surface water quality. In addition, groundwater would be monitored to confirm that the impacts to groundwater from the IIFP facility were minimal. • An SPCC plan would be implemented which would include: • Identification of potential significant sources of spills and a prediction of the direction and quantity of flow that would result from a spill from each source.
	Water use	• Identification of containment-type or diversionary structures such as dikes, berms, culverts, booms, sumps, and diversion basins used at the facility to prevent discharged oil from reaching the surrounding environment. • Procedures for inspection of potential sources of spills and spill containment/diversion structures. • Assigned responsibilities for implementing the plan, inspections, and reporting. • Control of drainage of rain water from dike areas. • Containment of oil and diesel fuel in bulk storage tanks. • Aboveground tank integrity testing. • Oil and diesel fuel transfer operational safeguards. • Native, drought-resistant vegetation would be planted. • Floor washing using mops and self-contained cleaning machines would be used to reduce water usage, as opposed to conventional washing with a hose. • High-efficiency washing machines would be installed. • Closed-loop cooling systems would be incorporated where possible. • Process waste water would be treated and recycled. Any small amounts of excess water from miscellaneous processes would be retained in a storage tank and sent to an evaporator.
Waste Management	Waste generation and management	• Minimize the quantities of waste by collecting and sorting waste for recycling or disposal. • Perform an assessment for each onsite waste storage area to identify and prevent potential accidental releases to the environment. • Monitor and inspect onsite waste storage facilities on an established schedule to detect any leaks or releases to the environment due to equipment malfunctions, so that corrective action could be taken promptly.
Waste Management		• Ship waste that requires offsite storage, treatment, or disposal to a licensed facility

Table 5-2. Summary of Potential Mitigation Measures Proposed by IIFP for Operations (Continued)

Impact Area	Activity	Mitigation Measures
(Continued)		appropriate for the waste type and in compliance with State and Federal requirements.
Air Quality	Emissions	• Process design features would be developed to lower the potential for air emissions. • Implement monitoring and inspection programs to detect any air emissions from equipment malfunction during operations, so that corrective action can be taken promptly. • Work practices would be employed to prevent or reduce air emissions releases. • Air emissions control systems (i.e., scrubber systems and dust collectors) would be designed to collect and strip potentially hazardous gases from plant effluents prior to release into the atmosphere. • Emission stacks would be sampled continuously and routinely analyzed.
Ecological Resources	Removal of plant and animal habitat	• A raptor perch would be placed in an unused open area. • Bird feeders would be installed at the visitor's center and quail feeders would be placed in unused open areas away from buildings. • Unused open areas, including areas of native grasses and shrubs, would be managed for the benefit of wildlife. • Drought-resistant native plant species would be used to revegetate disturbed areas and to enhance wildlife habitat. • Netting or other suitable material would be used to ensure birds are excluded from retention (evaporation) basins that do not meet New Mexico Water Quality Control Commission surface water standards for wildlife usage. • Animal-friendly fencing would be used within the site so that wildlife would not be injured or entangled. • The number of open trenches would be minimized at any given time. • Air-scrubbers system liquids would be treated prior to disposal or recycled. • Security lighting for all ground level facilities and equipment would be directed downward. • Herbicides would be used in limited amounts according to government regulations and manufacturer's instructions to control unwanted noxious vegetation.
Transportation	Traffic	• Shift changes and truck shipments would be scheduled for off-peak traffic periods, when practical.
Noise	Operation of Equipment and Vehicles	• The facility would be designed so that the reaction vessel systems, valves, transformers, pumps, generators, and other equipment would generally be located inside structures; the buildings themselves would limit noise outside the facility. • Distance, vegetation, and site buildings and structures would mitigate noise from equipment located outside of structures.

Table 5-2. Summary of Potential Mitigation Measures Proposed by IIFP for Operations (Continued)

Impact Area	Activity	Mitigation Measures
Public and Occupational Health	Hazardous materials processing	• To protect the public and workers, the plant design would incorporate features to minimize gaseous and liquid effluent releases and to keep them well below regulatory limits. • The radiation protection program would require routine radiation surveys and air sampling to assure that worker exposures are maintained ALARA. Exposure-monitoring techniques at the plant would include use of personal dosimeters by workers, personnel breathing zone air sampling, and annual whole-body counting. • Annual radiation exposure for an employee would be controlled, monitored, and maintained ALARA through the IIFP Radiation Protection Program. • Worker health and safety would be protected by a Chemical Safety Program, a Radiation Protection Program, and an Industrial Safety Program. • Handling of all chemicals and wastes would be conducted in accordance with an Environment, Health, and Safety Program which would conform to 29 CFR 1910 and specify the use of appropriate engineered controls, and personnel protective equipment to minimize potential chemical exposures. • Laboratory and maintenance operations activities involving hazardous gaseous or respirable emissions would be conducted with ventilation control (i.e., fume hoods, local exhaust or similar) and/or with the use of respiratory protection.

Source: IIFP, 2009; IIFP 2011

5.1 References

(IIFP, 2009) International Isotopes Fluorine Products, Inc. 2009. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Environmental Report, Revision A, ER-IFP-001. December 27, 2009. ADAMS Accession No. ML100120758.

(IIFP, 2011) International Isotopes Fluorine Products, Inc. 2011. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Official Responses to Environmental Report RAI's. Revision A. March 31, 2011. ADAMS Accession No. ML110970481.

6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

This chapter describes programs that would be used to measure and monitor radiation, radiological materials, and chemicals associated with operation of the proposed IIFP facility. It also provides data on principal pathways of exposure to the public and biota. This chapter is organized as follows: Section 6.1 describes the radiological monitoring program; Section 6.2 describes the physicochemical (i.e., chemical and meteorological properties that affect measurements) monitoring program; and Section 6.3 describes the ecological monitoring program.

These monitoring programs would comprise soil and vegetation sampling, water/sediment sampling, continuous airborne emission particulate monitoring and measuring, groundwater monitoring, direct radiation measuring, and sampling of stack emissions and air vents within the facility. Exact sampling locations would be determined at a later date based on site information (IIFP, 2009).

The facility would have an onsite analytical environmental monitoring laboratory equipped with analytical instruments necessary to ensure that the operation of the plant activities complies with Federal, State and local regulations and requirements. Compliance would be demonstrated by monitoring/sampling at various plant and process locations, and in the environment surrounding the facility, analyzing the samples and reporting the results of these analyses to the appropriate agencies. The environmental sampling/monitoring locations would be selected by the Health, Safety and Environmental staff in accordance with facility permits and good sampling practices.

The onsite laboratory would perform analyses on air, water, soil, flora, and fauna samples obtained from designated release points and areas around the plant. In addition to its environmental and radiological capabilities, the environmental monitoring laboratory also would be capable of performing bioassay analyses when necessary. Commercial, offsite laboratories may also be contracted to perform bioassay analyses.

6.1 Radiological Monitoring Program

The proposed IIFP facility would address radiological monitoring through two programs: the Effluent Monitoring Program and the Radiological Environmental Monitoring Program. The Effluent Monitoring Program would monitor, record, and report data for radiological contaminants being discharged from specific emission points such as an airborne release stack. Radiological Environmental Monitoring Program would monitor radioactivity in environmental media (i.e., soil, sediment, groundwater, biota, and air) within and outside the proposed IIFP facility site boundary. The following subsections provide information on the two radiological monitoring programs.

6.1.1 Effluent Monitoring Program

The NRC requires nuclear fuel cycle facilities such as the proposed IIFP facility to monitor and report the release of radiological airborne and liquid effluents to the environment in accordance with Title 10, “Energy,” of the U.S. Code of Federal Regulations (10 CFR), 20.1501(a) and (b). Table 6-1 lists the guidance documents that apply to the radiological monitoring program.

Table 6-1. Guidance Documents Applicable to Radiological Monitoring Program

Document	Applicable Guidelines
Regulatory Guide 4.15[1]	Quality Assurance for Radiological Monitoring Programs (Inception to Normal Operations to License Termination) - Effluent Streams and the Environment. This guide describes a method acceptable to the NRC for designing a program to ensure the quality of the results of measurements for radioactive materials in the effluents and the environment outside of nuclear facilities during normal operations.
Regulatory Guide 4.16[2]	Monitoring and Reporting Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Cycle Facilities. This guide describes a method acceptable to the NRC for submitting semiannual reports that specify the quantity of each principal radionuclide released to unrestricted areas to estimate the maximum potential annual dose to the public resulting from effluent releases.

[1] NRC, 2007
[2] NRC, 2010

Public exposure to radiation from routine operations at the proposed IIFP facility may occur as the result of the discharge of liquid and gaseous effluents, including controlled releases from the uranium deconversion process lines during decontamination and maintenance of equipment. In addition, radiation exposure to the public may result from the transportation and storage of DUF_6 feed cylinders. Of these potential pathways, discharge of gaseous effluent has the highest potential to introduce uranium into the environment (IIFP, 2009). Section 4.1.2.11 of this draft EIS presents the potential impacts from the potential release pathways.

Compliance with 10 CFR 20.1301, Dose limits for individual members of the public, would be demonstrated using a calculation of the total effective dose equivalent (TEDE) to the individual likely to receive the highest dose in accordance with 10 CFR 20.1302(b)(1) (IIFP, 2009). The determination of the TEDE pathway analysis is supported by appropriate models, codes, and assumptions that accurately represent the facility, site, and the surrounding area. The computer codes used to calculate dose associated with potential gaseous and liquid effluent from the plant follow the methodology for pathway modeling, as described in Regulatory Guide 1.109 (NRC, 1977), and have undergone validation and verification by NRC.

Administrative action levels are established for effluent samples and monitoring instrumentation as an additional check in the effluent control process. These action levels are well below regulatory limits; their purpose is to support implementation of corrective actions before releases approach regulatory limits. Effluent samples that exceed the action level are cause for an investigation into the source of elevated radioactivity. For example, radiological analyses would be performed more frequently on ventilation air filters if there is an unexplained increase in gross radioactivity, or when a process change or other circumstance change radioactivity concentrations in the effluent stream. Progressively more rigorous corrective actions would be implemented based on the radioactivity level, through means of automatic shutdown programming and operating procedures to be developed in the detailed alarm design (IIFP, 2009).

Under routine operating conditions, radioactive material in effluent discharged from the facility would comply with regulatory release criteria. Compliance would be demonstrated through effluent and environmental sampling data. Processes are designed to include, when practical, provision for automatic shutdown in the event action levels are exceeded. Appropriate action

levels and actions to be taken are specified for liquid effluents and gaseous releases (IIFP, 2009).

The effluent monitoring program would be overseen by IIFP Radiation Safety Program, Quality Assurance (QA) personnel and would be subject to periodic audits. Written procedures would specify the collection of representative samples, use of appropriate sampling methods and equipment, appropriate locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples. In addition, IIFP would develop written procedures for maintaining and calibrating sampling and measuring equipment, including ancillary equipment such as airflow meters, to ensure that all radiological monitoring equipment is properly maintained and calibrated at regular intervals. The effluent monitoring program procedures would include functional testing and routine checks to demonstrate that monitoring and measuring instruments are in working condition. Employees involved in implementation of this program would be trained in the program procedures (IIFP, 2009).

6.1.1.1 Gaseous Effluent Monitoring

To ensure compliance with regulatory requirements, potentially radioactive effluents from the facility would be discharged only through monitored pathways. The effluent sampling program would measure the quantities and concentrations of radionuclides discharged to the environment. Uranium isotopes and daughter products are expected to be the most common radionuclides in the gaseous effluent.

Effluents would be sampled as shown in Table 6-2. Representative samples would be collected from each release point. Because uranium in gaseous effluents may exist in a variety of compounds (e.g., UF_6, uranium oxide, UF_4, and uranyl fluoride), effluent data would be maintained, reviewed, and assessed by the facility's Radiation Protection Manager to ensure that all gaseous effluent discharges comply with regulatory release criteria for uranium. However, the gaseous effluent monitoring program for the IIFP plant would be designed to determine the quantities and concentrations of all gaseous discharges to the environment, not just uranium. The process exhaust stacks would be equipped with monitors for particulates, HF, and gross radioactivity (IIFP, 2009).

Table 6-2. Gaseous Effluent Sampling Program

Area	Type Sample	Type of Analysis	Frequency
Dust Collector Stacks	Continuous Air Filter	Gross Alpha/Beta Isotopic	Weekly/Composite/ Quarterly
Process Stacks	Continuous Air Filter	Gross Alpha/Beta Isotopic/Fluoride	Weekly/Composite/ Quarterly
Air Vents	Continuous Air Filter	Gross Alpha/Beta Isotopic	Weekly/Composite/ Quarterly

Source: IIFP, 2009

Monitoring for uranium isotopes would be performed continuously and samples would be analyzed at least once per operating shift. If an unacceptable level of uranium is detected (i.e., if it exceeded the administrative action level), IIFP would investigate the cause and corrective action would be taken. The gaseous effluent sampling program would support the determination of quantity and concentration of radionuclides discharged from the facility and support the collection of other information required for 10 CFR 20.1501(a) and (b) (IIFP, 2009).

6.1.1.2 Liquid Effluent Monitoring

Liquids potentially contaminated with low concentrations of uranium could be generated from equipment decontamination, floor washings, and laundry. Except for discharges from the Sanitary Treatment System, liquid effluents would be contained on the proposed IIFP site via collection tanks and retention basins (IIFP, 2009).

Potentially contaminated liquid effluent would be routed to the Decontamination Area for treatment. In the Decontamination Area, radioactive material would be removed from waste water through a combination of clean-up processes that would include precipitation, filtration, and ion exchange. Representative sampling would be ensured through the use of tank agitators and recirculation lines. Collection tanks would be sampled before the contents were sent through any treatment process. Treated water would then be collected in other tanks, which would be sampled. Concentrated radioactive solids generated by the liquid treatment processes would be disposed of as LLW at an off-site licensed disposal facility (IIFP, 2009).

6.1.2 Radiological Environmental Monitoring Program

The primary objective of the Radiological Environmental Monitoring Program (REMP) would be to provide verification that IIFP operations do not result in detrimental radiological impacts to the environment. The REMP data would confirm the effectiveness of effluent controls and provide additional verification of the power of the effluent monitoring program to produce results. The REMP would establish a process for collecting data for assessing radiological concentrations in the environment, estimate the potential impacts on the public, and support the demonstration of compliance with applicable radiation protection standards and guidelines.

6.1.2.1 Sampling Program

To meet the REMP objectives, representative samples from various environmental media would be collected and analyzed for radioactivity. The types and frequency of sampling and analyses are summarized in Table 6-3. Environmental media identified for sampling consist of ambient air, groundwater, soil/sediment, and vegetation.

Environmental samples would generally be analyzed at the on-site analytical laboratory. However, samples could be shipped to a qualified independent laboratory for analyses. Monitoring and sampling activities, laboratory analyses, and reporting of radioactivity in the environment would be conducted in accordance with industry-accepted and agency-approved methodologies.

The REMP would include the collection of data during pre-operational years in order to establish baseline radiological information that would be used in determining and evaluating releases from plant operations to the local environment. The REMP would be initiated at least 12 months prior to initiation of plant operations in order to develop a sufficient database before the arrival of the first uranium hexafluoride shipment. Radionuclides in environmental media would be identified using technically appropriate, accurate, and sensitive analytical instruments.

Data collected during the operational years would be compared to the baseline generated by the pre-operational data. Such comparisons would provide a means of assessing the magnitude of potential radiological impacts on members of the public and in demonstrating compliance with applicable radiation protection standards.

Table 6-3. Radiological Sampling and Analysis Program

Sample Type	Location	Sampling	Collection Frequency	Type of Analysis
Continuous Airborne particulate	Six locations along fence line and in the region of influence, including the location of the nearest resident	Continuous operation of air sampler with sample collection as necessary based on dust loading, but at least biweekly	Quarterly composite samples by location	Gross beta/gross alpha analyses each filter change. Quarterly isotopic analysis on composite sample
Vegetation/Soil Analyses	Five (including four locations along fence line and a control at an offsite location some distance away)	For each vegetation and soil sample, 1 to 2 kg (2.2 to 4.4 lbs)	Quarterly pre-operation/semi-annual during operation	Isotopic analyses/fluoride
Groundwater	Four wells	Samples [4 L (1.1 gal)]	Semiannually	Isotopic analyses
Thermoluminescent Dosimeters (TLDs)	Eight locations along fence line	Samples collected quarterly	Quarterly	Gamma and neutron equivalent
Stormwater	Site Stormwater Retention Basin, DUF_6 Cylinder Storage Pads, Stormwater Retention Basins	Water sample 4 L (1.1 gal). Sediment samples 1 to 2 kg (2.2 to 4.4 lbs)	Semiannually	Isotopic analyses

Source: IIFP, 2009

Over time, revisions to the REMP may be necessary and appropriate to assure reliable sampling and collection of environmental data. The rationale and actions behind such revisions to the program would be documented and reported to the appropriate regulatory agency, as required. REMP sampling focuses on locations within 1.6 km (1 mi) of the facility, but may also include distant locations as control sites. The sampling locations may be subject to change, as determined from the results of periodic review of land use.

The concentrations of radioactive material in gaseous effluent from the proposed IIFP facility are expected to be very low because of process and effluent controls. Consequently, air samples collected at locations that are close to the facility would provide the best opportunity to detect and identify plant-related radioactivity in the ambient air. Therefore, air monitoring activities would concentrate on locations close to the plant, such as the plant perimeter fence or the plant property line. Air monitoring stations would be situated along the fence perimeter, at the nearest residence, and at “control comparative” locations. In addition, an air monitoring station would be located next to the Stormwater Retention Basins to measure for particulate radioactivity that may be resuspended into the air from sediment when the basin is dry. Environmental air samplers would operate on a continuous basis with sample retrieval for a gross alpha and beta analysis occurring weekly (or more often if dust loads are heavy) (IIFP, 2009).

Vegetation and soil samples, from on and offsite locations would be collected quarterly in each compass sector during the pre-operational REMP. This would ensure the development of an adequate baseline. During the operational years, vegetation and soil sampling would be performed semiannually in five compass sectors, including the three with the highest predicted atmospheric deposition (based on the prevailing wind direction). Vegetation samples may include garden vegetables or grass, depending on availability. Soil samples would be collected in the same vicinity as the vegetation samples (IIFP, 2009).

On October 15, 2010, soil and vegetation samples were collected and shipped to analytical laboratories for analysis (GL Environmental, 2010) to establish baseline conditions. Table 6-4 presents the results of these samples.

Table 6-4. Baseline Radiological Soil and Vegetation Samples

	Soil Sample Bq/g (µCi/g)	Vegetation Sample
U-234	0.016 to 0.022 (4.42×10^{-7} to 5.95×10^{-7})	Less than minimum detectable concentrations
U-235/U-236	2.06×10^{-4} to 9.62×10^{-4} (5.58×10^{-9} to 2.60×10^{-8})	Less than minimum detectable concentrations
U-238	0.0217 to 0.0220 (5.86×10^{-7} to 5.95×10^{-7})	3.85×10^{-4} (1.04×10^{-8})
Other Isotopic Uranium	Less than minimum detectable concentrations	Less than minimum detectable concentrations

Source: GL Environmental, 2010
Bq/g = becquerel/gram
µCi/g = microcurie/gram

Groundwater samples from onsite monitoring wells would be collected semiannually for radiological analysis. Two monitoring wells would be downgradient of the proposed IIFP site, one would be located downgradient of the DUF_6 Cylinder Storage Pads, and one (background monitoring well) would be upgradient of the site. Sediment samples would be collected semiannually from the stormwater runoff retention basins on site to analyze for any buildup of uranic material being deposited (IIFP, 2009).

Direct radiation in offsite areas from processes inside the facility buildings is expected to be minimal because the low-energy radiation associated with the uranium would be shielded by process piping, equipment, and cylinders. Because the offsite dose equivalent rate from stored DUF_6 cylinders is expected to be very low and difficult to distinguish from the variance in normal background radiation beyond the site boundary, demonstration of compliance would rely on a system that combines direct dose equivalent measurements and computer modeling to extrapolate the measurements. Environmental TLDs would be placed at the plant perimeter fence line or other location(s) close to the DUF_6 cylinders to provide quarterly direct dose equivalent information. The direct dose equivalent at offsite locations would be estimated through extrapolation of the quarterly TLD data using computer programs (IIFP, 2009).

6.1.2.2 Procedures

Monitoring procedures would employ approved analytical methods and instrumentation. The instrument maintenance and calibration program would comply with manufacturers

recommendations. The onsite laboratory and any contract laboratory used to analyze the IIFP facility samples would participate in third-party laboratory intercomparison programs appropriate to the media and analyses being measured. The following are examples of these third-party programs:

- The DOE Mixed Analyte Performance Evaluation Program and DOE Quality Assurance Program
- Analytics, Inc., Environmental Radiochemistry Cross-Check Program

IIFP would require that all radiological and nonradiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program or an equivalent State laboratory accreditation agency for the analytes being tested (IIFP, 2009).

The REMP would fall under the oversight of IIFP's Quality Assurance Program. Quality assurance procedures would be implemented to ensure representative sampling, proper use of appropriate sampling methods and equipment, proper locations for sampling points, and proper handling, storage, transport, and analyses of effluent samples. In addition, written procedures would ensure that sampling and measuring equipment, including ancillary equipment such as airflow meters, would be properly maintained and calibrated at regular intervals according to manufacturer recommendations. The implementing procedures would include functional testing and routine checks to demonstrate that monitoring and measuring instruments were in working condition.

IIFP would periodically conducted as part of its Quality Assurance Program (IIFP, 2009). The quality control procedures used by the analytical laboratories would conform to the guidance in Regulatory Guide 4.15 (NRC, 2007). These quality control procedures would include the use of established standards such as those provided by the National Institute of Standards and Technology and the use of standard analytical procedures such as those established by the National Environmental Laboratory Accreditation Conference (IIFP, 2009).

6.1.2.3 Reporting

Reporting procedures would comply with the requirements of 10 CFR 70.59 and the guidance specified in Regulatory Guide 4.16 (NRC, 2010). Reports of the concentrations of principal radionuclides released to unrestricted areas in effluents would be provided and would include the minimum detectable concentration (MDC) for the analysis and the error for each data point. Each year, IIFP would submit a summary report of the environmental sampling program to the NRC, including all associated data, as required by 10 CFR 70. The report also would include the types, numbers, and frequencies of environmental measurements and the identity and concentrations of nuclides found in the environmental samples. Significant positive trends would also be noted in the report, along with any adjustment to the program, unavailable samples, and deviations from the sampling program.

6.2 Physicochemical Monitoring

6.2.1 Introduction

The primary objective of physicochemical monitoring would be to provide verification that the operations at the IIFP plant do not result in detrimental chemical impacts on the environment. Effluent controls would be in place to ensure that chemical concentrations in gaseous and liquid

effluents are maintained ALARA. In addition, physicochemical monitoring would provide data to confirm the effectiveness of effluent controls.

Administrative action levels would ensure that chemical discharges remain below the limits specified in the facility discharge permits: the EPA Region 6 NPDES General Discharge Permits and the New Mexico Environment Department / Water Quality Bureau WQB) Groundwater Discharge Permit/Plan. Physicochemical monitoring would be performed for routine operations with provisions for additional evaluation in response to potential accidental releases.

Physicochemical monitoring would sample stormwater, soil, sediment, vegetation, and groundwater (Table 6-5) to confirm that chemical discharges are below regulatory limits. There are no surface waters on the site; therefore, no surface water monitoring program would be implemented. However, soil sampling would include outfall/overflow areas such as the outfall at the Site Stormwater Retention Basins. In the event of any accidental release from the facility, these sampling protocols would be initiated immediately and on a continuing basis to document the extent/impact of the release until conditions have been abated and mitigated (IIFP, 2009).

Table 6-5. Physicochemical Sampling

Sample Type	Sample Location	Frequency	Sampling and Collections[2]
Stormwater	Stormwater Detention Basins	Quarterly	Analytes as determined by baseline program
Vegetation	5 minimum[1]	Quarterly/ Semiannually[3]	Fluoride Uptake (growing seasons)
Soils	5 minimum[1]	Quarterly/ Semiannually[3]	Metals, Organics, Pesticides, and Fluoride Uptake
Water/Sediment	2 minimum[1]	Quarterly/ Semiannually[3]	Analytes as determined by baseline program
Groundwater	Selected Groundwater Wells	Semiannually	Metals, Organics, and Pesticides

Source: IIFP, 2009

[1] Locations to be established by Health Safety &Environmental organization.

[2] Analyses will meet EPA Lower Limits of Detection (LLD), as applicable, and will be based on the baseline surveys and the sample type.

[3] Quarterly during pre-operations; semiannual during operations.

Waste liquids, solids and gases from related processes and decontamination operations would be analyzed and/or monitored for chemical contamination to determine safe disposal methods or further treatment requirements.

6.2.2 Evaluation and Analysis of Samples

Samples of liquid effluents, solids and gaseous effluents from plant processes would be analyzed in the environmental monitoring laboratory. Results of process sample analyses would be used to verify that process parameters were operating within expected performance ranges. Results of liquid effluent sample analyses would be characterized to determine if treatment is required prior to discharge or disposal.

6.2.3 Quality Assurance

Quality assurance would be achieved by following a set of formalized and controlled procedures that IIFP would create, implement and periodically review for sample collection, lab analysis, chain of custody, reporting of results, and corrective actions. Corrective actions would be instituted if an action level is exceeded for any of the measured parameters. IIFP would establish three action levels: the sample parameter is three times the normal background level, the sample parameter exceeds any existing administrative limits, or the sample parameter exceeds any regulatory limit. The third scenario represents the worst case, which is not expected, however, triggering any of the three action levels would initiate an action plan. Corrective actions would be implemented to ensure that the cause for the action level exceedance is identified and immediately corrected; applicable regulatory agencies are notified, if required; communications to address lessons learned are dispersed to appropriate personnel; and applicable procedures are revised accordingly, if needed. Action plans would be commensurate with the severity of the exceedance.

IIFP would ensure that the onsite laboratory and any contract laboratory used to analyze IIFP samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. The IIFP facility would require all radiological and non-radiological laboratory vendors to be certified by the National Environmental Laboratory Accreditation Conference or an equivalent State laboratory accreditation agency for the analytes being tested.

6.2.4 Lower Limits of Detection

Lower limits of detection (LLDs) for the parameters sampled for in the Stormwater Monitoring Program are listed in Section 6.2.6. LLDs for the non-radiological parameters would be based on the results of the baseline surveys and the sampled media. Minimum detectable concentrations for environmental samples are listed in Table 6-6.

Table 6-6. Required Minimum Detectable Concentrations for Environmental Sample Analyses

Medium	Analysis	Minimum Detectable Concentrations Bq/ml (µCi/ml)
Ambient Air	gross alpha	3.7×10^{-14} (1.0×10^{-18})
Vegetation	isotopic uranium	3.7×10^{-6} (1.0×10^{-10})
Soil/Sediment	isotopic uranium	1.1×10^{-2} (3.0×10^{-7})
Groundwater	isotopic uranium	3.7×10^{-8} (1.0×10^{-12})

Source: IIFP, 2009.
Bq/ml = becquerel/milliliter
µCi/ml = microcurie/milliliter

6.2.5 Effluent Monitoring

Chemical constituents that may be discharged to the environment would be below concentrations established by State and Federal regulatory agencies as protective of the public health and the natural environment. Under routine operating conditions, no significant quantities of contaminants would be released from the facility. This would be confirmed through

monitoring and collection and analysis of environmental data. The facility would not directly discharge any industrial effluents to surface waters or to offsite locations, and there would be no plant tie-in to a publicly owned wastewater treatment works. Except for discharges from the sanitary treatment system, liquid effluents would be contained in the IIFP facility in collection tanks and retention basins.

No chemical sampling is planned for sanitary wastes because no plant process related effluents would be introduced into that system.

6.2.6 Stormwater Monitoring Program

A stormwater monitoring program would be initiated during construction. Data collected from the program would be used to evaluate the effectiveness of measures taken to prevent the contamination of stormwater and to retain sediments within site boundaries. A temporary detention basin would be used as a sediment control basin during construction as part of the overall sedimentation erosion control plan.

Stormwater monitoring would continue with the same frequency upon initiation of facility operation. During plant operation, samples would be collected from the DUF_6 Cylinders Storage Pad Stormwater Retention Basin and the Site Stormwater Detention Basin to demonstrate that runoff does not contain contaminants. A list of parameters to be monitored and monitoring frequencies is presented in Table 6-7.

Table 6-7. Stormwater Monitoring Program

Parameter	Frequency	Sampling Method	Lower Limit of Detection
Oil & Grease	Quarterly	Grab	0.5 ppm
Total Suspended Solids	Quarterly	Grab	0.5 ppm
5-Day Biological Oxygen Demand	Quarterly	Grab	2 ppm
Chemical Oxygen Demand	Quarterly	Grab	1 ppm
Total Phosphorous	Quarterly	Grab	0.1 ppm
Total Kjeldahl Nitrogen	Quarterly	Grab	0.1 ppm
pH	Quarterly	Grab	0.01 units
Nitrate plus Nitrite Nitrogen	Quarterly	Grab	0.2 ppm
Metals	Quarterly	Grab	Varies[1]

Source: IIFP, 2009.
[1] Analyses will meet EPA LLD, as applicable, and will be based on the baseline surveys and the sample type.
ppm = parts per million

The monitoring program would be refined to reflect applicable requirements as determined during the NPDES permit application process. Additionally, the Site Stormwater Retention Basin would adhere to the requirements of the Groundwater Discharge Permit/Plan from the New Mexico Water Quality Board.

6.2.7 Environmental Monitoring

The purpose of this section is to describe the surveillance monitoring program, which would be implemented to measure non-radiological chemical impacts on the environment. The ability to detect and contain any potentially adverse chemical releases from the facility to the environment would depend on chemistry data collected as part of the effluent and stormwater monitoring programs described in the preceding sections. Data acquisition from these programs encompasses both onsite and offsite sample collections. Final constituent analysis requirements would be in accordance with permit mandates. Sampling locations would be determined based on meteorological information and current land use. The sampling locations may be subject to change as determined from the results or any significant changes in land use.

The chemical monitoring program is designed to identify chemical concentrations in the environment that could be attributed to plant operations.

Vegetation samples would include grasses and shrub brush. Soil would be collected in the same vicinity as the vegetation sample. The samples would be collected from sectors chosen based on predicted direction of the prevailing winds. Sediment samples would be collected from the discharge points of the stormwater collection basins. Groundwater samples would be collected from the series of wells described in Section 6.1.2.1. Stormwater samples collected in the DUF_6 Cylinder Storage Pad Stormwater Retention Basin would be sampled to ensure no contaminants are present.

Operational sample results would be compared to baseline data collected during preoperational sampling to identify any positive trends. On October 15, 2010, two soil and two vegetation baseline samples were collected for analysis. Tables 6-8 and 6-9 present the results of these samples.

Operational monitoring surveys would be conducted at locations and frequencies established from baseline sampling data and as determined by requirements in EPA Region 6 NPDES General Discharge Permits and the New Mexico Water Quality Board Groundwater Discharge Permit/Plan.

Annually IIFP would submit a summary of the environmental sampling program results to regulatory authorities, as required. This summary would include the types, numbers and frequencies of samples collected, analytical results, and a discussion of any observed trends. Significant positive trends would be discussed, along with any adjustments to the program, unavailable samples, or deviations from the sampling protocol.

Table 6-8. Baseline Physicochemical Soil Sample Results

	Soil Sample 1 (mg/kg)	Soil Sample 2 (mg/kg)
Barium	88.5	109
Cadmium	0.27	0.42
Chromium	10.0	12.2
Lead	11.7	14.7
All other Resource Conservation and Recovery Act Metal Concentrations	Less than minimum detectable concentrations	Less than minimum detectable concentrations

Source: GL Environmental, 2010
mg/kg = milligrams/kilogram

Table 6-9. Baseline Physicochemical Vegetation Sample Results

	Vegetation Sample 1 (mg/kg)	Vegetation Sample 2 (mg/kg)
Resource Conservation and Recovery Act Metal Concentrations	Less than minimum detectable concentrations	Less than minimum detectable concentrations
Barium	10.6	10.9
Benzoic acid	0.48	0.46
Bis(2-ethylhexyl) phthalate	0.26	0.19
Phenol	0.40	Less than minimum detectable concentrations

Source: GL Environmental, 2010
mg/kg = milligrams/kilogram

6.2.8 Meteorological Monitoring

Atmospheric conditions (e.g., wind speed, wind direction, temperature, precipitation, relative humidity) would be monitored by electronic sensors mounted on a 40 m (131 ft) tower located on site. Data from this monitoring program would be used to characterize the site's meteorological conditions (both normal and extreme) in order to predict patterns of radionuclide and chemical dispersion and deposition. The meteorological tower would be at the same elevation as the finished facility grade. The tower would be located at a distance at least ten times the height of any obstruction to ensure that wind flow around structures would interfere with meteorological sampling. IIFP would establish instrument maintenance and calibration schedules, keep back-up monitoring equipment on hand, and deploy redundant data recorders to ensure at least 90 percent data recovery.

