(Public) First Group of Draft Responses from International Isotopes Inc. Regarding Requests for Additional Information for Review of the Fluorine Extraction and Depleted Uranium Deconversion Facility

The draft RAI responses include the following areas: Emergency Management, Environmental Protection, Fire Safety, General Information, Integrated Safety Analysis RAI #5, and Radiation Protection.

Emergency Management

These RAIs are based on a review of the IIFP FEP/DUP Emergency Plan (ML100130106) dated December 26, 2010. The following information is needed to demonstrate compliance with 40.31(j) and the acceptance criteria in NUREG-1520 Revision 1, Section 8.

EM-1 (EM-1) Consistent with the acceptance criteria in Section 8.4.3.1.9, provide the following information: Based on the close proximity of the Cunningham Station (0.6 miles), are there plans and/or methods available to notify the Cunningham Station personnel in the event of an emergency classification and/or possible release of chemicals/radioactive materials?

RESPONSE: Plans and methods, including details for notification to Cunningham Station and the other neighbors in proximity to the site, will be included in the specific Emergency Plan Implementation Procedures (EPIPs) (some already drafted). The EPIPs are being developed and expected to be finalized at least three (3) months before the startup of facility operations or receipt of licensed materials or hazardous process chemicals. In addition to the EPIPs, there will be mutual dialogue and review with the other industrial neighbors where they may be affected by EPIPs. Training and coordinated exercises will be conducted, where applicable, with the industrial neighbors relative to notification, evacuation and other emergency procedures used at the International Isotopes Fluorine Products (IIFP) Facility.

License Documentation Impact: Emergency Plan, Revision A, a new paragraph will be added at the end of Section 6.2.1 and also at the end of Section 6.2.2 as follows:

Plans and methods, including details for notification of neighbors in proximity to the site, will be included in the specific Emergency Plan Implementation Procedures (EPIPs). The EPIPs will be finalized at least three (3) months before the startup of facility operations or receipt of licensed materials or hazardous process chemicals. In addition to the EPIPs, there will be mutual dialogue and review with the other industrial neighbors where they may be affected by EPIPs. Training and coordinated exercises will be conducted, where applicable, with the industrial neighbors relative to notification, evacuation and other emergency procedures used at the IIFP Facility.

EM-2 [CLOSED]

EM-3 [CLOSED]

EM-4 (EM-4) Consistent with the acceptance criteria in Section 8.4.3.1.8, provide the following information: Section 7.4 of the application states, "Memoranda of Understanding (MOU) for assistance from off-site emergency services will be signed between IIFP and Hobbs Fire Department and the City of Hobbs Fire Department for fire and medical emergency services." Provide clarification as to when these MOU's will be signed.

RESPONSE: The Hobbs Fire Department and the City of Hobbs Fire Department are the same organizations and will be described as the "Hobbs Fire Department" in the changes to be made in the License Documentation below. Section 7.4 of the Emergency Response Plan will be modified to state that, Memoranda of Understanding (MOUs) for assistance from off-site emergency services will be signed between IIFP and the Hobbs Fire Department for fire and medical emergency services three (3) months prior to the startup of operations or receipt of licensed materials or hazardous process chemicals.

License Documentation Impact: Emergency Plan, Revision A, Section 7.4., will be changed by inserting a new second paragraph and modifying the former paragraph two that will become paragraph three.

The local off-site emergency service organizations reviewed the IIFP Emergency Plan and provided comments. The comments were incorporated into the IIFP Emergency Plan, Revision A, where applicable. The emergency services organizations have indicated in writing their support and cooperation for assisting in emergencies at the IIFP Facility, as shown by their response letters included in the IIFP License Application, Chapter 8, Section 8.1.

Memoranda of Understanding (MOUs) for assistance from off-site emergency services will be signed between IIFP and the Hobbs Fire Department ~~and the City of Hobbs Fire Department~~ for fire and medical emergency services three (3) months prior to the startup of operations or receipt of licensed materials or hazardous process chemicals. MOUs for assistance will also be signed with the Lea County Medical Center, Lea County Emergency Management, ~~Hobbs Police Department,~~ Lea County Sheriff's Department ~~Office~~(who has an agreement with the Hobbs Police Department), ~~New Mexico Department of Public Safety~~ and the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM) at least three (3) months prior to the startup of operations or receipt of licensed materials or hazardous process chemicals.

Environmental Protection

Section 9 of the LA generally follows the acceptance criteria found in the SRP, (NUREG-1520). However, Section 9 of the applicant's LA, together with the numerous references to other sections of the LA and the ER do not provide a sufficient standalone description of the environmental protection program. To be sufficient, references to chapters of the ER and other sections of the LA must focus on specific subchapters of the ER and subsections of the LA— rather than on whole topic areas—which, in some cases, are over 100 pages. For example, references must point to specific tables and figures, as appropriate, particularly when citing numeric values or equipment locations (e.g., monitoring locations). Modifications based on the following RAIs will provide greater transparency and traceability of technical presentations, facilitate a timely document review process, assure that Section 9 of the LA is complete and accurate, and allow the lay reader to follow the discussion better.

EP-1. Section 9.2.1, Radiation Safety. Please specifically identify each of the various subsections of the LA and ER that contain supplemental information related to the four acceptance criteria for Radiation Safety referenced in LA Section 9.2.1. Since the supplemental information is referenced in the individual subjects identified within LA Section 9 (e.g., under the individual headings in Sections 9.2.1.1 and 9.2.1.2), add a new last sentence to Section 9.2.1 similar to the following: "Specific references to the supplemental information are provided below, as appropriate."

Section 9.4.3.2.1 of the SRP, NUREG-1520, addresses Radiation Safety Program in accordance with 10 CFR 20.1101.

RESPONSE: The last sentence of Section 9.2.1, which states "Supplemental information can also be found in various sections of the LA as well as the IIFP ER", will be replaced with this sentence: "Specific references to supplemental information in the ER and LA are provided in each of the subsections below."

License Documentation Impact: Section 9.2.1 will be revised as follows:

The following sections address the four acceptance criteria that describe the facility Radiation Protection Program (RPP) as it applies to Environmental Protection. The RPP is discussed further in Chapter 4, Radiation Protection, of the LA. Specific references to ~~S~~supplemental information ~~can also be found in various sections of the LA as well as the IIFP ER~~ are provided in each section, as appropriate.

Environmental Protection

EP-2. Section 9, Environmental Protection - Section 9 of the applicant's LA relies heavily on references to the ER. Since the ER is not part of the LA, ensure that references to the ER are only used to provide additional information and do not contain commitments. 10 CFR 40.32(c) requires the application to contain adequate commitments to protect health and minimize danger to life and property.

RESPONSE: A survey of the IIFP Environmental Report (ER) and the IIFP License Application (LA) and the Integrated Safety Analysis Summary (ISA) was conducted. The ER was reviewed for statements that were made to protect health and minimize danger to life and property. The LA and ISA were also reviewed to determine if the corresponding statements covered in the ER were addressed in the LA or ISA. The table below also shows the number statements made in the ER to protect health and minimize danger to the life and property and the number of corresponding statements made and addressed in the LA or ISA. Of the 104 different statements made in the ER to protect health and minimize danger to life and property, only six of those were not addressed in the LA or ISA and five were only partially covered in the LA or ISA. Statements not addressed fully in the LA or ISA will be incorporated.

Table 1 Statements Made in the Environmental Report to Protect Health and Minimize Danger to Life and Property in Comparison to Those Addressed in the License Application and Integrated Safety Analysis Summary

ER Chapter	Title of Chapter	Statements Made in the ER to Protect Health and Minimize Danger to Life and Property	Corresponding Statement Addressed in LA or ISA
Chapter 1	Introduction of the Environmental Report	20	13 addressed 4 not addressed 3 partially addressed
Chapter 2	Alternatives	4	4 addressed
Chapter 3	Description of the affected Environment	22	21 addressed 1 partially addressed
Chapter 4	Environmental Impacts	21	20 addressed 1 not addressed
Chapter 5	Mitigation Measures	12	11 addressed 1 partially addressed
Chapter 6	Environmental Measurements and Monitoring Program	15	14 addressed 1 not addressed
Chapter 7	Cost-Benefit Analysis	0	None required
Chapter 8	Summary of Environmental Consequences	10 10	addressed
Chapter 9	References	0	None required
Chapter 10	List of Preparers	0	None required
Totals	IIFP Environmental Report	104	93 addressed 6 not addressed 5 partially addressed

RESPONSE:

1.3.2.2 The primary applicable codes and standards (editions applicable at time of design) for the design and building requirements of the IIFP Facility include the following:

- ASME/ANSI B16 Standard for Pipe and Fittings. **Statements not addressed in LA or the ISA Summary.**
- API 620 Design and Fabrication of Atmospheric Storage Tanks. **Statements not addressed in LA or the ISA Summary.**
- AISC Standards for Steel Construction. **Statements not addressed in LA or the ISA Summary.**
- ACI for Concrete Construction. **Statements not addressed in LA or the ISA Summary.**

License Documentation Impact: The 7th paragraph of Section 1.1.2 of the IIFP License Application, Revision A, will be replaced with the following:

Buildings, lighting, fire protection, and building support systems are designed in accordance with latest revisions, of building and construction codes including where applicable the National Fire Protection Association (NFPA) standards, local and State codes, and related codes and standards. NFPA Standards are listed in Table 7-1. The primary applicable codes and standards (editions applicable at time of design) for the design and building requirements of the IIFP Facility include the following:

- Uniform Plumbing Code (UPC) as amended by the New Mexico Plumbing Code (NMPC).
- International Energy Conservation Code (IECC) as amended by the New Mexico Energy Conservation Code (NMECC).
- Uniform Mechanical Code (UMC) as amended by the New Mexico Mechanical Code (NMMC).
- International Building Code (IBC) as amended by the New Mexico Commercial Building Code (NMCBC).
- National Electrical Code (NEC) as amended by the New Mexico Electrical Code (NMEC).
- International Fire Code (IFC).
- ASME/ANSI B16 Standard for Pipe and Fittings.
- ASME/ANSI B31 Pressure Piping (includes, power piping, process piping, gas piping, etc.).
- ASME Section VIII, Div 1 Design and Fabrication of Pressure Vessels. Latest Edition.
- API 620 Design and Fabrication of Atmospheric Storage Tanks.
- AISC Standards for Steel Construction.
- ASTM Standards for Steel Building Construction.
- ACI for Concrete Construction.

RESPONSE:

1.4.3.2 As part of this per mitting process, a S tormwater Po llution Preve ntion Plan (SWPPP) will be devel oped and a Notice of Intent (NO I) will be filed with the EPA at least two days prior to the commencement of construction activities**. SWPPP is not addressed in LA.**

1.4.4.15 NMAC, Title 20, Chapter 5, Part 2, "Registration of Tanks," establishes the state standards for the regulation of petroleum storage tanks. If needed, such storage tanks will be designed in accordance with state requirements and registration application made. **NMAC Title 20 is not addressed in the LA.**

1.4.4.16 NMSA Chapter 74, Article 12, "Night Sky Protection," establishes requirements to preserve and enhance the state's dark sky while promoting safety, conserving energy and preserving the environment for astronomy. These requirements will be addressed during detailed design of the facility. **NMSA Chapter 74 is not addressed in the LA.**

1.4.4.17 NMSA, Chapter 50, Sections 1-25, and implementing regulations at NMAC Title 11, "Labor Workers Compensation," Chapter 5, "Occupational Safety and Health" establishes state requirements for assuring safe and healthful working conditions for every employee. These state regulations are being followed to ensure any additional requirements beyond the federal OSHA regulations are adequately addressed. **NMSA Chapter 50 and implementing regulations are not addressed in the LA.**

1.4.5.5 Permits will be obtained to conduct rare, threatened and endangered (RTE) surveys for both plants and animals, in accordance with the timeframe requirements prior to construction. **Permits for ecological surveys are not addressed in the LA.**

1.5 A number of licenses and permits will be required for construction and operation of the IIFP plant. A summary of licenses and permits that are currently known to be required are listed in the Table 1-4.During the federal and State permitting process, any changes in requirements will be re-evaluated. **NPDES General Permit for Industrial Stormwater, General Construction Permit, and State Access Permit are addressed in the LA. Groundwater Discharge Permit/Plan, EPA ID Number, Endangered Species Survey Permit, and the Stormwater Pollution Prevention Plan are not addressed in the LA.**

License Documentation Impact: Section 9.1.4 of the IIFP License Application, Revision A will be revised as follows: (Also see RAI GI-11B for revisions in the LA, former Section 1.6.3.6 (new 1.7.3.4 "Groundwater Hydrology").

In addition to the NRC licensing and regulatory requirements, a variety of environmental regulations apply to the IIFP Facility during the construction, and operation phases. These regulations require permits from, consultations with, or approvals by, other governing or regulatory agencies. IIFP ER Chapter 1(IIFP, 2009a) summarizes the applicable environmental regulatory requirements, permits, licenses, or approvals, as well as the current status of each, as of the effective date of the ER. Permits include the following:

- NPDES General Permit for Industrial Stormwater,
- General Construction Permit,
- Air Construction (Air Quality: New Source Review/Authority to Construct) Permit,
- Air Operations Permit if required,
- NESHAP Permit if required,

- Groundwater Discharge Permit/Liquid Waste (sewage) Permit,
- EPA Hazardous Waste ID Number,
- Drinking Water System Permit
- Radiation Protection Permit,
- Above Ground Storage Tank Registration,
- NPDES Storm Water Pollution Prevention Plan (SWPPP)/Notice of Intent (NOI),
- State Access (Highway Right of Way) Permit,
- Clean Water Act, Section 404, and
- Rare, Threatened, and Endangered Species Survey Permit.

IIFP will also develop a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent (NOI) with the EPA at least seven days prior to the commencement construction activities. An agreement has been obtained with the New Mexico Environment Department (NMED) on the type and maximum quantities of depleted uranium and container possession limits. The NMED Agreement is incorporated into this IIFP LA. Miscellaneous regulations include the following:

- NMSA Chapter 74, Article 12, “Night Sky Protection,” establishes requirements to preserve and enhance the state’s dark sky while promoting safety, conserving energy and preserving the environment for astronomy. These requirements will be addressed during detailed design of the facility.
- NMSA, Chapter 50, Sections 1-25, and implementing regulations at NMAC Title 11, “Labor Workers Compensation,” Chapter 5, “Occupational Safety and Health” establishes state requirements for assuring safe and healthful working conditions for every employee. These state regulations are being followed to ensure any additional requirements beyond the federal OSHA regulations are adequately addressed.
- Groundwater monitoring wells are permitted through Office of the State Engineer (OSE) and well locations along with the boring logs are submitted to the OSE. Site-wide groundwater levels will be monitored routinely, and the groundwater monitoring well and pumping well networks will be analyzed to confirm that the changes in groundwater levels associated with the operation of the IIFP are minimal. Future detailed engineering and hydrological studies will identify the appropriate systems and locations.

RESPONSE:

6.2.6 In order to monitor and characterize meteorological phenomena (e.g., wind speed, direction, and temperature) during plant operation as well as consider interaction of meteorology and local terrain, conditions will be monitored with a meteorological tower located on site. **A meteorological tower is not addressed in the LA.**

License Documentation Impact: The IIFP License Application, Revision A, Section 9.2.2 paragraph one will be revised by adding a second sentence as follows:

Effluent and environmental controls and monitors are maintained at and around the facility to ensure that doses to the workers, the public, and the environment remain ALARA. In order to monitor and characterize meteorological phenomena (e.g., wind speed, direction, and temperature) during plant operation, conditions will be monitored using a meteorological tower located on site. In addition, monitors provide indication of potential off-normal occurrences requiring further investigation. Guidance provided in Regulatory Guide 4.16, “Monitoring and Reporting Radioactivity in Releases of Radioactive Material in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants " (NRC, 1985) has been utilized in the preparation of the environmental protection aspects of the RPP (IIFP, 2009b) where applicable.