6.3 Ecological Monitoring

The ecological monitoring program would be designed to characterize changes that may occur in the composition of biotic communities as a result of site preparation, construction, operation, and decommissioning of the proposed IIFP facility. The program would focus on observable changes in habitat characteristics and wildlife populations.

The ecological monitoring program would be carried out in accordance with generally accepted monitoring practices and the requirements of the USFWS and NMGF. Under the program, data would be collected and analyzed. Procedures would be established, as appropriate, for data collection, storage, analysis, reporting, and corrective actions.

6.3.1 General Ecological Conditions of the Site

Section 3.8 describes the natural environment of the proposed site and vicinity. The area is a transitional zone between the shortgrass prairie north of the Mescalero Ridge (Western Great Plains Shortgrass Prairie) and the desert communities south of the Mescalero Ridge (Apacherian-Chihuahuan Mesquite Upland Scrub). These habitat types commonly occur in the vicinity of the IIFP site (Figure 3-19). The vegetation in this area is dominated by deep sand tolerant- and extreme drought- and grazing-tolerant plant species. The natural habitats on the IIFP site and the region surrounding the site have been degraded by livestock grazing, oil and gas pipeline rights-of-way and access roads. As described in Section 3.7.2 of this draft EIS,

there are no wetlands or stream systems on the facility footprint, and therefore, no riparian habitat.

There are no important ecological communities on site that are vulnerable to change or that contain important species habitats, such as breeding areas, nursery, feeding, or other areas important to important species (Section 3.8).

6.3.2 Monitoring Program Elements

Several ecological elements would be monitored vegetation, birds, mammals, reptiles and amphibians. Currently there are no known actions or reporting levels for any of these elements. However, discussions with the responsible agencies (NMGF and USFWS) would continue and agency recommendations would be considered when developing action and/or reporting levels for each element.

IIFP would periodically monitor the proposed site property during the construction phases, operation phases, and decommissioning to ensure the risk to wildlife is minimized.

6.3.3 Observations and Sampling Design

The monitoring program would establish site baseline data collected before commencement of preconstruction activities. The procedures to characterize the baseline plant and animal populations would also be used for the construction and operations monitoring programs. Monitoring surveys during operations would be conducted annually for vegetation and semiannually for animals using the same sampling sites established during the baseline monitoring program (IIFP, 2009).

These surveys are intended to be sufficient to characterize broad changes in the composition of the ecological community in the vicinity of the facility that could be attributed to activities at the facility.

The analyses would comprise descriptive statistics (sample size, mean, standard deviation, standard error, and confidence interval for the mean). For these studies, a significance level of 5 percent would be used, resulting in a 95 percent confidence level (IIFP, 2009).

The data collected would be analyzed by the Environment, Health, and Safety staff. Annually report summarizing the results would be prepared (IIFP, 2009). The monitoring program for each of the ecological elements described below would be used for the duration stipulated in the terms of the NRC license agreement, if granted. The anticipated duration would most likely be the first three years of operation of the proposed IIFP facility. Following that initial monitoring period, program changes could be initiated based on operational experience and the results of the initial monitoring.

6.3.3.1 Vegetation

The following vegetation parameters would be monitored: species composition, percent ground cover, stem frequency, woody plant density, and production data. Sampling from 16 permanent sampling locations on the IIFP site would occur annually in September or October. Annual sampling is scheduled to coincide with the mature flowering stages of the dominant perennial species.

The sampling locations would be selected in areas outside of the proposed footprint of the IIFP facility. The selected sampling locations would be clearly marked (i.e., staked or flagged) on site, and the Global Positioning System (GPS) coordinates recorded. Permanent sampling locations would facilitate a long-term monitoring system designed to evaluate vegetation trends and characteristics.

Transects used for data collection would extend out 30-m (98-ft) in a given compass direction at each sampling location. Ground cover and stem occurrence frequency would be determined utilizing the line intercept method. Cover measurements would be read to the nearest 0.03-m (0.1-ft). Woody plant densities would be determined using the belt transect method. All individual shrubs and trees within 2-m (6.6-ft) of the 30-m (98-ft) transect would be counted. Productivity would be determined by estimating the production within three 0.25-m^2 (2.7-ft^2) plots and harvesting each species in one 0.25-m^2 (2.7-ft^2) plot along the transect and converting the dry weight of the plot vegetation into kg of forage per ha (lbs/ac).

6.3.3.2 Birds

Site-specific avian surveys would be conducted in both the wintering and breeding seasons to verify the presence of particular bird species. For the winter survey, the distinct habitats at the site would be identified and the bird species composition within each of the habitats described. Transects, 100-m (328-ft) in length, would be established within each distinct homogenous habitat, and data would be collected along each transect. Species composition and relative abundance would be determined based on visual observations and call counts. The spring survey would also determine the nesting and migratory status of the species observed and (as a measure of the nesting potential of the site) the occurrence and number of male territories. The area would be surveyed using the standard point count method.

All birds seen or heard by a qualified observer at each point would be recorded. Surveys would begin 15 minutes prior to sunrise and conclude by 10:00 am (or earlier on warm days) to coincide with the territorial males' peak singing times. The points would be recorded using a GPS, enabling return visits. Data would be compared with species known to exist in the area.

6.3.3.3 Mammals

All mammals observed during other ecological sampling will be noted and results compared to the species list compiled for the area.

6.3.3.4 Reptiles and Amphibians

A combination of pitfall trapping and walking transects (at trap sites) would provide data in sufficient quantity to allow statistical measurements of population trends, community composition, body size distributions and sex ratios that would reflect environmental conditions and changes at the site over time.

Each sample site would be located to maximize the total catch of reptile and amphibian species, rather than data on each individual caught. Each animal caught would be identified, sexed, snout-vent length measured, examined for morphological anomalies and released (sample with replacement design). There would be two sample periods, at the same time each year, in May and late June/early July, which would coincide with breeding activity for lizards; most snakes; and depending on rainfall, amphibians.

Because reptile and amphibian species are sensitive to climatic conditions, and to account for the spotty effects of rainfall, each sampling event would also record rainfall, relative humidity and temperatures. The rainfall and temperature data would act as a covariant in the analysis.

In addition to the monitoring plan described above, general observations would be gathered and recorded concurrently with other wildlife monitoring. The data would be compared to all the species known to exist in the area.

6.4 References

(GL Environmental, 2010) GL Environmental, Inc. 2010. 2010 Soil and Vegetation Characterization Report. Prepared for International Isotopes Fluorine Products. ADAMS Accession No. ML112140543

(IIFP, 2009) International Isotopes Fluorine Products, Inc. 2009. Fluorine Extraction Process & Depleted Uranium De-conversion Plant (FEP/DUP) Environmental Report, Revision A. December 27, 2009. ADAMS Accession No. ML100120758.

(NRC, 1977) U. S. Nuclear Regulatory Commission. 1977. Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50, Appendix I. Regulatory Guide 1.109, Revision 1. October, 1977.

(NRC, 2007) U.S. Nuclear Regulatory Commission. 2007. Quality Assurance for Radiological Monitoring Programs (Inception Through Normal Operations to License Termination)-Effluent Streams and the Environment. Regulatory Guide 4.15. Revision 2. 2007.

(NRC, 2010) U.S. Nuclear Regulatory Commission. 2010. Monitoring and Reporting Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Cycle Facilities. Regulatory Guide 4.16. Revision 2. 2010.

7.0 COST-BENEFIT ANALYSIS SUMMARY

This chapter summarizes benefits and costs associated with the proposed action and the no-action alternative. Chapter 4 (Environmental Impacts) of this draft EIS discusses the potential impacts of the construction, operation, and decommissioning of the proposed IIFP facility.

Implementation of the proposed action would generate national, regional, and local benefits and costs. The primary national benefit of the proposed IIFP facility would be a benefit to the national uranium fuel cycle by ensuring that commercial enrichment facilities throughout the nation do not have to rely on long-term storage of DUF_6. The regional benefits of the proposed project would be increased employment, economic activity, and tax revenues in the region around the proposed site. Some of these regional benefits, such as tax revenues, would accrue specifically to Lea County and the City of Hobbs. Other benefits may extend to neighboring Eddy County. Environmental costs associated with the proposed IIFP facility are, for the most part, limited to the area immediately surrounding or on the site.

The data for this analysis are drawn largely from Chapter 4, the assessment of environmental impacts. Monetary cost data is taken from IIFP's environmental report prepared for the license application (IIFP, 2009) and subsequent responses to NRC staff's requests for additional information (IIFP, 2011). The analysis separately covers both the construction (including preconstruction) and operations phases. As described in Section 4.1.3, NRC regulation 10 CFR 40.36 requires IIFP to have a decommissioning plan and provide for funding of the decommissioning. Decommissioning costs are evaluated in this analysis only in terms of payments to a decommissioning fund.

Section 7.1 presents the costs and benefits of the no-action alternative. Section 7.2 presents costs of the proposed action. Section 7.3 presents benefits of the proposed action. Section 7.4 presents a summary of the cost-benefit analysis, including NRC staff's determination of cost-effectiveness.

7.1 Costs and Benefits of the No-Action Alternative

Under the no-action alternative, NRC would not grant a license to IIFP to construct, operate and decommission the facility. No DUF_6 would be deconverted into fluoride products (for commercial resale) and depleted uranium oxides (for disposal). Without a deconversion facility such as the proposed facility, DUF_6 would continue to be stored, primarily at commercial uranium enrichment facilities in the United States. Fluoride products would not be manufactured and sold to end users. Planned or existing commercial enrichment facilities would not be able to send their DUF_6 to the IIFP facility for deconversion. As a result, the proposed site would not be disturbed by the proposed project activities. Ecological, natural, and socioeconomic resources would remain unaffected by the proposed action, except for what occurred during preconstruction. All potential environmental impacts from the proposed action (that is, not including preconstruction) would be avoided. Similarly, all project-specific socioeconomic impacts (e.g., related to employment, economic activity, population, housing, local finance) would be avoided.

Table 2.5 of Section 2.3 summarizes and compares the external environmental costs and benefits of both the proposed action and the no-action alternatives. Section 4.1 provides details on these external environmental and socioeconomic costs and benefits for the proposed action. Section 4.3 provides details for the no-action alternative.

7.2 Costs of the Proposed Action

The costs for a project are usually presented as internal and external costs. Internal costs are those that are borne by the owner, IIFP in this instance. These costs are most easily expressed as monetary costs. External costs are those borne by others or by the environment. Such costs can be monetary, but most often include both quantitative and qualitative environmental impacts. As described in Sections 2.1 and 2.2.2.2.1, IIFP intends to develop this project in two phases, with the Phase 1 component the subject of the current license application. Because Phase 2 is closely related to Phase 1 and is a reasonably foreseeable action for which analysis of cumulative impacts is required, this section presents both Phase 1 and Phase 2 costs. Section 7.2.1 discusses costs during the construction phase, and Section 7.2.2 discusses costs during the operations phase.

7.2.1 Construction Costs

7.2.1.1 Internal Costs

Internal construction costs include capital costs and labor costs. All costs are presented in 2009 dollars.

IIFP's environmental report provides cost estimates based on the assumptions presented there. Table 7-1 of this section presents the capital costs and labor costs. Both capital and labor costs are spread out over the years of construction (2012 through 2013 for Phase 1 and 2015 through 2016 for Phase 2).

Table 7-1. Construction Capital and Labor Costs for the IIFP Facility (millions of 2009 dollars)

Cost Category	Phase 1 Costs[a] (in millions of dollars)	Phase 2 Costs[a] (in millions of dollars)	Total Phases 1 and 2 Costs (in millions of dollars)
Capital Costs			
Fixed Capital			
DUF_4 plant	$9 – $12	0	$9 – $12
FEP plant	$15 – $19	0	$15 – $19
Oxide add-on plant	0	$26 – $34	$26 – $34
Balance of Plant	$15 – $20	$1 – $1.5	$16 – $21.5
Engineering, procurement, and construction management	$7 – $11	$7 – $9	$14 – $20
Project management and programs	$2 – $3	$1 – $1.5	$3 – $4.5
Contractor fees	$2 – $3	$1 – $2	$3 – $5
Contingency	$5 – $6	$3 – $4	$8 – $10
Subtotal Fixed Capital	$55 – $74	$39 – $52	$94 – $126
Development/Startup Capital			
Regulatory, licenses, permits	$3 – $4	$1 – $1.5	$4 – $5.5
Pre-startup working capital	$9 – $12	$1 – $2	$10 – $14

Table 7-1. Construction Capital and Labor Costs for the IIFP Facility (millions of 2009 dollars) (Continued)

Cost Category	Phase 1 Costs[a] (in millions of dollars)	Phase 2 Costs[a] (in millions of dollars)	Total Phases 1 and 2 Costs (in millions of dollars)
Spare parts and startup inventories	$3 – $4	$1 – $1.5	$4 – $5.5
Subtotal Development/Startup	$15 – $20	$3 – $5	$18 – $25
Total Capital Costs	$70 – $94	$42 – $57	$112 – $151
Labor Costs			
Construction and installation	$22.3 – $34.1	$13.7 – $20.9	$36 – $55
Engineering, procurement, and construction management	$6.1 – $9.2	$3.7 – $5.7	$9.8 – $14.9
Project management	$1.6 – $2.3	$0.9 – $1.4	$2.5 – $3.7
Total Labor Costs	$29.9 – $45.6	$18.4 – $28.0	$48.3 – $73.6
Total Capital and Labor costs	$99.9 – $139.6	$60.4 – $85.0	$160.3 – $224.6

Source: IIFP, 2009

[a] Phase 1 and Phase 2 labor costs are estimated from the cumulative costs, based on the 62 percent-38 percent cost split for capital costs as found in the capital costs.

7.2.1.2 External Costs

External construction costs are summarized here.

Land Use: 259 ha (640 ac) of grazing land converted to industrial use

Historic and Cultural Resources: no resources expected to be affected

Visual Resources: no adverse impact expected

Climatology, Meteorology, and Air Quality: small, temporary, and local impacts to air quality; some small amount of CO_2 and other GHGs, criteria pollutants, and HAPs released

Geology, Mineral, and Soils: no prime farmland affected; 16 ha (40 ac) cleared

Water Resources: groundwater withdrawal a small percentage of that available; groundwater quality not expected to be adversely impacted; no surface water use or discharge

Ecological Resources: 16 ha (40 ac) of grassland removed; no threatened or endangered species expected to be affected

Socioeconomic Resources and Local Community Services: small decrease in available public service capacities; small increases in local tax revenues; small influx of money to the local economy; small improvement in employment rate

Traffic and Transportation: small increase in traffic near the intersection of NM 483 and US 62/180, but not sufficient to warrant mitigation

Noise: no adverse impact expected

Public and Occupational Health Impacts: construction injuries typical for industrial construction; no fatalities expected statistically

Waste Management: waste generation a small percentage of existing disposal capacities

7.2.2 Operations Costs

7.2.2.1 Internal Costs

Internal operations costs include raw materials, utilities, marketing and distribution, operations and maintenance, labor, waste disposal, and replacement capital costs. All costs are presented in 2009 dollars. The annual costs presented were estimated based on a 40-year plant operating life. The data presented here are from IIFP's environmental report (IIFP, 2009) and subsequent responses to NRC staff's requests for additional information (IIFP, 2011), and based on the assumptions presented in these documents.

Raw Materials

IIFP states (IIFP, 2009) that the proposed plant would use relatively small amounts of raw materials. This is because the primary input to the plant is a waste product from existing and proposed commercial enrichment facilities. The primary raw materials, other than the DUF_6 feedstock, are SiO_2, B_2O_3, $Ca(OH)_2$, KOH, and hydrogen gas. These materials are not expected to be procured in the region of influence (Lea and Eddy counties). The annual costs (in 2009 dollars) for raw materials are as follows:

Phase 1:	$1.89 million
Phase 2 (incremental):	$0.82 million
Cumulative:	$2.71 million

Utilities

Utilities include electricity, natural gas, water, nitrogen, steam, and compressed air. Some of these utilities would be produced on site. However, approximately $1.5 million (2009 dollars) per year of utilities would be procured during the Phase 1 only facility operations between 2013 and the beginning of 2017. An additional $1.7 million per year of utilities for Phase 2 would be procured each year from 2017 through 2050 as a result of the expansion to the Phase 2 facility. Beginning in 2017, the cumulative utilities procured from utility companies located in the region or State would cost approximately $3.2 million each year, thereby benefiting the local and state economies.

Marketing and Distribution

IIFP reports that the marketing and distribution of FEP products would likely amount to 8 percent of the SiF_4 cost or approximately $200,000 to $250,000 annually (2009 dollars). Only SiF_4 is accompanied by any marketing and distribution costs because the other products are sold to only a few customers under contracts. This is an annual cost that would be incurred irrespective of the startup of Phase 2, because SiF_4 is generated in the Phase 1 process.

Operations and Maintenance

Operations and maintenance (O&M) costs would be those associated with purchasing materials for repair and replacement of equipment or infrastructure, and operating supplies such as office supplies, safety equipment, or laboratory chemicals. IIFP estimates that the annual O&M costs (2009 dollars) would be:

Phase 1: $2.7 million
Phase 2 (incremental): $1.6 million
Cumulative O&M cost: $4.3 million

Not all of these monies would be spent in the region of influence.

Labor

Section 4.1.2.8 presents the workforce requirements for the IIFP facility operations. In Tables 7-8 and 7-9 of IIFP's environmental report (IIFP, 2009), IIFP projects the annual labor costs for both Phase 1 and Phase 2. These are as follows, in 2009 dollars:

Phase 1: $7.9 million to $9.1 million
Phase 2 (incremental): $1.4 million to $1.7 million
Cumulative labor cost: $9.6 million to $10.5 million

Waste Disposal

The types and quantities of waste for disposal are reported in Section 4.1.2.12. The largest disposal costs would be associated with depleted uranium oxide; however, other LLW, RCRA waste, and sanitary waste would be disposed as well. The costs for Phase 1 and Phase 2 waste disposal are presented in Table 7-10 of the IIFP's environmental report (IIFP, 2009 as modified by IIFP [2011]) and are reproduced in Table 7-2.

Table 7-2. Estimated Annual Waste Disposal Costs (millions of 2009 dollars)

Waste Type	Phase 1 (in millions of dollars)	Phase 2 (in millions of dollars)	Cumulative (in millions of dollars)
Depleted uranium oxide	$2.6 – $7.0	$5.4 – $15.5	$8.0 – $22.5
Other process low-level waste	$0.25 – $0.40	$0.01 – $0.05	$0.26 – $0.45
Miscellaneous low-level waste	$0.23 – $0.35	$0.22 – $0.30	$0.45 – $0.65
RCRA waste	$0.009 – $0.035	$0.005 – $0.010	$0.014 – $0.045
Sanitary waste	$0.002 – $0.003	negligible	$0.002 – $0.003
Total[1]	$3.1 – $7.8	$5.6 – $16	$8.7 – $24

[1] Totals rounded to two significant digits.

Replacement Capital

Replacement capital would be required to replace infrastructure and equipment over the life of the facility. IIFP estimates that replacement costs over the 40-year assumed life of the facility would be approximately $60 million to $85 million (2009 dollars); however, no replacement

capital expenditures are expected for the first 7 years. The costs accumulate more heavily as the facility ages. The NRC staff calculated an average annual replacement capital cost of $1.8 million to $2.8 million over the 13 years of maximum replacement expenditures.

Table 7-3 reports the values reported by IIFP in Chapter 7 of the environmental report (IIFP, 2009) and the subsequent response to NRC staff's requests for additional information (IIFP, 2011).

Table 7-3. Estimated Replacement Capital Expenditures (millions of 2009 dollars)

Time Period	Phase 1[1] (in millions of dollars)	Phase 2[1] (in millions of dollars)	Cumulative (in millions of dollars)
2011 – 2016	0	0	0
2017 – 2027	$4.6 – $5.6	$4.4 – $5.4	$9 – $11
2028 – 2037	$17.9 – $21.9	$17.2 – $21.1	$35 – $43
2038 – 2050	$16.3 – $19.9	$15.7 – $19.1	$32 – $39
Total 40-year period	$38.8 – $47.4	$37.3 – $45.6	$76 – $93

[1] IIFP (2011) states that 51 percent and 49 percent of the replacement capital costs would be associated with Phase 1 equipment and Phase 2 equipment, respectively.

Summary of Internal Operations Costs

Table 7-4 provides the total internal operations costs per year.

Table 7-4. Total Annual Internal Operations Costs (millions of 2009 dollars)

Type of Internal Cost	Phase 1 (in millions of dollars)	Phase 2 (in millions of dollars)	Cumulative (in millions of dollars)
Raw materials	$1.89	$0.82	$2.71
Utilities	$1.5	$1.7	$3.2
Marketing and distribution	$0.20 – $0.25	0.0	$0.20 – $0.25
O&M	$2.7	$1.6	$4.3
Labor	$7.9 – $9.1	$1.4 – $1.6	$9.6 – $10.5
Waste disposal	$3.1 – $7.8	$5.6 – $16	$8.7 – $24
Replacement capital	$38.8 – $47.4	$37.3 – $45.6	$76 – $93
Total[1]	$56 – $71	$48 – $67	$100 – $140

[1] Totals rounded to two significant digits.

7.2.2.2 External Costs

External operations costs are summarized here.

Land Use: Land use would be consistent with other uses in the area

Historic and Cultural Resources: no resources expected to be affected

Visual Resources: no adverse impact expected

Climatology, Meteorology, and Air Quality: small and local impacts to air quality

Geology, Mineral, and Soils: no adverse impact

Water Resources: groundwater withdrawal a small percentage of that available; groundwater quality not expected to be adversely impacted; no surface water use or discharge

Ecological Resources: no adverse impact expected

Socioeconomic Resources and Local Community Services: small decreases in public service capacities; small increases in local tax revenues; small influx of money to the local economy; small improvement in employment rate

Traffic and Transportation: small increase in traffic near the intersection of NM 483 and US 62/180, but not sufficient to warrant mitigation; radiation doses to members of the public from transport of radioactive wastes and depleted uranium far less than normal background

Noise: no adverse impact expected

Public and Occupational Health Impacts: operation injuries typical for industrial plant operation; no fatalities expected statistically; radiological emissions produce immeasurably small impacts; chemical emissions small and localized

Waste Management: waste generation a small percentage of existing disposal capacities

7.3 Benefits of the Proposed Action

7.3.1 Construction

Taxes

Phase 1 construction-related activities, purchases, and workforce expenditures would require several types of tax payments, including individual income taxes, gross receipts taxes, and property taxes. Increased tax revenues are considered a benefit to the State of New Mexico, Lea County, the Hobbs Municipal School District, the New Mexico Junior College, the communities in Lea County, and other locales where plant-related spending would occur.

IIFP (2011) estimates that approximately $554,400 of fee in lieu of property taxes would be paid to the Hobbs Municipal School District and the New Mexico Junior College during the Phase 1 construction period. IIFP is exempt from any other property tax.

IIFP estimates (in 2009 dollars) that Phase 1 construction costs would be between $70 million and $94 million (Section 4.1.1.8). Some portion of those expenditures would occur within the ROI and other counties nearby. The expenditures would generate gross receipts tax revenues for both the affected counties and for the State of New Mexico (IIFP, 2011b). Because IIFP would have an industrial revenue bond with Lea County, some facility-related expenditures would be exempt from gross receipts taxes.

Regional spending on goods and services by IIFP employees would generate gross receipts tax revenues for Lea and Eddy County municipalities, Lea County, Eddy County, New Mexico, and other locales where spending occurs.

Employment

During Phase 1 construction of the IIFP facility, 80 percent of the 140 IIFP construction jobs are expected to be filled by workers that already reside within the two-county ROI (Section 4.1.1.8). The 112 residents that would fill the construction jobs would represent 0.2 percent of the June 2010 labor force within the region. If all 112 of the jobs were filled by unemployed workers, the unemployment rate in the region of influence would decrease by 0.2 percent. The remaining 28 jobs would be filled by workers that would migrate into the ROI. The in-migrating workers would increase the labor force by 0.05 percent (Section 4.1.1.8). The 12 indirect jobs that would be created during Phase 1 construction of the IIFP facility would likely be filled by regional residents. If all 12 jobs were filled by unemployed workers, those workers would represent 0.3 percent of the unemployed labor force in June 2010 (Section 4.1.1.8).

Economy

IIFP (2011b) estimates that between $9,140,000 and $13,900,000 (2009 dollars) would be infused into the economy annually during the construction period for labor and materials. Most of these values would be spent within the ROI.

7.3.2 Operations

Taxes

Phase 1 operations-related activities, purchases, and workforce expenditures would require several types of tax payments, including corporate income taxes, individual income taxes, gross receipts taxes, and property taxes. Increased tax revenues are viewed as a benefit to the State of New Mexico, Lea County, the Hobbs Municipal School District, the New Mexico Junior College, the communities in Lea County, and other locales where plant-related spending would occur.

Table 4-21 presents the estimated corporate income and gross receipts taxes that would be paid to the State of New Mexico and Lea County entities. The low estimate of corporate income and gross receipt taxes paid to the State is $144,200,000 and $6,500,000 to Lea County. The low estimate on property taxes is $8,700,000 to Lea County (IIFP, 2011b).

In addition to IIFP's income and gross receipts tax payments, plant employees would contribute state individual income and state and county gross receipts tax revenues. IIFP facility employee earnings would be taxed as individual income. Regional spending on goods and services by IIFP employees would generate gross receipts tax revenues for Lea County, Eddy County, the State of New Mexico, and other locales where their spending would occur.

Employment

Approximately 80 percent of the IIFP operation positions would be filled by people currently residing in the two-county ROI (Table 4-19). Those 112 workers would represent 0.2 percent of the June 2010 two-county labor force (Section 4.1.2.8). If all 112 of these jobs were filled by unemployed workers in the region, the unemployment rate would decrease by 0.2 percent.

Approximately 20 percent of the IIFP operation positions (28 jobs) would be filled by people migrating into the region of influence from outside the region (Section 4.1.2.8). The in-migrating workers would represent a 0.2 percent increase of the June 2010 labor force (Section 4.1.2.8).

The in-migration of 28 workers to fill operation positions would also create 51 new indirect jobs within the ROI because of the multiplier effect (Section 4.1.2.8). If unemployed workers fill the 51 indirect jobs that would be created during the Phase 1 operation of the IIFP facility, they would represent 1.3 percent of the unemployed labor force in June 2010.

Economy

The regional economy would benefit from the capital investment expenditures and recurring costs associated with the operation of the IIFP facility. IIFP has provided estimates for some of these costs. The payroll associated with Phase 1 operating wages is within the range of $7,900,000 to $9,100,000 annually (Section 4.1.2.8). Operations employees and workers in indirect positions would spend earnings on goods and services within the region of influence. Additional costs associated with operations include replacement capital, waste disposal, insurance premiums, taxes, utilities, and maintenance materials and supplies. These expenditures would range from $17,315,000 to $23,727,000 annually (Section 4.1.2.8).

National Benefits

Long-term storage of DUF_6 poses potential health risks because of the physical and chemical characteristics of DUF_6. If DUF_6 is released to the atmosphere, it reacts with water vapor in the air, forming HF fumes and a uranium-fluoride compound, UO_2F_2. These products are chemically toxic. HF is an extremely corrosive gas that can damage the lungs and cause death if inhaled.

DUF_6 has been stored at DOE sites for approximately 40 years. The Defense Nuclear Facilities Safety Board, in 1995, issued a Technical Report (DNFSB, 1995) calling for improved safety analysis, inspections, and handling procedures to ensure safe storage of DUF_6. DOE has since embarked on a program of creating deconversion capability at two locations where uranium enrichment has been performed.

The proposed IIFP facility would provide a benefit to the national uranium fuel cycle by ensuring that commercial enrichment facilities throughout the nation do not have to rely on long-term storage.

Silicon tetrafluoride is used in the electronics industry. Boron trifluoride is used for ion implantation, as a catalyst for polymer reactions, and as a gas in neutron radiation detectors. Anhydrous hydrogen fluoride has many industrial uses. These byproducts of IIFP's deconversion process are marketable. The benefit to the nation is that the IIFP plant would be an alternate source of inexpensive (because it is the byproduct of the main process) fluoride products.

7.4 Evaluation Summary of the Proposed IIFP Facility

The internal construction and operations costs for the IIFP facility are based on proprietary business analyses performed by IIFP. Given that company investors are willing to pursue the license in light of these costs, the NRC staff's concern is primarily evaluation of costs to the communities around the facility and the State of New Mexico. Implementation of the proposed

action would have a SMALL positive overall economic impact on the region of influence. The implementation of the proposed action would generate national, regional, and local benefits and costs.

The primary national benefit of building the proposed IIFP facility would be improved management of the DUF_6 part of the uranium fuel cycle. The regional benefits of building the proposed IIFP facility would be increased employment, economic activity, and tax revenues in the region around the site. Some of these regional benefits, such as tax revenues, accrue specifically to Lea County. Other benefits may extend to neighboring counties in the state of New Mexico.

Costs associated with the proposed IIFP facility are, for the most part, limited to the area surrounding the site and the communities within commuting distance. These include monetary and environmental costs. As summarized above, the environmental costs are SMALL to MODERATE (for air quality). The influx of money into the State and local economies from the proposed action would appear to more than offset the small financial burdens placed on community services. The benefits to Lea County, Eddy County, the State of New Mexico, and the nation's capacity to maintain the uranium fuel cycle weigh somewhat favorably for the benefit side of this comparison.

7.5 References

(DNFSB, 1995) U.S. Defense Nuclear Facilities Safety Board. 1995. Integrity of Uranium Hexafluoride Cylinders. Technical Report DNFSB/TECH-4. May 5, 1995.

(IIFP, 2009) International Isotopes Fluorine Products. Inc. 2009. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Environmental Report, Revision A, ER-IFP-001. December 27, 2009. ADAMS Accession No. ML100120758.

(IIFP, 2011) International Isotopes Fluorine Products. 2011. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Official Responses to Environmental Report RAIs, Revision A. March 31, 2011. ADAMS Accession No. ML110970481.

8.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

On December 30, 2009, IIFP submitted an application to the NRC for a license to construct, operate, and decommission the proposed IIFP facility (IIFP, 2009). IIFP proposes to locate the facility in Lea County, New Mexico, approximately 22.5 km (14 mi) west of Hobbs, New Mexico. If licensed, the proposed facility would deconvert DUF_6 into fluoride products (for commercial resale) and depleted uranium oxides (for disposal).

Source material licenses, such as the one requested for the proposed IIFP facility, are regulated under Title 10, Code of Federal Regulations, Part 40 (10 CFR 40), in accordance with the *Atomic Energy Act of 1954*. Section 102 of the *National Environmental Policy Act of 1969*, as amended (NEPA) (Public Law 91-190; Title 42, Section 4321 et seq., United States Code [42 U.S.C. 4321 et seq.]), directs that an Environmental Impact Statement (EIS) is required for major Federal actions that significantly affect the quality of the human environment. Section 102(2)(C) of NEPA requires that an EIS include information about the following:

- environmental impacts of the proposed action,
- any adverse environmental effects that cannot be avoided, should the proposal be implemented,
- alternatives to the proposed action,
- the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, and
- any irreversible and irretrievable commitments of resources that would be involved if the proposed action is implemented.

NRC's regulations under 10 CFR 51 implement the requirements of NEPA. Because the NRC is responsible for licensing this facility, the licensing action is a Federal action, and must meet the requirements of NEPA. Based on the EIS and other information [including the original license application and responses to Requests for Additional Information (RAIs) received by NRC from the applicant] and analysis of the magnitude of potential impacts, the NRC staff will determine whether to issue a license to IIFP for the construction, operation, and decommissioning of the proposed IIFP facility.

IIFP anticipates two phases to the project, but the current license application is for the first phase only. Phase 2, under NEPA, is considered a "reasonably foreseeable future action" (40 CFR 1508.7). Therefore, Phase 2 impacts are considered cumulative impacts, and have been addressed in Section 4.2 of this draft EIS. IIFP expects to begin preconstruction activities in late 2011. If the license application is approved, IIFP expects to begin facility construction in 2012, which would continue for one year. Phase 2 construction would begin in 2015 and continue for one year.

As part of its license application, IIFP submitted an Environmental Report (ER). Information in the ER and supplemental environmental documentation provided by IIFP has been reviewed and independently verified by the NRC staff and used, in part, by the NRC staff in preparing this draft EIS. Upon acceptance of the ER, the NRC staff began the environmental review process described in 10 CFR 51 by publishing, on July 15, 2010, in the Federal Register (75 FR 42142) a Notice of Intent to prepare an EIS and conduct scoping. The purpose of the EIS scoping process was to assist in determining the range of actions, alternatives to the proposed action,

and potential impacts to be considered in the EIS, and to identify significant issues related to the proposed action. Comments and information from the public and government agencies were received during the scoping period. As part of the scoping process, the NRC staff held a public scoping meeting on July 29, 2010, in Hobbs, New Mexico. NRC staff considered the public comments received during the scoping process for preparation of this EIS; the summary of the EIS scoping process is provided in Appendix A.

In addition to reviewing IIFP's ER and supplemental documentation, the NRC staff consulted with appropriate Federal, State, and local agencies and Native American Tribes.

Included in this draft EIS are (1) the results of the NRC staff's analyses, which consider and weigh the environmental effects of the proposed action; (2) mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's assessment regarding the proposed action based on its environmental review.

Potential environmental impacts are evaluated in this draft EIS using the three-level standard of significance – SMALL, MODERATE, or LARGE – developed by the NRC using guidelines from the Council on Environmental Quality (CEQ) (40 CFR 1508.27). Table B-1 of 10 CFR 51, Subpart A, Appendix B provides the following definitions of the three significance levels:

- SMALL – Environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

8.1 Unavoidable Adverse Environmental Impacts

Section 102(2)(c)(ii) of NEPA requires that an EIS include information on any adverse environmental effects that cannot be avoided, should the proposed action be implemented. Unavoidable adverse environmental impacts are those potential impacts that cannot be avoided and for which no practical means of mitigation are available.

This section summarizes the environmental consequences for the proposed action that cannot be avoided and for which no practical means of mitigation are available. Identification and description of the environmental impacts for the proposed action that would result from construction, operation, and decommissioning of the proposed IIFP facility are presented in Chapter 4, "Environmental Impacts." The mitigation measures that would be incorporated into the proposed action to control and minimize potential adverse environmental impacts are summarized in Chapter 5, "Mitigation Measures and Commitments." The monitoring programs that would be incorporated into the proposed action are listed in Chapter 6, "Environmental Measurements and Monitoring Programs."

Implementing the proposed action would result in unavoidable adverse impacts to land use, ecological resources, groundwater quantity, and air quality. Unavoidable adverse impacts to land use would occur at the initiation of the project, commencing with restricting the current land use, grazing, from the property and committing it, for the duration of the facility license, to industrial purposes. Site preparation will destroy up to 16 ha (40 ac) of Western Shortgrass

Prairie or Apacherian-Chihuhuan Mesquite Upland Scrub habitat. However, both habitats are common throughout the region. Some topsoil would be lost during the grading and clearing, but this loss would be minimized with BMPs. Animal habitats would be destroyed and some mortality of individuals would occur during construction. The presence of the facility could prevent some animals from foraging or nesting in the vicinity of the facility.

During construction and operation, facility operations will consume small amounts of groundwater; the greatest groundwater use would occur during operations. The facility would use a small amount (approximately 0.5 percent) of the estimated annual 40-year planning period groundwater demand for Lea County, and 0.15 percent annually of the unappropriated water rights assigned to Lea County by the New Mexico Office of the State Engineer.

Construction and operation would release small quantities of pollutants, including radionuclides to the atmosphere. Emissions of CO_2 and other greenhouse gases, and CO and SO_2 during construction would be SMALL, however, construction could result in MODERATE impacts from NO_2, $PM_{2.5}$ and PM_{10} emissions. Construction impact to air quality would be localized and temporary. BMPs would minimize impacts to air quality during construction. Plant design would minimize emissions of radiological and chemical pollutants to levels well below regulatory limits; concentrations higher than background will not be detectable beyond the site boundary, and the releases will not adversely affect local or regional air quality.

8.2 Irreversible and Irretrievable Commitments of Resources

Environmental Review Guidance for Licensing Actions Associated with NMSS Programs [NUREG-1748 (NRC, 2003)], defines an “irreversible” commitment and an “irretrievable” commitment as follows:

- “Irreversible” refers to the commitment of environmental resources that cannot be restored.
- “Irretrievable” refers to the commitment of material resources that once used cannot be recycled or restored for other uses by practical means.

The implementation of the proposed action as described in Section 2.1 would include the commitment of land, water, energy, raw materials, and other natural and manmade resources. Approximately 16 ha (40 ac) on the 259-ha (640-ac) site would be affected by the construction, operation, and decommissioning of the proposed IIFP facility.

It is likely that, once the land has been committed to an industrial use, it will remain in industrial use in perpetuity, so this should be considered an irreversible commitment.

Groundwater use by the facility during both construction and operation would be consumptive. Groundwater withdrawn from the Ogallala aquifer will not be returned to the aquifer. Some will be lost to evaporation in the process, and the treated sanitary wastewater used to irrigate landscaping will transpire to the atmosphere through the process of photosynthesis. The depth to groundwater at the site is approximately 30 ft, so it is unlikely any landscape water will return to the groundwater.

Energy consumption will be in the form of gasoline and diesel fuel for construction equipment and generators, and coal or natural gas to generate electricity to power the facility. Some natural gas will be consumed in the production of hydrogen at the facility. These represent irretrievable uses of those resources.

The construction and operation of the proposed IIFP facility would require commitments of significant quantities of concrete, steel, nonferrous metals, plastics, and other material resources. At decommissioning, certain building materials and equipment could be recycled, however some materials would not be recyclable, and some materials would have been consumed by the deconversion process. Resources used in the construction and operation of the facility that could not be reused or recycled at the end of their useful life would represent an irreversible commitment. Materials consumed during the deconversion process would be irreversible commitments of resources. Hazardous and radioactive waste streams would be irreversible commitments of resources, as would the land needed to properly dispose of those waste streams.

No other irreversible or irretrievable commitments of resources were identified for the construction, operation, and decommissioning of the proposed IIFP facility.

8.3 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Consistent with the CEQ definition in 40 CFR 1502.16 and the definition provided in NUREG-1748 (NRC, 2003), this draft EIS defines short-term uses and long-term productivity as follows:

- Short-term uses generally affect the present quality of life for the public (i.e., the 40-year license period for the proposed IIFP facility).
- Long-term productivity affects the quality of life for future generations on the basis of environmental sustainability (i.e., long-term is the period after license termination for the proposed IIFP facility).

Construction, operation, and decommissioning of the proposed IIFP facility would necessitate short-term commitments of resources. The short-term commitment of resources would include land, water and energy sources, and materials which could be recovered or recycled. Impacts would be minimized by mitigation measures and resource management. The short-term use of these resources would result in potential long-term socioeconomic benefits to the local area and the region, such as improvements to the local economy and infrastructure supported by worker income and tax revenues and the maintenance and enhancement of a skilled worker base.

Workers, the public, and the environment would be exposed to slightly elevated concentrations of radioactive and hazardous materials over the short term from the operation of the proposed IIFP facility due to process emissions and the transport and disposal of hazardous and radioactive waste.

Upon expiration of the license, IIFP would decommission the facility, recycle some equipment and restore the facility for another use. The use of the site and the buildings for other industrial purposes would constitute a long-term benefit to the community and would increase long-term productivity. Continued employment, expenditures, and tax revenues generated during preconstruction, construction, and operation of the proposed IIFP facility and from future site uses after the facility is decommissioned would directly benefit the local, regional, and State economies and would be considered a long-term benefit.

8.4 References

(IIFP, 2009) International Isotopes Fluorine Products, Inc. 2009. Fluorine Extraction Process & Depleted Uranium De-conversion Plant (FEP/DUP) Environmental Report, Revision A, ER-IFP-001. December 27, 2009. ADAMS Accession No. ML100120758.

(NRC, 2003) U.S. Nuclear Regulatory Commission. 2003. Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, NUREG-1748, Washington D.C., 2003. ADAMS Accession No. ML032450279.

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10.0 GLOSSARY

Abatement: Diminution in amount, degree, or intensity.

Activity: A measure of the rate at which a material emits nuclear radiation, usually given in terms of the number of nuclear disintegrations occurring in a given length of time. The common unit of activity is the curie (Ci), which amounts to 37 billion disintegrations per second. The international unit of activity is the becquerel (Bq) and is equal to one disintegration per second.

Air pollutant: Any substance in air which could, if present in high enough concentration, harm humans, animals, vegetation, or material. Pollutants may include almost any natural or artificial substance capable of being airborne.

Air quality: A measure of the concentrations of pollutants, measured individually, in the air. These concentrations are often compared to regulatory standards.

Air quality standards: The concentration of a pollutant in air prescribed by regulations that may not be exceeded during a specified time in a defined area. Air quality standards are used to provide a measure of the health-related and visual characteristics of the air.

ALARA: Acronym for "as low as (is) reasonably achievable." An approach to keep radiation exposures (both to the workforce and the public) and releases of radioactive material to the environment at levels that are as low as social, technical, economic, practical, and public policy considerations allow. ALARA is not a dose limit; it is a practice in which the objective is the attainment of dose levels as far below applicable limits as possible.

Alluvium: Clay, silt, sand, and/or gravel deposits found in a stream channel or in low parts of a stream valley that is subject to flooding. Ancient alluvium deposits frequently occur above the elevation of present-day streams.

Alternative site: A ranked site, other than the proposed site, that was evaluated in the fine-screening step.

Ambient air: The surrounding atmosphere, usually the outside air, as it exists around people, plants, and structures. It is not the air in immediate proximity to emission sources.

Ambient Air Quality Standards*:* Standards established on a State or Federal level, that define the limits for airborne concentrations of designated “criteria” pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, and lead), to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Ambient Noise Level: A sound level that represents the background noise from community or environmental sound sources.

Anhydrous: Without water (H_2O).

Anthropogenic: Caused or influenced by humans.

Aqueous: Related to water.

Aquifer: Geologic unit sufficiently permeable to conduct groundwater.

Area of potential effect (APE): The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Assay: The qualitative or quantitative analysis of a substance; often used to determine the proportion of isotopes in radioactive materials.

Asymptomatic: Without symptoms.

Atmosphere: The layer of air surrounding the earth.

Atomic Energy Act of 1954 as amended: A Federal law that created the Atomic Energy Commission, which later split into the Nuclear Regulatory Commission and the Energy and Research and Development Administration (ERDA). ERDA became part of the Department of Energy in 1977. This act encouraged development and the use of nuclear energy for the general welfare and the security of the United States. This act authorized the Nuclear Regulatory Commission to regulate and license fuel fabrication facilities that seek to receive, possess, use, or transfer special nuclear material.

Attainment area: A region that meets the U.S. EPA National Ambient Air Quality Standards (NAAQS) for a criteria pollutant under the Clean Air Act.

Autoclave: A strong, pressurized, steam-heated vessel, as for laboratory experiments, sterilization, or cooking.

Background radiation: Radiation from: (1) naturally occurring radioactive materials, as they exist in nature prior to removal, transport, or enhancement or processing by man; (2) cosmic and natural terrestrial radiation; (3) global fallout as it exists in the environment; (4) consumer products containing nominal amounts of radioactive material or emitting nominal levels of radiation; and (5) radon and its progeny in concentrations or levels existing in buildings or the environment that have not been elevated as a result of current or past human activities.

Baghouse: A large chamber or room for holding bag filters used to filter gas streams.

Berms: A level space, shelf, or raised barrier separating two areas.

Baseline: A quantitative expression of conditions, costs, schedule, or technical progress to serve as a base or standard for measurement during the performance of an effort; the established plan against which the status of resources and the progress of a project can be measured.

Basin: A topographic or structurally low area or the area drained by a stream system.

Basalt: A fine-grained dark igneous (volcanic) rock that is low in silica content and has congealed from a molten (magma) state.

Best Management Practices (BMP): Structural, nonstructural, and managerial techniques recognized to be the most effective and practical means to reduce surface water and groundwater contamination while still allowing the productive use of resources.

Beta particle: A charged particle emitted from a nucleus during radioactive decay, with a mass equal to 1/1837 that of a proton. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns, and beta emitters are harmful if they enter the body. Beta particles may be stopped by thin sheets of metal or plastic.

Bioassay analyses: A method for quantitatively determining the concentration of a substance by its effect on the growth of a suitable animal, plant, or microorganism under controlled conditions.

Biomass: The dry mass of living matter, expressed in terms of a given area or volume.

Bollard: A strong wooden or metal post mounted on a wharf, quay, etc. to protect the stationary structure from, and stop, a moving craft or vehicle.

Boom: As used in this EIS, a temporary floating barrier launched on water to contain material such as an oil spill.

Boron: Semi-metallic chemical element, with atomic number 5, which has the chemical symbol B.

Bounding: That which represents the maximum reasonably foreseeable event or impact. All other reasonably foreseeable events or impacts would have fewer and/or less severe environmental consequences.

Buffer area: A designated area of land that is designed to permanently remain vegetated in an undisturbed and natural condition in order to protect an adjacent aquatic or wetland site from upland impacts and to provide habitat for wildlife.

Byproduct: A product from a manufacturing process that is not considered the principal material.

Candidate species: A species of plants or animals considered as a candidate for possible listing as endangered or threatened by a government agency.

Carbonaceous: Consisting of, containing, relating to, or yielding the element carbon (carbon is element with atomic number 6, and has the chemical symbol C).

Carbon monoxide: An odorless, colorless, poisonous gas produced by incomplete burning of carbon in fuels. Exposure to carbon monoxide reduces the delivery of oxygen to the body's organs and tissues. Elevated levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks.

Caliche: Calcium carbonate (chemical symbol $CaCO_3$) deposited in the soils of arid or semiarid regions.

Clarifier: A piece of equipment that removes suspended impurities or solid matter by settling, heating gently, or filtering.

Clean Air Act: A Federal law that requires the EPA to set and enforce air pollutant emissions standards for stationary sources and motor vehicles.

Climatology: The science devoted to the study, over time, of the conditions of the natural environment (rainfall, daylight, temperature, humidity, air movement) prevailing in specific regions of the earth.

Code of Federal Regulations (CFR): All Federal regulations in force are published in codified form in the Code of Federal Regulations.

Coke: The solid residue of impure carbon obtained from bituminous coal and other carbonaceous materials after removal of volatile material by destructive distillation.

Cold traps: A device that condenses all vapors except the permanent gases into a liquid or solid.

Committed dose equivalent: The predicted dose equivalent to a tissue or organ over a 50-year period after an intake of a radionuclide into the body. It does not include dose contributions from radiation sources external to the body. Committed dose equivalent is expressed in units of rem (or sievert) (1 rem = 0.01 sievert).

Committed effective dose equivalent: The sum of the committed dose equivalents to various organs or tissues in the body from radioactive material taken into the body, each multiplied by the tissue-specific weighting factor. Committed effective dose equivalent is expressed in units of rem (or sievert).

Community: A group of people (or animals) within a defined area that could be exposed to health risks from industrial pollutants or disturbed by noise, dust, and traffic associated with development of an industrial facility but that could also benefit from improved employment opportunities, higher land values, and infrastructure improvements associated with the project.

Concentration: The amount of a substance contained in a unit quantity (mass or volume) of a sample.

Conservative: When used with predictions or estimates, leaning on the side of pessimism. A conservative estimate is one in which the uncertain inputs are used in the way that provides a reasonable upper limit of the estimate of an impact.

Containment: Retention of a material or substance within prescribed boundaries.

Contamination: The presence of an unwanted chemical or radiological constituent in or on a material, person, property, or structure.

Cooling water: Water circulated through a nuclear reactor or processing plant to remove heat.

Cost-benefit analysis: A formal quantitative procedure comparing costs and benefits of a proposed project or act under a set of pre-established rules.

Council on Environmental Quality: The President's Council on Environmental Quality (CEQ) was established by the enactment of National Environmental Policy Act (NEPA). The CEQ is responsible for developing regulations to be followed by all Federal agencies in developing and implementing their own specific NEPA implementation policies and procedures.

Criteria pollutants: Six pollutants (ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide) known to be hazardous to human health and for which the EPA sets National Ambient Air Quality Standards under the Clean Air Act.

Critical habitat: The specific areas within the geographical area occupied by a species at the time it is listed as threatened or endangered on which are found those physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection. It also includes specific areas outside the geographical area occupied by the species at the time it is listed if these areas are determined to be essential for the conservation of the species.

Cryogenic: Of, or relating to low temperatures; or requiring low temperatures for storage.

Cultural resources: Archaeological sites, architectural features, traditional use areas, and Native American sacred sites or special use areas.

Cumulative impacts: Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Curie: A unit of radioactivity equal to 37 billion (3.7×10^{10}) disintegrations per second.

Daughter products: The remaining nuclide left over from radioactive decay.

Decibel (dB): A standard unit for measuring sound-pressure levels based on a reference sound pressure of 0.0002 dyne per square centimeter. This is the smallest sound a human can hear. In general, a sound doubles in loudness with every increase of slightly more than 3 decibels.

Deciduous: Falling off at maturity or tending to fall off and is typically used in reference to trees or shrubs that lose their leaves seasonally.

Decommissioning: The removal of a facility from active service.

Decontamination: The reduction or removal of an unwanted chemical or radiological constituent from a structure, area, object, or person. Decontamination of radiological contamination may be accomplished by (1) treating the surface to remove or decrease the contamination, (2) letting the material stand so that the radioactivity is decreased as a result of natural radioactive decay, or (3) covering the contamination to shield or attenuate the radiation emitted.

Deconversion: As used in this EIS, the process by which uranium hexafluoride (UF_6) is chemically converted to uranium oxide (UO_2) producing anhydrous hydrogen fluoride (HF) and other marketable fluoride byproducts.

Degradation: The process by which organic substances are broken down by living organisms.

Delaware Basin: An area in southeastern New Mexico and the adjacent parts of Texas where the Permian sea deposited a large thickness of evaporites some 220 to 280 million years ago. It is partially surrounded by the Capitan Reef.

Depleted uranium: Uranium having a percentage of uranium-235 smaller than the 0.7 percent found in natural uranium. In the context of this EIS, it is the residue or tails from the uranium enrichment process.

Depleted uranium hexafluoride (DUF_6): A compound of uranium and fluorine from which most of the uranium-235 isotope has been removed.

Diffusion: Movement of atoms, ions, or molecules of one substance into or through another as a result of thermal or concentration gradients.

Dike: A barrier (typically, an embankment for controlling or holding back water; or, in geology, a type of sheet intrusion that cuts discordantly across the geologic body).

Dispersion: The occurrence in which particles are dispersed in air, water, soil, or other another medium.

Dose equivalent: The product of absorbed dose in rad (or gray) in tissue and a quality factor. Dose equivalent is expressed in units of rem (or sievert).

Dose rate: The radiation dose delivered per unit time (e.g., rem per hour).

Ecology: The science dealing with the relationship of all living things with each other and with the environment.

Ecoregion: A classification of land based on similar climate, vegetation, and topography.

Effective dose equivalent: The sum of the products of the dose equivalent received by specified organs or tissues of the body and a tissue-specific weighting factor. The effective dose equivalent is expressed in units of rem (or sievert).

Effluent: A gas or fluid discharged into the environment, treated or untreated. Most frequently, the term applies to wastes discharged to surface waters.

EIS: Environmental impact statement; a document required by the National Environmental Policy Act for proposed major Federal actions involving potentially significant environmental impacts.

Emissions: Substances that are discharged into the air.

Endangered species: Plants and animals that are threatened with extinction, serious depletion, or destruction of critical habitat. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endangered Species Act of 1973: An act requiring Federal agencies, with the consultation and assistance of the Secretaries of the Interior and Commerce, to ensure that their actions will

not likely jeopardize the continued existence of any endangered or threatened species or adversely affect the habitat of such species.

Enrichment (process): Increasing the concentration of the uranium isotope U^{235} to more than that which exists in natural uranium ore, for use in atomic energy.

Environment: The sum of all external conditions and influences affecting the life development and, ultimately, the survival of an organism.

Environmental justice: The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population of people should be forced to shoulder a disproportionate share of the negative environmental impacts of pollution or environmental hazards due to a lack of political or economic strength.

Environmental monitoring: The act of measuring, either continuously or periodically, some quantity of interest, such as radioactive material in the air.

Ephemeral stream: A stream channel that carries water only during part of the year, immediately after periods of rainfall or snowmelt.

Equilibrium: A state of rest in a chemical or mechanical system.

ER: Environmental Report required as part of an environmental assessment, which identifies, describes and evaluates the likely significant effects on the environment of implementing a plan or program.

Erosion: Removal and transport of materials by wind, ice, or water on the earth's surface.

Escarpment: A long, nearly continuous cliff or relatively steep slope facing in one general direction, breaking the continuity of the land by separating two level or gently sloping surfaces, and produced by erosion or faulting.

Exposure limit: The level of exposure to a hazardous chemical (set by law or a standard) at which or below which adverse human health effects are not expected to occur.

Exposure pathways: A route or sequence of processes by which a radioactive or hazardous material may move through the environment to humans or other organisms. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route.

Fault: A fracture or a zone of fractures along which there has been displacement parallel to the fracture.

Fauna: The animal life of any particular region or time.

Floodplain: Low-lying areas adjacent to rivers and streams that are subject to natural inundations typically associated with precipitation.

Flora: The plant life occurring in a particular region, generally the naturally occurring or indigenous plant life.

Fluorocarbon: A halocarbon in which some hydrogen atoms have been replaced with fluorine.

Fluorine: The chemical element with atomic number 9, represented by the chemical symbol F.

Formation: A mapable geologic body of rock identified by lithic characteristics and stratigraphic position. Formations may be combined into groups or subdivided into members.

Fuel cycle: The series of steps involved in supplying fuel for nuclear power reactors. It can include mining, milling, isotopic enrichment, fabrication of fuel elements, use in a reactor, chemical reprocessing to recover the fissionable material remaining in the spent fuel, re-enrichment of the fuel material, re-fabrication into new fuel elements, and waste disposal.

Fugitive dust: Any solid particulate matter (PM) that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man. Fugitive dust may include emission from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or distorted.

Gamma: Short-wavelength electromagnetic radiation (high-energy photons) emitted In the radioactive decay of certain nuclides. Gammas are the same as gamma rays or gamma waves.

Gaussian plume: The distribution of material (a plume) in the atmosphere resulting from the release of pollutants from a stack or other source. The distribution of concentrations about the centerline of the plume, which is assumed to decrease as a function of its distance from the source and centerline (Gaussian distribution), depends on the mean wind speed and atmospheric stability.

Geology: The science that deals with the earth; the materials, processes, environments, and history of the planet, especially the lithosphere, including the rocks, their formation, and structure.

Geology and Soils: Those Earth resources that may be described in terms of landforms, geology, and soil conditions.

Greenhouse gas: A gas in an atmosphere that absorbs and emits radiation within the thermal infrared range.

Gross beta: The total rate of emission of beta particles from a sample, without regard to energy distributions or source nuclides.

Groundwater: All subsurface water, especially that contained in the saturated zone below the water table.

Habitat: The part of the physical environment in which a plant or animal lives.

Hazardous chemical: Under 29 CFR 1910, Subpart Z, "hazardous chemicals" are defined as "any chemical, which is a physical hazard or a health hazard." Physical hazards include combustible liquids, compressed gases, explosives, flammables, organic peroxides, oxidizers, pyrophorics, and reactives. A chemical is a health hazard when there is good evidence that acute or chronic health effects occur in exposed individuals. Hazardous chemicals include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes or mucous membranes.

Hazardous waste: According to the Resource Conservation and Recovery Act, a waste that, because of its characteristics, may (1) cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness, or (2) pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes possess at least one of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. Hazardous waste is nonradioactive.

Historic Resources: The sites, districts, structures, and objects associated with historic events, persons, or social or historic movements.

Historic and Cultural Resources: Cultural resources include any prehistoric or historic district, site, building, structure, or object resulting from, or modified by, human activity. Historic properties are cultural resources listed in, or eligible for listing in, the National Register of Historic Places.

Homogenous: Describing a substance or population with uniform composition.

Hopper: A (usually funnel-shaped) container in which materials, such as chemicals, are stored in readiness for dispensing.

Hydraulic conductivity: A quantity that describes the rate at which water flows through an aquifer. It has units of length/time and is equal to the hydraulic transmissivity divided by the thickness of the aquifer.

Hydrofluorocarbons: An organic chemical containing hydrogen, fluorine, and carbon; emitted as a byproduct of industrial manufacturing.

Hydroperiod: The number of days per year that an area of land is inundated with water; or the length of time that there is standing water at a location.

Indirect jobs: Jobs generated or lost in related industries within a regional economic area as a result of a change in direct employment.

Ingestion: To take in by mouth. Material that is ingested enters the digestive system.

Inhalation: To take in by breathing. Material that is inhaled enters the lungs.

Integrated Safety Analysis (ISA): A formalized and documented process that identifies potential accident sequences in a plant's operations, designates items relied on for safety to either prevent such accidents or mitigate their consequences to an acceptable level, and describes management measures to provide reasonable assurance of the availability and reliability of items relied on for safety.

Intermittent: As used in this EIS, a drainage feature that contains water for only part of the year, typically during wet seasons. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the conveyance of water.

Ionizing radiation: Radiation capable of displacing electrons from atoms or molecules to produce ions.

Isotope: An atom of a chemical element with a specific atomic number and atomic weight. Isotopes of the same element have the same number of protons but different numbers of neutrons. Isotopes are identified by the name of the element and the total number of protons and neutrons in the nucleus. For example, uranium-235 is an isotope of uranium with 92 protons and 143 neutrons and uranium-238 is an isotope of uranium with 92 protons and 146 neutrons.

Kilovolt (kV): A unit of electrical potential equal to a thousand volts.

Kilovolt-ampere (kVA): A unit of electrical power equal to 1000 volt-amperes.

Land use: The way land is developed and used in terms of the kinds of anthropogenic activities that occur (e.g., agriculture, residential areas, industrial areas).

Latent cancer fatalities (LCFs): Deaths resulting from cancer that has become active after a latent period following radiation exposure. For radiation exposure, latent cancer fatalities can be calculated from collective dose using the risk conversion factor of $6x10^{-4}$ LCFs per person rem.

Lithic: Made of stone.

Load factor: The ratio of the average electric load to the peak load over a period of time.

Loam: A rich, friable soil containing a relatively equal mixture of sand and silt, clay, and humus.

Low-level mixed waste: Low-level radioactive waste that also contains hazardous chemical components regulated under the Resource Conservation and Recovery Act.

Low-level radioactive waste: Wastes containing source, special nuclear, or by-product material are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the Low-Level Radioactive Waste Policy Act, that is, radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in section 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste).

Low-income population: A population where 25 percent or more of the population is identified as living in poverty.

Magnitude (earthquake): A measure of the total energy released by an earthquake. It is commonly measured in numerical units on the Richter scale. Each unit is different from an adjacent unit by a factor of 30.

Maim: To injure, disable or disfigure, usually by depriving of the use of a limb or other part of the body.

Maximally exposed individual (MEI): A hypothetical person who—because of proximity, activities, or living habits—could receive the highest possible dose of radiation or of a hazardous chemical from a given event or process.

Meteorological tower: An individual data acquisition point for weather and air related information (e.g., wind speed, wind direction, precipitation, opacity, etc.)

Meteorology: The science dealing with the atmosphere and its phenomena, especially as relating to weather.

Migration: The natural travel of a material through the air, soil, or groundwater.

Millirem (mrem): One thousandth of a rem (0.001 rem).

Mitigation: An action or actions implemented to lessen or alleviate impacts to a resource from a proposed action or activity. The purpose of mitigative actions is to avoid, minimize, rectify, or compensate for any adverse environmental impact.

Mixed waste: Waste that contains both "hazardous waste" and "radioactive waste" as defined in this glossary.

Modified Mercalli Intensity: A measurement of earthquake intensity based on the effects to people and structures. Ranges from I (low) to XII (total destruction), as opposed to the Richter scale, which measures the energy of the earthquake. Mercalli scale is often used to classify earthquakes that were not recorded on modern seismographs.

National Ambient Air Quality Standards (NAAQS): Air quality standards established by the Clean Air Act, as amended. The primary NAAQS are intended to protect the public health with an adequate margin of safety, and the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Emission Standards for Hazardous Air Pollutants (NESHAP): Emission standards for the control of releases of specified hazardous air pollutants, including radionuclides. These were implemented in the Clean Air Act Amendments of 1977.

National Environmental Policy Act (NEPA) of 1969: A Federal law constituting the basic national charter for protection of the environment. The act calls for the preparation of an environmental impact statement (EIS) for every major Federal action that may significantly affect the quality of the human or natural environment. The main purpose is to ensure that environmental information is provided to decision makers so that their actions are based on an understanding of the potential environmental and socioeconomic consequences of a proposed action and the reasonable alternatives.

National Historic Preservation Act (NHPA): A Federal law providing that property resources with significant national historic value be placed on the National Register of Historic Places. It does not require permits; rather, it mandates consultation with the proper agencies whenever it is determined that a proposed action might impact a historic property.

National Pollutant Discharge Elimination System (NPDES): Federal permitting system mandated by the Clean Water Act required for any discharges to waters of the United States.

National Register of Historic Places: A list maintained by the National Park Service of architectural, historic, archaeological, and cultural sites of local, state, or national importance.

Native vegetation: Plants that have evolved in a particular region and environment.

Nocturnal: Of, relating to, or occurring in the night.

Nonattainment areas: An area that has been designated by the EPA, or the appropriate State air quality agency, as exceeding one or more national or State Ambient Air Quality Standards.

Nonferrous: Not composed of or containing iron.

NO_x : Oxides of nitrogen, primarily nitrogen oxide and nitrogen dioxide. These are produced primarily by combustion of fossil fuels, and can constitute an air pollution problem.

Offgas treatment: An array of technologies to discharge, collect (filter), or destroy (catalyze, react, or combust) the vapors removed from soils or other media.

Order of magnitude: A multiple of ten. When a measurement is made with a result such as 3×10^7, the exponent of 10 is the order of magnitude of that measurement. To say that this result is known to within an order of magnitude is to say that the true value lies between 3×10^6 and 3×10^8.

Organic compounds: Of or designating carbon compounds. (Some simple compounds of carbon, such as carbon dioxide, are frequently classified as inorganic compounds.)

Oxide: A compound consisting of an element combined with oxygen.

Ozone: A molecule of oxygen in which three oxygen atoms are chemically attached to each other.

Package: In the regulations governing the transportation of radioactive materials, the packaging together with its radioactive contents as presented for transport.

Packaging: A shipping container without its contents.

Particulate matter: Materials such as dust, dirt, soot, smoke, and liquid droplets that are emitted into the air by sources such as factories, power plants, automobiles, construction activity, fires, and naturally by wind.

Peak ground acceleration: The maximum acceleration experienced by the particle on the ground during the course of the earthquake motion.

Permeability: The capability of a soil or rock to transmit a fluid.

Perennial: A drainage feature that contains water year-round during a year of normal rainfall. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water.

Personnel monitoring: The use of portable survey meters to determine the amount of radioactive contamination on individuals; or, the use of dosimetry to determine an individual's occupational radiation dose.

Person-rem: A measure of the radiation dose to a given population; the sum of the individual radiation doses received by that population.

pH: A measure of the hydrogen ion concentration in aqueous solution. Pure water has a pH of 7, acidic solutions have a pH less than 7, and alkaline solutions have a pH greater than 7.

Photosynthesis: The process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source.

Physiographic: Geographic regions based on geologic setting.

Playa lake: A temporary lake, or its dry often salty bed, in a desert basin.

Plume: The elongated pattern of contaminated air or water originating at a point source, such as a smokestack or a hazardous waste disposal site.

PM_{10}: Particulate matter with a 10-micron (mircrometer, μm) or less aerodynamic diameter. PM_{10} includes $PM_{2.5}$.

$PM_{2.5}$: Particulate matter with aerodynamic diameter of 2.5 micron or less. Since it is very small, $PM_{2.5}$ is important because it can be inhaled deep into the lungs.

Point source: A source of effluents that is readily identifiable and can be treated as if it were a point. This includes stacks, pipes, conduits, and tanks. A point source can be either a continuous source or a source that emits effluents only intermittently.

Pollutant: Any material entering the environment that has undesired effects.

Pollution: The addition of an undesirable agent to the environment in excess of the rate at which natural processes can degrade, assimilate, or disperse it.

Population dose: The sum of the radiation doses received by the individual members of a population.

Porosity: Percentage of void space in a material.

Potable water: Water that is safe for human consumption.

Potash: A potassium compound often used in agriculture and industry.

Prehistoric: Predating written history, in North America, also predating contact with Europeans.

Production well: A well used to retrieve water, petroleum, or gas from underground.

Purge gas: Inert gases used in chemical processes to flush a system of other gases.

Quaternary: Noting or pertaining to the present period of Earth's history, forming the latter part of the Cenozoic era, originating about 2 million years ago and including the Recent and Pleistocene epochs.

Radiation: Ionizing radiation; e.g., alpha particles, beta particles, gamma rays, X-rays, neutrons, protons, and other particles capable of producing ion pairs in matter. As used in this document, radiation does not include nonionizing radiation.

Radiation standards: Exposure standards, permissible concentrations, rules for safe handling, regulations for transportation, regulations for industrial control of radiation, and control of radioactive material by legislative means.

Radioactive waste: Materials from nuclear operations that are radioactive or are contaminated with radioactive materials and for which there is no practical use or for which recovery is impractical.

Radioactivity: The property or characteristic of radioactive material to undergo spontaneous transformations ("disintegrations" or "decay") with the emission of energy in the form of radiation. It means the rate of spontaneous transformations of a radionuclide. The unit of radioactivity is the curie (or becquerel). (1 curie = 3.7×10^{10} becquerel).

Radionuclide: A nuclide that emits radiation by spontaneous transformation.

Radon: A colorless, radioactive, inert gaseous element formed by the radioactive decay of radium.

Reactant: A substance participating in a chemical reaction, especially a directly reacting substance present at the initiation of the reaction.