RESPONSE:

5.2.12.2 Mitigation measures associated with DUF_6 cylinder storage areas as follows: … **The DUF_6 cylinder management program is addressed in LA Sections 1.1.3.2, 6.3, 6.3.1.2, 7.2, 7.3.6, and 7.4. DUF_6 cylinder valves and protectors are not addressed in the LA.**

License Documentation Impact: The IIFP License Application, Revision A, Rev A Section 1.1.3.2, fifth paragraph will be revised as follows:

Upon receipt, full cylinders of DUF_6 are visually inspected for damage and surveyed for radiation and removable contamination. Cylinders and cylinder valves shall be inspected for ANSI N14.1 requirements. Documents that contain information regarding cylinder ID, weight and uranium assay that accompany the shipment are reviewed and verified for accuracy. Uranium assay is qualitatively verified by performing a non-destructive gamma survey measurement. Once accepted for receipt, the cylinder is unloaded using the facility cylinder hauler vehicle and placed in the Full DUF_6 Storage Pad area until it is scheduled for feed to the de-conversion process. Only designated vehicles with less than 280 liters (74 gal) of fuel shall be allowed on the cylinder storage pads.

RESPONSE:

3.2.2.2 …If any DUF_4 is received, it will be contained in approved shipping containers in accordance with DOT regulations**. Shipping of DUF_4 is not addressed in the LA.**

Transportation routes for both incoming DUF_6 feed and outgoing uranium wastes will be those routes designated by the U.S. Department of Transportation to minimize the potential impacts to the public from the transportation of radioactive materials. **Using DOT transportation routes is not addressed in LA.**

4.2.6 Radioactive material shipments will be transported in packages that meet the requirements of 10 CFR 71 and 49 CFR 173 (CFR, 2009m; CFR, 2009ii). **10 CFR 71 and 49 CFR 173 are not addressed in the LA.**

License Documentation Impact: In the IIFP License Application, Revision A, Section 1.1.3.2, a final sentence will be added to the third paragraph and will read as follows:

The IIFP facility in Hobbs, New Mexico receives DUF_6 material in a solid physical state typically contained in 14-ton type 48-Y or 48-G cylinders owned by the supplier (the IIFP de-conversion customer). These cylinders are built to American National Standards Institute (ANSI) standards (ANSI, 2001) and are transported by truck trailers that are Department of Transportation (DOT) approved. The 48-Y cylinder is approved for multi-shipments, provided the ANSI standards; which include a 5 year hydrostatic test requirement are met. Empty 48-Y cylinders are returned to the customer following de-conversion. Radioactive material shipments will be transported in packages that meet the requirements of 10 CFR 71 and 49 CFR 171-173. Transportation routes for both incoming DUF_6 feed and outgoing uranium wastes will be those routes designated by the U.S. Department of Transportation to minimize the potential impacts to the public from the transportation of radioactive materials. If any DUF_4 is received, it will be contained in approved shipping containers in accordance with DOT regulations**.**

Environmental Protection

EP-3. Section 9.2.1.1, Radiological (ALARA) Goals for Effluent Control – This subsection states that ALARA Goals are typically 10-20 percent of the 10 CFR 20 Appendix B values. Please provide the specific ALARA Goals for air and liquid effluents and provide a more specific reference to LA Section 4; provide a more detailed discussion regarding how compliance with ALARA goals is demonstrated by discussing how each of the listed items (monitoring, analysis, and evaluations) contributes to compliance; and as part of that discussion, include greater detail addressing each of the three numbered items in LA Section 9.2.2.1 that are to be evaluated in order to assess trends.

Section 9.4.3.2.1(1) of the SRP, NUREG-1520, provides that ALARA goals are to be set at a modest fraction (from 10-20%) of the 10 CFR 20, Appendix B values.

RESPONSE: In the absence of current effluent measures, the ALARA goals for air and liquid effluents will be initially set at 20% of the 10 CFR 20 Appendix B values. As described in Section 9.2.1.1, these goals will be reviewed annually and adjusted as appropriate. ALARA goals are further described in LA Section 4.2.2, "ALARA Goals."

License Documentation Impact: LA Section 9.2.1.1, "Radiological (ALARA) Goals for Effluent Control," will be revised including a new first paragraph and will read as follows to include the specific ALARA goals stated above and to clarify the reference to LA Section 4.2.2.

Monitoring of facility effluents, analysis of monitoring samples, and evaluation of sampling data allow for the determination of the quantity of radioactive material released from the facility during normal operating conditions and thereby demonstrating attainment of ALARA goals and effluent limit compliance. Identification of the quantity of material released from the facility permit the evaluation of the success of control and containment of contamination. In addition, the determined quantity of radioactive material released from the facility will allow for the estimation of potential off-site dose to the public. Finally, identification of an unexpected increase in material quantities released from the facility allows for the detection of any unexpected release pathways previously unidentified.

ALARA Goals are set to demonstrate compliance with 10 CFR 20, "Standards for Protection Against Radiation" (CFR, 2009c) with respect to doses to the public, doses to the worker, and environmental effluents, and ~~are typically 10-20% of the~~ will be initially set at 20% of the 10 CFR 20 Appendix B values. Goals are set by the IIFP ALARA Committee and reviewed annually to assess the need to adjust specific values based on what may be ALARA for the particular measure. Compliance with the ALARA goals is demonstrated through monitoring, analysis, and evaluation of air emissions, liquid effluents, and disposition of solid waste. Trends are assessed using the monitoring results to evaluate the following: (1) facility operations control and containment of contamination; (2) projections of potential dose to offsite populations; and (3) detection of any unanticipated pathways for transport of radionuclide(s) within the environment. In accordance with the ALARA Program, these monitoring results are summarized and presented to the ALARA Committee on an annual basis. The ALARA Program and associated goals are further described in LA ~~Chapter~~ Section 4.2.2, ~~Radiation Protection~~ "ALARA Goals."

License Documentation Impact: The LA, Section 4.2.2 will be revised to reflect the initial establishment of the ALARA Goals at 20% of the 10 CFR 20 Appendix B values as shown below.

Specific goals of the ALARA Program include maintaining occupational exposures, as well as environmental releases, as far below regulatory limits as is reasonably achievable. With respect to environmental effluents, ALARA Goals will be initially set at 20% of the 10 CFR 20 Appendix B values. The ALARA concept is also incorporated into the design and operation of the facility. The size and number of areas with higher dose rates are minimal. Per approved written procedures, the time spent in these areas is controlled and projects are evaluated to ensure workers receive the minimum exposure. Areas where personnel spend significant amounts of time are designed to maintain the lowest dose rates reasonably achievable.

Environmental Protection

EP-4. Section 9.2.1.2, Effluent Controls to Maintain Public Doses ALARA – Please provide more specific references to subchapters within ER Chapters 2 and 6, and provide relevant tables or figures, if any (e.g., facility diagram of referenced equipment or buildings). Section 9.4.3.2.1(2) of the SRP, NUREG-1520, provides that the applicant describe and commit to the use of effluent controls to maintain public doses ALARA in accordance with 10 CFR 20.1101.

RESPONSE: LA S ection 9.2.1.2, "Effluent Controls to Maintai n Public Doses AL ARA," will be revised to provi de more specific references to ER Chapter 2 and ER Chapter 6 as requested and to references to the ISA, where applicable.

License Documentation Impact: LA Section 9.2.1.2, paragraph one will be revised and a new second paragraph will be added to provide references to effluent controls to read as follows:

Effluent controls are used to maintain public doses ALARA. Gaseous effluents, that may contain depleted uranium, pass through pre-filters, high efficiency filters, and carbon-bed filters prior to entering the plant scrubber system (three-stages, in series). After scrubbing, the effluents are discharged to the atmosphere via the scrubber system stack. Certain storage vessels, powder transfer systems, and packaging stations, where depleted uranium particles are involved, are connected to two-or-three –stage dust removal systems to ensure capture and recovery of depleted uranium particles, prior to being vented to the atmosphere. The stacks are continuously sampled and are routinely analyzed to measure radioactivity of the exhaust gases. ~~Chapter 2 of the IIFP ER (IIFP, 2009) addresses the process description and the effluent controls incorporated into the design of the facility, and Chapter 6 (IIFP, 2009) of the IIFP ER describes the stack sampling and measurements.~~

Effluent controls are described in the IIFP FEP/DUP ER (IIFP, 2009a) as part of the facility process descriptions in Subsections 2.1.3.6, 2.1.3.7, and 2.1.3.9. In addition, IIFP FEP/DUP ER Table 2-1 provides a list of design efficiencies for process vent off-gas treatment equipment, and IIFP FEP/DUP ER. Table 2-2 provides a list of major process vent stacks. ER Section 6.1 identifies the proposed sampling and monitoring locations for gaseous effluents, liquid effluents, and groundwater, and provides an overview of the effluent monitoring program to achieve ALARA. IIFP ER Figure 6-1 illustrates the planned monitoring locations at the site. IIFP ER subsections 6.1.1, 6.1.2, and 6.1.3 provide additional details about effluent and radiological monitoring. Effluent control and conservation features are described in IIFP FEP/DUP ER subsection 4.13.4. Section 3.1.10 of the IIFP Integrated Safety Analysis Summary (ISA) (IIFP, 2009d) describes the process vent stacks at the IIFP Facility. Table 3-4 in the ISA provides the listing of design efficiencies for the off-gas treatment equipment as does Table 2-1 of the ER. Table 3-5 of the ISA provides the stack heights and estimated flow rates of the major process vent stacks.

Environmental Protection

EP-5. Section 9.2.1.3, ALARA Reviews and Reports to Management – Section 9.4.3.2.1(3) of the SRP, NUREG-1520, provides, among other things, that the applicant commit to report the results of the annual review of the ALARA effluent control program to senior management. Please identify the senior management to whom the results of the ALARA review are reported. Also, provide a more specific reference to subsections within LA Section 4.

RESPONSE: The result of the ALARA review and recommendations for changes in facilities or procedures that are necessary to achieve ALARA goals are reported to the ALARA committee. Senior management members of the ALARA committee include the COO/Plant Manager, the Radiation Protection Manager, selected Department Managers, and the ESH Manager. The arrangement is described in LA Section 4.2.3.

License Documentation Impact: LA Section 9.2.1.3 will be revised as follows:

In accordance with the ALARA Program, the environmental protection aspects of the Radiation Protection Program (RPP) are reviewed as part of the annual ALARA review. Review of the ALARA Program is addressed in LA Chapter 4, ~~Radiation Protection~~ Section 4.2.3. The ALARA review includes analysis of trends in release concentrations, environmental monitoring data, and radionuclide usage; the review then determines the need for operational changes to achieve the ALARA effluent goals and evaluate designs for system installations or modifications. The results of the ALARA review are reported to senior management, along with recommendations for changes in facilities or procedures that are necessary to achieve ALARA goals. The senior management members on the ALARA Committee include the COO/Plant Manager, the Radiation Protection Manager, selected Department Managers, and the ESH Manager

Environmental Protection

EP-6. Section 9.2.1.4, Waste Minimization – Please identify and, if appropriate, provide a specific description of waste-minimization systems and operational procedures regarding conservation and recycling important compounds. Also, please identify the waste minimization practices that are consistent with Regulatory Guide 4.21.

Section 9.4.3.2.1(4) of the SRP, NUREG-1520, identifies, among other things, the elements of an acceptable waste minimization program under 10 CFR 20.1406.

RESPONSE: Specific descriptions of waste minimization systems and procedures will be added to the IIFP License Application Section 9.2.1.4. The additional descriptions will include the waste minimization practices that are consistent with Regulatory Guide 4.21.

License Documentation Impact: Section 9.2.1.4 will be amended as follows (with new text shown in red):

The highest priority has been assigned to minimizing the generation of waste through reduction, reuse, or recycling. The IIFP facility utilizes various engineered waste-minimization systems and operational procedures that aim at conserving materials and recycling important compounds; such as the regeneration and reuse of the plant scrubbing system potassium hydroxide solution. The facility is designed and operated in accordance with 10 CFR 20.1406, "Minimization of Contamination" (CFR, 2009d) to minimize contamination, facilitate eventual decommissioning, and minimize to the extent practicable the generation of radioactive waste. The waste minimization practices during design, construction, and operation of the facility are consistent with the guidance in Regulatory Guide 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning" (NRC, 2008).

The IIFP plant incorporates several waste minimization systems in its operational procedures and design that aim at a high priority of conserving materials and preventing the spread of contamination. The major of those systems and procedures are discussed below.

Recycling on-site is an important strategy of the waste minimization program; for example: 1) regenerating and recycling of potassium hydroxide (KOH) scrubbing solution for use in the plant scrubbing system. This design and operation eliminates the need to otherwise discharge the flow as treated wastewater and also conserves the use of the treating agent and saves cost; 2) collection and recycling of steam condensate back to the facility steam boilers, where applicable, for saving energy and minimizing disposal, and 3) conserving valuable water resources by using air coolers and recirculation of process cooling water thereby avoiding once-through flow of water.

Another important aspect of the IIFP waste minimization program is the employment of waste segregation methods and procedures to facilitate recycling and to minimize contamination. Various receptacles are provided to allow for segregation of clean and contaminated materials. To prevent cross contamination, training is provided with emphasis on minimizing waste and controlling disposal costs. The outer packaging associated with consumables is removed prior to use in a contaminated area to minimize potential for contamination and to facilitate recycling and disposal of the clean segregated materials.

Collected waste such as trash, compressible dry waste, scrap metals, and other candidate wastes will be volume reduced, where feasible, at a centralized on-site or/and off-site waste processing facility. An off-site facility will be used for the segregated "clean waste", such as cardboard, office paper waste, aluminum cans and scrap metal, where recycling is practical and can be best operated by a commercial vendor. ALARA controls will be maintained during facility operation to account for standard waste minimization practices as directed in 10 CFR 20.1406 (CFR, 2009d).

Lubrication oils and other oils are segregated to prevent cross contamination. The oils are collected and stored in sealed-concrete pad area utilizing curbs and dikes for containment in accordance with Resource Conservation and Recovery Act (RCRA) requirements. Non-contaminated waste oil is sent to an off-site recycle facility, where applicable. Oil that cannot be recycled is disposed at an off-site licensed disposal facility.

Plant ventilation systems are designed to confine airborne radioactive materials within the process area and as close to the point of origin as practicable. Construction materials for ventilation materials are selected as to have a smooth internal surface finish and IIFP minimizes the number of changes in direction to the extent practicable.

Mechanical integrity and preventative maintenance procedures are utilized in accordance with the facility Process Safety Management (Chemical Safety Plan) program. In part, the inspections, surveillance, scheduled and planned maintenance and audits provide a means by which potentials for leaks on piping and equipment are prevented or minimized. Design and operational procedures provide early detection if leaks do occur thus allowing prompt assessment to support timely and appropriate response. Monitoring and surveillance programs are extremely important in minimizing contamination. IIFP uses fluoride detector instrumentation, particulate detectors and personnel surveillance techniques to minimize contamination. If leaks are suspected, the use of area samplers is utilized to investigate and identify the area for correction. Where leaks of hazardous materials are suspected, posted areas and warning lights are utilized to protect employee health and communicate potential contamination problems. Suspected or known leakage problems are investigated, the equipment operation curtailed if needed and the leakage resolved including any clean up where applicable.

The IIFP facility is designed to minimize the usage of natural resources. Closed-loop cooling systems have been incorporated in the designs to reduce water usage. Power usage is minimized by efficient design of lighting systems, selection of high-efficiency motors, and use of proper insulation materials. Solar panels and geothermal heating systems, where practical, are utilized to reduce carbon based fuel requirements.

The scrubbing system and Environmental Protection Process are designed to recycle KOH thus conserving the treating agent. Secondary containment for tanks and tank systems are provided with a margin of safety to ensure containment in the event of a leak or spill of the largest tank capacity per EPA requirements. Tank sampling stations are designed to minimize the possibility of sample fluid leaking to the ground. Areas involving diesel refueling are also provided with secondary containment.

Radioactive, hazardous and mixed wastes are generated at the IIFP Facility. Such wastes are collected in labeled containers in each restricted area and transferred to a waste storage area for inspection. Suitable waste is volume reduced, if feasible, then disposed at a licensed waste disposal site.

A retention basin is used for the collection and monitoring of general site storm water runoff. Sanitary sewage effluent is discharged into a package unit where it receives primary, secondary and tertiary treatment. The effluent from sanitary treatment is used in the facility for process water make-up or for landscape and watering of the site tree farm.

An area (Decontamination Building) is provided in the operating facility for decontaminating equipment that may need to be cleaned before repair or for cleaning of materials, where feasible, prior to disposal. This system helps minimize the spread of contamination. Some of the equipment and systems provided in this area include:

- High pressure water/steam/air equipment, with a sloped sealed-type floor runoff and collection double contained sump pit;
- Totally enclosed grit blast unit with dust collection system;
- Ion-exchange units suitable to collect soluble uranium from solution;
- High efficiency filters suitable to remove small particulates of uranium from solution; and
- Tanks to provide hold capability and precipitation capacity for soluble uranium.

The operating facility Decontamination Building includes an area to perform the series of steps following equipment disassembly including degreasing, decontamination, drying, and inspection. Items from uranium processing systems, waste handling systems, and miscellaneous other items can be decontaminated in this system. To minimize worker exposure, prevent airborne radiological contamination resulting from dismantling, air suits or portable ventilation units are available. Decontamination of chemicals and wastes is provided by components, designated containers, and air filtration systems. Pipe and vessels in the Decontamination Building are provided with design measures to protect against spillage or leakage. Hazardous wastes and materials are contained in tanks and other appropriate containers and are strictly controlled by procedures.

Practices Consistent with Regulatory Guide 4.21 include:

~~A. Minimizing Facility Contamination~~

- Worker access to contaminated areas is controlled to assure that workers wear proper protective equipment and limit their time in the areas. Protective equipment is cleaned, stored or disposed in proper locations and receptacles;
- Waste volume reduction is considered and implemented at every opportunity, including training of employees;
- Leak and spill collection areas are provided;
- Floor liners and catch basins are included in areas of higher leak potential;
- Personnel surveillance techniques are part of the leak identification program;
- Monitoring is conducted for leaks or spills in area Control Room; for example, fluoride detectors and airborne particulate detectors;
- Radiological boundary control and monitoring stations are used in strategic locations to prevent carrying of uranium materials from Restricted areas into Unrestricted areas.

- Controlled purge and evacuation systems are used to prevent area contamination and potential out-leakage during maintenance and inspection;
- Decontamination Building and equipment are provided to clean equipment, where applicable, that has been removed for repair and re-installation;
- Floors are appropriately sloped for spills;
- Drains from locker rooms and cleanup showers in potential contamination areas are routed selectively to the Decontamination Building;
- Proper ventilation systems maintain positive pressure in control room areas;
- Secondary containment is provided in outside areas and includes excess capacity to capture leaks or spills from the largest vessel in the area in accordance with EPA requirements;
- Monitoring wells are provided and sampled both up gradient and down gradient with established baselines;
- Storm water retention basins have two impermeable barriers;
- Exterior tanks are located on or above concrete pads above grade and with curbs and dikes;
- Areas to support radioactive material handling are in contained areas;
- Drains for storm water are piped to retention basins with capability for sampling;
- Sanitary wastewater is piped to a tertiary treatment system and monitored prior to discharge, and
- Plant ventilation system designs confine airborne radioactive materials within the process area and as close to the point of origin as practicable. Construction materials for ventilation materials are selected as to have a smooth internal surface finish and minimize the number of changes in direction to the extent practicable.

B. Minimizing Contamination of the Environment

- Building areas where uranium is processed and handled are separated physically from other building rooms and areas where there is no need to have uranium present. These areas have separate ventilation and filtration systems to preclude contamination spread. Boundary control stations and hand/foot and portable monitors are used at applicable locations to verify that personnel and items exiting uranium process areas are not spreading radiological materials into non-uranium areas. The DUF_4 Process Building, FEP Oxide Staging Building, the facility operations Decontamination Building, DUF_4 Container Storage Building, DUF_4 Container Staging Building and the FEP Process Building (in areas where licensed material is processed) meet these specific design features.
- All areas of the plant are sectioned into Unrestricted and Restricted Areas. Restricted Areas limit access for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Radiation Areas and potential Airborne Contamination Areas have additional controls to inform workers of the potential hazard in the area and to help prevent the spread of contamination. All procedures for these areas fall under the Radiation Protection Program, and serve to minimize the spread of contamination and simplify the eventual decommissioning.
- Routine radiological surveys will be conducted throughout the facilities' operations life that will minimize the likelihood that radioactive contamination goes undetected and will provide a historical record which will simplify the site characterization process.

- Non-radioactive process equipment and systems are minimized in locations subject to potential contamination. This limits the size of the Restricted Areas and limits the activities occurring inside these areas.
- Local air filtration is provided for areas with potential airborne contamination to preclude its spread. Containment equipment with hoods that exhaust through dust collectors, that are designed with high removal efficiencies, are used where uranium materials are being packaged or withdrawn from process systems.
- The hazardous material processes include designs for purge and evacuation (P&E) systems and dust-collection equipment as a means to provide effective clean out of residual chemicals or dust from equipment or piping prior to opening systems for maintenance. The P&E and dust collector systems have multiple collection equipment in series (defense-in-depth) to ensure removal and treatment efficiency, redundancy, effectiveness and reliability.
- Storm water runoff via the plant storm sewer system flows to a "double lined" retention basin for either evaporation or for landscape (tree farm) watering. Prior to discharging collected storm water can be sampled if needed. It is not likely that collected storm water would exceed acceptable or regulated levels, but routine sampling for reuse or discharge are conducted for further assurance. Domestic sanitary waste water is tertiary treated to meet all discharge standards, and is either evaporated or used as harvested water for facility trees, grass and shrubs. The facility is designed for no liquid process water discharges. Engineered systems are used to provide for regeneration of scrubbing solutions and recycle within the process systems.

C. Facilitating Decommissioning

- During construction, a washable coating is applied to designated floors and walls in the Restricted Areas that have the higher potential to become radioactively contaminated during operation. The coating serves to lower waste volumes during decontamination and simplify the decontamination process;
- Sealed, nonporous pipe insulation is used in areas with higher potential to become contaminated. This facilitates cleaning in event of a spill and will reduce waste volume during decommissioning;
- Ample access is provided for efficient equipment dismantling and removal of equipment that may be contaminated. This minimizes the time of worker exposure;
- Tanks have access for entry and decontamination. Design provisions are also made to allow for removal of the wastes or materials contained in the tanks;
- Connections in the process systems, provided for required operation and maintenance, allow for thorough purging at plant shutdown. This system and procedure remove a significant portion of radioactive contamination prior to disassembly and prevent leakage to the general environment upon opening of equipment or piping;
- Design drawings, produced for all areas of the plant, will simplify the planning and implementing of decontamination procedures. This in turn will shorten the durations that workers are exposed to radiation;
- Worker access to contaminated areas is controlled to assure that workers wear proper protective equipment and limit their time in the areas;
- Radioactive and hazardous wastes produced during decommissioning will be collected, handled, and disposed of, in accordance with all regulations applicable to the facility at the time of decommissioning. Generally, procedures will be similar to those described for wastes produced during normal operation. These wastes will ultimately be disposed in

licensed radioactive or hazardous waste disposal facilities located elsewhere. Non-hazardous and non-radioactive wastes will be disposed in a manner consistent with good industrial practice, and in accordance with applicable regulations and

- To facilitate decommissioning, the information relating to the facility design, facility construction, design, modifications, site conditions before and after construction, onsite contamination and results of monitoring and radiological surveys will be readily recoverable through the IIFP document control and management process.

Environmental Protection

EP-7. Section 9.2.2, Effluent and Environmental Controls and Monitoring – Please identify or provide specific cross references to the subchapters of the ER and subsections of the LA that identify the effluent and environmental controls that are at and around the facility. Also, please provide a specific description of the portions of the Radiation Protection Plan (RPP) that address environmental protection.

Section 9.4.3.2.2(1) of the SRP, NUREG-1520, identifies, among other things, the criteria of an acceptable effluent monitoring program.

RESPONSE: Administrative and engineered controls for environmental effluents are described in the LA, subsections 4.1 through 4.7, and in the IIFP FEP/DUP ER (IIFP, 2009a), subsections 2.1.3, 4.2.2, 6.1.1, 6.1.2, and 6.1.3. As described in LA Section 4.2, the ALARA program is a subset of the Radiation Protection Program. With regard to effluent and environmental controls, the ALARA principle demands that radioactive effluents are monitored, and that environmental releases stay far below the regulatory limits. An additional aspect of the ALARA program includes the preparation and review of an annual report to evaluate effluent release trends as a means to ensure the ALARA programs are effectively implemented.

License Documentation Impact: In response to RAI-EP-7, a second paragraph will be added to LA Section 9.2.2 (paragraph one was modified in response to RAI EP-2) and will read as follows to include additional information:

Effluent and environmental controls and monitors are maintained at and around the facility to ensure that doses to the workers, the public, and the environment remain ALARA. In order to monitor and characterize meteorological phenomena (e.g. wind speed, direction, and temperature) during plant operation, conditions will be monitored with a meteorological tower located on site. In addition, monitors provide indication of potential off-normal occurrences requiring further investigation. Guidance provided in Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Material in Liquid and Gaseous Effluents from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants" (NRC, 1985) has been utilized in the preparation of the environmental protection aspects of the RPP (IIFP, 2009b), where applicable.

Administrative and engineered controls for environmental effluents are described in ISA Sections 2.4.10, 2.4.11 and 3.1 and the following subsections of the ISA. These controls are also described in the LA, Section 1.1.3 and the following subsections and Section 4.6 and the following subsections. These controls are also described in the IIFP FEP/DUP ER (IIFP, 2009a), subsections 2.1.3, 4.6.2.2, 4.6.2.3, 6.1, 6.2, and 6.3. The Radiation Protection Plan (RPP) that addresses environmental protection is described in ER Sections 6.1, 6.2 and 6.3 and is also described in LA Section 4.1-4.7. As described in LA Section 4.2, the ALARA program is a subset of the Radiation Protection Program. With regard to effluent and environmental controls, the ALARA principle demands that radioactive effluents are monitored and that environmental releases stay significantly below the regulatory limits. An additional aspect of the ALARA program includes the preparation and review of an annual report to evaluate effluent release trends as a means to ensure the ALARA programs are effectively implemented.

Environmental Protection

EP-8. Section 9.2.2.1, Expected Concentrations – Please identify the concentrations, calculations, and modeling of airborne and solid radioactive materials listed in this section. If available, provide specific references to the ER and LA subsections (including specific tables or Figures) which contain the information. Also, please identify or reference the conservative assumptions used in calculations and modeling of those concentrations.

Section 9.4.3.2.2(1)(a) of the SRP, NUREG-1520, identifies Expected Concentrations for effluent monitoring that are to be below limits specified in 10 CFR 20, Appendix B.

RESPONSE: Table 4-24 of the IIFP FEP/DUP ER (IIFP, 2009a) illustrates "Estimated and Bounding Radiological Releases from the Stacks." Calculations and modeling of airborne radioactive materials, and the conservative assumptions used in the calculations and modeling, are documented in Section 4.12.2 of the IIFP FEP/DUP ER (IIFP, 2009a).

License Documentation Impact: The second sentence in LA Section 9.2.2.1, under subsection "Expected Concentrations" will be replaced and the subsection will read as follows:

The expected concentrations, based on calculations and modeling, of radioactive materials in airborne and solid effluents were estimated using conservative assumptions~~. Those estimated values are proved in the IIFP ER, Chapter 4.~~ are shown in Table 4-24 of the IIFP FEP/DUP ER (IIFP, 2009a). Calculations and modeling of airborne radioactive materials, with the conservative assumptions used in the calculations and modeling, are documented in Section 4.12.2 of the ER. The concentrations controlled to be ALARA and below the limits specified in 10 CFR 20, Appendix B, Table 2 (CFR, 2009c). As stated above, the plant liquid effluents, that have potential for containing uranium, are recycled, reused and maintained on the IIFP site.

Environmental Protection

EP-9. Section 9.2.2.1, Calculations of Total Effective Dose Equivalent – It appears that compliance with dose limits for individual members of the public is demonstrated by calculation of the Total Effective Dose Equivalent (TEDE) as opposed to calculation of annual average concentrations of radioactive material released. Please provide more detailed discussions of the calculation of the TEDE by pathway analyses to demonstrate that the appropriate models, codes, and assumptions accurately represent the facility, site, the surrounding area, and the pathways considered. Also, please provide citations to any relevant tables and discussion within the ER, e.g., Subsection ER-4.12.

Section 9.4.3.2.2(1)(b) of the SRP, NUREG-1520, identifies Calculations of Expected Dose for effluent monitoring within limits in 10 CFR 20.1301 through calibrations identified in 10 CFR 20.1302.

RESPONSE: To demonstrate compliance with 10 CFR 20.1301 (via calculation of the TEDE to the individual likely to receive the highest dose), IIFP will apply the EPA Radiation Risk Assessment software, CAP-88 or COMPLY. References to committed dose equivalents are also provided.

License Documentation Impact: The subject paragraph in Section 9.2.2.1, "Calculations of Total Effective Dose Equivalent" of the LA Revision A will be revised as follows:

Dose projections to members of the public are performed routinely to ensure the annual dose to members of the public are kept ALARA and within the regulatory limit in accordance with approved written procedures. Compliance as described in 10 CFR 20.1302, "Compliance with Dose Limits for Individual Members of the Public" (CFR, 2009e); is demonstrated through either the calculation of the total effective dose to the individual likely to receive the highest dose, or through the calculation of annual average concentrations of radioactive material released in gaseous and liquid effluents. To demonstrate compliance with 10 CFR 20.1301 (via calculation of the TEDE to the individual likely to receive the highest dose), IIFP will apply the EPA Radiation Risk Assessment software, CAP-88 or COMPLY. There are four primary exposure pathways associated with plant effluent: inhalation; immersion in an effluent plume; direct radiation due to deposited radioactivity on the ground surface (ground plane exposure) and ingestion of contaminated food products. Of these four exposure pathways, inhalation exposures are expected to be the predominant pathways at site boundary locations and also at off-site locations that are relatively close to the site boundary. Input assumptions for the ~~CAP-88~~EPA codes will reflect the configuration and location of the release points, site-specific meteorology, the potential location of the maximally exposed individual, and the regional land use. Input assumptions similar to those applied in the ER dose calculations (documented in ER Section 4.12.2.2) will be used as necessary. Table 4-25 of the ER provides the annual and committed dose equivalents for exposures to the maximally exposed individual (MEI) from gaseous effluents. Table 4-26 from the ER provides annual and committed dose equivalents for exposures to the nearest resident from gaseous effluents. The estimated dose rate for sit boundary locations, the MEI, and the nearest resident is provided in Table 4-27. The guidance in Regulatory Guide 4.20, "Constraint on Releases of Airborne Radioactive Materials to the Environment for Licensees Other than Power Reactors" (NRC, 1996), is followed to determine compliance with dose limits to members of the public. Compliance with the dose limits to the members of the public is reported to the

NRC in the semi-annual effluent report as required by 10 CFR 40.65 "Effluent Monitoring Reporting Requirements" ~~(CFR, 2009f)~~.