Recharge: The downward vertical flow of groundwater to an aquifer. Recharge may be from seepage through the unsaturated zone (for unconfined aquifers) or downward flow from overlying layers (for confined aquifers).

Region of influence (ROI): The physical area that bounds the environmental, sociological, economic, or cultural features of interest for the purpose of impact analysis. A site-specific geographic area that includes the counties where approximately 90 percent of the site's current employees reside.

Rem: A common (or special) unit of dose equivalent, effective dose equivalent, or committed dose equivalent.

Resource Conservation and Recovery Act (RCRA): This Act was designed to provide "cradle to grave" control of hazardous chemical wastes.

Restricted area: Any area to which access is controlled for the protection of individuals from exposure to radiation and radioactive materials.

Riparian: Associated with stream banks or margins.

Risk: The likelihood of suffering a detrimental effect as a result of exposure to a hazard. In accident analysis, the probability weighted consequence of an accident, defined as the accident frequency per year multiplied by the consequence.

Risk assessment (chemical or radiological): The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific chemical or radiological materials.

Rotary calciner: An industrial processing kiln or oven and a drum using indirect heating and mixing.

Runoff: The portion of rainfall that is not absorbed by soil, evaporated, or transpired by plants, but finds its way into streams directly or as overland surface flows.

Sanitary/industrial waste: Nonhazardous, nonradioactive liquid and solid waste generated by normal housekeeping activities.

Scrubber: An apparatus for purifying a gas.

Sediment: Eroded soil particles that are deposited downhill or downstream by surface runoff.

Seismic: Pertaining to any earth vibration, especially an earthquake.

Seismicity: All of the earthquakes that may occur in a region, regardless of magnitude.

Semi-conductor: Any of various solid crystalline substances having electrical conductivity greater than insulators but less than good conductors.

Shielding: Any material or obstruction that absorbs radiation and thus tends to protect personnel or materials from the effects of ionizing radiation.

Sievert (Sv): A unit of radiation dose used to express a quantity called equivalent dose. This relates the absorbed dose in human tissue to the effective biological damage of the radiation by taking into account the kind of radiation received, the total amount absorbed by the body, and the tissues involved. Not all radiation has the same biological effect, even for the same amount of absorbed dose. One sievert is equivalent to 100 rem.

Silicon: A nonmetallic element occurring extensively in the earth's crust in silica and silicates.

Silt: A sedimentary material consisting of fine mineral particles intermediate in size between sand and clay.

Sink: A natural or artificial means of absorbing or removing a substance or a form of energy from a system.

Slurry pump: A machine composed of an impeller, casing, shaft/bearing assembly, shaft seal and sleeve, and drive; to increase the pressure of a liquid and solids mixture (slurry) through rotational/centrifugal force and convert electrical energy into kinetic energy; which drives the mixture from one location to another.

Soil association unit: A landscape or soil grouping that has a distinctive proportional pattern of soils; it normally consists of one or more major soils and at least one minor soil, and is named for the major soil(s).

Solidification: To make solid, compact, or hard.

Source material: Uranium or thorium ores containing 0.05 percent uranium or thorium regulated under the Atomic Energy Act. In general, this includes all materials containing radioactive isotopes in concentrations greater than natural and the by-product (tailings) from the formation of these concentrated materials

Source term: The kinds and amounts of radionuclides in an assumed release of radioactive material.

State Historic Preservation Officer (SHPO): The State officer charged with the identification and protection of prehistoric and historic resources in accordance with the National Historic Preservation Act.

Stormwater: The flow of water that results from precipitation and that occurs immediately following rainfall or as a result of snowmelt.

Subcritical: Incapable of sustaining a nuclear fission chain reaction.

Succulents: Having thick, fleshy, water-absorbing leaves or stems.

Sumps: A hole at the lowest point of a building or facility into which water is drained in order to be pumped out.

Surface water: A creek, stream, river, pond, lake, bay, sea, or other waterway that is directly exposed to the atmosphere.

Surge tank: A tank used to absorb surges in flow.

Tails: In the uranium enrichment process, tails refers to uranium hexafluoride with a reduced concentration of the uranium-235 isotope.

Tectonic activity: Movement of the earth's crust, produced by internal forces, such as uplift, subsidence, folding, faulting, and seismic activity.

Teragram: 10^{12} grams or a million metric tons ("tera" represents a factor of 10^{12}).

Terrestrial: Living or growing on land; not aquatic.

Tertiary: The first period of the Cenozoic era (after the Cretaceous period of the Mesozoic era and before the Quaternary period), thought to have covered the span of time between 65 million years and 3 to 2 million years ago. The Tertiary period is divided into five epochs: the Paleocene, Eocene, Oligocene, Miocene, and Pliocene.

Threatened Species: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Requirements for declaring a species threatened are contained in the Endangered Species Act.

Title V: Title V of the 1990 Clean Air Act Amendments requires all major sources and some minor sources of air pollution to obtain an operating permit. A title V permit grants a source permission to operate. The permit includes all air pollution requirements that apply to the source, including emission limits and monitoring, record keeping, and reporting requirements. It also requires that the source report its compliance status with respect to permit conditions to the permitting authority.

Topography: The shape of Earth's surface or the geometry of landforms in a geographic area.

Top soil: The fertile, surface portion of a soil; usually dark colored and rich in organic material.

Total effective dose equivalent (TEDE): The sum of the effective dose equivalent from radiation sources external to the body during the year plus the committed effective dose

equivalent from radionuclides taken into the body. A 50-year time interval is assumed for determining committed dose.

Toxic Substances Control Act (TSCA): A Federal law authorizing the U.S. Environmental Protection Agency to secure information on all new and existing chemical substances and to control any of these substances determined to cause unreasonable risk to public health or the environment. This law requires that the health and environmental effects of all new chemicals be reviewed by the EPA before such chemicals are manufactured for commercial purposes.

Transient species: Traveling nonresident, individuals of distinct animal species; migrating between seasonal breeding habitat, and overwintering or feeding habitat.

Transuranic waste: Waste containing more than 100 nanocuries of alpha-emitting transuranic (atomic number greater than 92) isotopes per gram of waste with half-lives greater than 20 years.

Unconfined aquifer: An aquifer that is not confined by a less-permeable confining unit. An aquifer where the water table elevation represents the hydraulic potential.

Unincorporated area: An area that is not located within the jurisdiction of any local government. Such unincorporated areas are governed and taxed by county-level government.

Uranium: A radioactive element with the atomic number 92 and, as found in natural ores, an atomic weight of approximately 238. The two principal natural isotopes are uranium-235 (0.7 percent of natural uranium), and uranium-238 (99.3 percent of natural uranium). Natural uranium also includes a minute amount of uranium-234.

Viewscape: Those features which provide a range of sight that can be identified as providing a community asset such as, but not limited to, pleasing vistas, scenes and views that provide a sense of place and character.

Viewshed: The area on the ground that is visible from a specific location.

Venturi scrubber: A “wet” scrubber, using gas atomizing spray ejection technology to control fine (under 10 micrometers diameter) particulate matter.

Volatile organic compound: Any compound containing carbon and hydrogen in combination with any other element that has a vapor pressure of 77.6 millimeters of mercury (1.5 pounds per square inch) absolute or greater under actual storage conditions.

Waste management: The planning, coordination, and direction of functions related to generation, handling, treatment, storage, transportation, and disposal of waste. It also includes associated pollution prevention and surveillance and maintenance activities.

Water deluge system: A sprinkler system employing open sprinklers that are attached to a piping system that is connected to a water supply through a valve that is opened by the operation of a detection system installed in the same areas as the sprinklers; when this valve opens, water flows into the piping system and discharges from all sprinklers attached thereto; deluge systems are used where large quantities of water are needed quickly to control a fast-developing fire; deluge valves can be electrically, pneumatically or hydraulically operated.

Water resources: This term includes both freshwater and marine systems, wetlands, floodplains, and ground water.

Wetlands: Land or areas exhibiting the following characteristics: hydric soil conditions; saturated or inundated soil during some part of the year and plant species tolerant of such conditions; also, areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, under normal circumstances, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wildlife corridor: An area of habitat connecting wildlife populations otherwise separated by human activities.

Wind rose: A plot of wind direction and speed showing the distribution of directions that the wind blows from at a measurement site. The proportion of the time that a wind blows from any given direction is indicated by the length of the “petal” on the wind rose.

Wind speed: The speed of air movement measured for a set height above ground level (agl) at a meteorological observing site. This height may vary depending on the location. Typically, anemometers at National Weather Service stations are placed at 32 ft 10 inches (10 m) agl; however, some are still found at 20 ft (6 m) agl.

APPENDIX A

SCOPING SUMMARY

ENVIRONMENTAL IMPACT STATEMENT SCOPING PROCESS

SCOPING SUMMARY REPORT

PROPOSED INTERNATIONAL ISOTOPES FLUORINE PRODUCTS, INC. (IIFP) FLUORINE EXTRACTION PROCESS AND DEPLETED URANIUM DE-CONVERSION PLANT TO BE LOCATED IN LEA COUNTY, NEW MEXICO

A.1 INTRODUCTION

On December 30, 2009, International Isotopes Fluorine Products, Inc. (IIFP) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for a license to construct and operate a proposed Fluorine Extraction Process (FEP) and Depleted Uranium De-conversion Plant (FEP/DUP) to be located at a site 22.5 kilometers (km) (14 miles [mi]) west of the City of Hobbs in Lea County, New Mexico. An Environmental Report was also submitted by IIFP at that time. If licensed, the FEP/DUP facility would be used for the deconversion of commercially-generated depleted uranium hexafluoride (DUF_6) inventories into depleted uranium oxide and other deconversion products.

In accordance with NRC regulations in Title 10 of the Code of Federal Regulations (10 CFR) Part 51 (10 CFR 51), which implement the National Environmental Policy Act of 1969, as amended (NEPA), the NRC staff is preparing an Environmental Impact Statement (EIS) for the proposed FEP/DUP facility as part of its decision-making process. The EIS will examine the potential environmental impacts associated with the proposed facility. The NRC staff has not identified any cooperating agencies for the preparation of this EIS. In addition to the EIS, the NRC staff will prepare a Safety Evaluation Report (SER) which will document the staff's review of safety and security issues associated with the proposed facility.

On July 15, 2010, NRC published in the *Federal Register* (FR) a Notice of Intent to prepare an EIS and to conduct the public scoping process (75 FR 41242). The public scoping comment period ended on August 30, 2010. Scoping is an early part of the NEPA process designed to help determine the range of actions, alternatives, and potential impacts to be considered in the EIS, and to identify significant issues related to the proposed action. In addition to the public scoping process, the NRC staff solicits input from State, local and other Federal agencies, and potentially affected Native American Tribes in order to focus on issues of genuine concern.

On July 29, 2010, the NRC staff held a public scoping meeting in Hobbs, New Mexico, to receive oral and written comments from interested parties. The public scoping meeting began with NRC staff providing a description of the NRC's roles, responsibilities, and mission. A brief overview of the licensing process was followed by a description of the environmental review process and a discussion of how the public can participate. The majority of the meeting was reserved for the public to ask questions and make comments on the scope of the environmental review.

As part of the environmental review process, the NRC staff has requested information regarding the scope of its environmental review from several sources. The NRC staff initiated consultation with the New Mexico State Historic Preservation Officer (SHPO), in accordance with the procedures in 36 CFR 800 to meet the requirements of Section 106 of the National Historic Preservation Act. In accordance with 36 CFR 800.3(f), the NRC staff has requested information from Native American Tribal members identified by the SHPO and the NRC staff. The NRC staff has also consulted with representatives of the U.S. Fish and Wildlife Service (USFWS) as required by Section 7 of the Endangered Species Act. The National Park Service was contacted and indicated that no parks would be affected by the project.

This scoping summary report addresses only comments received through the public scoping process and will be included as an Appendix of the EIS. Input from consulting agencies and potentially affected Native American Tribes will also be used as a basis for the impact assessments performed for each resource area. Correspondence with the SHPO and potentially-affected Native American Tribes are included in Appendix B of this draft EIS.

Correspondence with the USFWS, the National Park Service, and New Mexico Environment Department (NMED) are also included in Appendix B of this draft EIS.

This report has been prepared to summarize the comments received during the scoping process as required in 10 CFR 51.29(b). After publication of the draft EIS, the public will be invited to submit comments on the draft EIS. Availability of the draft EIS, the dates of the public comment period, and information about a public meeting to discuss the draft EIS will be announced in the Federal Register, on the NRC's website (http://www.nrc.gov/public-involve.html), and in the local news media. After evaluating comments on the draft EIS, the NRC staff will issue a final EIS that will serve as the basis for the NRC's consideration of potential environmental impacts in its decision on whether to license the proposed facility.

This report is organized into four main sections. Section 1 provides an introduction and background information on the environmental review process. Section 2 summarizes the comments and concerns expressed by government officials, agencies, and the public. Section 3 identifies the issues that the draft EIS will address and Section 4 describes those issues that are not within the scope of the draft EIS. Where appropriate, Section 4 also identifies other places in the decision-making process where issues that are outside the scope of the draft EIS may be considered.

A.2 ISSUES RAISED DURING THE SCOPING PROCESS

A.2.1 Overview

The public scoping process is an important component in determining the major issues that the NRC staff should address in the draft EIS. The comments provided by the public addressed several subject areas related to the IIFP proposed facility and the development of the draft EIS. Members of the public were able to submit comments on the scope of the IIFP proposed facility draft EIS by e-mail, postal mail, and by speaking and/or submitting written comments at the public scoping meeting held in Hobbs, New Mexico, on July 29, 2010. The scoping period ended on August 30, 2010.

Approximately 60 individuals not affiliated with the NRC staff attended the July 29, 2010, public scoping meeting in Hobbs, New Mexico. During the meeting, one individual asked a specific question about the licensing process. Ten individuals offered specific oral comments related to the proposed FEP/DUP facility. Including the comments received in the scoping meeting, a total of 28 oral and written comments were received from various individuals during the public scoping period, which ended on August 30, 2010. The scoping meeting transcript and the scoping comment letters received by the NRC are available on the NRC website, electronic reading room, at http://www.nrc.gov/reading-rm/adams/web-based.html. The ADAMS accession number for the scoping meeting transcript is ML102210424.

In addition to private citizens, the commenters included:

- A representative of Senator Tom Udall
- A Lea County Commissioner
- A Hobbs City Commissioner
- The Mayors of the Cities of Hobbs and Eunice
- The City Manager of Eunice
- State Senator Carroll Leavell (Letter read on his behalf)

Individuals providing oral and written comments addressed several subject areas related to the environmental review process of the proposed FEP/DUP facility. The following general topics categorize the comments received during the public scoping period:

- General support or opposition
- Socioeconomics
- Waste Management
- Water Resources
- Geology and Seismicity
- Transportation
- Public and Occupational Health
- Out of Scope

In addition to raising issues about the potential environmental impacts of the proposed facility, some commenters offered opinions and concerns that typically would not be included in an EIS. Although noted by the NRC in this summary document, comments of this type are not within the scope of environmental issues to be analyzed.

Other statements may be relevant to the proposed action, but have no direct bearing on the evaluation of alternatives or on the decision-making process regarding the proposed action. For instance, general statements of support for or opposition to the proposed action fall into this category. Comments of this type have been noted but are not used in defining the scope and content of the EIS.

A.2.2 Summary of Issues Raised

Several individuals provided comments regarding the beneficial potential socioeconomic impacts of the proposed facility on the local community. Other comments addressed potential impacts or risks posed by the facility due to seismic concerns, availability of water sources, transportation and disposal of waste, and possible health impacts associated with nuclear facilities. The following summary groups the comments received during the scoping period by technical area and issue.

A.2.2.1 General Support or Opposition

Several commenters expressed general support for the FEP/DUP facility. One commenter expressed opposition to locating the FEP/DUP facility, or any facility that deals with nuclear byproducts, in an area with a history of earthquakes and over an aquifer.

A.2.2.2 Socioeconomics

Three commenters expressed support for the project, specifically for the jobs that will be created by construction and operation of the facility and the positive economic impact it will have on the region.

A.2.2.3 Waste Management

Two commenters supported the project as a way to use uranium ‘tails’ that will be generated at the nearby URENCO USA uranium enrichment plant. One commenter stated that a disposal

path for waste from the FEP/DUP facility to the Andrews County, Texas, nuclear waste disposal facility is an unsafe disposal path. This commenter also requested that the EIS include disposal site suitability requirements, as described in 10 CFR 61.50.

A.2.2.4 Water Resources

One commenter stated that the EIS should include the aquifer map that has been prepared by Mesa Water Company. The same commenter also stated that Lea County lacks an adequate water supply for a nuclear project. This commenter expressed concern about a site that may potentially be used for disposal of waste from the FEP/DUP facility being located over the Ogallala Aquifer. The commenter also stated that the water supply of Hobbs, Eunice, and Jal risks being polluted by allowing a nuclear project in the area.

A.2.2.5 Geology and Seismicity

One commenter stated that the EIS should include the seismic hazards that have been indicated for Lea County by the U.S. Geological Survey. This commenter also stated that the Lea County site should not have been selected due to its seismic history. The commenter also expressed concerns about possible contamination of the Ogallala Aquifer by nuclear waste released during an earthquake.

A.2.2.6 Transportation

One commenter expressed concerns about the transportation of waste from the facility in Lea County (New Mexico) to the Andrews County, Texas, nuclear waste disposal facility just across the state line.

A.2.2.7 Public and Occupational Health

One commenter submitted a New Mexico Department of Health report showing elevated cancer rates in Lea County compared to other parts of the state and stated concern that allowing nuclear industry in the area will raise cancer rates.

A.2.2.8 Out of Scope

One commenter stated that the New Mexico Environment Department's denial of his request to set up offsite radiation monitors should be included in the EIS. One commenter stated that employees of various federal agencies should waive their liability immunity through the Federal Tort Claims Act and be fully liable for any damages, pollution to the water table, and loss of livelihood and health of Lea County citizens caused by any future earthquakes.

A.3 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The NEPA (42 U.S.C. 4321, et seq., as amended), and the NRC's implementing regulations for NEPA (10 CFR 51), specify in general terms what should be included in an EIS prepared by the NRC staff. Regulations established by the Council on Environmental Quality (40 CFR 1500-1508), while not binding on the NRC, provide useful guidance. Additional guidance for meeting NEPA requirements associated with licensing actions can be found in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs."

Pursuant to 10 CFR 51.71(a), in addition to public comments received during the scoping process, the EIS will also consider matters discussed in the IIFP Environmental Report. In accordance with 10 CFR 51.71(b), the EIS will consider major points of view and objections concerning the environmental impacts of the proposed action raised by other Federal, State, and local agencies, by any affected Indian Tribes/Pueblos, and by other interested persons. Pursuant to 10 CFR 51.71(c), the EIS will list all Federal permits, licenses, approvals, and other entitlements that must be obtained in implementing the proposed action, and will describe the status of compliance with these requirements. Any uncertainty as to the applicability of these requirements will be addressed in the EIS.

In accordance with 10 CFR 51.71(d), the draft EIS will include a preliminary analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of the alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. In the analysis, due consideration will be given to compliance with environmental quality standards and regulations that have been imposed by Federal, State, regional, and local agencies having responsibilities for environmental protections. The environmental impact of the proposed action will be evaluated in the EIS with respect to matters covered by such standards and requirements, regardless of whether a certification or license from the appropriate authority has been obtained. Compliance with applicable environmental quality standards and requirements does not negate the requirement for the NRC to weigh all environmental effects of the proposed action, including the degradation, if any, of water quality, and to consider alternatives to the proposed action that are available for reducing adverse effects.

While satisfaction of the NRC standards and criteria pertaining to radiological effects is necessary to meet the licensing requirements of the Atomic Energy Act, the EIS will also, for the purposes of NEPA, consider the radiological and nonradiological effects of the proposed action and alternatives. The development of the EIS is closely coordinated with the SER prepared by the NRC staff to evaluate the potential health and safety impacts of the proposed action. The EIS will also contain a discussion of the potential cumulative impacts of the proposed action.

Pursuant to 10 CFR 51.71(f), the draft EIS will include a preliminary recommendation by the NRC staff with respect to the proposed action. Any such recommendation will be reached after considering the environmental effects of the proposed action and reasonable alternatives, and after weighing the costs and benefits of the proposed action.

One goal in writing the EIS is to present the impact analyses in a manner that makes it easy for the public to understand. This EIS will provide the basis for the NRC decision with regard to potential environmental impacts. Those resources with potential significant impacts will be discussed in greater detail in the EIS than resources with potential minor or no impacts. This should allow readers of the EIS to focus on issues that were determined to be important in reaching the conclusions supported by the EIS. The following topical areas and issues will be addressed in the EIS.

Alternatives. The EIS will describe and assess the no-action alternative and other reasonable alternatives to the proposed action. Other alternatives may include alternative sites or alternative processes to the proposed chemical process.

Need for the Facility. The EIS will provide a discussion of the need for the proposed FEP/DUP facility.

Compliance with Applicable Regulations. The EIS will list relevant permits and regulations that apply to the proposed FEP/DUP facility. These include air, water, and solid waste disposal permits.

Land Use. The EIS will discuss the potential land use impacts associated with the proposed site preparation, construction, and operating activities. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Transportation. The EIS will discuss the potential impacts associated with the transportation of the construction materials, feed material, product, and waste during both normal transportation and under credible accident scenarios. The potential impacts on local transportation routes due to workers, delivery vehicles, and waste removal vehicles will be evaluated. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Geology and Soils. The EIS will assess the potential impacts to the geology and soils of the proposed FEP/DUP facility. The potential for earthquakes or any other major ground motion considerations will be addressed in the SER and potential environmental impacts of those phenomena will be evaluated in the EIS. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Water Resources. The EIS will assess the potential impacts on surface water and groundwater quality and water use due to the proposed action. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Ecological Resources. The EIS will assess the potential environmental impacts on ecological resources, including plant and animal species. Threatened and endangered species and critical habitats that may occur in the area will be discussed. The outcomes of consultations with resource protection agencies, as required by Section 7 of the *Endangered Species Act* of 1973 (16 U.S.C. Section 1536(a)(2)), will be discussed. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Air Quality. The EIS will make determinations concerning the meteorological conditions of the site location, the ambient air quality, the contributions of other sources to air quality, and the potential impacts of site preparation, construction, and operation of the proposed FEP/DUP facility on local air quality. In addition, the EIS will consider the impact of the proposed facility on climate change. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Noise. The EIS will discuss the potential impacts associated with noise from site preparation, construction, operation, and decommissioning of the proposed FEP/DUP facility. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Historic and Cultural Resources. The EIS will address the potential impacts of the proposed FEP/DUP facility on the historic and archaeological resources of the area. The outcomes of consultations with historic and cultural resource protection agencies, consistent with Section 106 of the *National Historic Preservation Act* of 1966 (36 CFR 800) will be discussed. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Visual and Scenic Resources. Potential impacts to the overall visual and scenic character of the area will be addressed. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Socioeconomics. The EIS will address demography, economic base, labor pool, housing, utilities, public services, education, and recreation potentially affected by the proposed action and alternatives. The hiring of new workers from outside the area could lead to potential impacts on regional housing, public infrastructure, and economic resources. Potential population changes leading to changes in the housing market and demands on the public infrastructure will be assessed. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Costs and Benefits. The EIS will compile in one place the costs and benefits of the proposed project so that a determination can be made of any net positive benefit to Lea County, the region, and the Nation. The EIS will compare the potential environmental and monetary costs and benefits of constructing and operating the proposed FEP/DUP facility.

Resource Commitments. The EIS will identify the potential for any unavoidable adverse impacts and irreversible and irretrievable commitments of resources. It will also address the relationship between local, short-term uses of the environment and the maintenance and enhancement of long-term productivity. Associated mitigative measures and environmental monitoring requirements will be presented, as applicable.

Public and Occupational Health. The EIS will include a determination of potentially adverse effects on human health that result from chronic and acute exposures to ionizing radiation and hazardous chemicals, and from physical safety hazards. Potentially adverse effects on human health might occur during site preparation, construction, operation, or decommissioning. Potential impacts associated with the implementation of the proposed action will be assessed under normal operation and credible accident scenarios. As appropriate, the assessment will include an analysis of mitigation measures to address potential adverse impacts.

Waste Management. The EIS will discuss the management of wastes, including by-product materials, generated from the site preparation, construction, and operation of the proposed FEP/DUP facility to assess the potential impacts of generation, storage, and disposal.

Decommissioning. The EIS will provide a discussion of facility decommissioning and associated potential impacts.

Cumulative Impacts. The EIS will address the potential cumulative impacts from past, present, and reasonably foreseeable future activities at and near the site, including preconstruction activities and a proposed facility expansion.

Environmental Justice. The EIS will address any potential disproportionately high and adverse environmental impacts of the proposed FEP/DUP facility on low-income and minority populations.

A.4 ISSUES CONSIDERED TO BE OUTSIDE THE SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The purpose of an EIS is to assess the potential environmental impacts of a proposed action in order to assist in an agency's decision-making process – in this case, NRC's licensing process.

As noted in Section 2.1, some issues and concerns raised during the scoping process are not relevant to the EIS because they are not directly related to the assessment of potential environmental impacts or the decision-making process. The lack of in-depth discussion in the EIS, however, does not mean that an issue or concern lacks value. Issues beyond the scope of the EIS either may not yet be at the point where they can be resolved or are more appropriately discussed and decided in other venues.

Some of the issues raised during the public scoping process for the proposed facility are outside the scope of the EIS, but are analyzed in the SER. For example, health and safety issues are considered in detail in the SER prepared by the NRC staff for the proposed action and are summarized in the EIS. The EIS and the SER are related in that they may cover some of the same topics and may contain similar information, but the analysis in the EIS is focused on the assessment of potential environmental impacts. In contrast, the SER deals primarily with safety evaluations and procedural requirements or license conditions to ensure the health and safety of workers and the general public. The SER also covers other aspects of the proposed action such as demonstrating that the applicant will provide adequate funding for the proposed facility in compliance with the NRC's financial assurance regulations.

Some of the issues raised during the public scoping process are not addressed in the EIS as they are not appropriate for resolution in the EIS. Other issues, including support of or opposition to nuclear facilities and the liability of federal workers under the Federal Tort Claims Act, are also beyond the scope of the EIS. The mission of the NRC is to license and regulate the Nation's civilian use of byproduct, source, and special nuclear materials in order to protect public health and safety, promote the common defense and security, and protect the environment. The NRC's regulations are designed to protect both the public and workers against radiation hazards from industries that use radioactive materials. The NRC's scope of responsibility includes regulation of commercial nuclear power plants; research, test, and training reactors; nuclear fuel cycle facilities; medical, academic, and industrial uses of radioactive materials; and the transport, storage, and disposal of radioactive materials and wastes. Activities not within the jurisdiction of the NRC are not subject to NRC regulations nor appropriate for consideration in the NRC's decision making process.

APPENDIX B

CONSULTATION/CORRESPONDENCE

June 29, 2010

The Honorable Louis Maynahonah Sr.
Chairman
Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko, OK 73005

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR INTERNATIONAL ISOTOPES FLUORINE PRODUCTS, INC. PROPOSED FLUORINE EXTRACTION PROCESS & DEPLETED URANIUM DE-CONVERSION PLANT

Dear Chairman Maynahonah:

International Isotopes Fluorine Products, Inc. (IIFP), a wholly owned subsidiary of International Isotopes, Inc. (INIS), has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed uranium processing facility. The facility is proposed to be located within a 640-acre section near Hobbs, New Mexico in Lea County (see enclosed map), of which approximately 40 acres would be developed. The 40-acre site would be fenced in and contain process-related buildings and an administrative office building. The proposed facility would provide services to the uranium enrichment industry for de-conversion of depleted uranium hexafluoride (DUF_6) into uranium oxides for long-term stable disposal. The proposed facility would also produce high-purity inorganic fluorides for applications in the electronic, solar panel, and semiconductor markets and anhydrous hydrofluoric acid for various industrial applications.

As established in Title 10 Code of Federal Regulations Part 51 (10 CFR Part 51), the NRC regulation that implements the National Environmental Policy Act of 1969, as amended, the NRC is preparing an Environmental Impact Statement (EIS) for the proposed action. The NRC process includes an opportunity for public and intergovernmental participation in the environmental review. We want to ensure that you are aware of our efforts and pursuant to 10 CFR 51.28(b), the NRC invites you to provide input to the scoping process for this EIS. In addition, as outlined in 36 CFR 800.8(c), the NRC plans to coordinate compliance with Section 106 of the National Historic Preservation Act of 1966 through the requirements of the National Environmental Policy Act of 1969. In accordance with Section 106 of the National Historic Preservation Act, the EIS will include an analysis of potential impacts to historic and cultural properties. To support the environmental review, the NRC is requesting information to facilitate the identification of tribal historic sites or cultural resources that may be affected by the proposed facility. Any input you provide will be used to enhance the scope and quality of our review in accordance with 10 CFR 51 and 36 CFR 800. After assessing the information you provide, the NRC will determine what additional actions are necessary to comply with Section 106 of the National Historic Preservation Act.

We would also like to invite you to attend a public meeting that we will be holding on Thursday, July 29, 2010, at the Lea County Event Center, 5101 Lovington Highway in Hobbs, New Mexico, from 5:30 p.m. until 8:30 p.m. The purpose of this meeting is to solicit comments from stakeholders and members of the public on the scope of the EIS review.

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The IIFP license application is publicly available in the NRC Public Document Room (PDR) located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at http://www.nrc.gov/reading-rm/adams.html. The accession number for the license application is ML100630503. Persons who do not have access to ADAMS or encounter problems, should contact the NRC's PDR reference staff by telephone at 1-800-397-4209, or 301-415-3747, or by e-mail at pdr@nrc.gov.

Please submit any comments you may have to offer on the environmental review within 30 days of receipt of this letter. If you have any questions, please contact Asimios Malliakos of my staff by telephone at 301-415-6458 or by email at Asimios.Malliakos@nrc.gov. Thank you for your assistance.

Sincerely,

/RA/

Diana Diaz-Toro, Branch Chief
Environmental Review Branch A
Environmental Protection and Performance
Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 40-9086

Enclosure:
Figure 1, Proposed IIFP Site
Location

1

Mr. Michael Burgess
Chairman
Comanche Indian Tribe
P.O. Box 908
Lawton, OK 73502

Mr. Donald G. Tofpi
Tribal Chairman
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015

Ms. Holly B. E. Houghten
Tribal Historic Preservation Officer
Mescalero Apache Tribe
P.O. Box 227
Mescalero, NM 88340

Mr. Frank Paiz
Governor
Ysleta del Sur Pueblo
119 South Old Pueblo Road
El Paso, TX 79907

Mr. Samuel Cata
Tribal Liaison
New Mexico Historic Preservation Division
Bataan Memorial Building
407 Galisteo St., Suite 236
Santa Fe, NM 87501

Ms. Jodie Hayes
Tribal Administrator
Shawnee Tribe
29 South Highway, 69A
Miami, OK 74354

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July 2, 2010

Ms. Jan V. Biella
Interim New Mexico State Historic
Preservation Officer
Historic Preservation Division
Bataan Memorial Building
407 Galisteo St., Suite 236
Santa Fe, New Mexico 87501

SUBJECT: INITIATION OF THE NATIONAL HISTORIC PRESERVATION ACT SECTION 106 PROCESS FOR INTERNATIONAL ISOTOPES FLUORINE PRODUCTS, INC. PROPOSED FLUORINE EXTRACTION PROCESS & DEPLETED URANIUM DE-CONVERSION PLANT

Dear Ms. Biella:

International Isotopes Fluorine Products, Inc. (IIFP), a wholly owned subsidiary of International Isotopes, Inc. (INIS), has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed uranium processing facility. The facility is proposed to be located within a 640-acre section near Hobbs, New Mexico in Lea County (see enclosed map), of which approximately 40 acres would be developed. The 40-acre site would be fenced in and contain process-related buildings and an administrative office building. The proposed facility would provide services to the uranium enrichment industry for de-conversion of depleted uranium hexafluoride (DUF_6) into uranium oxides for long-term stable disposal. The proposed facility would also produce high-purity inorganic fluorides for applications in the electronic, solar panel, and semiconductor markets and anhydrous hydrofluoric acid for various industrial applications.

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Please submit any comments you may have to offer on the environmental review within 30 days of receipt of this letter. If you have any questions, please contact Asimios Malliakos of my staff by telephone at 301-415-6458 or by email at Asimios.Malliakos@nrc.gov. Thank you for your assistance.