Environmental Protection

EP-10. Section 9.2.2.1, Effluent Discharge Locations – Please identify the locations of airborne effluent discharges and monitoring. Also identify contributing sources, if any, for discharge points.

Section 9.4.3.2.2(1)(c) of the SRP, NUREG-1520, addresses Effluent Discharge Locations for effluent monitoring.

RESPONSE: The subject paragraph from LA Section 9.2.2.1 will be revised to locate the airborne discharges and contributing sources for discharge points.

License Documentation Impact: Section 9.2.2.1, "Effluent Discharge Locations" of the LA Revision A will be revised as follows:

There will be two types of airborne effluent discharges from the IIFP site – stack effluent discharges and roof exhaust fan discharges. The locations of stack effluent discharges are illustrated in the plot plan, "Modified Site Features with Sampling Stations and Monitoring Locations" (Figure 6-1) of the IIFP FEP/DUP ER. Roof exhaust fans are located on buildings which house areas where uranium is processed or handled. Both discharge types will be monitored as described in Section 6.1.1.1 of the ER.

There are two stacks involving contributing sources in the airborne effluent discharge locations. Two sources contribute to the effluent from the FEP Dust Collector Stack (number 03) -- one each from the SiF_4 and BF_3 process systems. The process off-gas from the DUF_4, SiF_4 and BF_3 are all scrubbed in the three-stage (in series) equipment of the Plant KOH Scrubbing System. The treated gas from the last stage of the scrubbers exists the Plant KOH Scrubbing System Stack (number 01).

~~The IIFP ER Chapter 6 (IIFP, 2009) addresses the estimated locations of the airborne effluent discharges and monitoring estimated locations for the site.~~ Liquid plant effluents are maintained on the IIFP site and there is no discharge of process wastewater. Liquid effluent monitoring is described in ER Section 6.1.1.2.

Environmental Protection

EP-11. Section 9.2.2.1, Continuous Sampling Airborne Effluents – Briefly summarize relevant portions of ER Chapter 6 that are referenced. Please define (quantify) what is meant by "significant" regarding increases in radiation levels that would trigger additional analyses. Also, please summarize (briefly) the purpose of the Effluent Monitoring Program (EMP), and provide a more specific reference to subchapters within ER Chapter 6 where the EMP is discussed.

Section 9.4.3.2.2(1)(d) of the SRP, NUREG-1520, addresses Continuous Sampling Airborne Effluents for effluent monitoring under the Radiation Protection Program under 10 CFR 20. 1101.

RESPONSE: A 25% increase in radiation levels would be indicative of a significant increase in radiation levels to trigger additional analysis. The purpose of the effluent monitoring program will be briefly described and a reference to the location of the REMP discussion in Section 6.1.1 of the ER will be added to the subject paragraph. .

License Documentation Impact: Section 9.2.2.1, "Continuous Sampling Airborne Effluents" will be revised as follows:

The IIFP ER Chapter 6 addresses the Effluent Monitoring Program (EMP) (IIFP, 2009c). The purpose of the Effluent Monitoring Program (EMP) is to ensure that surveys are performed as necessary to demonstrate compliance with regulations and to demonstrate that the amount of radioactive material present in the facility effluent remains ALARA. The REMP is discussed in Section 6.1.1 of the IIFP FEP/DUP ER.

The effluent stacks, where licensed materials are involved, are sampled continuously and is routinely analyzed to measure radioactivity of the exhaust air. The collection filters in the sample systems are removed periodically and analyzed for gross alpha and beta activity. The filters are composited periodically and an isotopic analysis is performed. Radiological analyses are performed on ventilation air filters if there is a significant 25% increase in gross radioactivity, or when a process change or other circumstances cause significant changes in radioactivity concentrations.

Environmental Protection

EP-12. Section 9.2.2.1, Sample Collection and Analysis – Please clarify what is meant by the term "appropriate" sample collection and analysis methods and frequencies for the effluent medium and indicate the radionuclides sampled. Provide a brief summary of the EMP that addresses sample collection and analysis and frequencies.

Section 9.4.3.2.2(1)(e) of the SRP, NUREG-1520, addresses Sample Collection and Analysis for effluent monitoring.

RESPONSE: Sample collection and analysis methods and frequencies for the effluent medium will be performed in accordance with Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment" and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants."

Section 6.1.1 of the FEP/DUP ER describes the Effluent Monitoring Program. Section 6.1 of the IIFP FEP/DUP ER (IIFP, 2009a) describes the proposed sampling and monitoring locations for gases effluents and liquid effluents. The subject subsection will be modified to include a summary.

License Documentation Impact: The subject paragraph from LA Revision A Section 9.2.2.1 will be revised as follows:

The EMP establishes ~~appropriate~~ sample collection and analysis methods and frequencies for the effluent medium and the radionuclide(s) sampled. Sample collection and analysis methods and frequencies for the effluent medium will be performed in accordance with Regulatory Guide 4.15 "Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment" and Regulatory Guide 4.16, "Monitoring and Reporting Radioactivity in Releases of Radioactive Materials in Liquid and Gaseous Effluent from Nuclear Fuel Processing and Fabrication Plants and Uranium Hexafluoride Production Plants."Sampling methods ensure that representative samples are obtained using appropriate sampling equipment and sample collection and storage procedures. Monitoring instruments are calibrated at least annually or more frequently if suggested by the manufacturer. IIFP ensures that sampling equipment (pumps, pressure gages, and air flow calibrators) are calibrated by qualified individuals. Sampling equipment and lines are inspected for defects, obstructions, and cleanliness as part of the plant preventive maintenance procedures.

Section 6.1.1 of the FEP/DUP ER describes the Effluent Monitoring Program. Section 6.1 of the IIFP FEP/DUP ER (IIFP, 2009a) describes the proposed sampling and monitoring locations for gases effluents and liquid effluents. Figure 6-1 of the IIFP FEP/DUP ER (IIFP, 2009a), "Modified Site Features with Sampling Stations and Monitoring Locations," indicates the locations of the environmental sampling stations and monitoring locations. Further, Section 6.1.1 of the ER describes the sampling media, frequency, and analysis types to be performed.

Environmental Protection

EP-13. Section 9.2.2.1, Radionuclide-Specific Analysis – Specify that plant preventive maintenance procedures will be maintained onsite and implemented. Specify where monitoring reports are discussed. Alternatively, briefly summarize what is meant by the term, summary reports. Also, in the second paragraph, clarify what is meant by "a significant increase" in gross radioactivity. Briefly summarize relevant portions of ER Chapter 6.1.1.

Section 9.4.3.2.2(1)(f) of the SRP, NUREG-1520, addresses Radionuclide-Specific Analysis for effluent monitoring.

RESPONSE: Plant preventive maintenance procedures will be specified to be maintained onsite and implemented. Section 9.2.2.1, Sample Collection and Analysis will be revised as indicated in the License Documentation Impact below.

Monitoring reports are discussed in Section 9.2.2.1, Reporting Procedures.

A 50% increase in gross radioactivity will indicate "a significant increase" in gross radioactivity Section 9.2.2.1, Radionuclide-Specific Analysis will be revised to add this clarification and to briefly summarize gaseous effluents.

A brief summary of relevant ER Chapter 6, Section 6.1.1 will be added to subsection "Radionuclide Specific Analysis."

License Documentation Impact: Section 9.2.2.1, Section 9.2.2.1, Radionuclide-Specific Analysis, will be revised as indicated below:

<u>Radionuclide-Specific Analysis</u>

Radionuclide-specific analyses are performed on selected composited samples as indicated in Chapter 6.1.1 of the IIFP ER (IIFP, 2009a). Because uranium in gaseous effluent may exist in a variety of compounds (e.g., DUF_6, uranium oxide, DUF_4, and DUO_2F_2), effluent data is maintained, reviewed, and assessed by the facility's Radiation Protection Manager to assure that gaseous effluent discharges comply with regulatory release criteria for uranium. The Effluent Monitoring Program falls under the oversight of the IIFP Radiation Safety Program. Section 6.1.1 addresses the Effluent Monitoring Program. As a matter of compliance with regulatory requirements, potentially radioactive effluent from the facility is discharged only through monitored pathways. The effluent sampling program for the IIFP facility is designed to determine the quantities and concentrations of radionuclides discharged to the environment. Uranium isotopes and daughter products are expected to be the prominent radionuclides in the gaseous effluent. Process stacks and air vents are (1) sampled continuously through the use of air filters and analyzed for gross alpha/beta and isotopic and (2) analyzed weekly with additional quarterly composite analysis.

Plant preventive maintenance procedures will be specified to be maintained onsite and implemented. These preventive maintenance procedures, and the associated configuration management for these procedures, are described in LA subsection 11.2.2.

Monitoring reports, which include the quantities of individual radionuclide(s) estimated on the basis of methods other than direct measurement, include an explanation and justification of how the results were obtained. Monitoring reports are discussed in Section 9.2.2.1, “Reporting Procedures.”

Radionuclide analysis may be performed more frequently at the beginning of the monitoring program until a predictable and consistent composition is established. Likewise, the analysis frequency may be increased when there is a ~~significant~~ 50% increase in gross radioactivity in effluents or a process change or other circumstance that might cause a significant variation in the radionuclide composition.

Environmental Protection

EP-14. Section 9.2.2.1, Minimum Detectable Concentrations – Please provide a more specific reference to subchapters within ER Chapter 6. Provide a summary of relevant portions of Chapter 6 that are referenced.

Section 9.4.3.2.2(1)(g) of the SRP, NUREG-1520, addresses Minimum Detectable Concentrations for effluent monitoring for concentrations in 10 CFR 20, Appendix B.

RESPONSE: LA Section 9.2.2.1 will be revised to provide a reference to the subchapters within ER Chapter 6 which addresses minimum detectable concentrations for effluent monitoring.

License Documentation Impact: LA Section 9.2.2.1 will be revised as follows:

~~ER Chapter 6 (IIFP, 2009) presents the required minimum detectable concentration (MDC) for gross alpha analyses performed on gaseous effluent samples.~~

ER Chapter 6.1.1.1 describes the gaseous effluent monitoring requirements for the facility. A minimum detectable concentration (MDC) of at least $3.7x10^{-11}$ Bq/ml ($1.0x10^{-15}$ µ-Ci/ml) will be required for all gross alpha analyses performed on gaseous effluent samples.

Environmental Protection

EP-15. Section 9.2.2.1, Action Levels – Please identify the specific action levels. Also, identify any steps involving effluent monitoring that would be taken before shutdown.

Section 9.4.3.2.2(1)(i) of the SRP, NUREG-1520, addresses Action Levels for effluent monitoring.

RESPONSE: Specific action levels will be set at 50% of the 10 CFR 20 Appendix B Table 2 values.

License Documentation Impact: Section 9.2.2.1, "Action Levels" will be revised as indicated below:

Administrative action levels are established for effluent samples and monitoring instrumentation as an additional step in the effluent control process. All action levels are sufficiently low so as to permit implementation of corrective actions before regulatory limits are exceeded. Action levels will be set at 50% of the 10 CFR 20 Appendix B Table 2 values. Effluent samples that exceed the action level are cause for an investigation into the source of elevated radioactivity. Processes are designed to include, when practical, provision for automatic shutdown in the event action levels are exceeded.

Environmental Protection

EP-16. Section 9.2.2.1, Federal and State Standards for Discharges – Please define the term, "air-contaminant source." Also, provide a specific reference to the ER subchapter that provides the status of all Federal, State, and local requirements.

Section 9.4.3.2.2(1)(j) of the SRP, NUREG-1520, addresses Federal and State Standards for Discharges for effluent monitoring.

RESPONSE: Air-contaminant source means any building, structure, or facility, or combination thereof, which emits or is capable of emitting air contaminants to the atmosphere that are regulated by Federal, State and local requirements.

License Documentation Impact: The definition of air-contaminant source and the specific reference to the ER Section that provides status of all Federal, State and local requirements will be included as a revision in the IIFP License Application Section 9.2.2.1 under "Federal and State Standards for Discharges" to read as follows:

New Mexico Statutes Annotated (NMSA), Chapter 74, "Environmental Improvement," Article 2, "Air Pollution," (NMSA, 2009a) and implementing regulations in the New Mexico Administrative Code (NMAC) Title 20, "Environmental Protection," Chapter 2, "Air Quality," (NMAC, 2009a) establishes air-quality standards and permit requirements prior to construction or modification of an air-contaminant source. IIFP defines an air-contaminant source as any building, structure, or facility, or combination thereof, which emits or is capable of emitting air contaminants to the atmosphere that are regulated by Federal, State and local requirements. These regulations also define requirements for an operating permit for major producers of air pollutants and impose emission standards for hazardous air pollutants. Accordingly, IIFP will file applications and obtain appropriate air construction and operating permits, where applicable. The IIFP Environmental Report Section 1.4 addresses applicable regulatory requirements and status.

Environmental Protection

EP-17. Section 9.2.2.1, Waste Management Procedures – If possible, specify the Low Level Waste disposal site that may be used. Please provide a reference, include any figures, to the plant description in the LA or ER that contains the waste management facilities, as discussed in paragraph 2 of this section.

Section 9.4.3.2.2(1)(n) of the SRP, NUREG-1520, addresses Waste Management Procedures for effluent monitoring.

RESPONSE: Final selection of a low level waste (LLW) disposal site has not been made.; however, Table 4-4 of the IIFP FEP/DUP ER (IIFP, 2009a) identifies transportation radiological data for three possible licensed LLW disposal destinations (1) Energy Solutions in Clive, Utah, (2) WCS, a Texas facility just inside the Texas border near Eunice, New Mexico, and (3) GTS Duratek in Oak Ridge, Tennessee. Discussions have been conducted with Energy Solutions relative to disposal and acceptance criteria of the uranium oxide waste that is a byproduct of the IIFP Fluorine Extraction Process (FEP). Currently, the Energy Solutions disposal facility at Clive, Utah is a licensed and acceptable facility for disposal of the uranium oxide and other LLW waste. The WCS Texas facility is expected to also be available to accept LLW and uranium oxide by the time the IIFP Facility becomes operational.

Additional information about the waste management facilities and descriptions is provided below as amendments to the Section 9.2.2.1, "Waste Management Procedures." Some of the building descriptions being added to Section 9.2.2.1 are also being revised in response to the Request for Additional Information (RAI) General Information (GI)-6.B.

License Documentation Impact: Subsection 9.2.2.1, Waste Management Procedures," paragraphs two will be revised, the section will be expanded and paragraph three will be deleted. The subsection will read as follows:

Waste Management Procedures

Solid waste management facilities with sufficient capability to enable preparation, packaging, storage, and transfers to licensed disposal sites in accordance with the regulations, are incorporated into the IIFP Facility design and are maintained in proper operating condition as required to support the operation of the facility. Waste management procedures and processes are performed in various buildings and areas of the IIFP Facility depending on the locations and characteristics of the waste stream. The main buildings involved are the FEP Process Building, FEP Oxide Staging Building, Decontamination Building, Environmental Protection Process (EPP) Building and the Material Warehouse. These major buildings and areas are either described below or references to other Sections of the IIFP License Application are provided for more specific descriptions.

The locations of the buildings and areas discussed below are shown in the IIFP License Application, General Information, Figure 1-5. A larger and more legible site drawing showing the subject buildings and locations is provided as Drawing 100-C-0001, Revision D, and is part of the engineering drawing package provided to the NRC as separate document files of the IIFP License Application. The subject building sizes are provided in Table 1-2, Chapter 1 General Information of the License Application

Table 1-3, Chapter 1, General Information of the License Application shows the estimated annual quantity of waste generated at the IIFP Facility. The largest amount of solid waste generated is the depleted uranium oxide that is a byproduct of the FEP process. This waste is managed using the equipment and facilities of the FEP Process Building and the FEP Oxide Staging Building. The depleted uranium oxide from the FEP process is collected in the oxide storage hopper for temporary storage until it is packaged for shipment. The depleted uranium oxide byproduct is filled into Department of Transportation approved drums (or other approved transport containers). The oxide is filled into the packaging container using an enclosed filling (drum off) station located in the FEP Process Building. The oxide hoppers and the drum-off stations are located on the first level of the building. The filling station enclosure is connected to the FEP oxide dust collection system to provide negative pressure in the enclosed filling station to contain and capture dust during the filling process. After filling, the uranium oxide shipping containers are then checked, labeled and staged temporarily in the FEP Oxide Staging Building for scheduled loading and shipment by trailer truck to a licensed disposal site. The FEP Oxide Staging Building is adjacent to, and on the east-side of the FEP Process Building. The wall between the FEP Oxide Staging Building and the FEP Process Building is a fire barrier. This building is a two level building with a reinforced concrete floor on the first level with containment-type curbing. It is used for staging of oxide waste containers for loading into truck trailers and transporting to an off-site licensed waste disposal facility. Equipment in the building consists of weighing equipment, electrical and instrumentation monitoring and alarm panels and controls, exhaust hood systems, piping and ductwork connections to the primary dust collector system.

The Decontamination Building serves as a facility with equipment to manage Low-Level Contaminated Waste (LLW) other than the depleted uranium oxide waste. The Decontamination Building is located adjacent to, and on the north side of the DUF_4 Building. The construction provides for a fire barrier between the Decontamination Building and the DUF_4 Building. This building is used for decontamination of equipment for maintenance and for handling and preparing LLW for shipments. The Decontamination Building contains an equipment cleaning booth and hood system, equipment for sorting and packaging LLW and mixed dry solid waste, loading station, weighing scales, drying equipment, primary and secondary dust collector system in series, contaminated-water holding tanks, primary and polishing filters, associated pumps, piping, field equipment instrumentation panels, ion exchange columns and associated controls and backwash systems.

Radioactive waste, including dust collector bags, ion exchange resin, crushed-contaminated drums, contaminated trash, contaminated and carbon-bed trap material are collected in labeled containers in each Restricted Area and transferred to a temporary radioactive waste storage area located in the Decontamination Building. In this area LLW is sorted, if needed, prepared, packaged, and surveyed. Suitable waste is volume-reduced using compaction equipment, if feasible. The LLW is loaded and transported for disposal at an off-site licensed LLW disposal facility.

Also in the Decontamination Building, relatively small volumes of miscellaneous waste liquors, that have potential to contain depleted uranium, are concentrated, filtered and treated to remove the depleted uranium from liquid steams. Depleted uranium removed from liquid streams is collected, dried for volume reduction and to meet acceptance criteria and sent to an off-site licensed low-level-waste disposal site along with the waste depleted uranium oxides produced by the de-conversion processes.

The EPP Building and adjacent area is used to treat and manage fluoride-bearing waste liquors. The design of the IIFP Facility includes equipment to regenerate spent potassium hydroxide (KOH) solutions that can be reused and recycled in the plant scrubber system. This design and operation eliminates the need to otherwise discharge the flow as treated wastewater and also conserves the use of the treating agent and saves cost. Also, aqueous waste solutions that are not licensed material but contain fluoride or trace metals are treated in the EPP.

The treatment of fluoride-bearing liquors results in a solid particulate calcium fluoride (CaF_2) which may be sold as a raw material for use in the fluorine chemical industry. Converting the fluoride in the subject liquors to a solid is the means by which fluoride wastes are managed with potential use as a resource in other industrial markets. The treatment process, preparation and packaging procedures for the CaF_2 are conducted in the Environmental Protection Process (EPP) Building. In this area, the CaF_2 is filtered from the process and dried for shipment to customers, where there is a demand, or shipped to an off-site Resource Conservation and Recovery Act (RCRA) permitted disposal site if there is no feasible market demand. The EPP Building and equipment is described in the IIFP License Application Section 1.1.2.1 and in the Integrated Safety Analysis (ISA) Summary Section.3.1.8.

The Material Warehouse is located just northeast of the Process Offices and Laboratory Building. This warehouse is used to receive and store such items as piping components, electrical conduit, wiring, equipment for capital construction projects and spare parts. Small quantities of chemicals such as paints, oils, and cleaning agents may be stored in the warehouse. No licensed materials are stored in this building.

Part of the Material Warehouse is used for managing non-radioactive waste. Designated areas inside the Material Warehouse and some collection containers on the adjacent outside curbed concrete pads are used to collect, sort, package, if necessary, and load non-radioactive waste. This waste has been segregated and surveyed to be determined as non-radioactive prior to moving to the Material Warehouse area. Waste sent to this area must be approved for release to licensed commercial disposal or recycling. This waste includes industrial sanitary wastes, such as cardboard, paper, wood, scrap metal, etc. Some of these wastes, such as cardboard, paper, and metal may be shipped to off-site facilities for recycle or minimization, and, then sent, if required, to an off-site licensed waste disposal facility.

One area in the warehouse is designated for these type wastes. Another area in the warehouse is set aside to manage small quantities of Resource Conservation and Recovery Act (RCRA) waste that is not otherwise handled at the EPP. The RCRA waste is packaged, labeled, manifest and loaded for shipment. A permitted transport contractor is used to transport the waste to a permitted RCRA facility for disposal.

~~Descriptions of the proposed IIFP waste management systems are provided in the IIFP Chapter 3.~~

Environmental Protection

EP-18. Section 9.2.2.2, Environmental Monitoring - Environmental Monitoring is mislabeled as merely being one of several topics under Section 9.2.2.1, Effluent Monitoring. Instead, Environmental Monitoring should be identified separately as the second subsection under Section 9.2.2, Effluent and Environmental Controls and Monitoring. Because Environmental Monitoring is the second part of Section 9.2.2, it should be numbered separately as Subsection 9.2.2.2.

Section 9.4.3.2.2(2) of the SRP, NUREG-1520, addresses Environmental Monitoring.

RESPONSE: The referenced subsection will be removed from Section 9.2.2.1, Effluent Monitoring as described below.

License Documentation Impact: The following subsections will be deleted from Section 9.2.2.1, Effluent Monitoring and moved to a new section 9.2.2.2 Environmental Monitoring. This is described in response to RAI EP-19.

~~**Environmental Monitoring**~~

~~The following sections address the acceptance criteria related to environmental monitoring.~~

~~Background and Baseline Measurements Prior to facility operations, soil and groundwater samples will be collected from the site and analyzed to determine a baseline to be used in evaluating changes in potential environmental conditions caused by facility operations. Air and water samples will be collected from remote locations in order to provide background data during operations.~~

~~Monitoring The EMP (IIFP, 2009c) at the IIFP facility is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines. The types and frequency of sampling and analyses are summarized in the IIFP ER Chapter 6.1., Radiological Environmental Monitoring Program. Environmental media identified for sampling consist of ambient air, groundwater, soil/sediment, direct radiation, and vegetation.~~

Environmental Protection

EP-19. Section 9.2.2.2, Environmental Monitoring – As noted above, Section 9.2.2.2 should have been the location within the LA to describe Environmental Monitoring. LA Section 9.2.2.1, Effluent Monitoring, identifies 14 topics related to the effluent monitoring acceptance criteria. The acceptance criteria closely track the topic headings identified in Section 9.4.3.2.2(1) of the SRP, (NUREG-1520). However, Environmental Monitoring, which should have been numbered as LA Section 9.2.2.2, did not identify the 9 SRP topics related to the environmental monitoring acceptance criteria. LA Section 9.2.2.2 only identified two SRP topics in a very brief and conclusory manner. These two topics only touch lightly on a few of the remaining (missing) topics. Provide additional discussion to address all of the nine SRP topics and provide additional specific cross-referencing.

Environmental Monitoring acceptance criteria in Section 9.4.3.2.2(2) of the SRP (NUREG-1520), which are labeled as being (a) through (i), address the specific information needed in the Effluent Monitoring section of the LA, as discussed above. Provide a brief summary for each of these, as well as a cross-reference to the appropriate LA or ER subsections or subchapters that provide the needed additional detail. Note that it appears that some criteria are not addressed at all (e.g., (d) analytical methods and instrumentation, maintenance and calibration program, (e) action levels and actions to be taken, (f) identify MDCs for Environmental Monitoring that are at least as low as those for Effluent Monitoring for air and water (g) data analysis methods and criteria, and (i) adequacy of environmental data to assess impacts from any releases identified in the ISA). Please provide this missing information.
Section 9.4.3.2.2(2) of the SRP, NUREG-1520, addresses Environmental Monitoring under 10 CFR 20.

RESPONSE: A new section 9.2.2.2, Environmental Monitoring will be added to include the information deleted from the previous section, 9.2.2.1, Effluent Monitoring and expanded to address all 9 SRP topics identified in Section 9.4.3.2.2(2) of the SRP (NUREG-1520).

License Documentation Impact: The following section 9.2.2.2, Environmental Monitoring, will be added as described below.

9.2.2.2 Environmental Monitoring

The following sections address the acceptance criteria related to environmental monitoring.

Background and Baseline Measurements

The Radiological Environmental Monitoring Program (REMP) at the IIFP Facility establishes a process for collecting data for assessing radiological impacts on the environs. The REMP includes the collection of data during pre-operational years in order to establish baseline radiological information that will be used in determining and evaluating impacts from operations at the plant on the local environment. The REMP will be initiated at least 12 months prior to plant operations in order to develop a sufficient database. Prior to facility operations, ~~soil and groundwater~~ samples will be collected from the site and analyzed to determine a baseline to be used in evaluating changes in potential environmental conditions caused by facility operations. Vegetation and soil samples, both from on and off-site locations will be collected on a quarterly basis in each sector during the pre-operational REMP. The REMP is described in the IIFP ER

Section 6.1.2, “Radiological Environmental Monitoring”. Air and water samples will be collected from remote locations in order to provide background data during operations.

Monitoring

~~The REMP~~ Sampling Program is described in the IIFP ER Section 6.1.2.1. The following sections describe the types of monitoring to be performed.

The EMP (IIFP, 2009c) at the IIFP facility is a major part of the effluent compliance program. It provides a supplementary check of containment and effluent controls, establishes a process for collecting data for assessing radiological impacts on the environs and estimating the potential impacts on the public, and supports the demonstration of compliance with applicable radiation protection standards and guidelines. The types and frequency of sampling and analyses are summarized in the IIFP ER Chapter 6.1, Radiological Environmental Monitoring Program. Environmental media identified for sampling consist of ambient air, groundwater, soil/sediment, direct radiation, and vegetation.

Direct Radiation Monitoring

~~Direct radiation monitoring of~~ the stored DUF_6 cylinders will be accomplished by use of environmental thermoluminescent dosimeters (TLDs) placed at the plant perimeter fence line or other location(s) close to the DUF_6 cylinders.

Air Monitoring

~~Air samples will~~ be collected at locations that are close to the plant that would provide the best opportunity to detect and identify plant-related radioactivity in the ambient air. Air monitoring stations will be situated along the fence perimeter, next to the Stormwater Retention Basins, nearest resident, and “control comparative” location. The control sample location will be established beyond 5 km (5 mi) in an upwind sector. Air samplers will operate on a continuous basis.

Vegetation and Soil

~~Vegetation and soil~~ samples, both from on and off-site locations will be collected in five different sectors. Vegetation samples may include vegetables and grass, depending on availability. Soil samples will be collected in the same vicinity as the vegetation samples.

Groundwater

~~Groundwater~~ samples from monitoring wells will be collected. A background well will be located on the up-gradient side of the plant. Two wells will be located down gradient to the plant. One well will be located on the southeast side of the Full DUF_6 Cylinder Storage Pad.

Sediment

~~Sediment~~ samples will be collected from the stormwater runoff retention basis on site to monitor for any buildup of uranic material being deposited.

Stormwater

Stormwater samples will be collected from the site Stormwater Retention Basin and the DUF_6 cylinder storage pads.

Sampling Locations and Frequencies

Table 6-2 of the IIFP ER summarizes the sampling locations, frequencies, and type of analysis to be performed for each Sample Type described previously. Section 6.1 of the IIFP ER lists the proposed sampling and monitoring locations for environmental sampling. The exact locations will be finalized with the completion of final site design.

Monitoring Procedures

Monitoring procedures will employ well-known acceptable analytical methods and instrumentation. The instrument maintenance and calibration program will be appropriate to the given instrumentation, in accordance with manufacturers' recommendations.

IIFP will ensure that the on-site laboratory and any contractor laboratory used to analyze IIFP samples participates in third-party laboratory intercomparison programs appropriate to the media and analytes being measured. IIFP will require that all radiological and non-radiological laboratory vendors are certified by the National Environmental Laboratory Accreditation Program (NELAP) or an equivalent state laboratory accreditation agency for the analytes being tested.

Action Levels

Action levels will be established to identify concentrations at which an investigation will be performed, as well as levels at which process operations would be shut down. Action Levels for vegetation, soil, groundwater, sediment, and stormwater samples will initially be set at twice background. Action levels for direct radiation monitoring samples will initially be set at 10% of the 10 CFR 20 dose limits to the public. Action levels for air monitoring will initially be set at 1% of the 10 CFR 20 Appendix B values. Action levels will be reviewed and adjusted annually as necessary.

Minimum Detectable Concentration

Minimum Detectable Concentrations (MDCs) will be specified for sample analysis on the basis of the action levels. The MDCs will at least as low as those selected for effluent monitoring in air, $3.7x10^{-11}$ Bq/ml ($1.0x10^{-15}$ μ Ci/ml).

Data Analysis

As specified in approved written procedures, data analysis methods and criteria used in evaluating and reporting the environmental sampling results will be appropriate and indicate when an action level is being approached in time to take corrective actions.

Status of Licenses, Permits and Approvals

The federal, state, and local requirements for environmental monitoring are followed in accordance with the licenses and permits described in LA Section 9.2.2.1, “Federal and State Standards for Discharges.”

Monitoring for “High” and “Intermediate” Consequence Accidents

The ISA did not identify any accidents that resulted in “High” or “Intermediate” consequences with respect to environmental impact. However, the environmental monitoring will be adequate for assessing impacts to the environment from potential radioactive and non-radioactive releases.

Environmental Protection

EP-20. Section 9.2.3, Integrated Safety Analysis (ISA) – Clarify whether the IROFS also address the consequences of accidental releases on the environment outside the site boundary. Briefly summarize accidents that could impact the members of the public located outside the facility boundary and any associated IROFS; provide appropriate specific references to the ISA.

Section 9.4.3.2.3 of the SRP (NUREG-1520) addresses environmental protection in the ISA.

RESPONSE: Accident sequences that could result in radiological or non-radiological releases to the environment are described in ISA Section 3, "Processes, Hazards, and Accident Sequences. Demonstration of compliance is provided in Section 4 of the ISA Summary. Section 5 of the ISA Summary details the Process Hazard Analysis Methodology.