Sincerely,

/RA/

Diana Diaz-Toro, Branch Chief
Environmental Review Branch A
Environmental Protection and Performance
Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
Figure 1, Proposed IIFP Site
Location

Docket No.: 40-9086

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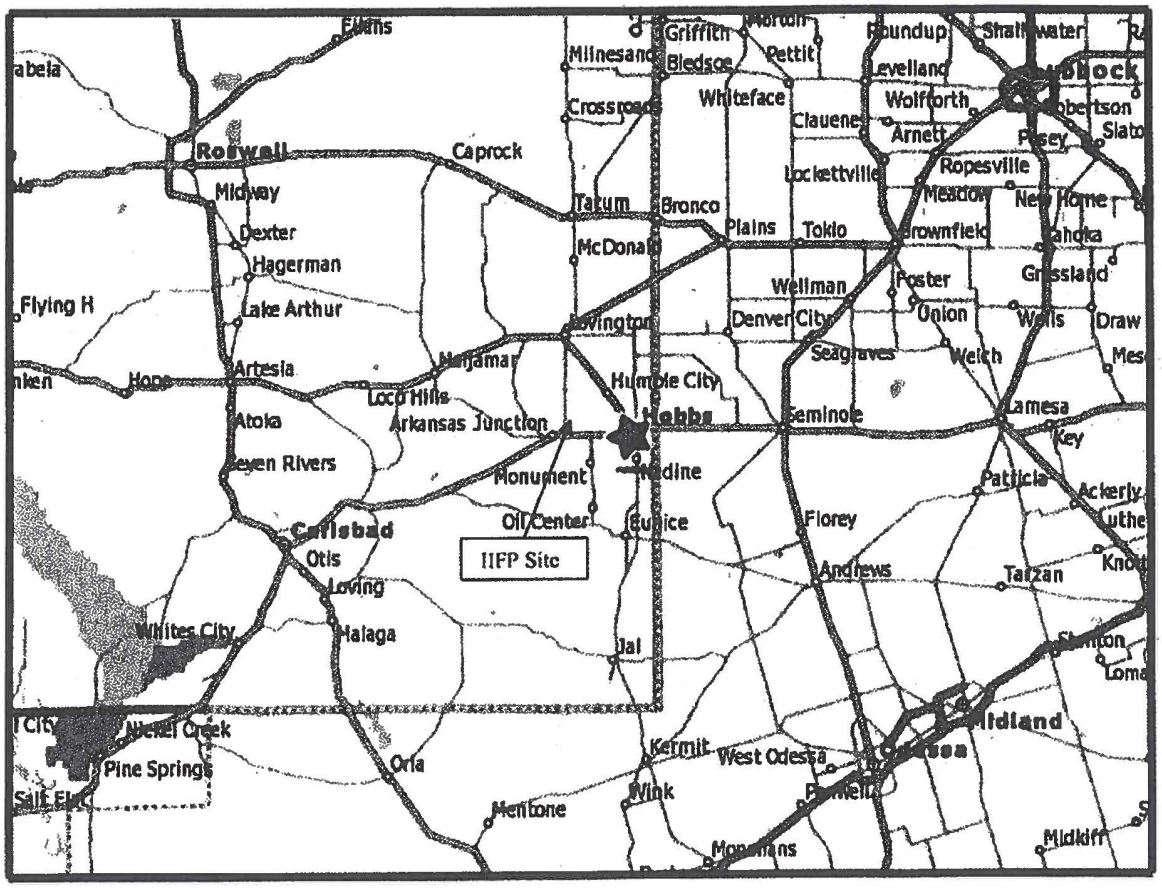

Figure 1. Proposed IIFP Site Location - The proposed site location is in Township 18S, Range 37E, Sections 26, 27, 34, and 35. The approximate center of the site is at latitude 32 degrees and 43 min North and 103 degrees and 20 min West longitude.

1 Enclosure

Ysleta del Sur Pueblo
Tribal Council
117 South Old Pueblo Road • P.O. Box 17579 • El Paso, Texas 79917 • (915) 859-8053 • Fax: (915) 859-4252

July 13, 2010

Diana Diaz-Toro
Branch Chief
Environmental Protection Office
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Diana Diaz-Toro:

This letter is in response to the correspondence received in our office in which you provide the Ysleta del Sur Pueblo the opportunity to comment on International Isotopes Fluorine Products, Inc. (IIFP) initiation of the National Historic Preservation Act Section 106 Process, and submittal for a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed uranium processing facility near Hobbs, (Lea County) New Mexico.

While we do not have any comments on the preparation of an Environmental Impact Statement (EIS) and believe that this proposed project will not adversely affect traditional, religious or culturally significant sites of our Pueblo and have no opposition to it; we would like to request consultation should any human remains or artifacts unearthed during this project be determined to fall under Native American Graves Protection and Repatriation Act (NAGPRA) guidelines. Copies of our Pueblo's Cultural Affiliation Position Paper and Consultation Policy are available upon request.

Thank you for allowing us the opportunity to comment on the proposed project.

Sincerely,

Javier Loera

Javier Loera
War Captain/Tribal Historic and Preservation Officer
Ysleta del Sur Pueblo
E-mail: jloera@ydsp-nsn.gov

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STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 FAX (505) 827-6338

BILL RICHARDSON
Governor

July 15, 10

Diana Diaz-Toro, Branch Chief
Environmental Review Branch A
Environmental Protection and Performance Assessment Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington D.C. 20555-0001

Re: Proposed Flourine Extraction Process and Depleted Uranuim De-Conversion Plant

Dear Ms. Diaz-Toro:

Thank you for providing the maps, photos, and scope of work for the above referenced project. We will need additional information in order to continue consultation on this project under Section 106 of the National Historic Preservation Act (NHPA).

Our archaeological records show that a no cultural resource surveys to identify historic properties have been conducted for the project area. In order to identify historic properties within the project area, or area of potential effect (APE), as required for compliance with Section 106, this office recommends that you engage the services of a professional archaeologist to conduct a pedestrian archaeological survey of the property. For federal undertakings on state lands, archaeological surveys require a contractor to hold a state archaeological survey permit and meet the Secretary of the Interior's standards. It is not necessary for the archaeologist to have a state permit if the property is privately owned; however, consultants with a state permit are familiar with New Mexico state standards for survey and reporting. A list of archaeologists and archaeological firms with permits for state lands in New Mexico may be found at http://www.nmhistoricpreservation.org/documents/99.DOCUMENT.pdf. The archaeologist will write a report detailing the results of his/her work, including recommendations about eligibility and effect of all sites in/near the project area and submit it to your office.

Compliance with Section 106 also includes consultation with Native American tribes that may be culturally affiliated with historic properties, sacred sites and/or traditional cultural properties (TCPs) in the project area. A list of tribes who wish to be consulted concerning projects within Lea County is available at http://www.nmhistoricpreservation.org/documents/21.DOCUMENT.pdf. Please contact any other tribes that you believe would be interested in commenting on this project.

The consultation letter should provide the tribes with information about the proposed project, funding sources, contact name and information for NRC, information on

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archaeological sites in the project area, their eligibility for listing to the National Register of Historic Places or State Register of Cultural Properties, and what may happen to the archaeological sites as a result of the project. You will be able to obtain the latter information from the conclusions of the archaeological survey report. The letters should invite the tribes to comment on all the information provided and request that they provide their concerns about any TCPs that may be affected by the project.

Any information tribes report to you will be considered during our 30-day review period. Once the archaeological survey report is complete, please send us the report for review and consultation regarding any effects the proposed project may have on historic properties in the area of potential effect. The report should be accompanied by a cover letter from your office requesting a formal determination of effect for the undertaking (i.e. no effect, no adverse effect, adverse effect). Any attachments to the report that the consultant provides must also be sent to our office (i.e. NMCRIS Investigation Abstract Form (NIAF), Laboratory of Anthropology (LA) site records, etc.). At this time, you should also send a sample tribal consultation letter, along with information on who was contacted, and copies of any responses received. If you conduct follow-up telephone calls, which is encouraged, please note in your letter, or in a separate document, the results of the phone calls so that we ensure that any concerns have been addressed.

If you have any questions concerning the additional information requested, or questions on how the tribal consultation should proceed, please do not hesitate to contact me. I can be reached by telephone at (505) 827-4225 or by email at Bob.Estes@state.nm.us.

Sincerely,

Bob Estes

Bob Estes
Archaeologist

Log: 89794
cc. Asimios Malliakos

1

PATRICK H. LYONS
COMMISSIONER

State of New Mexico
Commissioner of Public Lands
310 OLD SANTA FE TRAIL
P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

COMMISSIONER'S OFFICE
Phone (505) 827-5760
Fax (505) 827-5766
www.nmstatelands.org

090631

14 October 2010

Jan Biella
Historic Preservation Division
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Re: **Proposed Depleted Uranium Processing Facility, Active Land Sale / Exchange, International Isotopes, Inc; Nuclear Regulatory Commission; Lone Mountain Archaeological Services Report # 1224.; New Mexico State Land Office compliance file 10DE277**

Dear Ms. Biella:

I have reviewed the captioned document prepared by Lone Mountain Archaeological Services, Inc. (LMAS) on behalf of Gordon Environmental, Inc. (GEI) under contract to International Isotopes, Inc. (III). Enclosed, please find one copy of the report as prepared by LMAS, together with a map I have prepared to supplement their report. Also enclosed herewith for your reference are copies of correspondence between III and the State Historic Preservation Officer (SHPO), and between III and tribal governments, all dating to 2009, and my recent email communications with GEI. I submit this suite of materials to you in support of the larger federal undertaking, but also in order to address the state undertaking consisting of the land exchange / sale itself.

I first became aware of this project on 14 May 2009, via notification from LMAS of impending survey in support of proposed construction of a depleted uranium de-conversion and fluorine extraction processing facility on trust lands. The location surveyed (Section 27, T18S, R36E, N.M.P.M.) is on lands whose surface and subsurface estates are managed by the New Mexico State Land Office (SLO). You will note that there is no mention in LMAS' survey documentation of either an intended land exchange / sale, the role of III, or the involvement of the Nuclear Regulatory Commission (NRC).

Until queried briefly by New Mexico Historic Preservation Division (HPD) staff on 11 August, and contacted on 07 and 08 October 2010 by GEI, I was unaware of completion of the survey, NRC involvement, the apparently already accomplished exchange of the land with Lea County, or the impending sale of same to III. I have not been contacted by anyone previous to 07 / 08 October regarding the exchange / sale. Similarly, I have not been contacted by Lea County, the NRC, or III regarding the federal undertaking. I understand from correspondence with GEI (see email of 08 October, attached) that they believe you have not yet received copies of the tribal consultation letters, so I have provided the copies thereof as forwarded to me by GEI.

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The report itself indicates that the entire area (640 acres, more or less, within Section 27) was subjected to intensive pedestrian survey using appropriate methods. The results were largely negative, identifying only three isolated occurrences. These isolated occurrences are not thought to be cultural properties worthy of further consideration and protection. The map I prepared shows the location of the parcel, the adjacent pattern of state trust and private ownerships, the areas of previous archaeological surveys, and the locations of the known archaeological sites. The gray ring surrounding the subject parcel illustrates the limits of a five-mile (8000-meter) buffer area. The current survey nearly doubles the total acres of survey that have been conducted within the overall buffer area. Note also that only four sites have been discovered and documented in that area. This area of approximately 64,000 acres has now seen an arbitrary, non-random, surveyed sample of approximately 1500 acres. It is not surprising that the current survey returned negative results, given the observed site density estimated from the findings of previous surveys.

The map also illustrates the location of all state trust lands (regardless of surface or subsurface estates) that are located within five miles of any registered cultural property. This presentation is based on a dataset derived from GIS analysis of data currently displayed by the New Mexico Cultural Resource Information System, Archaeological Records Management Section, in their on-line system. Note that the subject parcel is just outside five miles from a registered cultural property -- LA 43256 (SR #162), a site variously known as Monument Springs, Monument Springs Site, and the HAT Ranch Headquarters.

Given the situation outlined above, the SLO recommends a finding of no effect / no cultural properties / no historic properties for both undertakings. There are no documented cultural properties within the area of potential effect (APE) when considering direct effects. Similarly, there are no registered cultural properties within the assumed, five-mile APE when considering indirect effects.

As always, if any cultural materials are discovered when ground disturbance associated with construction begins, all work in the vicinity of the discovery should cease, and the SHPO should be notified. If you believe that the SLO can be of any assistance at any time, we would be happy to oblige.

If you have questions or require further information, please do not hesitate to contact me.

Sincerely,

David C. Eck
Trust Land Archaeologist
(505) 827-5857
deck@slo.state.nm.us

Xc: Compliance file 10DE277cd

Concur with recommendations as proposed.
Michelle Ensey 10/25/10
for NM State Historic Preservation Officer

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NMCRIS INVESTIGATION ABSTRACT FORM (NIAF)

1. NMCRIS Activity No.:	2a. Lead (Sponsoring) Agency:	2b. Other Permitting Agency(les):	3. Lead Agency Report No.:
113862	NM State Land Office		

4. Title of Report: ***Cultural Resource Survey of 640 Acres for the Arkansas Junction Site, Lea County, New Mexico***

Author(s) S. Daras

5. Type of Report
☒ Negative ☐ Positive

6. Investigation Type
☐ Research Design ☒ Survey/Inventory ☐ Test Excavation ☐ Excavation ☐ Collections/Non-Field Study
☐ Overview/Lit Review ☐ Monitoring ☐ Ethnographic study ☐ Site specific visit ☐ Other

7. Description of Undertaking (what does the project entail?):
The proposed project is for the construction of the International Isotopes Inc. depleted uranium de-conversion and fluorine extraction processing facility. The facility will be located within a limited footprint inside the 640 acres, with extensive buffer zones.

8. Dates of Investigation: (from: May 18, 2009 to May 25, 2009

9. Report Date: May 26, 2009

10. Performing Agency/Consultant:
Lone Mountain Archaeological Services, Inc.
Principal Investigator: Cathy Travis
Field Supervisor: Thoras R. Dye
Field Personnel Names: Richard Fransisco and Francisco Britton

11. Performing Agency/Consultant Report No.: 1224

12. Applicable Cultural Resource Permit No(s):
NM State Permit: NM 09-073

13. Client/Customer (project proponent): Gordon Environmental
Contact: Dacia R. Tucholke
Address: 213 S. Camino del Pueblo
Bernalillo, NM 87004
Phone: (432) 688-6884

14. Client/Customer Project No.:

15. Land Ownership Status (***Must*** *be indicated on project map):*

Land Owner	Acres Surveyed	Acres in APE
State	640	640
TOTALS	640	640

16 Records Search(es):

Date(s) of ARMS File Review April 17, 2009	Name of Reviewer(s) C. Travis	
Date(s) of NR/SR File Review April 17, 2009	Name of Reviewer(s) S. Daras	
Date(s) of Other Agency File Review	Name of Reviewer(s)	Agency

17. Survey Data:

a. Source Graphics ☒ NAD 27 ☐ NAD 83
☒ USGS 7.5' (1:24,000) topo map ☐ Other topo map, Scale:
☒ GPS Unit Accuracy ☐ <1.0m ☒ 1-10m ☐ 10-100m ☐ >100m

b. USGS 7.5' Topographic Map Name | **USGS Quad Code**

Monument North, NM	32103-G8

c. County(les): Lea

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17. Survey Data (continued):

d. Nearest City or Town: Hobbs

e. Legal Description:

Township (N/S)	Range (E/W)	Section	¼ ¼ ¼
18 S	36 E	27	Entire section

Projected legal description? Yes [ ], No [X] **Unplatted [ ]**

f. Other Description (e.g. well pad footages, mile markers, plats, land grant name, etc.): Barbed wire fences border the northern and western areas of project and NM State 483 extends along the western edge of the project area. The southern and eastern sides of the project area are not bounded. Two large power lines run east-to-west just outside of the southern boundary of the project area.

18. Survey Field Methods:

Intensity: ☒ 100% coverage ☐ <100% coverage

Configuration: ☒ block survey units ☐ linear survey units (l x w): ☐ other survey units (specify):

Scope: ☒ non-selective (all sites recorded) ☐ selective/thematic (selected sites recorded)

Coverage Method: ☒ systematic pedestrian coverage ☐ other method (describe)

Survey Interval (m): 15 **Crew Size:** 3 **Fieldwork Dates:** May 18, 2009 to May 25, 2009

Survey Person Hours: 180 **Recording Person Hours:** 0 **Total Hours:** 180

Additional Narrative:

19. Environmental Setting (NRCS soil designation; vegetative community; elevation; etc.): The project area is located on a flat plain with a few shallow intermittent playas. A southeast-trending drainage is located in the far southwest quarter of the project area. The area is characterized by gently sloping terrain in the Querecho Plains, dominated primarily by the Kimbrough-Lea complex with 0 to 3 percent slopes (USDA Web Soil Survey 2009). The soil is derived from mixed alluvium and/or eolian sands. Other soil associations present are the Kimbrough gravelly loam, Portales loam, Portales-Stegall loams, and Stegall and slaughter soils.

Vegetation is characteristic of semidesert grassland (Brown 1994), and includes ringtail muhley, hairy grama, and other various forbs and grasses. Mesquite, prickly pear, horse crippler cacti, and rainbow cacti were also observed. Elevation is 3,814 ft (1,163 m) amsl in the northwest corner and 3,784 ft (1,153) amsl in the southeast corner of the project area.

a. Percent Ground Visibility: 100% in burned areas and 75-80% in grassy areas **b. Condition of Survey Area (grazed, bladed, undisturbed, etc.):** Numerous power lines, buried pipelines, and associated two-track roads are present throughout the project area. Approximately 45 percent of the survey area (eastern portion of the survey area) has been burned by recent grass fires. The south ½ of the southeast ¼ has been utilized as a gravel pit, crusher and hot plant site. One dry hole (abandoned well pad) is also located in the SW ¼ of the SW ¼, and it appears to have been capped in the 1980's or 1990's.

21. CULTURAL RESOURCE FINDINGS ☒ **Yes, See Page 3** ☐ **No, Discuss Why:** Three isolated occurrences were identified. A files check yielded three previous NMCRIS activities, but no previously recorded sites within 1 km of the project area. The absence of cultural resources in the project area may be explained by the presence of shallow sediments with exposed caliche (indicating a lack of lithic raw materials), and a lack of permanent water sources. This may have made the location unattractive to prehistoric peoples.

22. Required Attachments (check all appropriate boxes):

- ☒ **USGS 7.5 Topographic Map with sites, isolates, and survey area clearly drawn**
- ☒ **Copy of NMCRIS Mapserver Map Check**
- ☐ **LA Site Forms - new sites** (*with sketch map & topographic map*)
- ☐ **LA Site Forms (update) - previously recorded & un-relocated sites** (*first 2 pages minimum*)
- ☐ **Historic Cultural Property Inventory Forms**
- ☒ **List and Description of Isolates, if applicable see page 3)**
- ☐ **List and Description of Collections, if applicable**

23. Other Attachments:

- ☐ **Photographs and Log**
- ☐ **Other Attachments**

(Describe):

24. I certify the information provided above is correct and accurate and meets all applicable agency standards.

Principal Investigator/Responsible Archaeologist: Cathy Travis

Signature Cathy Travis **Date** May 26, 2009 **Title (if not PI):**

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25. Reviewing Agency: Reviewer's Name/Date Accepted ( ) Rejected ( ) Tribal Consultation (if applicable): ☐ Yes ☐No	26. SHPO Reviewer's Name/Date: HPD Log #: SHPO File Location: Date sent to ARMS:

CULTURAL RESOURCE FINDINGS

[fill in appropriate section(s)]

1. NMCRIS Activity No.: 113862	2. Lead (Sponsoring) Agency: NM State Land Office	3. Lead Agency Report No.:

SURVEY RESULTS:

Sites discovered and registered: 0
Sites discovered and NOT registered: 0
Previously recorded sites revisited (*site update form required*): 0
Previously recorded sites not relocated ***(site update form required):*** 0
TOTAL SITES VISITED: 0
Total isolates recorded: 3 **Non-selective isolate recording?** ☒
Total structures recorded (*new and previously recorded, including acequias*): 0

MANAGEMENT SUMMARY: Three isolated occurrences were encountered during this survey. The isolated occurrences have been completely recorded in a manner consistent with current standards and do not require any additional work. Therefore, the proposed undertaking will have no effect on cultural resources.

Isolated Occurrences (UTM NAD 27, Zone 13)

IO No.	Northing	Easting	Description
IO 1	3621150	656161	A brown chert San Jose projectile fragment, distal end, reworked (35 mm x 23 mm x 7 mm)(see Figure 1)
IO 2	3621745	655564	One gray quartzite hammerstone, one end and edge battered (53 mm x 43 mm x 26 mm)
IO 3	3621263	654810	Three manganese decolorized glass body fragments, ¼ in thick

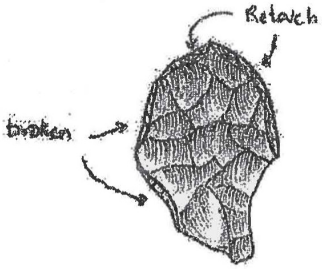

Figure 1: IO 1, San Jose Projectile Point (actual size)

IF REPORT IS NEGATIVE YOU ARE DONE AT THIS POINT.

SURVEY LA NUMBER LOG

Sites Discovered:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

Previously recorded revisited sites:

LA No.	Field/Agency No.	Eligible? (Y/N, applicable criteria)

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From:	Malliakos, Asimios
Sent:	Wednesday, June 15, 2011 3:06 PM
To:	JimmyA@ComancheNation.com
Subject:	Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant
Attachments:	Letter to the tribes.pdf; Site Location ML1011600270.pdf

Dear Mr. Jimmy Arterbery,

As we discussed in the phone attached please find the letter we sent to the tribes. Although the letter is addressed to the Honorable Louis Maynahonah Sr., in the last page of the letter shows the addresses that identical letters were sent. The list includes the name of Mr. Michael Burgess, Chairman, Comanche Indian Tribe. Attached also please find a map with the site location which is mentioned in the letter. I will appreciate any comments you may have before the end of this month, June 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:
http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to the Comanche Indian Tribe. As you requested, I will be sending the copy of the DEIS directly to you and I will be requesting your comments.

Thank you

Asimios Malliakos
Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-6458
Fax: 301-415-5369
Email: Asimios.Malliakost@nrc.gov

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From: Jimmy Arterberry [jimmya@comanchenation.com]
Sent: Wednesday, June 15, 2011 3:43 PM
To: Malliakos, Asimios
Subject: RE: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Asimios,
I've had a chance to look over the document sent and have no comment at this time. I will anticipate the Draft EIS. Thank you, jimmy

Jimmy W. Arterberry, THPO
Comanche Nation
P.O. Box 908
Lawton, Oklahoma 73502
(580) 595-9960 or 9618
(580) 595-9733 FAX

-----Original Message-----
From: Malliakos, Asimios [mailto:Asimios.Malliakos@nrc.gov]
Sent: Wed 6/15/2011 2:06 PM
To: Jimmy Arterberry
Subject: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Dear Mr. Jimmy Arterbery,

As we discussed in the phone attached please find the letter we sent to the tribes. Although the letter is addressed to the Honorable Louis Maynahonah Sr., in the last page of the letter shows the addresses that identical letters were sent. The list includes the name of Mr. Michael Burgess, Chairman, Comanche Indian Tribe. Attached also please find a map with the site location which is mentioned in the letter. I will appreciate any comments you may have before the end of this month, June 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:
http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to the Comanche Indian Tribe. As you requested, I will be sending the copy of the DEIS directly to you and I will be requesting your comments.

Thank you

Asimios Malliakos
Environmental Project Manager

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U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-6458
Fax: 301-415-5369
Email: Asimios.Malliakost@nrc.gov<mailto:Asimios.Malliakost@nrc.gov>

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From:	Malliakos, Asimios
Sent:	Wednesday, June 15, 2011 4:02 PM
To:	Samuel.Cata@state.nm.us
Subject:	Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant
Attachments:	Letter to the tribes.pdf; Site Location ML1011600270.pdf; Cultural Resource Report.pdf

Dear Mr. Samuel Cata,

As we discussed in the phone attached please find the letter we sent to the tribes. Although the letter is addressed to the Honorable Louis Maynahonah Sr., in the last page of the letter shows the addresses that identical letters were sent including your name. Attached also please find a map with the site location which is mentioned in the letter. In addition attached find the cultural survey report, no findings were made but I am attaching the report for your review. I will appreciate any comments you may have before the end of this month, June 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:
http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to you and I will be requesting your comments.

Thank you

Asimios Malliakos
Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-6458
Fax: 301-415-5369
Email: Asimios.Malliakost@nrc.gov

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From: Cata, Samuel, DCA [samuel.cata@state.nm.us]
Sent: Wednesday, June 15, 2011 4:17 PM
To: Malliakos, Asimios
Subject: RE: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Mr. Asimios Malliakos
I have received your E-mail correspondence and have submitted it to our staff for internal monitoring. We will reply as appropriate. Thank you very much for this information and I do appreciate that you will keep us advised on the status of this proposed activity.
Thank You
Sam

From: Malliakos, Asimios [mailto:Asimios.Malliakos@nrc.gov]
Sent: Wednesday, June 15, 2011 2:02 PM
To: Cata, Samuel, DCA
Subject: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Dear Mr. Samuel Cata,

As we discussed in the phone attached please find the letter we sent to the tribes. Although the letter is addressed to the Honorable Louis Maynahonah Sr., in the last page of the letter shows the addresses that identical letters were sent including your name. Attached also please find a map with the site location which is mentioned in the letter. In addition attached find the cultural survey report, no findings were made but I am attaching the report for your review. I will appreciate any comments you may have before the end of this month, June 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:
http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to you and I will be requesting your comments.

Thank you

Asimios Malliakos
Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-6458
Fax: 301-415-5369
Email: Asimios.Malliakost@nrc.gov

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Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

From: Malliakos, Asimios [Asimios.Malliakos@nrc.gov]
Sent: Thursday, June 30, 2011 4:37 PM
To: 'holly@mescaleroapache.org'
Subject: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Attachments: Letter to the tribes.pdf; Site Location ML1011600270.pdf; Cultural Resource Report.pdf

Dear Ms Houghten,

On June 29, 2010, Diana Diaz-Toro from the U.S. Nuclear Regulatory Commission (NRC) sent you a letter, for the International Isotopes proposed de-conversion plant, near Hobbs, in Lea County New Mexico, pursuant to the Historic Preservation Act Section 106. Attached please find the letter we sent to several tribes, Although the attached letter is addressed to the Honorable Louis Maynahonah Sr., in the last page the letter shows the addresses that identical letters were sent including you. Attached also please find a map with the site location which is mentioned in the letter. In addition attached find the cultural survey report, no findings were made but I am attaching the report for your review. I will appreciate any comments you may have on the attached letter before July 15, 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:

http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to you and I will be requesting your comments on the DEIS at that time.

Thank you

Asimios Malliakos

Environmental Project Manager

U. S. Nuclear Regulatory Commission

Office of Federal and State Materials and

Environmental Management Programs

Mail Stop: T-8F5

Washington, DC 20555-0001

Telephone: 301-415-6458

Fax: 301-415-5369

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From: Asimios.Malliakos@nrc.gov
To: kjumper_shawneetribe@hotmail.com
Date: Fri, 1 Jul 2011 15:32:58 -0400
Subject: Historic Preservation Act Section 106 for International Isotopes Proposed De-Conversion Plant

Dear Kim Jumper,

As a follow-up to our conversation today, attached please find a letter we sent to the tribes, for the International Isotopes proposed de-conversion plant, near Hobbs, in Lea County New Mexico, pursuant to the Historic Preservation Act Section 106. Although the letter is addressed to the Honorable Louis Maynahonah Sr., in the last page of the letter shows the addresses that identical letters were sent including Ms. Jodie Hayes, of the Shawnee Tribe of Oklahoma. Attached also please find a map with the site location which is mentioned in the letter. In addition attached find the cultural survey report, no findings were made but I am attaching the report for your review. I will appreciate any comments you may have by July 15, 2011.

For your convenience the Environmental Report for the International Isotopes proposed De-Conversion plant is accessible at the web address:
http://pbadupws.nrc.gov/docs/ML1001/ML100120758.pdf

Please be aware the NRC is preparing for the proposed facility a Draft Environmental Impact Statement (DEIS) which is expected to be published on November 2011. The DEIS will include discussion on Historic and Cultural Resources. A copy of the DEIS will be send to you and I will be requesting your comments.

Thank you

Asimios Malliakos
Environmental Project Manager
U. S. Nuclear Regulatory Commission
Office of Federal and State Materials and
4

Environmental Management Programs
Mail Stop: T-8F5
Washington, DC 20555-0001
Telephone: 301-415-6458
Fax: 301-415-5369
Email: Asimios.Malliakost@nrc.gov

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July 2, 2010

Mr. Wally Murphy, Field Supervisor
New Mexico Ecological Service Field Office
U.S. Fish & Wildlife Service
2105 Osuna NE
Albuquerque, NM 87113

SUBJECT: REQUEST FOR INFORMATION REGARDING ENDANGERED OR THREATENED SPECIES AND CRITICAL HABITAT FOR INTERNATIONAL ISOTOPES FLUORINE PRODUCTS, INC. PROPOSED FLUORINE EXTRACTION PROCESS & DEPLETED URANIUM DE-CONVERSION PLANT

Dear Mr. Murphy:

International Isotopes Fluorine Products, Inc. (IIFP), a wholly owned subsidiary of International Isotopes, Inc. (INIS), has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission a proposed uranium processing facility. The facility is proposed to be located within a 640-acre section near Hobbs, New Mexico in Lea County (see enclosed map), of which approximately 40 acres would be developed. The 40-acre site would be fenced in and contain process-related buildings and an administrative office building. The proposed facility would provide services to the uranium enrichment industry for de-conversion of depleted uranium hexafluoride (DUF_6) into uranium oxides for long-term stable disposal. The proposed facility would also produce high-purity inorganic fluorides for applications in the electronic, solar panel, and semiconductor markets and anhydrous hydrofluoric acid for various industrial applications.

As established in Title 10 Code of Federal Regulations Part 51 (10 CFR Part 51), the NRC regulation that implements the National Environmental Policy Act of 1969, as amended, the NRC is preparing an Environmental Impact Statement (EIS) for the proposed action. The EIS will include an analysis of potential impacts to endangered or threatened species and critical habitat in the action area. Please provide information that you may have regarding the presence of endangered or threatened species and critical habitat in the action area. After analyzing all the information collected, the NRC will follow up with your office regarding compliance with the Section 7 consultation process.

We would also like to invite you to attend a public meeting that we will be holding on Thursday, July 29, 2010, at the Lea County Event Center, 5101 Lovington Highway in Hobbs, New Mexico, from 5:30 p.m. until 8:30 p.m. The purpose of this meeting is to solicit comments from stakeholders and members of the public on the scope of the EIS review.

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The IIFP license application is publicly available in the NRC Public Document Room (PDR) located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at http://www.nrc.gov/reading-rm/adams.html. The accession number for the license application is ML100630502. Persons who do not have access to ADAMS or encounter problems should contact the NRC's PDR reference staff by telephone at 1-800-397-4209, or 301-415-3747, or by e-mail at pdr@nrc.gov.

Please submit any comments you may have to offer on the environmental review within 30 days of receipt of this letter. If you have any questions, please contact Asimios Malliakos of my staff by telephone at 301-415-6458 or by email at Asimios.Malliakos@nrc.gov. Thank you for your assistance.

Sincerely,

/RA/

Diana Diaz-Toro, Branch Chief
Environmental Review Branch A
Environmental Protection and Performance
Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
Figure 1, Proposed IIFP Site
Location

Docket No.: 40-9086

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Mr. Tod Stevenson, Director
New Mexico Department of Game and Fish
P.O. Box 25112
Santa Fe, NM 87504

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

AUG 10 2010

Thank you for your recent request for information on threatened or endangered species or important wildlife habitats that may occur in your project area. The New Mexico Ecological Services Field Office has posted lists of the endangered, threatened, proposed, candidate and species of concern occurring in all New Mexico Counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: http://www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm. If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find New Mexico Listed and Sensitive Species Lists on the main page and click on the county of interest. Your project area may not necessarily include all or any of these species. This information should assist you in determining which species may or may not occur within your project area.

Under the Endangered Species Act of 1973, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. Similarly, it is their responsibility to determine if a proposed action has no effect to endangered, threatened, or proposed species, or designated critical habitat. On December 16, 2008, we published a final rule concerning clarifications to section 7 consultations under the Act (73 FR 76272). One of the clarifications is that section 7 consultation is not required in those instances when the direct and indirect effects of an action pose no effect to listed species or critical habitat. As a result, we do not provide concurrence with project proponent's "no effect" determinations.

If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

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Candidates and species of concern have no legal protection under the Act and are included on the web site for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Also on the web site, we have included additional wildlife-related information that should be considered if your project is a specific type. These include communication towers, power line safety for raptors, road and highway improvements and/or construction, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area.

Sincerely,

Wally Murphy
Field Supervisor

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New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary - Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Tony Delfin
Acting Division Director
Forestry Division

NEW MEXICO STATE FORESTRY

7/15/2010
75 FR 41242
(1)

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2011 JUN 15 AM 9:23
RULES AND DIRECTIVES BRANCH

9 June 2011

Chief, Rules and Directives Branch
Mail Stop T6-D59
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Nuclear Regulatory Commission:

Energy, Minerals and Natural Resources Department – Forestry Division's Endangered Plant Program has no comments on the proposed Environmental Impact Statement for the Proposed International Isotopes Uranium Processing Facility near Hobbs, New Mexico. There are currently no known state endangered plant species or plant species of concern in Lea County.