Table 5-10, "Risk Matrix and Risk Index Values in the ISA Summary depicts the matrix for the Severity of Consequences and Likelihood of Occurrences. Consequence categories are determined for environmental exposure by comparison of the 24-hour averaged release of radioactive materials outside the restricted area to 5000 times the values in Table 2 of Appendix B to Part 20. If an accidental release results in concentrations exceeding this metric, the accident is assigned a consequence category of intermediate. If the likelihood category of the accident is greater than 2 (not unlikely), then IROFS would be assigned to lower the Risk Index to 4 or less.

There were no accident sequences identified which resulted in concentrations exceeding the environmental performance metric therefore, no IROFS were designated for accidental releases on the environment outside the site boundary.

ISA Summary Section 9.2.3 will be revised as shown below.

License Documentation Impact: Section 9.2.3 of the IIFP License Application, Revision A will be revised to read as follows.

IIFP has prepared an ISA (IIFP, 2009d) in accordance with 10 CFR 70.62, "Safety Program and Integrated Safety Analysis" (CFR, 2009f), which includes the evaluation of high and intermediate consequence events involving releases of radioactive material to the environment. The ISA process is described in detail in LA Chapter 3, Integrated Safety Analysis, and the ISA details and results are provided as the IIFP ISA Summary. Accident sequences that could result in radiological or non-radiological releases to the environment are described in ISA Section 3, "Processes, Hazards, and Accident Sequences. Demonstration of compliance provided in Section 4 of the ISA Summary. Section 5 of the ISA Summary details the Process Hazard Analysis Methodology.

Table 5-10, "Risk Matrix and Risk Index Values in the ISA Summary depicts the matrix for the Severity of Consequences and Likelihood of Occurrences. IROFS are established for any accident for which the Risk Index is greater than 4. Consequence categories are determined for environmental exposure by comparison of the 24-hour averaged release of radioactive materials outside the restricted area to 5000 times the values in Table 2 of Appendix B to Part 20. If an accidental release results in concentrations exceeding this metric, the accident is assigned a consequence category of intermediate. If the likelihood category of the accident is greater than 2 (not unlikely), then IROFS would be assigned to lower the Risk Index to 4 or less.

There were no accident sequences identified which resulted in concentrations exceeding the environmental performance metric therefore, no IROFS were designated for accidental releases on the environment outside the site boundary.

Fire Safety

FS-1 [CLOSED]

Fire Safety

FS-2 [CLOSED]

Fire Safety

FS-3 [CLOSED]

Fire Safety

FS-4 [CLOSED]

Fire Safety

FS-5 [CLOSED]

Fire Safety

FS-6 [CLOSED]

Fire Safety

FS-7 [CLOSED]

Fire Safety

FS-8 [CLOSED]

FS-9 Table 7-1, p. 7-1

Provide reference to the individual edition for each of the various NFPA Standards that INIS is committed to following. Although there is reference to the "most current versions" of NFPA standards, this implies the editions committed to would change over time which would present an unnecessary burden to both the NRC and INIS.

The regulation 10 CFR 40.32(c) requires the applicant to provide equipment, facilities, and procedures which are adequate to protect health and minimize danger to life and property.

RESPONSE: Chapter 7, Table 7-1 of the IIFP License Application will be updated, as shown below under License Documentation Impacts, to show the NFPA code editions and respective date of the edition that INIS is committed to following. Any references to "most current versions" relative to NFPA codes or standards will be removed from the IIFP License Application.

License Documentation Impacts: The original Table 7-1, NFPA Standards of the License Application will be revised to show the dates of the respective NFPA standard that INIS will follow.

Table 7-1 NFPA Standards

Standard	Title of Standard
NFPA 10-2007	Portable Fire Extinguishers
NFPA 13-2007	Installation of Sprinkler Systems
NFPA 14-2007	Standard for the Installation of Standpipe and Hose Systems
NFPA 15-2007	Standard for Water Spray Fixed Systems for Fire Protection
NFPA 20-2007	Installation of Stationary Pumps for Fire Protection
NFPA 22-2003	Water Tanks for Private Fire Protection.
NFPA 24-2007	Installation of Private Fire Service Mains and Their Appurtenances
NFPA 30-2008	Flammable and Combustible Liquids Code
NFPA 45-2004	Fire Protection for Laboratories Using Chemicals.
NFPA 54-2006	National Fuel Gas Code.
NFPA 55-2005	Storage, Use and Handling of Compressed Gases and Cryogenic Fluids in portable and Stationary Containers, Cylinders and Tanks.
NFPA 70-2008	National Electric Code
NFPA 70E-2009	Standard for Electrical Safety in the Workplace®
NFPA 72-2007	National Fire Alarm Code
NFPA 80-2007	Standard for Fire Doors and Other Opening Protectives
NFPA 80A-2007	Recommended Practice for Protection of Buildings from Exterior Fire Exposures
NFPA 85-2007	Boiler and Combustion Systems Hazards Codes
NFPA 90A-2009	Installation of Air-conditioning and Ventilating Systems
NFPA 90B-2009	Installation of Warm Air Heating and Air-conditioning Systems
NFPA 91-2004	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids
NFPA 101-2006	Life Safety Code
NFPA 110-2006	Emergency and Standby Power Systems
NFPA 430-2004	Storage of Liquid and Solid Oxidizers

Fire Safety

Standard	Title of Standard
NFPA 220-2006	Standard on Types of Building Construction
NFPA 221-2006	Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls
NFPA 251-2006	Standard Methods of Tests of Fire Resistance of Building Construction and Materials
NFPA 600-2010	Standard on Industrial Fire Brigades
NFPA 780-2008	Standard for the Installation of Lightning Protection Systems
NFPA 801-2008	Standard for Fire Protection for Facilities Handling Radioactive Materials
NFPA 1410-2010	Standard on Training for Initial Emergency Scene Operations

General Information

GI-1 *Comparison between the topographical features in License Application (LA) Figures 1-3 and 1-4 gives the impression that the 640-acre plot would extend beyond the county sections represented in Figure 1-4.Consistent with NUREG-1520, Section 1.1.4.3(2), trace out the 640-acre property on LA Figure 1-4, similar to LA Figure 1-3, to clarify how county Sections 26, 27, 34 and 35 overlap with the 640-acre property.*

RESPONSE: The site proposed by the Lea County Economic Development Council consisted of four (4) 640-acre Sections from which INIS would select one section on which to build the proposed IIFP Facility. The intent of the original Figure 1-3 in Chapter 1 of the IIFP License Application was to show the general area in relation to Highways 62 and 483. At the time that Figure 1-3 was developed, the exact boundaries had not been clearly defined. The Figure 1-3 outline boundaries shown on the map should have been updated to be correct and consistent with the later information used in the updated correct Figure 1-4.

License Documentation Impact: Figure 1-3 in the License Application Revision A, Chapter 1, Section 1.1.1 will be replaced with the revised Figure 1-3 below. Also, paragraph three of the Section 1.1.1 will be revised to read as follows:

The area surrounding the site consists of vacant land and industrial properties. The general area ~~consisting of four (4) approximate 640-acre Sections is delineated in Figure 1-3, IIFP Site Map with Surrounding Industrial Properties.~~ of the site location consisting of four (4) approximate 640-acre Sections is shown in Figure 1-3 in relation to New Mexico (NM) Highways 483 and U.S. Highway 62.

Figure 1-3 IIFP Site Map with Surrounding Industrial Properties.

Figure 1-3 IIFP~~ General Site Location in Relation to NM Highway 483 and U.S~~. Highway 62

General Information

GI-2 Consistent with the acceptance requirements presented in NUREG 1.2.4.3(4), provide a specific request for a license period such as 10 to 40 years.

RESPONSE: A specific request for a license period of 40 years is being made in the IIFP License Application and described by the revisions below.

License Documentation Impact: In response to RAI GI-2**,** new wording will be added to the 2nd sentence of paragraph six of the IIFP License Application, Revision A, Chapter 1, "General Information". Note: Further modification of the final sentence of the paragraph will be made in response to RAI GI-7A. Section 1 paragraph six will be revised to read as follows:

IIFP is requesting a license authorizing up to 750,000 kilograms of depleted uranium (kgU) to be maintained at any one time in the facility inventory. IIFP is requesting the license authorization for up to 40 years and is plansning to operate the facility indefinitely and continue to renew the licenses as needed. IIFP also has a written agreement with the State of New Mexico on the maximum inventories of major chemicalsdepleted uranium oxides and total depleted uranium that can be maintained on site.

License Documentation Impact: Section 1.4 of the IIFP License Application, Chapter 1, will be revised to read as follows:

1.4 Requested Licenses and Authorized Uses

The Source Material license for the material described in Table 1-4 of Section 1.3 above is requested to be authorized for up to 40 years. IIFP plans to operate the facility indefinitely and continue to renew the license as needed.

IIFP will not store or process Special Nuclear Material (SNM) at the FEP/DUP Facility. Therefore, no licenses and authorized uses for SNM are requested. SNM is defined in 10 CFR 70.4, "Definitions," (2008d).

General Information

GI-3 *Ensure that the page numbering in the electronic version of the Environmental Report (ER) matches the hard copy submitted to the U.S. Nuclear Regulatory Commission (NRC).*

RESPONSE: It is unclear why there would be differences in the page numbering with the electronic version of the submitted Environmental Report with the hard copy submitted to the NRC. The electronic copy submitted matches the paging of the Environmental Report in the NRC Agency Document Access and Management System (ADAMS) Web database. In any new revisions, the page numbering of the electronic submittals will be reviewed to ensure that those match hard copy submittals.

License Documentation Impact: None.

General Information

GI-4 *Integrated Safety Analysis (ISA) Summary Table 4-3 references release scenario evaluation number DUF-00. This term does not appear to be defined in the ISA Summary. Provide a definition for DUF-00 in ISA Summary Table 4-2 or some other appropriate location.*

RESPONSE: DUF-00 is not an IROFS. It is defined as "No IROFS Required." This identifier was used as a placeholder in our Excel spreadsheet. A unique identifier and value was needed in this location to avoid an error in the spreadsheet calculations**.**

License Documentation Impact: The term DUF-00 is being defined and added in the IIFP Integrated Safety Analysis Summary, Section 4.1 to read as follows:

Table 4-1 indicates the definitions for the contents of each column in the accident summary tabulations. Table 4-2 is a reference list of identified IROFS that includes a brief functional description of each item. The term DUF-00 is used as a special identifier in the ISA Summary tables and is defined as "No IROFS required". More detailed descriptions of IROFS are provided in Section 6. It should be noted that these items are shown in numerical order with the exception of numbered items that were originally identified as potential IROFS but were not required after the final risk analysis was completed, Table 4-3, Table 4-4 and Table 4-5 list the potential accident sequences that were identified that could have consequences that are Category 2 or 3 based on the performance criteria of 10 CFR 70.61 (CFR, 2009a). The likelihood, consequence, and risk ratings are also provided. Environmental levels are all determined to be Category 1. The measures to reduce the risk to acceptable levels (IROFS) by either reducing the frequency of occurrence of the events or mitigating the consequences of the events are also identified. Descriptions of the accident sequences are shown in Section 3.

General Information

GI-5 Verify that the LA section break 1.6.3.4 is placed in the proper location or whether it should be moved up one paragraph, next to Hydrology.

RESPONSE: Hydrology was incorrectly identified as a subheading under Section 1.6.3.3, "Severe Weather." Hydrology should have been labeled as Section 1.6.3.4 with the incorrectly labeled Section 1.6.3.4, "Characteristics of Nearby Rivers, Streams, and Other Bodies of Water," as a subheading to Hydrology. The License Application will be revised to correctly label the Sections.

License Documentation Impact: The License Application former Section 1.6.3.3 (now Section 1.7.3.3 in response to RAI RP-13), subsection "Hydrology" will be revised as follows (No change has occurred in the text for the section.):

~~Hydrology~~

1.7.3.4 Hydrology

License Documentation Impact: The License Application, Revision A, Sections 1.6.3.4-1.6.3.8 will be revised as a subheading to new 1.7.3.4 "Hydrology". Subsequent Sections and subsections of the Chapter 1 of the License Application will be renumbered accordingly. (No changes will occur in the text for these sections.):

~~1.6.3.4 Characteristics of Nearby Rivers, Streams, and Other Bodies of Water~~

Characteristics of Nearby Rivers, Streams, and Other Bodies of Water

~~1.6.3.5 Depth to the Groundwater Table~~

Depth to the Groundwater Table

~~1.6.3.6 Groundwater Hydrology~~

Groundwater Hydrology

1.6.3.7 Characteristics of the Uppermost Aquifer

Characteristics of the Uppermost Aquifer

~~1.6.3.8 Design Basis Flood Events Used for Accident Analysis~~

Design Basis Flood Events Used for Accident Analysis

General Information

GI-6 The application should provide a clear understanding of the site operations. Consistent with NUREG-1520, Section 1.1.4.3, provide the following information:

A. The application refers to Phase 1 and 2 of the facility in LA Section 1.2.2, LA Table 7-3, LA Chapter 9, LA Chapter 10, and multiple locations in the ER and other documents. The words "Phase 1" and "Phase 2" gives the impression that the license application covers both Phases. From a licensing review perspective, the only operation under consideration is "Phase 1." "Phase 2" will be evaluated under a completely separate licensing action. This is further obscured by the use of the terms "design/build phase" and "operations phase," both of which are included in the review of the current application. Consistent with NUREG-1520 , Section 1.1.4.3(1), provide the following information: Consider modifying the phrases "Phase 1" and "Phase 2" to refer to separate licensing actions. Make a clear distinction between current application activities and future application activities. Provide an explanation early in Chapter 1 which clearly explains the difference between the current application activities and future application activities. Ensure that this explanation clearly distinguishes between current requested activities and future, non-requested activities.

RESPONSE: In the license application that was submitted in December 2009, the term Phase 1 Facility is used to identify the near-term construction of the initial IIFP Facility and the associated licensing action.

The current license application is only for the near term facility (referred to as Phase 1 Facility) and requested activities within the current license applications is only for Phase 1.

A future expansion is planned (referred to as Phase 2 Facility) that includes additional capacity and a process for direct de-conversion of depleted uranium hexafluoride to depleted uranium oxide. Phase 2 construction and operation will require a separate and future licensing action.

The only part of the current IIFP License Application (LA) where there is a need to identify the separate Phase 2 future licensing action and construction is the Chapter 9, "Environmental Protection." All other references to Phase 2 will be removed from the License Application other than where it is being defined and explained in LA Chapter 1, "General Information."

The referral to a future Phase 2 expansion is briefly discussed in the LA Chapter 9 owing to links and references in the LA Chapter 9 to the IIFP "Environmental Report" (ER). IIFP decided to prepare and submit the ER for the IIFP Site for both the initial facility being covered under the current license application and for the planned expansion later. The future Phase 2 Facility is evaluated in the current ER submittal owing to the plans to add a Phase 2 expansion within approximately 3-4 years of the initial facility operation. However, that Phase 2 expansion would require a separate and future licensing action.

Additionally, the word "Phase" in relation to design/build, construction and operation of the facility will be removed during the next License Application revision.

License Documentation Impact: An explanation beginning with a new third paragraph will be added to the IIFP License Application Chapter 1, "General Information" introductory section, former paragraph three will also be revised. The information in the new paragraphs clarifies the differences between the Phase 1 and Phase 2 Facilities relative to their different construction time periods and separate licensing actions. The introductory section will be revised to read (changes in red text) to read as:

International Isotopes Fluorine Products (IIFP), Inc., a wholly owned subsidiary of International Isotopes Inc. (INIS), intends to build and operate a new uranium processing facility (plant) near Hobbs in Lea County, New Mexico (referred to as the Hobbs site). IIFP will provide services to the uranium enrichment industry for converting (de-conversion) depleted uranium hexafluoride (DUF_6) 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 (SiF_4) and boron trifluoride (BF_3) will be manufactured in the IIFP facility by utilizing the fluorine derived from the de-conversion of DUF_6. The fluoride gas products are highly valuable for applications in the electronic, solar, and semi-conductor markets. In addition, anhydrous hydrogen fluoride (AHF) is a product of the de-conversion and is sold as a chemical in high demand for various industrial applications.

Depleted uranium hexafluoride referred to as "tails" is the by-product of uranium enrichment. Enrichment is required as a vital step in the nuclear fuel cycle to produce fuel for nuclear reactors. All of the existing and planned commercial uranium enrichment processes use uranium hexafluoride (UF_6) as the process gas to produce isotopic enriched UF_6. Upon further processing, the enriched uranium material results in the desired nuclear fuel product. The depleted tails may have some residual value but will ultimately require disposal. A commercial service is needed in the U.S. to convert the DUF_6 into the more stable uranium oxide for long term disposal. This process is generally referred to as "de-conversion". IIFP is proposing to design, engineer and license the nation's first privately-owned commercial facility for de-conversion of DUF_6.

IIFP is applying for a license to construct and operate a facility for commercial de-conversion services and production of high-purity products as discussed above. This current license application and requested licensing activities considers only the near term initial facility construction and operation and is referred to as the Phase 1 Facility and licensing action.

A future expansion is planned (referred to as Phase 2) but it is not part of the current licensing activity or application. Any such new expansions (or facility phases) would be licensed and constructed in different time periods under separate licensed actions.

The only part of the current license application where there is a need to identify the future and separate Phase 2 licensing action and construction is the Chapter 9, "Environmental Protection." The referral to a future Phase 2 expansion is briefly discussed in the LA Chapter 9 owing to links and references in the LA Chapter 9 to the IIFP "Environmental Report" (ER). IIFP decided to prepare and submit the ER for the IIFP Site for both the initial facility being covered under the current license application and for the planned later expansion. The future Phase 2 Facility is evaluated in the current ER submittal because of plans to add a Phase 2 expansion within approximately 3-4 years of the initial facility operation. However, that Phase 2 expansion would require a separate and future licensing action.

This ~~Chapter provides an overview of the~~ initial ~~IIFP Facility; specifically named the~~ Fluorine Extraction Process/Depleted Uranium De-Conversion Plant (FEP/DUP) commercial facility along with a description of the facility and various processes and a description of the FEP/DUP site. Institutional information is provided to identify the applicant, describe th~~e applicant's financ~~ial qualifications, and describe the proposed license activities.

License Documentation Impact: Section 1.2.2 of the IIFP License Application will be revised to read as follows:

1.2.2 Financial Qualifications

IIFP estimates the total initial capital and startup cost of the initial IIFP Facility FEP/DUP commercial facility to be approximately $75-90 million dollars (estimated in 2009 US dollars), excluding escalation, in~~terest,~~ waste disposition, decommissioning, and any repl~~acement equipment required~~ during the life of the facility.Plans are to finance the facility mostly through capital funding investors.

~~IIFP presently intends to~~ utilize a surety bond and Standby Trust Fund method to provide reasonable financial assurance of that decommissioning funding will be available at the time of decommissioning the facility. At least six months prior to startup of the Phase 1IIFP Ffacility described in the current license ~~a~~pplication, IIFP will provide NRC the financial assurance instrument that IIFP intends to execute. Upon finalization of the specific ~~funding~~ instrument to be used and at least 21 days prior to the commencement of operations, IIFP will supplement its application to include the signed, executed documentation. The surety bond and fund will provide assurance that decommissioning costs will be paid in the unexpected event IIFP is unable to meet its decommissioning obligations at the time of decommissioning. In this case, funds drawn from the surety bond will be placed directly into a standby trust fund naming the U.S. Nuclear Regulatory Commission as the beneficiary.

A Decommission Funding Plan (DFP) for the facility is developed and provided as Chapter 10 of the IIFP NRC Licensing Application.

License Documentation Impact: The third paragraph of the IIFP License Application, Chapter 9 introductory section will be revised to read as follows:

It also should be noted, that in In addition to the proposed facility requested in the current licensing activity and License Applicationof this submitted LA, the ER evaluates the ~~environmental effects of~~ ~~an~~ a future add-on DUF_6 process for direct de-conversion to depleted uranium oxide, referred to as Phase 2. The ~~DUF_6-to-oxide de-~~conversion future expansion is not part of the current Licens~~e~~ Application or requested activities. The future Phase 2 process was evaluated in the current ER submittal owing to the plans to begin adding this process to the original facility within approximately 3-4 years of the first facility operation. The DUF_6-to-oxide de-conversion plant is not part of this initial LA. The Phase 2 expansion would require a separate and future licensing activity at the appropriate time to its construction. Plans ~~are to amend the LA for the future Phase 2 process at the appropriate time.~~

~~**License Documentation Impact:** The first paragraph~~ (split to create a new second paragraph) of Section 9.1 of the IIFP License Application will be revised to read as follows:

9.1 Environmental Report

The ER (IIFP, 2009) constitutes one portion of an application to be submitted by IIFP to construct and operate a facility that offers de-conversion services of DUF_6 and extracts the fluoride from the DUF_6 to produce high-purity fluoride gas products and anhydrous hydrofluoric acid (AHF). During this Phase 1 process the DUF_6 uranium will be de-converted into depleted uranium (DU) tetrafluoride (DUF_4) and then into DU oxide in the fluorine extraction process. In the future Phase 2 F~~f~~acility, that will be licensed and constructed as a separate activity, an additional process will be used for direct de-conversion of DUF_6 to AHF and depleted uranium oxide. In both processes, the fluorine products and AHF are sold, and the depleted uranium oxide is sent for off-site disposal to a licensed low-level radioactive waste disposal facility.

The proposed IIFP F~~f~~acility~~, and planned phase 2 expansion,~~ will be located near Hobbs, New Mexico (Figure 9-1). The ER for the proposed facility serves two primary purposes. First, it provides information that is specifically required by the Nuclear Regulatory Commission (NRC) to assist it in meeting its obligations under the National Environmental Policy Act (NEPA) of 1969 (NEPA, 1969) and the Environmental Protection Agency's (EPA) NEPA-implementing regulations. Second, it demonstrates that the environmental protection measures proposed by IIFP are adequate to protect both the environment and the health and safety of the public.

License Documentation Impact: The introductory section of IIFP Chapter 10, "Decommissioning" will be revised to eliminate references to a Phase 2 facility and will read (changes in red text) as follows:

10 Decommissioning

This chapter presents the International Isotopes Fluorine Products, Inc. (IIFP) Plant initial Decommissioning Funding Plan for its Fluorine Extraction Process and Uranium De-conversion Plant (FEP/DUP). This Decommissioning Funding Plan (DFP) has been developed following the guidance provided in NUREG-1757 (NRC, 2006). The DFP is for only the current IIFP License Application and licensing activities. Any future facility expansions of licensing actions would require an amended or separate DFP.

~~The IIFP facility will be constructed in two phases, with Phase 1 completing the DUF_6 to DUF_4 process and the DUF_4 to fluorine products processes and the supporting infrastructure of the plant. IIFP plans to expand the facility de-conversion capacity by constructing a Phase 2 plant approximately 4 years later. The current licensing application, Integrated Safety Analysis (ISA) and Decommission Funding Plan submittal are for Phase 1 construction and operation only. Separate or amended licensing and a revised DFP will be developed and submitted at an appropriate time during the licensing process of the Phase 2 project. The Phase 2 will consist of the additional processing equipment to convert DUF_6 directly into uranium oxide.~~

IIFP, Inc., as a wholly owned subsidiary of International Isotopes, Inc. (INIS), commits to decontaminate and decommission the facility at the end of its operation so that the facility and grounds can be released for unrestricted use. The Decommissioning Funding Plan will be reviewed and updated as necessary at least once every three years starting from the time of the start of operations. Prior to facility decommissioning, a Decommissioning Plan will be prepared in accordance with 10 CFR 40.42 (CFR, 2008a) and submitted to the NRC for approval.

This chapter fulfills the applicable provisions of NUREG-1757 (NRC, 2006) through submittal of information in tabular form (Tables 10-1 through 10-18) as suggested by the NUREG.

License Documentation Impact: The first paragraph of the IIFP License Application Section 10.1 will be deleted and the revised Section will read as follows. Also, the wording "Phase 1" will be deleted from the title of Section 10.1.1 as shown below.

10.1 Deco mmissioning Strategy

~~The Decommissioning Funding Plan addresses the overall strategy for decommissioning the entire Phase 2 facility. However, because of the two-phase construction approach to this facility, the DFP only provides a detailed cost estimate, schedule and the financial assurance plan for the Phase 1 equipment and the infrastructure equipment that will be common to both phases. This initial DFP, including cost estimates, schedule and financial assurance, assumes that only a Phase 1 facility would exist at the time that decommission is required. This strategy of preparing and submitting an initial DFP for Phase 1 facilities only, in this license application, conservatively considers that IIFP would cease business before Phase 2 is constructed or that Phase 2 would not materialize. This contingency strategy does provide for the financial assurance of the Phase 1 facility in any case. Expansion of the plant to Phase 2 will require amendments to the IIFP license, and the DFP will be updated and re-submitted to the NRC for approval prior to the introduction of nuclear materials into the Phase 2 portion of the facility.~~

The overall strategy for decommissioning is to decontaminate or remove all materials from the site in order to release the facility and the site for unrestricted use. This approach avoids long-term storage and monitoring of wastes on site. The type and volume of wastes produced at the FEP/DUP facility do not warrant delays in waste removal normally associated with a deferred dismantlement option.

At the end of useful plant life, the FEP/DUP facility will be decommissioned such that the site and remaining facilities may be released for unrestricted use as defined in 10 CFR 20.1402 (CFR, 2008b).

All remaining facilities will be decontaminated where needed to acceptable levels for unrestricted use. Hazardous wastes will be treated or disposed of in licensed hazardous waste facilities. Disposal of radioactive or hazardous material will not occur at the plant site, but at licensed facilities located elsewhere. Following decommissioning, the facilities and site will be available for reuse.

Financial arrangements are made to cover costs required for returning the ~~Phase 1 portions of the site~~ initial IIFP Facility to unrestricted use. Updates on cost and funding will be provided as described above. A detailed updated Decommissioning Plan will be submitted at a date near end of plant life, in accordance with 10 CFR 40.42 (CFR, 2008a).

The following describes decommissioning plans and funding arrangements. This information was developed in support of the decommissioning cost estimate. Specific elements of the planning may change with the submittal of the decommissioning plan required at the time of license termination.

10.1.1 IIFP ~~Phase 1~~ Facility Description

License Documentation Impact: Paragraph two in LA Section 10.1.3.1 and the first paragraph in Section 10.3.2 will be revised to eliminate references to a Phase 2 facility and will read (changes in red text) as follows:

Actual decontamination and decommissioning would follow shortly upon approval of the plan and the award of any subcontracts. The decommissioning plan schedule for the ~~Phase 1~~IIFP F~~f~~acility is shown as Figure 10-1. ~~At the time of required decommissioning, if only a Phase 1 plant exists, then upon decommissioning and final survey and confirmation by the NRC, the license would be terminated and the site/facility could be released for reuse. If a Phase 2 also exists at the time of required decommissioning, the updated future DCF Plan for Phase 2 will have indentified the costs, schedule and any decontamination and decommission requirements for the~~ ~~DUF_6~~ ~~to oxide process beyond those already identified in the Phase 1 Plan.~~

In accordance with 10 CFR 40.36(d) (CFR, 2008h), IIFP will update the decommissioning cost estimate for the FEP/DUP, and the associated funding levels, over the life of the facility. Updates will take into account changes resulting from inflation or site-specific factors, such as changes in facility conditions or expected decommissioning procedures. ~~Funding level updates will also address anticipated operation of Phase 2 portions of the facility prior to introducing nuclear materials into that equipment.~~

License Documentation Impact: Table 7-3 of the IIFP License Application will be revised to delete the subtitle “Phase 1” from the second row of the Table. The remaining Table data are for the IIFP Facility that is described in the current licensing activities and License Application.

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B. LA Sections 1.1.2.1 and 1.1.2.2 and Table 1-2 provide a description of each of the major buildings at the facility. However, buildings which process uranium (listed in Table 1-2 in bold text) are grouped and described in general terms, while other major buildings, e.g., decontamination building, fire pump house, etc. are described individually, building by building. Consistent with the requirements in NUREG-1520, Section 1.1.4.3 (2), provide a description of the processes conducted in the processing of uranium, building by building, similar to the other major buildings listed in Section 1.1.2.2. Ensure that the description is presented in a manner that facilitates an understanding of the flow of material through the process.

RESPONSE: The process buildings and their type of construction were described in LA Section 1.1.2.1 mainly as a group as we viewed the LA Chapter 1, "General Information" as more introductory to the License Application. We described the "Other Major Buildings" in more detail in Section 1.1.2.2 originally in order to differentiate their type of construction and individual functions in support of the process building group. The Section 1.1.2.1 is being revised, as shown below, to include individual process building descriptions and in a manner that will describe the basics of flow of material through the processes that are later described in the Section 1.1.3 of the LA Chapter 1, "General Information".

License Documentation Impact: Starting at Paragraph four of Section 1.1.2 the Section is being revised to move and update the Table 1-2. Additional wording and a list have been added to the end of paragraph seven in response to RAI EP-2(black text is original and red text is change) to read as follows:

The process equipment is located within building structures, where feasible. Process buildings that function as product and waste material storage have separate areas for each purpose. Those areas have loading/unloading docks to facilitate shipping.

Process buildings have aprons, curbing and dikes and external pads have curbing and dikes where chemicals are stored or handled. Pumps are provided on pads and in building selected areas to transfer chemicals to containers or to the Environmental Protection Process (EPP) in event of a spill or leak.

Auxiliary buildings generally house:

- Materials;
- Maintenance shop;
- Laboratory equipment;
- Steam boilers and supporting utilities;
- Electrical utility equipment;
- Sanitary water treatment, certain equipment for process water treatment and recycle, and
- Accommodation for personnel work, break-rooms, change-rooms, and toilets.

Buildings, lighting, fire protection, and building support systems are designed in accordance with latest revisions, of building and construction codes including where applicable the National Fire

Protection Association (NFPA) standards, local and State codes, and related codes and standards. NFPA Standards are listed in Table 7-1. The primary applicable codes and standards (editions applicable at time of design) for the design and building requirements of the IIFP Facility include the following:

- Uniform Plumbing Code (UPC) as amended by the New Mexico Plumbing Code (NMPC).
- International Energy Conservation Code (IECC) as amended by the New Mexico Energy Conservation Code (NMECC).
- Uniform Mechanical Code (UMC) as amended by the New Mexico Mechanical Code (NMMC).
- International Building Code (IBC) as amended by the New Mexico Commercial Building Code (NMCBC).
- National Electrical Code (NEC) as amended by the New Mexico Electrical Code (NMEC).
- International Fire Code (IFC).
- ASME/ANSI B16 Standard for Pipe and Fittings.
- ASME/ANSI B31 Pressure Piping (includes, power piping, process piping, gas piping, etc.).
- ASME Section VIII, Div 1 Design and Fabrication of Pressure Vessels. Latest Edition.
- API 620 Design and Fabrication of Atmospheric Storage Tanks.
- AISC Standards for Steel Construction.
- ASTM Standards for Steel Building Construction.
- ACI for Concrete Construction.