Sincerely,

Robert Sivinski
Botanist
EMNRD-Forestry

SUNSI Review Complete
Template = ADH-013

E-RIDS = ADH-03
Add = A. Mallios (ACM1)
M. Bartlett (mab11)

Forestry Division
1220 South St. Francis Drive • Santa Fe, New Mexico 87505
Phone (505) 476-3325 • Fax (505) 476-3330 • www.emnrd.state.nm.us/FD

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GOVERNOR
Susana Martinez

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod W. Stevenson

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
Fax: (505) 476-8124

Visit our website at www.wildlife.state.nm.us
For information call: (505) 476-8000
To order free publications call: (800) 862-9310

STATE GAME COMMISSIONERS

JIM McCLINTIC
Chairman
Albuquerque, NM

THOMAS "DICK" SALOPEK
Vice-Chairman
Las Cruces, NM

DR. TOM ARVAS
Commissioner
Albuquerque, NM

SCOTT BIDEGAIN
Commissioner
Tucumcari, NM

ROBERT V. HOFFMAN
Commissioner
Las Cruces, NM

GERALD "JERRY" A. MARACCHINI
Commissioner
Rio Rancho, NM

BILL MONTOYA
Commissioner
Alto, NM

June 21, 2011

Asimios Malliakos, Environmental Project Manager
US Nuclear Regulatory Commission
Mail Stop T-8F5
Washington DC 20555-0001

Re: International Isotopes Uranium Processing Facility; NMGF Project No. 13058

Dear Mr. Malliakos:

In response to your request, the New Mexico Department of Game & Fish (NMGF) has reviewed information pertaining to the above referenced project. NRC is in the process of preparing an Environmental Impact Statement as required by the National Environmental Policy Act of 1969. Public scoping was conducted in 2010, however NMGF did not submit scoping comments at that time. We appreciate the additional opportunity to contribute to development of the EIS for this project. The comments below are based mostly on information presented in the project Environmental Report, Revision A, dated December 27, 2009.

The purpose and need for the facility is to provide services to the uranium enrichment industry for de-conversion of depleted uranium hexafluoride (DUF6) into uranium oxide for long-term stable disposal. The company will also include a commercial plant to produce specialty fluoride gas products for sale. High-purity silicon tetrafluoride (SiF4) and boron trifluoride (BF3) will be manufactured in the IIFP facility by utilizing the fluorine derived from the deconversion of DUF6. The fluoride gas products are highly valuable for applications in the electronic, solar panel, and semi-conductor markets. In addition, anhydrous hydrogen fluoride (AHF) is a by-product of the de-conversion process and is sold as an important chemical for various industrial applications. The project area is located in Lea County, approximately 14 miles west of Hobbs NM. General habitat type is transitional between Southern High Plains shortgrass prairie and Chihuahuan Desert scrub. Existing surface disturbance on the site is associated with oil and gas development and utility corridors.

Important Habitat

The ER is not entirely correct where it concludes a lack of important habitat on the project area (Sections 3.5.9 and 3.5.13). Despite an unpredictable hydroperiod, ephemeral playa lakes (internal drainage basins) are important breeding and nursery grounds for amphibians, and important stopovers areas for migratory waterfowl and

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shorebirds. Project-related facilities should be aligned so as to avoid adverse impact to playa depressions, including excess siltation. Vegetated arroyos, such as the one running west to east across the project area, are used as wildlife movement corridors, and support a disproportionate density of nesting birds. Project-related facilities should be aligned so as to avoid adverse impact to the unnamed arroyo. In addition to black-tailed prairie dogs (a State sensitive and FWS Species of Concern), prairie dog colonies support a large number of associated species, including raptors and mammalian predators. It is unclear from the ER whether the project area includes prairie dog towns, however it is within a Natural Heritage Program of NM buffered location of an occurrence for black-tailed prairie dog, documented in 2005. Project-related facilities should be aligned so as to avoid any prairie dog colonies.

Wildlife Surveys

Presence of lesser prairie-chicken (State sensitive and FWS Candidate for listing) on the project area is possible although not likely. NMGF recommends that construction projects avoid lesser prairie-chicken leks (communal breeding grounds) by 1.5 miles. If construction will take place within 1.5 miles of a lek, no activity should be allowed between the hours of 3:00 to 9:00 am, from February 15 through June 30, to avoid interfering with auditory breeding activity. We recommend that the project area be surveyed in spring of 2012 to determine the presence or absence of this species. NMGF recommended survey protocol is available from our lesser prairie-chicken biologist Grant Beauprez, at (575) 478-2460, or grant.beauprez@state.nm.us.

To avoid violation of the federal Migratory Bird Treaty Act, clearance of vegetation should take place outside the general migratory bird nesting season (April through August). If vegetation will be cleared within the nesting season, nest surveys should be conducted, and active nests avoided until the nestlings have fledged. NMGF recommends pre-construction clearance surveys for swift fox and burrowing owl burrows. A burrowing owl survey and mitigation guideline is available on our website at http://wildlife.state.nm.us/conservation/habitat_handbook/documents/2007burrowingowlfinalfinal.pdf. If any swift fox burrows are likely to be impacted by construction, or included within the fenced area, please contact NMGF for appropriate mitigation measures.

Chapter 6 of the ER proposes an ecological monitoring program. This program does not respond to any particular regulatory requirement, but is intended "to characterize gross changes in the composition of the vegetative, avian, mammalian, and reptilian/amphibian communities of the site associated with operation of the plant." NMGF recommends the addition of a comparable nearby reference area to the study design, to control for climatic and other changes common to the surrounding area. The Wildlife Baseline Study guideline, available on our website at http://wildlife.state.nm.us/conservation/habitat_handbook/documents/WildlifeBaselineStudyGuidelinesand%20Appendix.pdf, includes information that may be useful in designing your monitoring study. NMGF requests that results of the ecological monitoring program be shared with this agency, for purposes of general information.

Best Management Practices

Consult the website of the NM Rare Plants Technical Council (http://nmrareplants.unm.edu/), or contact the NM Forestry Division, for information about plant species of concern. Conduct surveys of any suitable habitat that may be present on the project site, for rare plants which are known to occur in Lea County.

Prepare a noxious weed management plan, including a pre-construction survey, post-construction monitoring plan, steps to prevent new infestation or the spread of existing infestations, and assignment of responsibility for control of any plants on the NM Department of Agriculture Noxious Weed list.

It may not be necessary to exclude wildlife from stormwater retention ponds, unless they are expected to contain potentially harmful substances such as hydrocarbons, detergents, acids, salts, surfactants, dispersants, or heavy metals. Large wildlife will be excluded by site perimeter security fencing. If total exclusion is desired, ponds can be

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covered or netted to exclude flying and terrestrial animals. Extruded, knit or woven material is preferred above monofilament netting material, as it is less likely to ensnare wildlife and cause injury or death. Light colors are better (more visible) than dark. Netting should be maintained taut around the frame. If the pits will contain only water and soil, and they are not covered or netted, they should be provided with ramps to allow the escape of wildlife which may become trapped. If space allows, ramps may consist of sloping back at least one side of the pit to a 3:1 or greater horizontal:vertical ratio. Constructed ramps are commonly made from sheets of expanded metal for steel tanks, or constructed of packed earth for earthen pits. Ramps made of material with surface texture can be used in the presence of smooth liners or other slippery substrate. To be effective, the escape mechanism must be intercepted by an animal swimming around the periphery of the tank or pit at any reasonably anticipated water level. NMGF is available for consultation regarding netting or escape ramp options for any specific size and type of pit. Open above-ground tanks should also be covered, netted or provided with means of escape.

Screen all open stacks and vents, to exclude birds or bats which may seek these locations to nest or roost.

NMGF Trenching guidelines (http://wildlife.state.nm.us/conservation/habitat_handbook/documents/TrenchingGuidelines.pdf) should be included as specifications for all underground utility installation. All new electric distribution lines should be constructed in accordance with the Avian Power Line Interaction Committee (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* This report may be ordered from APLIC at http://www.aplic.org.

Thank you for the opportunity to comment on this project. We have enclosed a list of state and federal Wildlife of Concern known to occur in Lea County, for your information. If there are any questions, please contact Rachel Jankowitz at 505-476-8159, or rjankowitz@state.nm.us.

Sincerely,

Matthew Wunder, Chief
Conservation Services Division

cc: Wally Murphy, Ecological Services Field Supervisor, USFWS
George Farmer, SE Area Habitat Specialist, NMGF

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NEW MEXICO WILDLIFE OF CONCERN
LEA COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/southwest/es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information. E = Endangered; T = Threatened; s = sensitive; SOC = Species of Concern; C = Candidate; Exp = Experimental non-essential population; P = Proposed

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Sand Dune Lizard	Sceloporus arenicolus	E	P	
Bald Eagle	Haliaeetus leucocephalus	T		
Aplomado Falcon	Falco femoralis	E	Exp	
Peregrine Falcon	Falco peregrinus	T	SOC	
Lesser Prairie-Chicken	Tympanuchus pallidicinctus	s	C	
Mountain Plover	Charadrius montanus	s	SOC	
Least Tern	Sterna antillarum	E	E	
Yellow-billed Cuckoo	Coccyzus americanus	s	SOC	
Burrowing Owl	Athene cunicularia		SOC	
Broad-billed Hummingbird	Cynanthus latirostris	T		
Loggerhead Shrike	Lanius ludovicianus	s		
Bell's Vireo	Vireo bellii	T	SOC	
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Sprague's Pipit	Anthus spragueii		C	
Cave Myotis Bat	Myotis velifer	s		
Black-tailed Prairie Dog	Cynomys ludovicianus ludovicianus	s	SOC	
Swift Fox	Vulpes velox velox	s	SOC	
Black-footed Ferret	Mustela nigripes		E	
Western Spotted Skunk	Spilogale gracilis	s		
Sandhill White-tailed Deer	Odocoileus virginianus texana	s		

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APPENDIX C

AIR EMISSIONS

AIR EMISSIONS

C.1 Introduction

The construction and operation of the proposed IIFP facility would result in an increase in air emissions due to construction, operations, and decommissioning workforce commuter vehicles and delivery vehicles, and, during construction, construction equipment. This Appendix presents the inputs and methodology used to estimate emission rates from vehicles in order to compare the estimated pollutant concentrations with National Ambient Air Quality criteria (NAAQS). The impacts of emissions on air quality also considered the downwind dispersion rates, and the input and methodology for those calculations are included in this Appendix.

C.2 Air Pollutant Emissions from On-Road Vehicles

This section discusses on-road vehicle air pollutant emissions, during construction, operation, and decommissioning of the proposed IIFP facility.

C.2.1 Model Input

The basic calculation to determine a pollutant emission rate is to multiply the number of vehicle miles by the pollutant's emission factor (explained below for pollutants listed in Table C-2). The number of commuter vehicles was conservatively estimated based on the size of the construction and operations workforces presented applicant's Environmental Report (IIFP, 2009). The daily mileage was estimated based on the likely residences of the workforces (see this draft EIS Sections 4.1.1.8 for construction and 4.1.2.8 for the methodology to estimate commuter mileage). The estimated numbers of daily deliveries and mileage was also estimated from information found in the Environmental Report. This information is summarized in Table C-1.

Emission factors were determined using the computer code MOVES (EPA, 2010a), an EPA emission inventory model. It provides an accurate estimate of emissions from mobile sources under a wide range of user-defined conditions. MOVES was used to calculate emission factors for volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxides (NO_x), carbon dioxide equivalents (CO_2), sulfur dioxide (SO_2), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), particulate matter less than 10 microns in diameter (PM_{10}), benzene, methyl tertiary butyl ether (MBTE), 1,3 butadiene, formaldehyde, acetaldehyde, and acrolein for the years of interest. Phase 1 construction is expected to start in 2012 and be completed in 2013. Phase 2 construction is expected to begin in year 2015 and be completed in 2016 Facility operations would begin in 2013, and extend for the 40-year license term. The year 2011 was chosen as the model year.

Different emissions emanate from a vehicle depending on type of activity and time of the day. The model accounts for all emissions during normal daily activity. The types of emission processes are:

- **Running exhaust** – tailpipe emissions during highway travel.
- **Starting exhaust** – tailpipe emissions that occur as a result of starting a vehicle. These emissions are independent of running exhaust emissions. The magnitude of these emissions is dependent on how long the vehicle has been sitting prior to starting.

Table C-1. Worker and Delivery Vehicle Rates Due to Construction, Operation, and Decommissioning Activities of the IIFP Facility

	(vehicles)	*(miles/day)*	*(days/phase)**	*(vehicle miles/phase)*
Preconstruction (3 months)				
workers	70	40	62.5	175,000
deliveries	10	40	62.5	25,000
equipment	2	40	62.5	5,000
Phase 1 Construction (1 year)**				
workers	140	40	250	1,400,000
deliveries	20	40	250	200,000
equipment	4.25	40	250	42,500
Phase 1 Operations (1 year)				
workers	140	40	250	1,400,000
deliveries	10.6	1512	250	4,006,800
Phase 2 Construction (1 year)				
workers	180	40	250	1,800,000
deliveries	20	40	250	200,000
equipment	2	40	250	20,000
Phase 2 Operations* (per year)				
workers	40	40	250	400,000
deliveries	17.2	1512	250	6,501,600
Decommissioning (3 years)				
workers	40	40	750	1,200,000
deliveries	0	-	750	0

* After 2016, both phases of the facility will be operational. The "Phase 1 operations" entries apply only to the years 2013 to 2016, when only Phase 1 is operation. "Phase 2 operations" entries include both Phase 1 and Phase 2 operations, beginning in year 2016.
** The work year was taken to be 250 days long.

Source: IIFP, 2011

- **Tirewear** – particulate emissions as friction between tires and the highway wear away the tire.
- **Brakewear** – particulate emissions from brake use.
- **Evaporation loss** – fuel loss through rubber and plastic components while the vehicle is sitting .
- **Crankcase exhaust** – the exhaust gases that escape around the piston rings and enter the crankcase during normal operation.

Table C-2 presents the results of all the sources of emissions as grams per mile driven, as calculated by the MOVES model using the input parameters from Table C-1.

Table C-2. MOVES Emission Factor Outputs for 2011

Pollutant	Emission Factor (gram/mile)		
	workers	deliveries	equipment
VOCs	7.37×10^{-1}	8.72×10^{-1}	1.02
CO	7.82	1.02 x10	1.20 x10
NO_x	1.04	4.63	1.71
SO_2	8.28×10^{-3}	1.12×10^{-2}	9.96×10^{-3}
PM_{10}*	3.53×10^{-2}	2.38×10^{-1}	5.30×10^{-2}
$PM_{2.5}$*	1.90×10^{-2}	1.97×10^{-1}	3.23×10^{-2}
CO_2 - equivalent	4.28×10^{2}	9.57×10^{2}	5.30×10^{2}
benzene	1.67×10^{-2}	1.92×10^{-2}	2.57×10^{-2}
MBTE	0.00	0.00	0.00
1,3 butadiene	2.86×10^{-3}	4.34×10^{-3}	4.56×10^{-3}
formaldehyde	6.41×10^{-3}	2.46×10^{-2}	1.15×10^{-2}
acetaldehyde	5.93×10^{-3}	1.27×10^{-2}	9.72×10^{-3}
acrolein	2.97×10^{-4}	1.20×10^{-3}	5.31×10^{-4}

*PM totals are the sum of organic carbon, elemental carbon, and sulfate particulate emissions.

C.2.2 Analysis Methods

Emission rates of the six criteria pollutants (i.e., CO, NO_X, SO_2, PM_{10}, $PM_{2.5}$ and VOCs, an ozone precursor), CO_2 equivalent, and six hazardous air pollutants (HAPs) (i.e., benzene, MBTE, 1,3 butadiene, formaldehyde, acetaldehyde, and acrolein) as calculated by MOVES for Lea County in 2011 (Table C-2) were multiplied by the worker and delivery vehicles mileage estimates (Table C-1) to arrive at total emissions.

C.2.3 Results

Pollutant emission amounts for the span of construction and operation phase are reported in draft EIS Sections 4.1.1.4 for construction (Tables 4-4 and 4-5), 4.1.2.4 for operations (Tables 4-15 and 4-16), and 4.2.2.4 for the Phase 2 increment.

C.3 Air Pollutant Emissions from Construction Activities

This section discusses air pollutant emissions as a result of construction activities. This includes emissions from construction equipment, fugitive dust emissions from land disturbance from construction activities, and fugitive emissions from the onsite diesel refueling activities.

C.3.1 Analysis Methods

All emissions were calculated using the general equation for emissions estimation (EPA, 1995a):

$E = A \times EF \times (1-ER/100)$

where:

- E = emissions
- A = activity rate
- EF = emission factor
- ER = overall emission reduction efficiency, as %

For construction equipment the activity rate is measured as horsepower-hours. The following equation (EPA, 2005a) was used to determine the horsepower-hours:

$HP\text{-}hr = (Max\ HP) \times (LF) \times (\#) \times (hrs)$

where:

- HP-hr = horsepower-hours
- Max HP = maximum horsepower
- LF = load factor
- # = number of units used
- hrs = hours that equipment operates

For fugitive dust emissions in the first equation, the activity rate is the number of acres that would be disturbed by construction activities. Because the applicant indicated that watering would be used to control fugitive dust emissions, an emission reduction efficiency of 50% was assumed.

For fugitive emissions from the onsite diesel refueling activities in the first equation, the activity rate is the number of gallons of diesel fuel used. The amount of diesel fuel used was calculated using the following equation (EPA, 2010b):

$DB = BSFC \times TAF \times A$

where:

- DB = diesel burned
- BSFC = brake specific fuel consumption
- TAF = transient adjustment factor
- A = activity rate (HP-hr)

Carbon dioxide equivalents were calculated using the equation (EPA, 2005b):

$CO_2e = CO_2 + (21 \times CH_4) + (310 \times N_2O)$

where:

- CO_2e = carbon dioxide equivalents
- CO_2 = carbon dioxide
- CH_4 = methane
- N_2O = nitrous oxide

The applicant provided equipment lists and schedules showing the hours of equipment operation per month for each construction phase (preconstruction, Phase 1 and Phase 2), and the amount of disturbed acreage (IIFP, 2011).

C.3.2 Emission Factors

Emission factors for CO_2, VOCs, CO, NO_2, SO_2, $PM_{2.5}$, and PM_{10} were determined using the computer code NONROAD (EPA, 2005b), an EPA emission inventory model. Default values for Lea County, New Mexico (i.e., climate/meteorology, equipment age, deterioration factors, fuel properties, and growth factors) were used as inputs for the model. The year 2011 was chosen at the modeling year.

Emission factors for the greenhouse gases methane (CH_4) and nitrous oxide (N_2O) were obtained from the EPA guidance document "Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance Direct Emissions from Mobile Combustion Sources" (EPA, 2008).

Emission Factors for fugitive dust emissions were obtained from Section 13.2.3 of EPA AP-42 "Compilation of Air Emission Factors" (EPA, 1995a). Emission factors for refueling activities were provided by the applicant (IIFP, 2011).

C.3.3 Results

The input used in the calculations described in Section C.3.1, and the calculated monthly and annual emissions, and maximum emissions rates for each pollutant for each construction phase (Table C-2) are reported in Draft EIS Sections 4.1.1.4 for Phase 1, and 4.2.2.4 for preconstruction and Phase 2 construction.

C.4 Incremental Downwind Air Pollutant Concentration Increases

C.4.1 Model Input

Emissions from construction equipment would be dispersed downwind. Dispersion coefficients were determined using the computer code SCREEN3 (EPA, 1995b), an EPA single source Gaussian plume model. Dispersion coefficients were determined for the maximum concentration (at the construction site), the property border (at 900 meters from the construction site), and 1 mile (1,600 meters) from the construction site for Phase 1 preconstruction and construction, Phase 2 construction, and Phase 1 operations (Table C-3).

C.4.2 Analysis Methods

There is a direct correlation between the source emission rate and the dispersion coefficients (disp coeff) calculated by SCREEN3. For example, a 5-fold increase in the emission rate input to SCREEN3 results in a 5-fold increase in the resulting dispersion concentrations. Therefore, setting the source emission rate to 1.0 gram/second/square meter allows scaling of the emission rates by multiplying them by SCREEN3's dispersion coefficients. This was done using Eq. C.3-1 for the preconstruction, Phase 1 construction, and Phase 2 construction to determine the peak 1-hour concentrations at the site border (900 meters) and at one mile (1,600 meters). The peak 3-hour, 8-hour, 24-hour, and annual concentrations were derived by multiplying the peak 1-hour concentration by the conversion factors given in Table C-4 (EPA, 1992). The resulting concentrations are provided in Section C.4.3.

$$[(A + B) \times C] + [D \times E] = F \qquad \text{Eq. C.3-1}$$

Table C-3. SCREEN3 Outputs: Dispersion Coefficients

Preconstruction / Phase 1 Construction		
Volume ($\mu g/m^3$)/(g/s)	max (157 m)	935.9
	900 m	246.4
	1600 m	144.5
Area ($\mu g/m^3$)/($g/s/m^2$)	max (223 m)	1.648×10^8
	900 m	2.492×10^7
	1600 m	1.565×10^7
Phase 2 Construction		
Volume ($\mu g/m^3$)/(g/s)	max (30 m)	7352
	900 m	593.4
	1600 m	274.7
Area ($\mu g/m^3$)/($g/s/m^2$)	max (35 m)	9.386×10^7
	900 m	1.753×10^6
	1600 m	7.636×10^5
Phase 1 Operations - Utilities		
Point ($\mu g/m^3$)/(g/s)	max (107 m)	608.0
	900 m	145.5
	1600 m	132.9
Phase 1 Operations - H_2 Generation		
Point ($\mu g/m^3$)/(g/s)	max (140 m)	666.5
	900 m	210.0
	1600 m	166.5

where A = Construction Equipment 1-hour Peak Emission Rate

B = Construction Vehicles 1=hour Peak Emission Rate

C = SCREEN3 Volume Dispersion Coefficient

D = Fugitive Dust 1-hour Peak Emission Rate

E = SCREEN3 Area Dispersion Coefficient

F = One-hour Peak Concentration at Site Boundary or 1.6 km (1 mi)

Table C-4. EPA Peak Hour Conversion Factors

3-Hour Conversion Factor	0.90
8-Hour Conversion Factor	0.70
24-Hour Conversion Factor	0.40
Annual Average Conversion Factor	0.10

Source: (EPA, 1992)

The 1-hour peak concentrations at site border for each construction phase and operations were determined according to Eq. C.3-2. All emission-generating units were conservatively assumed to operate continuously. The conversion factors given in Table C-4 were used to determine peak 3-hour, 8-hour, 24-hour, and annual concentrations. The resulting concentrations are provided in Section C.4.3.

$$[(G + H + J) \times K] + [L \times M] = N \qquad \text{Eq. C.3-2}$$

where G = Boilers 1-hour Peak Emission Rate

H = Generators 1-hour Peak Emission Rate

J = Firewater Pump 1-hour Peak Emission Rate

K = SCREEN3 Utilities Point Dispersion Coefficient

L = H_2 Generator 1-hour Peak Emission Rate

M = SCREEN3 H_2 Generation Point Dispersion Coefficient

N = One-hour Peak Concentration at Site Boundary or 1.6 km (1 mi)

C.4.3. Results

Peak 1-hour, 3-hour, 8-hour, 24-hour, and annual concentrations at the site boundary for each construction phase and operations and their percent of the NAAQS that were calculated are reported in draft EIS Sections 4.1.1.4 for construction (Table 4-6), 4.1.2.4 for operations (Table 4-17), and 4.2.2.4 for cumulative impacts.

C.5 References

(EPA, 1992) U.S. Environmental Protection Agency. 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019, October, 1992. Available at http://www.epa.gov/oppt/exposure/presentations/efast/usepa_1992b_sp_for_estim_aqi_of_ss.pdf. Accessed August 9, 2011.

(EPA, 1995a) U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emissions Factors, Fifth Edition and Supplements, AP-42. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. January 1995. . Available at http://www.epa.gov/ttn/chief/ap42/index.html. Accessed May 18, 2011. Relevant sections are posted in ADAMS with ADAMS Accession Nos. ML 11194A234, ML11194A236, and ML 11182C051.

(EPA, 1995b) U.S. Environmental Protection Agency. 1995. "SCREEN3 Model User's Guide," EPA-454/B-95-004, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. September 1995. Available at http://www.epa.gov/ttn/scram/userg/screen/screen3d.pdf. Accessed May 18, 2011. ADAMS Accession No. ML071930125.

(EPA, 2005a) U.S. Environmental Protection Agency. 2005. "User's Guide for the Final NONROAD2005 Model," EPA420-R-05-013, Office of Transportation and Air Quality. December 2005. Available at http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2005/420r05013.pdf.

(EPA, 2005b) U.S. Environmental Protection Agency. 2005. Metrics for Expressing Greenhouse Gas Emissions: Carbon Equivalents and Carbon Dioxide Equivalents. EPA420-F-05-002, February 2005. . Available at http://www.epa.gov/oms/climate/420f05002.pdf. Accessed October 14, 2011.

(EPA, 2008) U.S. Environmental Protection Agency. 2008. Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance Direct Emissions from Mobile Combustion Sources. EPA430-K-08-004, May 2008. Available at http://www.epa.gov/climateleaders/documents/resources/mobilesource_guidance.pdf. Last Accessed on June 2, 2011.

(EPA, 2010a) U.S. Environmental Protection Agency. 2010. MOVES – Motor Vehicle Emission Simulator, August 26, 2010. Available at http://www.epa.gov/otaq/models/moves/index.htm, last accessed June 2, 2011.

(EPA, 2010b) U.S. Environmental Protection Agency. 2010. Exhaust and Crankcase emission Factors for Nonroad Engine Modeling -- Compression-Ignition, NR-009d. EPA-420-R-10-018, July 2010. Available at http://www.epa.gov/oms/models/nonrdmdl/nonrdmdl2010/420r10018.pdf. Accessed October 14, 2011.

(IIFP, 2009) International Isotopes Fluorine Products. 2009. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Environmental Report, Revision A. ER-IFP-001, Revision A. December 27, 2009. ADAMS Accession No. ML 100120758.

(IIFP, 2011) International Isotopes Fluorine Products, 2011. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Official Responses to Environmental Report RAIs, Revision A ,Talking Points Regarding the Environmental Report. May 24, 2011. ADAMS Accession No. ML111530402.

APPENDIX D

SOCIOECONOMIC INFORMATION

SOCIOECONOMIC INFORMATION

D.1 Introduction

This Appendix presents the bases to establish the region of influence (ROI) for socioeconomic conditions, and calculations to assess impacts in the ROI. In addition, this Appendix contains the input used for the Environmental Justice analysis.

D.2 Socioeconomic Region of Influence (ROI)

The identification of a socioeconomic region of influence for a site is dependent on many factors, which can include, but are not necessarily limited to:

- Population and population densities of the counties within 50 miles of the proposed site
- Population of those counties' largest population centers
- Geographic locations of the population centers in relation to the proposed site
- Estimated travel distance or travel time from the population centers to the proposed site
- Mean travel time to work for each county
- Employment data for each county
- Worker commuting patterns from the surrounding counties to the county containing the proposed site ("host county")

In identifying the socioeconomic ROI, the initial step was to identify counties that lie primarily within the 50-mile radius or counties with only a small portion of their area within the 50-mile radius but with a large population center within the 50-mile radius . Two counties in New Mexico and three counties in Texas have these characteristics: Lea County and Eddy County, New Mexico, and Andrews, Gaines, and Yoakum Counties, Texas. A review of the key factors for each county, determined that the proposed action has the potential to impact socioeconomic variables (employment, population, income, housing, infrastructure, and community services) in the two New Mexico counties only (Lea and Eddy). Therefore, these counties were identified as the socioeconomic ROI. For the reasons discussed below, the proposed action is unlikely to impact socioeconomic variables in the Texas counties (Andrews, Gaines, and Yoakumand these counties were not included in the socioeconomic ROI. Each county's demographics are summarized in Tables D-1 through D-5 and briefly analyzed below.

Table D-1 provides information on population, income, distances and commuting time for counties and population centers. Table D-2 provides employment characteristics by county. Table D-3 provides county-to-county worker flows. Table D-4 provides information on housing units and staffed hospital beds. Table D-5 provides hospital beds details per hospital/medical center.

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Table D-1. Population, Income, Distances and Commuting Time for Counties and Population Centers.

County	Population (2000)[a]	Population Density per Square mile of Land Area (2000)[a]	Population Estimate (2009)[a]	Mean Travel Time to Work, 2000 (Minutes)[a]	Median Household Income (2008 dollars)[a]	County's Largest Population Center[b]	Population Center Population (2000)[b]	Population Center Population (2009)[b]	Driving Miles from Population Center to proposed site
New Mexico									
Lea	55,508	12.6	60,232	18.7	$45,813	Hobbs	28,657	30,838	10-15
Eddy	51,658	12.4	52,706	18.3	$43,784	Carlsbad	25,625	26,259	60-65
Texas									
Andrews	13,004	8.7	14,057	20.6	$49,043	Andrews	9,652	10,448	70-75
Gaines	14,467	9.6	15,382	17.4	$40,489	Seminole	5,910	6,251	40-45
Yoakum	7,322	9.2	7,698	15.9	$50,317	Denver City	3,985	4,140	45-50

Sources and Notes:

[a] USCB, 2010a

[b] USCB, 2010b

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Table D-2. Employment Characteristics by County.

County	Number of Jobs (2008)[a]	Construction Jobs (2008)[a]	Construction Jobs as Percent of All Jobs (2008)[a]	Professional, Scientific, and Technical Services Jobs (2008)[a]	Professional, Scientific, and Technical Services Jobs as Percent of All Jobs (2008)[a]	Civilian Labor Force (2009)[b]	Annual Average Unemployment Rate (2009)[b,c] (%)	Unemployment Rate (June 2010)[b,c] (%)
New Mexico								
Lea	37,622	3,460	9.2%	1,019	2.7%	28,890	7.6	8.0
Eddy	30,692	2,597	8.5%	1,315	4.3%	28,700	5.5	6.1
Texas								
Andrews	7,337	860	11.7%	(D)	NA	7,008	7.1	6.6
Gaines	8,043	992	12.3%	150	1.9%	7,016	6.4	6.4
Yoakum	4,980	419	8.4%	67	1.3%	4,134	7.7	6.8

Sources:

[a] BEA, 2010a

[b] BLS, 2010a

[c] BLS, 2010b

(D) - Not shown (by the BLS) to avoid disclosure of confidential information, but the amount is included in the BEA's totals.

NA = Not available

2
3

Table D-3: County-to-County Worker Flows, 2000.

Res State	Res County	Res (C)MSA	Res PMSA	Residence State- County Name	Work State	Work County	Workplace State-County Name	Count	Percent from Resident County
35	025	9999	9999	Lea Co. NM	035	015	Eddy Co. NM	303	1.5%
35	025	9999	9999	Lea Co. NM	035	025	Lea Co. NM	18,566	93.6%
35	015	9999	9999	Eddy Co. NM	035	015	Eddy Co. NM	19,236	95.3%
35	015	9999	9999	Eddy Co. NM	035	025	Lea Co. NM	195	1.0%
48	003	9999	9999	Andrews Co. TX	035	025	Lea Co. NM	49	1.0%
48	003	9999	9999	Andrews Co. TX	048	003	Andrews Co. TX	3,794	77.2%
48	165	9999	9999	Gaines Co. TX	035	025	Lea Co. NM	179	3.4%
48	165	9999	9999	Gaines Co. TX	048	165	Gaines Co. TX	4,285	80.6%
48	501	9999	9999	Yoakum Co. TX	035	025	Lea Co. NM	135	4.8%
48	501	9999	9999	Yoakum Co. TX	048	501	Yoakum Co. TX	2,383	84.4%

Source: USCB, 2003

Table D-4. Housing Units and Staffed Hospital Beds.

County, State	Housing Units, 2009 [a]	Percent of Total Units	Staffed Hospital Beds [b]	Percent of Total Staffed Beds
Lea Co., NM	24,837	40.1%	226*	44.5%
Eddy Co., NM	22,645	36.5%	147*	28.9%
Andrews Co., TX	5,810	9.4%	88*	17.3%
Gaines Co., TX	5,645	9.1%	25*	4.9%
Yoakum Co., TX	3,062	4.9%	22*	4.3%
Total	61,999		508	

Sources:

[a] USCB, 2010a

[b] AHA, 2007

* See Hospital Beds details per Hospital/Medical Center, in Table D.5 below.

Table D-5. Hospital Beds Details per Hospital/Medical Center.

New Mexico Hospital Beds	Hospital Beds	County Total
Eddy County		147
Carlsbad Medical Center	127	
Artesia General Hospital	20	
Lea County		226
Lea Regional Medical Center	214	
NOR-Lea General Hospital	12	
Texas Hospital Beds		
Andrews County		88
Permian Regional Medical Center	88	
Yoakum County		22
Yoakum County Hospital	22	
Gaines County		25
Memorial Hospital	25	

Source: AHA, 2007

D.2.1 Lea County, New Mexico

Lea County is the host county for the proposed IIFP project. The proposed location is approximately 14 miles west of Hobbs, New Mexico. Lea County had a year 2000 population of 55,508 and an estimated 2009 population of 60,232, with 12.6 people per square land mile in 2000 (Table D-1). The county's largest population center is Hobbs, with a 2000 population of 28,657, and an estimated 2009 population of 30,838. Hobbs is the largest city within a 50-mile radius (Carlsbad, in Eddy County New Mexico, has about 26,300 residents and lies on the 50-mile perimeter). Lea County's mean commute time is 18.7 minutes.

In 2009, Lea County's civilian labor force was 28,890 persons (Table D-2). In 2008, employment in the construction industry accounted for 9.2 percent of total employment and employment in the professional, scientific, and technical services industry (the industry classification of the proposed project) accounted for approximately 2.7 percent of the jobs. In 2009, the annual average unemployment rate was 7.6 percent. The unemployment rate in June 2010 was 8.0 percent.

In 2000, Lea County's 19,828 commuting residents traveled to a worksite (USCB, 2003). Of those, 18,566 (93.6 percent) traveled to a worksite in Lea County. An additional 303 workers (1.5 percent) commuted to a worksite in Eddy County. The remaining 4.8 percent traveled to a worksite elsewhere. Of the 19,790 jobs in Lea County in 2000, 18,566 (93.8 percent) were held by residents of Lea County. Residents of Eddy County held 195 (1.0 percent) of those jobs. No other county had residents that filled at least 1 percent of the Lea County jobs (Table D-3).

Lea County, in the vicinity of the proposed site, in particular, is well served by state and county highways and roads. Sufficient community amenities and infrastructure to support additional population are in Lea County. In 2009, Lea County had 40.1 percent of the housing inventory in the five subject counties (Table D-4). Lea County had 44.5 percent of all the staffed hospital beds in the five-county area (Tables D-4 and D-5).

Based on the proximity to the proposed project site, availability of amenities including housing, and the historical county-to-county worker travel patterns, Lea County is the most likely county for project workers to reside. Also, Lea County would be the major recipient of facility-generated property taxes. Therefore, Lea County , was included in the socioeconomic ROI of the proposed project.

D.2.2 Eddy County, New Mexico

A substantial portion of Eddy County, New Mexico is within the 50-mile radius of the proposed site. Eddy County had a year 2000 population of 51,658 and an estimated 2009 population of 52,706 with 12.4 people per square land mile in 2000 (Table D-1). The county's largest population center is Carlsbad, with a 2000 population of 25,625 and an estimated 2009 population of 26,259. Carlsbad is on the perimeter of the 50-mile radius of the proposed site. Eddy County's mean commute time is 18.3 minutes. Carlsbad is approximately 60-65 driving miles from the proposed site.

In 2009, Eddy County's civilian labor force was 28,700 persons (Table D-2). In 2008, employment in the construction industry accounted for 8.5 percent of total employment and

employment in the professional, scientific, and technical services industry (the industry classification of the proposed project) accounted for approximately 4.3 percent of the jobs in the county. In 2009, the annual average unemployment rate was 5.5 percent. The unemployment rate in June 2010 was 6.1 percent.

In 2000, of Eddy County's total commuting population, 19,236 (95.3 percent) traveled to a worksite in Eddy County and 195 (1.0 percent) commuted to a worksite in Lea County (Table D-3).

Eddy county is served by several state and county highways and roads. U.S. Highway 62 travels NNE from Carlsbad to the proposed site. Eddy County has sufficient community amenities and infrastructure to support its population. In 2000, Eddy County had 36.5 percent of all housing inventory in the five subject counties and 28.9 percent of all the staffed hospital beds in (Tables D-4 and D-5).

Eddy County, New Mexico, borders the host county of the proposed project. A substantial portion of the county and a portion of its largest population center is within the 50-mile radius. The county population center is accessible to the proposed site via a major U. S. Highway. Although historically few Eddy County residents have traveled to Lea County for work, commuting patterns may change with newly available employment opportunities, particularly in the professional, scientific, and technical services industry. Based on the proximity to the proposed site, easy vehicle access, and availability of amenities including housing, this analysis concludes that some project workers would likely live in Eddy County. Therefore, Eddy County, New Mexico, was included in the socioeconomic ROI of the proposed project.

D.2.3 Andrews County, Texas

A substantial portion of Andrews County, Texas, is within the 50-mile radius of the proposed site. In 2000, Andrews County had a population of 13,004 and an estimated 2009 population of 14,057with 8.7 persons per square land mile in 2000 (Table D-1). The county's largest population center is Andrews, with a 2000 population of 9,652 and an estimated 2009 population of 10,448. Andrews is outside the 50-mile radius of the proposed site. Andrews County's mean commute time is 20.6 minutes. The proposed site is approximately 70-75 driving miles from the city of Andrews.

In 2009, Andrews County's civilian labor force was 7,008 persons. In 2008, employment in the construction industry accounted for 11.7 percent of total employment (Employment in the professional, scientific, and technical services industry was confidential and not disclosed by the Bureau of Labor Statistics). In 2009, the annual average unemployment rate was 7.1 percent. The unemployment rate in June 2010 was 6.6 percent (Table D-2).

In 2000, 3,794 (77.2 percent)of Andrews County commuting residents traveled to a workplace in Andrews County and 49 residents (1.0 percent) commuted to a worksite in neighboring Lea County (Table D-3).

The rural county is served by state and county highways and roads. In 2000, Andrews County had less than 10 percent of all housing inventory in the five subject counties and 17.3 percent of all the staffed hospital beds (Tables D-4 and D-5).

Andrews County, Texas, borders the host county of the proposed project. A substantial portion of the county is within the 50-mile radius. However, the county population center is not readily accessible to the proposed site via a major transportation artery. Historically, few Andrews County workers commute to Lea County., Therefore, few project workers would be expected to live in Andrews County and it was not included in the socioeconomic ROI.

D.2.4 Gaines County, Texas

A substantial portion of Gaines County, Texas, is within the 50-mile radius of the proposed site. In 2000, Gaines County had a population of 14,467 and an estimated 2009 population of 15,382with 9.6 persons per square land mile in 2000 (Table D-1). The county's largest population center is Seminole, with a 2000 population of 5,910 and an estimated 2009 population of 6,251. Gaines County's mean commute time is 17.4 minutes. The proposed site is approximately 40-45 driving miles from Seminole.

In 2009, Gaines County's civilian labor force was 7,016 persons. In 2008, employment in the construction industry accounted for 12.3 percent of total employment and employment in the professional, scientific, and technical services industry accounted for 1.9 percent of total employment. In 2009, the annual average unemployment rate was 6.4 percent. The unemployment rate in June 2010 was also 6.4 percent (Table D-2).

In 2000, 4,285 (80.6 percent) of Gaines County commuting residents traveled to a worksite in Gaines County and 179 (3.4 percent) commuted to a worksite in neighboring Lea County.

The rural county is served by state and county highways and roads. In 2000, Gaines County had less than 10 percent of all housing inventory in the five subject counties, and 25 staffed hospital beds, less than 5 percent of all the staffed hospital beds (Tables D-4 and D-5).

Gaines County, Texas, borders the host county of the proposed project. A substantial portion of the county and its largest population center are within the 50-mile radius. The county population center is accessible to the proposed site via a major transportation artery. However, because historically few Gaines County workers commute to work in Lea County and the professional, scientific, and technical industry accounts for only 1.9 percent of the relatively small county workforce. Therefore, few project workers would be expected to live in Gaines County and it was not included in the socioeconomic ROI.

D.2.5 Yoakum County, Texas

A substantial portion of Yoakum County Texas is within the 50-mile radius of the proposed site. In 2000, Yoakum County had a population of 7,322 and an estimated 2009 population of 7,698with 9.2 persons per square land mile in 2000 (Table D-1). The county's largest population center is Denver City, with a 2000 population of 3,985 and an estimated 2009 population of 4,140. Yoakum County's mean commute time is 15.9 minutes. The proposed site is approximately 45-50 driving miles from Denver City.

In 2009, Yoakum County's civilian labor force was 4,134 persons. In 2008, employment in the construction industry accounted for 8.4 percent of total employment and employment in the

professional, scientific, and technical services industry accounted for 1.3 percent of total employment. In 2009, the annual average unemployment rate was 7.7 percent. The unemployment rate in June 2010 was 6.8 percent (Table D-2).

In 2000, 2,383 (84.4 percent) ofYoakum County commuting residents traveled to a workplace in Yoakum County and 135 (4.8 percent) commuted to a worksite in neighboring Lea County (Table D-3).

The rural county is served by state and county highways and roads. In 2000, Yoakum County had approximately 4.9 percent of all housing inventory in the five subject counties and less than 5 percent of all the staffed hospital beds (Tables D-4 and D-5).

Yoakum County, Texas, borders the host county of the proposed project. A substantial portion of the county and its largest population center are within the 50-mile radius. The county population center is accessible to the proposed site via a major road. However, because historically few Yoakum County workers commute to work in Lea County and the professional, scientific, and technical industry accounts for only 1.3 percent of the relatively small county workforce, few project workers would be expected to live in Yoakum County. Therefore, Yoakum County, Texas, was not included in the socioeconomic ROI.

D.2.6 Workflow Patterns Summary

Historical patterns of commuting are the strongest proxy available to predict residential settlement patterns for workers migrating to an area for new employment opportunities. County-to-county worker flow patterns are established by commuters based on their demonstrated preferences for residential areas. These demonstrated preferences are thought to include commuting times, housing, amenities, and other opportunities for employment. In this analysis, workers in Lea County demonstrated a preference for working in Lea County and residents of the surrounding counties demonstrated a reluctance to drive to a worksite in Lea County. Despite the limited employment opportunities in Andrews, Gaines, and Yoakum County, few residents of those counties have elected to drive to Lea County, with its larger employment base. Eddy's County's relatively large employment in the professional, scientific, and technical service sector reflects the presence of WIPP (Waste Isolation Pilot Plant) and related industries. These variables, coupled with the availability of highway access between Carlsbad and Hobbs, indicate a strong worker exchange between Lea and Eddy Counties.

D.3 Environmental Justice

This discussion supports the identification of minority and low-income populations within 50 miles of the proposed project location, as shown in draft EIS Chapter 3, Figures 3-20 through 3-25.

Procedures for the determination of minority and low-income populations are discussed in this section. Appendix C of the Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NRC, 2003), provides the current NRC guidance for identifying minority and low-income populations. The guidance was used in identifying minority and low-income populations in this draft EIS.

The area potentially impacted by environmental issues was determined to be within a 50-mile radius of the site, which is the area that was evaluated for impacts of potential facility accidents. Therefore, the minority populations and low-income populations were determined for all census block groups that fell entirely or partially within 50 miles of the project location. Block groups were used because census blocks (smaller than block groups) do not report income data and census tracts (larger than block groups) might not delineate minority or low-income populations within the larger general population (NRC, 2003). U.S. Census Bureau (USCB) Summary File 1 containing race data (USCB 2000a; USCB 2000b) and Summary File 3 containing household poverty data (USCB 2000c; USCB 2000d) were obtained for all block groups in New Mexico and Texas since the 50-mile radius encompasses parts of both states.

For each race/ethnicity minority category (Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Other Race, Two or More Races [Multi-Racial], and Hispanic Ethnicity), and for each block group the percentage of the total population made up of the minority/ethnicity was calculated. The Aggregate category was also determined. The Aggregate is the sum of all the minorities within a block group. The percentage of low-income households was also calculated for each block group.

The Hispanic Ethnicity category is NOT included in the aggregate of minorities because the USCB considers race and Hispanic origin (ethnicity) as two separate and distinct concepts. People who are Hispanic may be of any race. People in any race group may be either Hispanic or Not Hispanic. Each person has two attributes, their race (or races) and whether or not they consider themselves Hispanic. Because each person is counted in a race category and in either the Hispanic or not Hispanic category, including the Hispanic ethnicity in the “aggregate race” category would double count a number of individuals. As such, the race categories and the Hispanic Ethnicity categories are considered separately.

The minority demographic data and low-income data were then attributed to block group spatial data in ArcGIS® 9.3 to develop a comprehensive shapefile dataset containing demographic and low-income data for every block group in the state. ArcGIS® is a geographic information system (GIS) modeling software which is used to access and query mapped demographic and low-income data (ESRI, 2008).

In order to identify whether a minority or low-income population exists, an area larger than the proposed site and immediately surrounding environs, and that encompasses the entire area of potential impact must be identified for comparative analysis (NRC, 2003). This area is called a geographic area. Because the 50-mile radius used in this analysis includes parts of New Mexico and Texas, the geographic area used as the basis for identifying individual block groups with minority or low-income populations was the states of New Mexico and Texas. Block group low-income and minority populations in New Mexico were compared to the total low-income and minority populations in New Mexico, and block groups low-income and minority populations in Texas were compared to the total Texas low-income and minority populations.

A significant minority population is considered to be present if: (1) the minority population in the census block group exceeds 50 percent or (2) the minority population percentage of the block group is significantly greater (typically at least 20 percentage points) than the minority population percentage in the geographic area (NRC, 2003). A significant low-income population is considered to be present if: (1) the low-income household population in the census block

group exceeds 50 percent or (2) the percentage of households below the poverty level in an environmental impact area is significantly greater (typically at least 20 percentage points) than the low-income household percentage in the geographic area (NRC, 2003).

State and county percentages for minority and low-income populations were obtained using summary statistics in ArcGIS® 9.3 and then compared to the USCB information (USCB, 2000e USCB, 2000f). The low-income and minority populations of all block groups wholly or partially within the 50-mile radius were identified if that block group contained a significant "minority population" or a "low-income population" as defined by NRC (2003). The results of the GIS modeling are shown on Table D.7, which indicates state and county percentages of racial composition and low income status for comparison.

Table D6 provides the number of block groups entirely or partially in the 50 mile radius with minority or low-income populations.

Table D-7 contains the state and county percentages of low-income and minority populations. These data were compared to the percentages of low income households and minority populations in each block group in the 50-mile radius to arrive at the information in Table D-6.

Ninety-six block groups are within 50 miles of the project. Block groups within 50 miles of the proposed project location have Black, Some Other Race, Aggregate, Hispanic and low-income populations (Table D-6). .

D.4 Construction and Operation Workforce Characteristics Calculations

The tables below present the assumptions used for construction and operation workforce assessments presented in Chapter 4 of the draft EIS. Table D-8 presents the construction workforce characteristics during construction of the proposed facility (IIFP, 2011) and assumptions based on NRC studies of workforces in substantially similar situations (BMI, 1981).

Table D-9 presents the operations workforce estimated number of on-site employees during the Phase I operation of the proposed IIFP facility (IIFP, 2011), and assumptions based on NRC studies of workforces in substantially similar situations (BMI, 1981).

D.5 Socioeconomic Calculations Used in Chapter 4 – Environmental Consequences

Table D-10 presents the calculations used to support the conclusions presented in Chapter 4 of the Draft EIS related to population, employment, income, housing, public utilities, and education.

Table D-6. Race and Low-income Population Block Groups within 50 miles of the Proposed Project.

State	County	County FIPS Number	Number of Block Groups	Black	American Indian or Alaskan Native	Asian	Native Hawaiian or Other Pacific Islander	Some Other Race	Two or More Races	Aggregate	Hispanic	Low-Income Households
New Mexico	Chaves	5	2	0	0	0	0	0	0	0	1	0
New Mexico	Eddy	15	3	0	0	0	0	0	0	0	1	0
New Mexico	Lea	25	64	1	0	0	0	14	0	10	24	10
Texas	Andrews	3	3	0	0	0	0	0	0	0	0	0
Texas	Cochran	79	1	0	0	0	0	0	0	0	0	0
Texas	Gaines	165	13	0	0	0	0	0	0	1	3	0
Texas	Loving	301	1	0	0	0	0	0	0	0	0	0
Texas	Terry	445	1	0	0	0	0	0	0	0	0	0
Texas	Winkler	495	1	0	0	0	0	0	0	0	0	0
Texas	Yoakum	501	7	0	0	0	0	1	0	0	3	0
		Totals:	96	1	0	0	0	15	0	11	32	10

Source: ESRI, 2008; USCB, 2000a; USCB, 2000b; USCB, 2000c; USCB, 2000d; USCB, 2000e; USCB, 2000f; USCB, 2000g; USCB, 2000h

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Table D-7. State and County Percentages of Race and Low-Income Populations

State	County	Black(%)	American Indian or Alaskan Native (%)	Asian (%)	Native Hawaiian or Other Pacific Islander (%)	Some Other Race (%)	Multi-Racial (%)	Aggregate (%)	Hispanic (%)	Low-Income Households (%)
New Mexico (state only)	NA	1.89	9.54	1.06	0.08	17.04	3.65	33.25	42.08	16.78
New Mexico	Chaves	1.97	1.13	0.53	0.06	21.25	3.12	28.05	43.83	19.12
New Mexico	Eddy	1.56	1.25	0.45	0.09	17.67	2.64	23.66	38.76	16.72
New Mexico	Lea	4.37	0.99	0.39	0.04	23.81	3.27	32.87	39.65	19.90
Texas (state only)	NA	11.53	0.57	2.70	0.07	11.69	2.47	29.03	31.99	13.98
Texas	Andrews	1.65	0.88	0.71	0.02	16.79	2.87	22.92	40.00	16.74
Texas	Cochran	4.53	0.83	0.21	0.05	27.35	2.55	35.52	44.13	21.67
Texas	Gaines	2.28	0.76	0.15	0.01	14.17	2.35	19.72	35.77	19.08
Texas	Loving	0.00	0.00	0.00	0.00	8.96	1.49	10.45	10.45	0.00
Texas	Terry	5.00	0.53	0.22	0.02	14.28	3.40	23.45	44.09	20.53
Texas	Winkler	1.85	0.45	0.20	0.00	20.35	2.34	25.19	44.00	18.58
Texas	Yoakum	1.39	0.71	0.12	0.01	25.48	1.65	29.38	45.93	18.20

Source: USCB, 2000a; USCB, 2000b; USCB, 2000c; USCB, 2000d; USBC, 2000g; USCB, 2000h

Table D 8. Workforce Characterization During IIFP Phase 1 Construction.

WORKFORCE CHARACTERIZATION	
Peak number of workers on-site during construction (IIFP, 2011)	140
WORKFORCE MIGRATION	
Percent of construction workforce migrating into ROI	20%
Total of construction workers migrating into ROI during construction peak	28
FAMILIES	
Percent of construction workers who bring families (BMI, 1981)	70%
Percent of construction workers who do not bring families	30%
Average construction worker family size (worker, spouse, children) (BMI, 1981)	3.25
Number of construction workers who would move into ROI and bring families	20
Number of construction workers who would move into ROI and not bring families	8
TOTAL IN-MIGRATION - FAMILIES AND UNACCOMPANIED WORKERS	
Number of construction workers who would bring families into ROI (total new families in ROI)	20
Number of in-migrating workers' family members	44
Number of in-migrating workers accompanied by family, plus family members	64
Number of in-migrating workers who would not bring families into ROI	8
Number of in-migrating workers and family members (= new population in ROI)	72
SCHOOL-AGE CHILDREN	
Number of school-age children per construction family (BMI, 1981)	0.8
Number of in-migrating school-age children	16
POST-CONSTRUCTION WORKFORCE RETENTION	
Percent of in-migrating construction workers that would leave, post-construction (BMI, 1981)	50%
Number of in-migrating construction workers that would leave ROI, post-construction	14
Number of in-migrating construction workers and their families plus in-migrating workers without families that would leave ROI, post-construction	36
Number of school-age children of in-migrating construction workers that would migrate to ROI	16
Number of in-migrating school-age children that would leave ROI, post-construction	8
EMPLOYMENT	
Construction workforce peak	140
Number of construction workers who migrate into ROI (20% of construction workforce peak)	28
Employment multiplier for construction workers in ROI (indirect portion only) (BEA, 2010b)	0.4324
Indirect jobs resulting from in-migrating construction workers	12

Sources: BEA .2010b; BMI. 1981; IIFP. 2011

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Table D-9. Workforce Characterization During IIFP Phase 1 Operation.

WORKFORCE CHARACTERIZATION	
Peak number of workers on-site during operation (IIFP, 2011)	140
WORKFORCE MIGRATION	
Percent of operation workforce migrating into ROI	20%
Number of operation workers migrating into ROI during operation peak	28
FAMILIES	
Percent of operation workers who bring families (BMI, 1981)	100%
Percent of workers who do not bring families	0%
Average New Mexico family size, 2009 (USCB, 2010c)	3.23
Number of operation workers who would move into ROI and bring families	28
Number of operation workers who would move into ROI and not bring families	0
TOTAL IN-MIGRATION - FAMILIES AND UNACCOMPANIED WORKERS	
Number of operation workers who would bring families into ROI (= total new families in ROI)	28
Number of in-migrating operation worker family members	62
Number of in-migrating operation workers accompanied by family, plus family members	90
Number of operation workers who would not bring families into ROI	0
Number of operation workers and family members migrating into ROI (= new population in ROI)	90
SCHOOL-AGE CHILDREN	
Number of school-age children per family (BMI, 1981)	0.8
Number of in-migrating school-age children	22
EMPLOYMENT	
Operation workforce peak	140
Number of operation workers who migrate into ROI (20% of workforce peak)	28
Employment multiplier for operation workers in ROI (indirect portion only) (BEA, 2010b)	1.8173
Indirect jobs resulting from in-migrating operation workers	51
Number of persons unemployed in ROI, June 2010 (BLS, 2010a)	3,993

Sources: BEA, 2010b; BLS, 2010a; BMI., 1981; IIFP, 2011; USCB, 2010c.

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Table D.10: Socioeconomic Calculations

	Phase 1 Construction	Phase 1 Operation
POPULATION		
2009 ROI Population (USCB, 2010e)	112,938	112,938
Total In-migration Associated with Phase 1 of the IIFP Project	72	90
Percent ROI Population Increase related to IIFP Project Phase 1	0.06%	0.08%
EMPLOYMENT AND INCOME		
June 2010 ROI Labor Force (BLS, 2010a)	56,945	56,945
Estimated Number of people, who would become IIFP Phase 1 Employees, Currently Living within the ROI (80% of workforce)	112	112
Number of In-migrating IIFP Phase 1 Workers	28	28
June 2010 ROI Labor Force Plus In-migrating IIFP Phase 1 Workers	56,973	56,973
Percent Jobs Filled by In-migrants Represent of June 2010 ROI Labor Force	0.05%	0.05%
June 2010 ROI, Unemployment Rate (BLS, 2010a)	7.0%	7.0%
June 2010 ROI, Number of People Employed (BLS, 2010a)	52,952	52,959
June 2010 ROI, Number of People Unemployed (BLS, 2010a)	3,993	3,993
Number of Indirect Jobs Created (BEA, 2010b)	12	51
Percent Indirect Jobs Represent of the June 2010 ROI Labor Force	0.02%	0.09%
HOUSING		
Vacant Housing Units in the ROI (USCB, 2010d)	5,823	5,823
Housing Units Needed for In-migrating IIFP Workers	28	28
Percent of Needed Housing Units Represent of Vacant Housing Units	0.48%	0.48%

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Table D.10: Socioeconomic Calculations (Continued)

	Phase 1 Construction	Phase 1 Operation
PUBLIC UTILITIES		
People Served by Major Public Water Suppliers in 2007-2009 (NMED, 2010a)	88,643	88,643
Number of IIFP Phase 1 Workers and their Family Members Who Would Migrate into the ROI	72	90
Percent Increase of People to be Served by Major Public Water Suppliers	0.08%	0.10%
Number of People Served by Major Public Wastewater Systems, 2009 (NMED, 2010b; Artesia, 2010; Carlsbad, 2010; Appendix A; Lovington, 2010)	78,917	78,917
Percent Increase of People to be Served by Major Wastewater Systems	0.09%	0.11%
EDUCATION		
2008 Public School Enrollment (NCES, 2010)	22,847	22,847
Number of School-Aged children of IIFP In-migrants Eligible for Public School Enrollment	16	22
Percent Increase School-aged Children In-migrants Represent of 2008 ROI Public School Enrollment	0.07%	0.10%

Source: Artesia, 2010; BEA, 2010b; BLS, 2010a; Carlsbad, 2010; Appendix A, Lovington, 2010; NCES, 2010; NMED, 2010a; NMED, 2010b; USCB, 2010d; USCB, 2010e

D.6 References

(Artesia, 2010) City of Artesia Water and Wastewater Department. 2010. Personal Communication between M. Stroud, (City of Artesia Water and Wastewater Department) and P. Baxter (TtNUS). September 28, 2010. ADAMS Accession No. ML112840402.

(BEA, 2010a) U.S. Department of Commerce, Bureau of Economic Analysis. 2010. Table CA25N-Total full-time and part-time employment in NAICS industry, Eddy County New Mexico, Lea County New Mexico, Andrews County Texas, Gaines County Texas, and Yoakum County Texas. Update April. Available at http://bea.gov/, accessed August 20, 2010.ADAMS Accession No. ML112920317.

(BEA, 2010b) U.S. Department of Commerce, Bureau of Economic Analysis. 2010. RIMS II Multipliers for Eddy, NM and Lea, NM. Economic and Statistics Administration, Washington, D.C. September, 2010. ADAMS Accession No. ML112720418.

(BLS, 2010a) U S Department of Labor, Bureau Labor Statistics. 2010.. Local Area Unemployment Statistics (LAUS), 2010 to 2011, New Mexico, Lea County and Eddy County New Mexico" Available at http://data.bls.gov/. Accessed August 23 and 31, 2010. ADAMS Accession No. ML103430031.

(BLS, 2010b) U.S. Department of Labor, Bureau of Labor Statistics. 2010. Local Area Unemployment StatisticsAndrews County Texas, Gaines County Texas, Yoakum County Texas. Available at hhtp://data.bls.gov/. Accessed August 23 and 31, 2010. ADAMS Accession No. 112710648.

(Carlsbad, 2010) City of Carlsbad Waste Water Treatment Plant. 2010. Personal Communication between A. Sena (City of Carlsbad Waste Water Treatment Superintendent) and P. Baxter (TtNUS). November 17, 2010. ADAMS Accession No. ML112840422

(ESRI, 2006) Environmental Systems Research, Inc. 2006. U.S. Census Block Groups. Tele Atlas North America, Inc. Redlands, CA.

(IIFP, 2011) International Isotopes Fluorine Products, Inc. 2011. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Official Responses to Environmental Report RAIs, Revision A. March 31, 2011. ADAMS Accession No. ML110970481.

(Lovington, 2010) City of Lovington Wastewater Treatment Plant. 2010. Personal Communication between M. De La Cruz (City of Lovington Wastewater Treatment Plant) and P. Baxter (TtNUS). September 30, 2010. ADAMS Accession No. ML112840439.

(NCES, 2010) National Center for Education Statistics. 2010. Search for Public School Districts, Lea and Eddy Counties, New Mexico. Available at http://nces.ed.gov/ccd/districtsearch/. Accessed August 30, 2010. ADAMS Accession No. ML103430054.

(NMED, 2010a) New Mexico Environment Department. 2010. "RE: FOIA Request." Personal Communication between M. Huber (New Mexico Environment Department) and N. Hill (TtNUS). September 22, 2010. ADAMS Accession No. ML112850086.

(NMED, 2010b) New Mexico Environment Department, Ground Water Quality Bureau. 2010. Ground Water Regulated Facilities, List of Current Discharge Permits, updated 07/29/2010. Available at http://www.nmenv.state.nm.us/gwb/NMED-GWQB-Permits.htm. Accessed August 31, 2010. ADAMS Accession No. ML112710484.

(NRC, 2003). U.S. Nuclear Regulatory Commission. 2003. Environmental Review Guidance for Licensing Actions Associated with NMSS Programs. Final Report. NUREG 1748. August 2003. Division of Waste Management, Washington, D.C. ADAMS Accession No. ML ML032450279.

(USCB, 2000a) U. S. Census Bureau 2000. *Summary File 1 for New Mexico: Census 2000.* Available at http://www2.census.gov/census_2000/datasets/Summary_File_1/New_Mexico/. Accessed July 23, 2010. ADAMS Accession No. ML112710551.

(USCB, 2000b) U. S. Census Bureau 2000.*Summary File 1 for Texas: Census 2000.* Available at http://www2.census.gov/census_2000/datasets/Summary_File_1/Texas/. Accessed July 23, 2010. ADAMS Accession No. ML112710551.

(USCB, 2000c) U. S. Census Bureau 2000.*Summary File 3 for New Mexico: Census 2000.* Available at http://www2.census.gov/census_2000/datasets/Summary_File_3/New_Mexico/. Accessed July 23, 2010. ADAMS Accession No. ML112710554.

(USCB, 2000d) U. S. Census Bureau 2000.*Summary File 3 for Texas: Census 2000.* Available at http://www2.census.gov/census_2000/datasets/Summary_File_1/Texas/. Accessed July 23, 2010. ADAMS Accession No. ML112710554.

(USCB, 2000e) U. S. Census Bureau 2000. Texas Fact Sheet. Census 2000 Demographic Profile Highlights. American Fact Finder. Available at http://factfinder.census.gov/. Accessed july 27, 2010.

(USCB, 2000f). U. S. Census Bureau 2000. New Mexico Fact Sheet. Census 2000 Demographic Profile Highlights. American Fact Finder. Available at http://factfinder.census.gov/. Accessed july 27, 2010.

(USCB, 2000g) U. S. Census Bureau 2000. P92. Poverty Status in 1999 of Households by Household Type by Age of Householder. Detailed Tables. Census 2000 Summary File 3 (SF 3) Sample Data. Available at http://factfinder.census.gov/. Accessed July 26, 2010.

(USCB, 2000h) U. S. Census Bureau 2000. P3. Race and P4. Hispanic or Latino, and Not Hispanic or Latino by Race (Total Population). Detailed Tables. Census 2000 Summary File 1 (SF 1) 100-Percent Data. Available at http://factfinder.census.gov/. Accessed September 7, 2010.

(USCB, 2010a) U. S. Census Bureau. 2010. State and County Quick Facts, "Lea County and Eddy County New Mexico." Revised August 16. Available at http://quickfacts.census.gov/. Accessed September 21, 2010. ADAMS Accession No. ML103430121.

(USCB, 2010b) U. S. Census Bureau 2010. Table 4. Annual Estimate of the Resident Population for Incorporated Places, April 1 2000 to July 1 2009. New Mexico and Texas. Release date June 2010. Available at http://www.census.gov/. Accessed August 23, 2010.

(USCB, 2010c) U S Census Bureau. 2010. American FactFinder. New Mexico Fact Sheet. 2005-2009 American Community Survey 5-Year Estimates. Data Profile Highlights. Available online at http://factfinder.census.gov. Accessed April 11, 2011. ADAMS Accession No. ML112720609.

(USCB, 2010d) U. S. Census Bureau. 2010. American FactFinder, Fact Sheet, American Community Survey 2006 - 2008, Eddy County, New Mexico, Carlsbad City, New Mexico, Hobbs

City, New Mexico, and Lea County New Mexico. Revised August 16, 2010. Available at http://quickfacts.census.gov/. Accessed September 21, 2010. ADAMS Accession No. ML 112920332.

(USCB,2010e) U. S. Census Bureau. 2010. U. S. Census Bureau. 2010. State and County Quick Facts, New Mexico and Lea County, New Mexico, Revised August 16. Available at http://quickfacts.census.gov/. Accessed September 21, 2010. ADAMS Accession No. ML103430126.

(USCB, 2003) U. S. Census Bureau. 2003. Table 3: County-To-County Worker Flow, 2000, Residence County to Workplace County Flows for New Mexico and Texas. New Mexico and Texas. Available at http://www.census.gov/. Accessed August 23, 2010. ADAMS Accession No. ML112920337.

APPENDIX E

TRANSPORTATION OF RADIOACTIVE MATERIALS

TRANSPORTATION OF RADIOACTIVE MATERIALS

E.1 Introduction

This Appendix summarizes calculations that were used in making determinations within the draft EIS, related to the transportation of radioactive materials. The proposed IIFP Depleted Uranium Deconversion Plant/Fluorine Extraction Process Facility would be located in Hobbs, New Mexico. The facility would receive depleted uranium (DU) in the chemical form of DUF_6 and convert it to a more stable and disposable chemical form of DUO_2. The process would recover fluorine which would be available for sale on the market. The deconversion process requires transportation of the DU cylinders (full) from current storage locations at enrichment facilities, disposal of low-level radioactive waste (LLW), and possible transportation of empty DU cylinders.

E.2 Radioactive Materials Transportation Analysis

The DUF_6 would be transported to the IIFP facility in 48Y cylinders designed for storage and transportation of DUF_6. All current or proposed U.S. commercial enrichment facilities were identified as representative origins for shipments of DUF_6. These are (1) Urenco USA facility just east of Eunice, New Mexico, (2) the GE-Hitachi Global Laser Enrichment (GLE) Facility north of Wilmington, North Carolina, and (3) the Areva Eagle Rock Enrichment Facility west of Idaho Falls, Idaho. The cylinders would be shipped one per 18-wheel truck. The empty DUF_6 cylinders would be shipped back to the location of origin. In the event that cylinders are not returned, they could be disposed as LLW or filled with DUO_2 and disposed as LLW. The empty cylinders are conservatively assumed to be shipped one per truck, consistent with IIFP data; however, two per truck is also a likely scenario.

The DUO_2 is assumed to be waste. It would be packaged into 55-gallon drums and loaded 40 per truck (subject to weight limitations). Shipment destinations selected for analysis are the Energy*Solutions* Clive, Utah facility and the Waste Control Specialists (WCS) facility on the Texas-New Mexico border west of Andrews, Texas (immediately east of the Urenco USA facility).

Process LLW (low-level waste resulting from the deconversion process) and miscellaneous LLW (low-level waste incidental to the deconversion process) volumes would be small compared to the DUO_2 waste. The radioactivity in most of this waste would likely be less concentrated than the DUO_2 waste. The process and miscellaneous LLW also would be packaged into 55-gallon drums, loaded 40 per truck, and shipped to the same disposal facilities as the DUO_2 waste. Decommissioning waste would be similar to miscellaneous LLW and would be packaged into 55-gallon drums, loaded 40 per truck, and shipped to the same disposal facilities as the LLW and DUO_2 waste.

Routing characteristics, including distances travelled, population density along the route, and stop time for crew breaks and inspecting the cargo were generated by the TRAGIS Code, Version 1.5.4 (Johnson and Michelhaugh, 2003). Radiological impacts from radioactive material shipments were calculated using the RADTRAN Code, Version 5.6 (Wiener et. al, 2006).

Input parameters for the transportation analysis were obtained from IIFP (IIFP, 2011), NUREG-0170 (NRC, 1977), and the Louisiana Energy Services (LES) Gas Centrifuge Facility License Application (REF) and are provided in Tables E-1 and E-3. The numbers of shipments

and relative travel distances were provided by IIFP (IIFP, 2011a)) and accident frequency and severity were provided by NUREG-0170 (NRC, 1977). Dimensions of packages and similar information presented in Tables E-1 and E-2 were from the LES Environmental Impact Statement (NRC, 2005). State-specific accident and fatality rates are from Table 4 of the study, State-Level Accident Rates for Surface Freight Transportation: A Reexamination (Saricks and Tompkins, 1999).

The RADTRAN results and the Microsoft Excel calculations are provided in E-4 through E-9.

Table E-1A. Input Parameters for 48Y Cylinders (Part 1 of 3)

Parameter Description	**Input Parameters**		
Title of Project	Truck transport of Empty/Full 48Y UF_6 Cylinder to Destination		
Accident Options	Incident Free, Accident		
Output Level	1		
Health Effects	Rem/Person-rem		
Package Parameters			**Source**
Package Name	48Y-Cylinder		*Appendix D, Table D-4, LES EIS*
Long Dimension (m)	3.73		*Appendix D, Table D-4, LES EIS*
Dose Rate (mrem/h)			
Full UF_6 Cylinders	2.80 x 10-1	mrem/hr @ 1 meter	*Appendix D, Table D-7, LES EIS*
Empty UF_6 Cylinders	1.00	mrem/hr @ 1 meter	*Appendix D, Table D-7, LES EIS*
Gamma Fraction	1		*RADTRAN Default*
Neutron Fraction	0		*RADTRAN Default*
Radionuclide Parameters			
Package Name	48Y-Cylinder		
Radionuclide	See Inventory		
Physical/Chemical Group	Powder for solids and Gas for Radon		
Curies	See Inventory		
Vehicle Parameters			**Source**
Vehicle Name	Vehicle-1		
Number of Shipments	1		*User Defined Value*
Vehicle Size (m)	3.73		*same as package size*
Vehicle Dose Rate (mrem/h)			*same as package dose rate*
Gamma Fraction	1		*RADTRAN Default*
Neutron Fraction	0		*RADTRAN Default*
Crew Size	2		*NUREG 0170*
Crew Distance	3.1		*NUREG 0170*
Crew Shielding Factor	1		*NUREG 0170*
Crew View	1.22		*Appendix D, Table D-4, LES EIS*
Exclusive Use	Yes		*RADTRAN Default*
Package	48Y-Cylinder		*User Defined Value*
Number of Packages	1		*User Defined Value*

1

Table E-1B. Input Parameters for 48Y Cylinders (Part 2 of 3)

Parameter Description	***Input Parameters***			
Link Parameters				**Source**
Link Name				
Vehicle Name	Vehicle-1	Vehicle-1	Vehicle-1	
Length (km)	Route specific, see TRAGIS output			*TRAGIS output*
Speed (km/h)	88.49	40.25	24.16	*NUREG 0170*
Population Density (persons/km^2)	Route specific, see TRAGIS output			*TRAGIS output*
Vehicle Density (Vehicles/h)	470	780	2800	*NUREG 0170*
Persons per Vehicle	2	2	2	*NUREG 0170*
Accident Rate (accidents/veh-km)	State specific values			*Saricks and Tompkins, 1999, Table 4*
Fatalities Per Accident	State specific values			*Saricks and Tompkins, 1999, Table 4*
Zone	Rural	Suburban	Urban	*RADTRAN Default*
Type	Primary Highway Primary Highway Primary Highway			*RADTRAN Default*
Farm Fraction	0	0	0	*RADTRAN Default*
Stop Parameters				**Source**
Stop Name	Stop-1			
Vehicle Name	Vehicle-1			
Minimum Distance	20			*NUREG 0170*
Maximum Distance	20			*NUREG 0170*
People or People/km^2	50			*NUREG 0170*
Shielding Factor	1			*RADTRAN Default*
Time (h)	4			*TRAGIS output*
Handling Parameters				
Handle Name	Handle-1			
Vehicle Name	Vehicle-1			
Number of Handlers	4			*NUREG 0170 (2 handlers at the shipping and 2 handlers receiving end of the route)*
Distance (m)	1			*NUREG 0170*
Time (h)	0.25			*NUREG 0170 (15 minutes)*

1
2

Table E-1C. Input Parameters for 48Y Cylinders (Part 3 of 3)

Parameter Description	**Input Parameters**								
Accident Parameters									
	Probability Parameters								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Probability Fraction	0.55	0.36	0.07	0.016	0.0028	0.0011	8.50×10^{-5}	1.50×10^{-5}	*NUREG 0170*
	Deposition Velocity Parameters								
Physical/Chemical Group	Powder	Gas							
Deposition Velocity (m/s)	0.01	0							
	Release Parameters								
Physical/Chemical Group	Powder								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Release Fraction	0	0.01	0.1	1	1	1	1	1	*NUREG 0170*
	Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Release Fraction	0	1	1	1	1	1	1	1	*User defined value*
	Aerosol Parameters								
Physical/Chemical Group	Powder and Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Aerosol Fraction	1	1	1	1	1	1	1	1	*NUREG 0170*
	Respirable Parameters								
Physical/Chemical Group	Powder and Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Respirable Fraction	1	1	1	1	1	1	1	1	*NUREG 0170*
Balance of RADTRAN Inputs	RADTRAN Defaults								

Table E-2A. Input Parameters for 55-Gallon Drums (Part 1 of 3)

Parameter Description	**Input Parameters**		
Title of Project	Truck transport of 55-Gallon-Drums of DUO_2/Other Waste to Destination		
Accident Options	Incident Free, Accident		
Output Level	1		
Health Effects	Rem/Person-rem		
Package Parameters			
Package Name	55-Gallon-Drum		
Long Dimension (m)	0.88		
Dose Rate (mrem/h)			
DUO_2 Waste	1.93 x 10-1	mrem/hr @ 1 meter	*Response to RAI 5, Table RAI 5-e-1*
Other Waste	3.05×10^{-2}	mrem/hr @ 1 meter	*Response to RAI 5, Table RAI 5-e-1 (weighted average of all except DUO_2)*
Other Waste	9.45×10^{-4}	mrem/hr @ 1 meter	*Response to RAI 5, Table RAI 5-e-1 (Minimum dose rate)*
Gamma Fraction	1		*RADTRAN Default*
Neutron Fraction	0		*RADTRAN Default*
Radionuclide Parameters			
Package Name	55_Gallon_Drum		
Radionuclide	See Inventory		
Physical/Chemical Group	Powder for solids and Gas for Radon		
Curies	See Inventory		
Vehicle Parameters			
Vehicle Name	Vehicle_1		
Number of Shipments	1		*User Defined Value*
Vehicle Size (m)	12.2		*the length of 20 55-gallon drums (assuming the drums are arranged 20 x 2)*
Vehicle Dose Rate (mrem/h)	6.00×10^{-2}		*same as package dose rate*
Gamma Fraction	1		*RADTRAN Default*
Neutron Fraction	0		*RADTRAN Default*
Crew Size	2		*NUREG 0170*
Crew Distance	3.1		*NUREG 0170*

1

1

Table E-2A. Input Parameters for 55-Gallon Drums (con't.) (Part 1 of 3)

Parameter Description	**Input Parameters**	
Vehicle Parameters (con't.)		
Crew Shielding Factor	1	*NUREG 0170*
Crew View	1.22	*the width of 2 55-gallon drums*
Exclusive Use	Yes	*RADTRAN Default*
Package	55_Gallon_Drum	*User Defined Value*
Number of Packages	40	*User Defined Value*

2

3

Table E-2B. Input Parameters for 55-Gallon Drums (Part 2 of 3)

Parameter Description	**Input Parameters**			
Link Parameters				
Link Name				
Vehicle Name	Vehicle-1	Vehicle-1	Vehicle-1	
Length (km)	Route specific, see TRAGIS output			*TRAGIS output*
Speed (km/h)	88.49	40.25	24.16	*NUREG 0170*
Population Density (persons/km^2)	Route specific, see TRAGIS output			*TRAGIS output*
Vehicle Density (Vehicles/h)	470	780	2800	*NUREG 0170*
Persons per Vehicle	2	2	2	*NUREG 0170*
Accident Rate (accidents/veh-km)	State specific values			*Saricks and Tompkins, 1999, Table 4*
Fatalities Per Accident	State specific values			*Saricks and Tompkins, 1999, Table 4*
Zone	Rural	Suburban	Urban	*RADTRAN Default*
Type	Primary Highway	Primary Highway	Primary Highway	*RADTRAN Default*
Farm Fraction	0	0	0	*RADTRAN Default*
Stop Parameters				
Stop Name	Stop-1			
Vehicle Name	Vehicle-1			
Minimum Distance	20			*NUREG 0170*
Maximum Distance	20			*NUREG 0170*
People or People/km^2	50			*NUREG 0170*
Shielding Factor	1			*RADTRAN Default*
Time (h)	4			*TRAGIS output*
Handling Parameters				
Handle Name	Handle-1			
Vehicle Name	Vehicle-1			
Number of Handlers	4			*NUREG 0170 (2 handlers at the shipping and 2 handlers receiving end of the route)*
Distance (m)	1			*NUREG 0170*
Time (h)	0.25			*NUREG 0170 (15 minutes)*

Table E-2C. Input Parameters for 55-Gallon Drums (Part 3 of 3)

Parameter Description	**Input Parameters**								
Accident Parameters									
	Probability Parameters								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Probability Fraction	0.55	0.36	0.07	0.016	0.0028	0.0011	8.50×10^{-5}	1.50×10^{-5}	*NUREG 0170*
	Deposition Velocity Parameters								
Physical/Chemical Group	Powder	Gas							
Deposition Velocity (m/s)	0.01	0							
	Release Parameters								
Physical/Chemical Group	Powder								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Release Fraction	0	0.01	0.1	1	1	1	1	1	*NUREG 0170*
	Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Release Fraction	0	1	1	1	1	1	1	1	*User defined value*
	Aerosol Parameters								
Physical/Chemical Group	Powder and Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Aerosol Fraction	1	1	1	1	1	1	1	1	*NUREG 0170*
	Respirable Parameters								
Physical/Chemical Group	Powder and Gas								
Probability Index	0	1	2	3	4	5	6	7	*NUREG 0170*
Respirable Fraction	1	1	1	1	1	1	1	1	*NUREG 0170*
Balance of RADTRAN Inputs	RADTRAN Defaults								

Table E-3. Number of Shipments

	Phase 1	Phase 2	Cumulative
Full DUF_6 Cylinders each from Urenco USA, GLE Facility, and Areva Eagle Rock	293	635	928
Empty DUF_6 Cylinders each to Urenco USA, GLE Facility, and Areva Eagle Rock	293	496	789
DUO_2 each to Energy Solutions and WCS	155	295	476
Miscellaneous Waste each to Energy*Solutions* and WCS	31	20	51
Decommissioning Waste each to Energy*Solutions* and WCS			64

Values from Table 3-2 of IIFP, 2011

Table E-4. Incident Free RADTRAN Output

	Incident Free Transportation Impacts (Person-Rem)					
	Crew	Off Link	On Link	Totals	Handling	Stops
Full DUF_6 Cylinders from Urenco USA	1.03×10^{-4}	9.95×10^{-7}	1.09×10^{-5}	1.15×10^{-4}	8.02×10^{-4}	a
Full DUF_6 Cylinders from GLE Facility	6.96×10^{-3}	2.88×10^{-4}	2.01×10^{-3}	9.26×10^{-3}	8.02×10^{-4}	1.01×10^{-3}
Full DUF_6 Cylinders from Areva Eagle Rock	6.13×10^{-3}	1.66×10^{-4}	1.63×10^{-3}	7.93×10^{-3}	8.02×10^{-4}	1.01×10^{-3}
Empty DUF_6 Cylinders to Urenco USA	3.68×10^{-4}	3.55×10^{-6}	3.88×10^{-5}	4.10×10^{-4}	2.86×10^{-3}	a
Empty DUF_6 Cylinders to GLE	2.49×10^{-2}	1.03×10^{-3}	7.18×10^{-3}	3.31×10^{-2}	2.86×10^{-3}	3.59×10^{-3}
Empty DUF_6 Cylinders to Areva Eagle Rock	2.19×10^{-2}	5.92×10^{-4}	5.84×10^{-3}	2.83×10^{-2}	2.86×10^{-3}	3.59×10^{-3}
DUO_2 to Energy*Solutions*	3.95×10^{-3}	3.32×10^{-4}	3.60×10^{-3}	7.88×10^{-3}	1.11×10^{-2}	1.86×10^{-3}
DUO_2 to WCS	7.09×10^{-5}	2.15×10^{-6}	2.35×10^{-5}	9.66×10^{-5}	1.11×10^{-2}	a
Miscellaneous Waste to Energy*Solutions*	1.93×10^{-5}	1.63×10^{-6}	1.76×10^{-5}	3.86×10^{-5}	5.44×10^{-5}	9.13×10^{-6}
Miscellaneous Waste to WCS	3.47×10^{-7}	1.05×10^{-8}	1.15×10^{-7}	4.73×10^{-7}	5.44×10^{-5}	
Miscellaneous Waste to Energy*Solutions*	6.24×10^{-4}	5.25×10^{-5}	5.69×10^{-4}	1.25×10^{-3}	1.76×10^{-3}	2.95×10^{-4}
Miscellaneous Waste to WCS	1.12×10^{-5}	3.40×10^{-7}	3.71×10^{-6}	1.53×10^{-5}	1.76×10^{-3}	a

a: A stop was not assumed since the route was short.

Note: The Decommissioning Waste is the same as Miscellaneous Waste

Table E-5. Accident RADTRAN Output

	Accident Transportation Impacts (Person-Rem)				
	Ground	Inhaled	Resuspended	Cloudshine	Total
Full DUF_6 Cylinders from Urenco USA	2.89×10^{-8}	4.25×10^{-6}	5.37×10^{-9}	3.84×10^{-12}	4.29×10^{-6}
Full DUF_6 Cylinders from GLE Facility	9.84×10^{-5}	1.45×10^{-2}	1.83×10^{-5}	1.31×10^{-8}	1.46×10^{-2}
Full DUF_6 Cylinders from Areva Eagle Rock	7.30×10^{-5}	1.07×10^{-2}	1.35×10^{-5}	9.67×10^{-9}	1.08×10^{-2}
Empty DUF_6 Cylinders to Urenco USA	2.90×10^{-10}	1.54×10^{-8}	2.31×10^{-11}	3.32×10^{-12}	1.57×10^{-8}
Empty DUF_6 Cylinders to GLE	9.79×10^{-7}	5.19×10^{-5}	7.80×10^{-8}	1.12×10^{-8}	5.29×10^{-5}
Empty DUF_6 Cylinders to Areva Eagle Rock	7.31×10^{-7}	3.87×10^{-5}	5.83×10^{-8}	8.36×10^{-9}	3.95×10^{-5}
DUO_2 to Energy*Solutions*	1.39×10^{-4}	2.17×10^{-2}	2.61×10^{-5}	1.96×10^{-8}	2.19×10^{-2}
DUO_2 to WCS	5.18×10^{-8}	8.12×10^{-6}	9.74×10^{-9}	7.32×10^{-12}	8.18×10^{-6}
Miscellaneous Waste to Energy*Solutions* (Low TI)	1.32×10^{-6}	1.05×10^{-4}	8.73×10^{-7}	7.44×10^{-11}	1.07×10^{-4}
Miscellaneous Waste to WCS (Low TI)	4.95×10^{-10}	3.91×10^{-8}	3.27×10^{-10}	2.78×10^{-14}	3.99×10^{-8}
Miscellaneous Waste to Energy*Solutions*	1.32×10^{-6}	1.05×10^{-4}	8.73×10^{-7}	7.44×10^{-11}	1.07×10^{-4}
Miscellaneous Waste to WCS	4.95×10^{-10}	3.91×10^{-8}	3.27×10^{-10}	2.78×10^{-14}	3.99×10^{-8}

Note: The Decommissioning Waste is the same as Miscellaneous Waste

Table E-6. Phase 1 Collective Doses to Various Receptors from Radiological Transportation

	General Public		Drivers and Passengers		Persons at Stops		Truck Drivers		Package Handlers	
	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem
Full DUF_6 Cylinders from Urenco USA	2.9×10^{-6}	2.9×10^{-4}	3.2×10^{-5}	3.2×10^{-3}	a	a	3.0×10^{-4}	3.0×10^{-2}	2.3×10^{-3}	2.3×10^{-1}
Full DUF_6 Cylinders from GLE Facility	8.4×10^{-4}	8.4×10^{-2}	5.9×10^{-3}	5.9×10^{-1}	3.0×10^{-3}	3.0×10^{-1}	2.0×10^{-2}	2.0	2.3×10^{-3}	2.3×10^{-1}
Full DUF_6 Cylinders from Areva Eagle Rock	4.9×10^{-4}	4.9×10^{-2}	4.8×10^{-3}	4.8×10^{-1}	3.0×10^{-3}	3.0×10^{-1}	1.8×10^{-2}	1.8	2.3×10^{-3}	2.3×10^{-1}
Empty DUF_6 Cylinders to Urenco USA	1.0×10^{-5}	1.0×10^{-3}	1.1×10^{-4}	1.1×10^{-2}	a	a	1.1×10^{-3}	1.1×10^{-1}	8.4×10^{-3}	8.4×10^{-1}
Empty DUF_6 Cylinders to GLE	3.0×10^{-3}	3.0×10^{-1}	2.1×10^{-2}	2.1	1.1×10^{-2}	1.1	7.3×10^{-2}	7.3	8.4×10^{-3}	8.4×10^{-1}
Empty DUF_6 Cylinders to Areva Eagle Rock	1.7×10^{-3}	1.7×10^{-1}	1.7×10^{-2}	1.7	1.1×10^{-2}	1.1	6.4×10^{-2}	6.4	8.4×10^{-3}	8.4×10^{-1}
DUO_2 to Energy*Solutions*	5.1×10^{-4}	5.1×10^{-2}	5.6×10^{-3}	5.6×10^{-1}	2.9×10^{-3}	2.9×10^{-1}	6.1×10^{-3}	6.1×10^{-1}	1.7×10^{-2}	1.7
DUO_2 to WCS	3.3×10^{-6}	3.3×10^{-4}	3.6×10^{-5}	3.6×10^{-3}	a	a	1.1×10^{-4}	1.1×10^{-2}	1.7×10^{-2}	1.7
Miscellaneous Waste to Energy*Solutions*	1.6×10^{-5}	1.6×10^{-3}	1.8×10^{-4}	1.8×10^{-2}	9.1×10^{-5}	9.1×10^{-3}	1.9×10^{-4}	1.9×10^{-2}	5.5×10^{-4}	5.5×10^{-2}
Miscellaneous Waste to WCS	1.1×10^{-7}	1.1×10^{-5}	1.2×10^{-6}	1.2×10^{-4}	a	a	3.5×10^{-6}	3.5×10^{-4}	5.5×10^{-4}	5.5×10^{-2}
DUO_2 and Misc to Energy*Solutions*	5.3×10^{-4}	5.3×10^{-2}	5.8×10^{-3}	5.8×10^{-1}	3.0 x 10-3	3.0×10^{-1}	6.3×10^{-3}	6.3×10^{-1}	1.8×10^{-2}	1.8
DUO_2 and Misc to WCS	3.4×10^{-6}	3.4×10^{-4}	3.8×10^{-5}	3.8×10^{-3}	a	a	1.1×10^{-4}	1.1×10^{-2}	1.8×10^{-2}	1.8
Greatest risk scenario	***4.4×10^{-3}***	***$4.4 \times 1^{0-1}$***	***3.3×10^{-2}***	***3.3***	***1.6×10^{-2}***	***1.6***	***$1.0 \times 1^{0-1}$***	***1.0 x 10***	***2.8×10^{-2}***	***2.8***

1

Table E-7. Phase 2 Incremental Collective Doses to Various Receptors from Radiological Transportation

	General Public		Drivers and Passengers		Persons at Stops		Truck Drivers		Package Handlers	
	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem
Full DUF_6 Cylinders from Urenco USA	6.3×10^{-6}	6.3×10^{-4}	6.9×10^{-5}	6.9×10^{-3}	A	a	6.5×10^{-4}	6.5×10^{-2}	5.1×10^{-3}	5.1×10^{-1}
Full DUF_6 Cylinders from GLE Facility	1.8×10^{-3}	1.8×10^{-1}	1.3×10^{-2}	1.3	6.4×10^{-3}	6.4×10^{-1}	4.4×10^{-2}	4.4	5.1×10^{-3}	5.1×10^{-1}
Full DUF_6 Cylinders from Areva Eagle Rock	1.1×10^{-3}	1.1×10^{-1}	1.0×10^{-2}	1.0	6.4×10^{-3}	6.4×10^{-1}	3.9×10^{-2}	3.9	5.1×10^{-3}	5.1×10^{-1}
Empty DUF_6 Cylinders to Urenco USA	1.8×10^{-5}	1.8×10^{-3}	1.9×10^{-4}	1.9×10^{-2}	A	a	1.8×10^{-3}	1.8×10^{-1}	1.4×10^{-2}	1.4
Empty DUF_6 Cylinders to GLE	5.1×10^{-3}	5.1×10^{-1}	3.6×10^{-2}	3.6	1.8×10^{-2}	1.8	1.2×10^{-1}	1.2 x 10	1.4×10^{-2}	1.4
Empty DUF_6 Cylinders to Areva Eagle Rock	2.9×10^{-3}	2.9×10^{-1}	2.9×10^{-2}	2.9	1.8×10^{-2}	1.8	1.1×10^{-1}	1.1 x 10	1.4×10^{-2}	1.4
DUO_2 to Energy*Solutions*	9.8×10^{-4}	9.8×10^{-2}	1.1×10^{-2}	1.1	5.5×10^{-3}	5.5×10^{-1}	1.2×10^{-2}	1.2	3.3×10^{-2}	3.3
DUO_2 to WCS	6.3×10^{-6}	6.3×10^{-4}	6.9×10^{-5}	6.9×10^{-3}	A	a	2.1×10^{-4}	2.1×10^{-2}	3.3×10^{-2}	3.3
Miscellaneous Waste to Energy*Solutions*	1.1×10^{-5}	1.1×10^{-3}	1.1×10^{-4}	1.1×10^{-2}	5.9×10^{-5}	5.9×10^{-3}	1.2×10^{-4}	1.2×10^{-2}	3.5×10^{-4}	3.5×10^{-2}
Miscellaneous Waste to WCS	6.8×10^{-8}	6.8×10^{-6}	7.4×10^{-7}	7.4×10^{-5}	a	a	2.2×10^{-6}	2.2×10^{-4}	3.5×10^{-4}	3.5×10^{-2}

Table E-8. Cumulative Collective Doses to Various Receptors from Radiological Transportation

	General Public		Drivers and Passengers		Persons at Stops		Truck Drivers		Package Handlers	
	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem	Person-Sv	Person-rem
Full DUF_6 Cylinders from Urenco USA	9.2×10^{-6}	9.2×10^{-4}	1.0×10^{-4}	1.0×10^{-2}	a	a	9.6×10^{-4}	9.6×10^{-2}	7.4×10^{-3}	7.4×10^{-1}
Full DUF_6 Cylinders from GLE Facility	2.7×10^{-3}	2.7×10^{-1}	1.9×10^{-2}	1.9	9.4×10^{-3}	9.4×10^{-1}	6.5×10^{-2}	6.5	7.4×10^{-3}	7.4×10^{-1}
Full DUF_6 Cylinders from Areva Eagle Rock	1.5×10^{-3}	1.5×10^{-1}	1.5×10^{-2}	1.5	9.4×10^{-3}	9.4×10^{-1}	5.7×10^{-2}	5.7	7.4×10^{-3}	7.4×10^{-1}
Empty DUF_6 Cylinders to Urenco USA	2.8×10^{-5}	2.8×10^{-3}	3.1×10^{-4}	3.1×10^{-2}	a	a	2.9×10^{-3}	2.9×10^{-1}	2.3×10^{-2}	2.3
Empty DUF_6 Cylinders to GLE	8.1×10^{-3}	8.1×10^{-1}	5.7×10^{-2}	5.7	2.8×10^{-2}	2.8	2.0×10^{-1}	2.0 x 10	2.3×10^{-2}	2.3
Empty DUF_6 Cylinders to Areva Eagle Rock	4.7×10^{-3}	4.7×10^{-1}	4.6×10^{-2}	4.6	2.8×10^{-2}	2.8	1.7×10^{-1}	1.7 x 10	2.3×10^{-2}	2.3
DUO_2 to Energy Solutions	1.6×10^{-3}	1.6×10^{-1}	1.7×10^{-2}	1.7	8.9×10^{-3}	8.9×10^{-1}	1.9×10^{-2}	1.9	5.3×10^{-2}	5.3
DUO_2 to WCS	1.0×10^{-5}	1.0×10^{-3}	1.1×10^{-4}	1.1×10^{-2}	a	a	3.4×10^{-4}	3.4×10^{-2}	5.3×10^{-2}	5.3
Miscellaneous Waste to Energy*Solutions*	2.7×10^{-5}	2.7×10^{-3}	2.9×10^{-4}	2.9×10^{-2}	1.5×10^{-4}	1.5×10^{-2}	3.2×10^{-4}	3.2×10^{-2}	9.0×10^{-4}	9.0×10^{-2}
Miscellaneous Waste to WCS	1.7×10^{-7}	1.7×10^{-5}	1.9×10^{-6}	1.9×10^{-4}	a	a	5.7×10^{-6}	5.7×10^{-4}	9.0×10^{-4}	9.0×10^{-2}
Decommissioning Waste to Energy*Solutions*	3.4×10^{-5}	3.4×10^{-3}	3.6×10^{-4}	3.6×10^{-2}	1.9×10^{-4}	1.9×10^{-2}	4.0×10^{-4}	4.0×10^{-2}	1.1×10^{-3}	1.1×10^{-1}
Decommissioning Waste to WCS	2.2×0^{-7}	2.2×10^{-5}	2.4×10^{-6}	2.4×10^{-4}	a	a	7.2×10^{-6}	7.2×10^{-4}	1.1×10^{-3}	1.1×10^{-1}
DUO_2 and Misc to Energy*Solutions*	1.6×10^{-3}	1.6×10^{-1}	1.7×10^{-2}	1.7	9.0×10^{-3}	9.0×10^{-1}	1.9×10^{-2}	1.9	5.4×10^{-2}	5.4
DUO_2 and Misc to WCS	1.0×10^{-5}	1.0×10^{-3}	1.1×10^{-4}	1.1×10^{-2}	a	a	3.4×10^{-4}	3.4×10^{-2}	5.4×10^{-2}	5.4
Greatest risk scenario	***1.2×10^{-2}***	***1.2***	***9.3×10^{-2}***	***9.3***	***4.7×10^{-2}***	***4.7***	***2.8×10^{-1}***	***2.8 x 10***	***8.4×10^{-2}***	***8.4***

Table E-9. Annual Accident Dose-Risk and LCF-Risk from Radiological Transportation

	Dose-Risk		LCF Risk
	Person-Sv	Person-rem	
Full UF_6 Cylinders from Urenco USA	1.3×10^{-5}	1.3×10^{-3}	7.5×10^{-7}
Full UF_6 Cylinders from GLE Facility	4.3×10^{-2}	4.3	2.6×10^{-3}
Full UF_6 Cylinders from Areva Eagle Rock	3.2×10^{-2}	3.2	1.9×10^{-3}
Empty UF_6 Cylinders to Urenco USA	4.6×10^{-8}	4.6×10^{-6}	2.8×10^{-9}
Empty UF_6 Cylinders to GLE	1.5×10^{-4}	1.5×10^{-2}	9.3×10^{-6}
Empty UF_6 Cylinders to Areva Eagle Rock	1.2×10^{-4}	1.2×10^{-2}	6.9×10^{-6}
UO_2 to Energy*Solutions*	6.4×10^{-2}	6.4	3.9×10^{-3}
UO_2 to WCS	2.4×10^{-5}	2.4×10^{-3}	1.4×10^{-6}
Miscellaneous Waste to Energy*Solutions*	3.1×10^{-4}	3.1×10^{-2}	1.9×10^{-5}
Miscellaneous Waste to WCS	1.2×10^{-7}	1.2×10^{-5}	7.0×10^{-9}
Decommissioning Waste to Energy*Solutions*[a]	3.1×10^{-4}	3.1×10^{-2}	1.9×10^{-5}
Decommissioning Waste to WCS[a]	1.2×10^{-7}	1.2×10^{-5}	7.0×10^{-9}
Greatest Risk Scenario	***$1.1 \times 1^{0-1}$***	***1.1 x 10***	***6.4×10^{-3}***

Note: latent cancer fatalities per person rem (ISCORS, 2002) = 6.00×10^{-4}

a. Represents total campaign – not annual

E.3 References

(IIFP, 2011) International Isotopes Fluorine Products. 2011. Fluorine Extraction Process and Depleted Uranium De-conversion Plant (FEP/DUP) Official Responses to Environmental Report RAIs, Revision A. March 31, 2011. ADAMS Accession No. ML110970481.

(ISCORS, 2002) Interagency Steering Committee on Radiation Standards. 2002. "A Method for Estimating Radiation Risk from Total Effective Dose Equivalent (TEDE)," ISCORS Technical Report 2002-02, Final Report, Washington, D. C. ADAMS Accession No. ML112720579.

(Johnson and Michelhaugh, 2003) Johnson, P. E. and R. D. Michelhaugh. 2003. Transportation Routing Analysis Geographic Information System (TRAGIS) User's Manual. Oak Ridge National Laboratory, Oak Ridge, Tennessee. June, 2003.

(NRC, 1977) U.S. Nuclear Regulatory Commission. 1977. Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, NUREG-0170, Office of Standards Development, December 1977.

(NRC, 2005) U.S. Nuclear Regulatory Commission. 2005. Final Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico / NUREG – 1790, June 2005. ADAMS Accession No. ML051730238.

(Saricks and Tompkins, 1999) Saricks, C.L. and M.M. Tompkins. 1999 State-Level Accident Rates for Surface Freight Transportation: A Reexamination, ANL/ESD/TM-150, Argonne National Laboratory, April, 1999. ADAMS Accession No. ML112720605.

(Wiener et. al, 2006) Wiener R. F., D. M. Osborn, G.S. Mills, D. Hinojosa, T. L. Heames, and D. J. Orcutt. 2006. "RadCat 2.3 User Guide." SAND2006-6315, Sandia National Laboratories, Albuquerque, New Mexico.

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11. ABSTRACT *(200 words or less)*

International Isotopes Fluorine Products, Inc. (IIFP), a wholly-owned subsidiary of International Isotopes, Inc., has submitted a license application to the U.S. Nuclear Regulatory Commission (NRC) to construct, operate, and decommission Phase 1 of a fluorine extraction and depleted uranium deconversion facility in Lea County, New Mexico. The proposed facility would provide services to the uranium enrichment industry, which makes fuel for nuclear power reactors. The IIFP facility would deconvert depleted uranium hexafluoride into fluoride products for commercial resale, and depleted uranium oxides for disposal. The license application for Phase 1 requests NRC to license the possession of up to 750,000 kilograms (827 tons) of depleted uranium under Title 10 "Energy" of the U.S. Code of Federal Regulations (10 CFR) Part 40, "Domestic Licensing of Source Material" in accordance with the Atomic Energy Act of 1954.

This draft Environmental Impact Statement (EIS) was prepared in compliance with the National Environmental Policy Act (NEPA) and the NRC regulations for implementing NEPA (10 CFR 51). This draft EIS evaluates the potential environmental impacts of the proposed action, which is to construct, operate, and decommission Phase 1 of the fluorine extraction and depleted uranium deconversion facility, and its reasonable alternatives, and describes IIFP's monitoring program and proposed mitigation measures.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

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