A listing of the major buildings and estimated sizes is provided in Table 1-2.

Table 1-2 IIFP FEP/DUP Plant Building Sizes

BUILDING **(Areas where uranium is processed or stored are marked in "bold" print")**	**DIMENSIONS (feet)**			**APPROXIMATE AREA (square feet)**	**APPROXIMATE VOLUME (cubic feet)**
LENGTH		**WIDTH**	**EAVE HEIGHT**		
DUF_6 Autoclave Building	90 60		40	5,400	216,000
DUF_4 Process Building	50 50		70	2,500	175,000
DUF_4 Container Storage Building	~~40~~50	40 18		~~1,600~~2,000	~~28,800~~36,000
DUF4 Container Staging Building	25 25		18	625	11,250
Decontamination (Decon) Building	50 30		30	1,500	45,000
FEP Process Building (SiF_4 and BF_3)	60	~~40~~50	~~60~~70	~~2400~~3,000	~~144~~210,000
FEP Oxide Staging Building	~~40~~50	20 30		~~800~~1,000	~~24~~30,000
FEP Product Storage & Packaging Building	50	35	18	1,750	31,500
AHF Staging Containment Building	40	30	30	1,200	36,000
Fluoride Products Trailer Loading Building	90	20	20	1,800	36,000
Maintenance & Stores Building	60	50	15	3,000	45,000
EPP Building	40	30	18	1,200	21,600
~~Lime Silo Storage Shed~~	~~20~~	~~20~~	~~8~~	~~400~~	~~3,200~~
Utilities Building	50	50	18	2,500	45,000
Material Warehouse	100	50	18	5,000	90,000
Main Switchgear Building	50	40	18	2,000	36,000
Fire Pump House	~~10~~20	~~10~~20	15	~~100~~400	~~1,500~~6,000
Water Treatment Building	30	15	15	450	6750
Process Offices	50	30	15	1,500	22,500
Laboratory (**Small uranium samples handled)**	30 30		15	900	13,500
Administrative Building	80	50	15	4,000	60,000
Guard House	25	20	10	500	5,000

License Documentation Impact: LA, Section 1.1.2.1 is being revised (black text is original and red text is change) to read as follows:

1.1.2.1 Process Buildings and Process Areas

General Description

The DUF_6 Autoclave Building, DUF_4 Process Building, DUF_4 Container Storage Building, DUF_4 Container Staging Building, Decontamination (Decon) Building, FEP Process Building (SiF_4 and BF_3), FEP Oxide Staging Building, FEP Product Storage & Packaging Building and the EPP Building are of structural steel beam and column construction with metal wall panels and with Class 1 metal roofs. The first floor of each building is constructed of reinforced concrete with cur~~bing to function as a containment-type~~ barrier. ~~Located in the northeast corner of th~~e access pad and adjacent to the DUF_4 Process Building, is the DUF_4 Container Staging Building. This building is used for removing DUF_4 from DUF_4 sh~~ipping containers that may be received from suppliers and for transferring into the DUF_4 hoppers located in the DUF_4 Process Building.~~

~~The AHF Staging Containment Building and the Fluoride Products Trailer Loading Buildin~~g are constructed of reinforced concrete floor slabs with a containment-type barrier design around the inside perimeter. The upper sections of these buildings are of concrete or concrete block construction with Class 1 metal roofs.

Radiological boundary control hand-foot monitors are strategically located at building walkway exits of areas where determined to be needed. Fluoride and radiological detection systems, local alarms and alarm notification to Controls Rooms are also strategically located in those building areas, where applicable.

The process buildingsDUF_4 Process Building and the FEP Process Building are multi-story buildings where necessary to provide requirements for equipment space and to provide elevations for p~~ermitting gravity~~ flow of particulate solids through equipment and piping, where applicable. The upper~~ floors are configured such as to provide adequate room for equip~~ment function and maintenance. The upper floor areas below the equipment and piping containing powdered ~~materials are constructed of reinforced concrete with curbing and seal coatings on floor and wall surfaces. Othe~~r upp~~er flo~~or areas of the buildings are constructed of metal grating or metal flooring.

Process Control Rooms are provided in the major processes, including appropriate monitoring, recording, alarm notification and control instrumentation. A Control Room is located in the DUF_4 Process Building. The DUF_6 Autoclave Building is controlled from the DUF_4 Process Building. The FEP Process Building plant has its own process Control Room for the SiF_4 and BF_3 processes. The AHF Staging Containment Building and Fluoride Products Trailer Loading Facility Building share a Co~~ntrol~~ Room. Likewise, one control area is located in the Utilities Building for monitoring and controlling the steam boiler system, air compressors and other utility ~~supply e~~quipment. Control room areas and electrical and instrument rooms are typically of concrete block construction with concrete or metal roofs. Ceiling assemblies and fire walls separate these areas from production areas of the facilities. Process area Control Rooms, where routinely occupied by workers, have environments maintained for comfort and safety. Control Rooms located in process areas, where uranium or hazardous chemicals are processed, stored or handled, have separate heating, ventilation and air conditioning (HVAC) systems. The Control Rooms in these areas are designed to maintain a positive pressure environment with high-efficiency filtration of intake air and are provided with low pressure alarms to notify occupants should a loss of pressure inside a Control Room occur.

The process buildings are classified per NFPA 13 as Ordinary Group 2 and are protected with 100 percent coverage, wet-type fire protection sprinkler systems with Class 1 standpipes between floors in all exit stairways of multi-story buildings. (NFPA, 2007). Codes followed for construction are the latest editions as adopted by the State of New Mexico. Further information is provided for code construction conformance requirements in the IIFP Integrated Safety Analysis Summary, Section 2.3. IIFP will contract and use a Design and Build contractor for detail design, engineering and construction of the IIFP Facility. A final Record of Codes for construction will be established at the time the Design and Build contractor starts the detail design.

Each process building/area and its relationship to respective process flows are further described below.

Full DUF_6 Cylinder Storage Pad

Cylinders containing solid DUF_6 are received by truck from customers/suppliers in accordance with approved Department of Transportation shipping requirements. After following pre-unloading procedures for material accountability, cylinder inspection, shipping document verifications, and IROFS requirements related to assay and weight verification, the cylinder is unloaded for temporary storage at the Full DUF_6 Cylinder Storage Pad. This pad is used to stage full DUF_6 cylinders for processing. Cylinders are moved by a special cylinder hauler to the DUF_6 Autoclave Building as needed for feeding of contents to the DUF_6-to-DUF_4 process. Protective anchored concrete-filled pipe bollards are installed around the perimeter of the cylinder pad in locations where a potential exposure to uncontrolled vehicle traffic exists. The pad is constructed of reinforced concrete and is approximately 175 feet wide by 200 feet long and is sized to store up to 60 full cylinders. The entire storage pad is curbed for storm water collection and is provided with underground drains connecting to the Cylinder Pad Stormwater Retention Basin located south of the cylinder pad. The surface and slope of the cylinder pad is designed to prevent any significant pooling of liquids. The pad is provided with saddles to space and support the cylinders. A full cylinder is placed in a saddle and never stacked.

DUF_6 Autoclave Building

The DUF_6 Autoclave Building is one level and includes a large overhead area to accommodate a bridge crane. The building contains two containment-type autoclaves that use controlled steam to safely vaporize the solid DUF_6 for feeding to the DUF_4 process. The vaporized DUF_6 flow is from the feed cylinder located in the autoclave through a feed header and piping to the DUF_6-to-DUF_4 reaction vessel that is located in the DUF_4 Process Building. Typically, the content of one DUF_6 cylinder is being fed to the reaction vessel from one autoclave. The other autoclave is going through a cycle of unloading an emptied cylinder, reloading of a full solid-contents cylinder and heating the cylinder contents in preparing it to be fed to the reaction vessel.

Also included in the DUF_6 Autoclave Building are two cold boxes cooled by refrigeration systems and sized to contain one 48Y-type cylinder each. One cold box is used to collect DUF_6 cylinder heels after cylinders have been fed out to the DUF_4 process. The other cold box is the receiving vessel for the purge and evacuation system that serves the DUF_4 process.

Two rail mounted cylinder carts and weigh scales are provided in the autoclave area. One cart and scale are located between the two autoclaves, and the other cart and scale are located between the cold boxes. An overhead bridge crane is installed to hoist the DUF_6 cylinders into and out of the autoclaves and cold boxes. The crane path is designed to permit lateral movement without traveling above an autoclave or cold box containing a DUF_6 cylinder.

Motor Control Center (MCC) and instrumentation equipment rooms are located in the east end of the DUF_6 Autoclave Building on the first floor.

Just west of the DUF_6 Autoclave Building, a reinforced concrete pad is installed as a staging area for DUF_6 cylinders. This pad is located at the entrance doors to the DUF_6 Autoclave Building to provide for staging of both empty and full cylinders by the cylinder hauler to and from the out~~door cylinder storage pads. Protective and~~ ~~d concrete-filled pipe bollards are ins~~talled around the staging area for protection of DUF_6 cylinders from vehicular traffic.

Empty DUF_6 Cylinder Storage Pad

Approximately 150 ft east of the intersection of the East and South Roads is the Empty DUF_6 Cylinder Storage Pad. This pad is used to stage empty DUF_6 cylinders in preparation for shipment from the facility. A security fence is installed around the entire perimeter of the cylinder pad with one entrance opening with clearance for the cylinder hauler to maneuver. The pad is constructed of reinforced concrete and is approximately 105 ft wide x 185 ft long and sized to contain up to 40 empty cylinders. The pad is provided with saddles to space and support the cylinders. Empty cylinders may be double stacked if necessary.

DUF_4 Process Building

The DUF_4 Process Building is a five level building adjacent to the DUF_6 Autoclave Building with a fire barrier between the two buildings. It is within this building that DUF_6 is converted to DUF_4 and AHF.

The DUF_6 from the DUF_6 Autoclave Building flows to the DUF_6 surge tank where it enters the top of the DUF_6 to DUF_4 reaction vessel. Also hydrogen gas from the hydrogen gas generator system, that is located outside and remote of the DUF_4 Process Building, flows through control systems into the top of the reaction vessel. The DUF_6 reacts with the hydrogen gas to form DUF_4 solid particles and AHF gas. The DUF_4 powder is removed from the reaction vessel by a cooling screw where it is transported to hoppers for temporary storage. The AHF exits the bottom of the reaction vessel through the cooling screw as an off-gas; passes through two sets of filters in series configuration; through a series of carbon-bed traps to remove any residual un-reacted DUF_6 then through two in-series condensers where the AHF liquefies and drains into temporary storage tanks that are located in the AHF Staging Containment Building. The residual off-gas that passes through the second condenser flows through a hydrogen burner and the Plant KOH Scrubbing System and vent stack, all of which are located external to the DUF_4 Process Building.

The top level of the DUF_4 Process Building contains the top portion of the reaction vessel and the DUF_6 surge tank. Also on this level are the primary and secondary dust collectors and dust collector blower. The fourth level houses six carbon-bed traps (configured as two banks of three traps in series), the off-gas primary filter, and the off-gas secondary filter. The partial AHF condenser, total AHF condenser and the cooling screw conveyor are located on the third level. The second level contains the product transfer screw, vibrating screen and the top heads of the three DUF_4 storage hoppers. The bottom outlets of the three DUF_4 storage hoppers and the product vacuum transfer system are located on the first level. One bay is clear on all floors to be used to facilitate maintenance of equipment, instrumentation and piping. Just west of the DUF_4 Process Building, a reinforced concrete equipment access pad is installed to provide access to equipment for removal from the DUF_4 Building if removal of such equipment is required for maintenance.

DUF_4 Container Staging Building

Located in the northeast corner of the access pad and adjacent to the DUF_4 Process Building, is the DUF_4 Container Staging Building. The purpose of this building is to provide equipment and space ~~for unloading, staging and emptying DUF$_4$ containers that may have been used to~~ temporarily store additional inventory of DUF$_4$. The building may also be used to handle DUF$_4$ that may be received from other suppliers for conversion of DUF$_4$ to fluoride gas products. This building is used for removing DUF$_4$ from storage or shipping containers and for transferring into the DUF$_4$ hoppers located in the DUF$_4$ Process Building.

Decontamination (Decon) Building

The Decontamination Building serves as a facility with equipment to manage Low-Level Contaminated Waste (LLW) other than the depleted uranium oxide waste. A more detail explanation in the use of the Decontamination Building to manage LLW is provided in Section 9.2.2.1, “Waste Management Procedures;” Chapter 9 of the IIFP License Application.

The Decontamination (Decon) Building is located adjacent to, and on the north side of the DUF$_4$ Process Building. The construction provides for a fire barrier between the Decontamination Building and the DUF$_4$ Process Building. This Decon Building and its equipment is used for decontamination of process equipment for maintenance and removal of depleted uranium from decontamination wash waters or from small volumes of contaminated liquors. The Decon Building contains an equipment cleaning booth and hood system, primary and secondary dust collector system in series, holding tanks, precipitation tanks, primary and polishing filters, associated pumps, piping, field equipment instrumentation panels, ion exchange columns and associated controls and backwash systems.

FEP Process Building

The FEP Process Building is a four level building located just east of the DUF$_4$ Process Building. The SiF_4 and BF_3 processes that involve licensed material are housed in this building. The flow of process materials for both of these processes begins with DUF$_4$ being transported from the DUF$_4$ Process Building to the respective DUF$_4$ feed hoppers (bin) in the FEP Process Building.

In the SiF_4 process, the DUF$_4$ is mixed with SiO_2 and fed to the rotary calciner equipment. In the rotary calciner the mixture reacts to form SiF_4 gas and solid particle uranium oxide. The depleted uranium (DU) oxide discharges the end of the rotary calciner and is temporarily stored in hoppers until packaged for shipment to an off-site licensed disposal facility. The SiF_4 product exits the rotary calciner as an off-gas, flows through a set of filters configured in series flow and through pre-condensers for removing hydrogen fluoride (HF) impurities. The product gas then flows to primary and secondary cold traps where the product is collected. The residual off-gas from the secondary cold trap flows to the Plant KOH Scrubbing System to receive three-stage treatment prior to discharging to the atmosphere through the vent stack.

In the BF_3 process, the DUF$_4$ is mixed with B_2O_3, fed into a pre-heater where moisture is removed by forming HF that leaves the pre-heater as a vapor and flows to the Plant KOH Scrubbing System. The mixed solids discharge the pre-heater into a rotary calciner where the BF_3 product gas and uranium oxide are produced. The depleted uranium oxide discharges the rotary calciner to temporary storage hoppers until packaged for shipment to an off-site licensed disposal facility. The BF_3 product gas flows from the rotary calciner through two in-series filters, through pre-condensers for HF impurity removal, and then is collected in primary and secondary cold traps. The off-gas that exits the secondary cold trap flows to the Plant KOH Scrubbing System for three-stage treatment prior to discharging to the atmosphere through the vent stack.

The top level of the FEP Building supports the product cold traps, the pre-condensers, secondary filters, primary and secondary dust collectors, and dust collector blower. The third level houses the primary filters, the SiO_2 and B_2O_3 feed hoppers, DUF_4 feed hopper, the dust collector fines hopper, the ribbon blender, the feed conveyors, and the pre-heater (for the BF_3 process only). The second level contains the rotary calciners for the SiF_4 and BF_3 processes. The cooling screws associated with the rotating calciner discharges are also on the second level. The oxide hoppers and the drum-off stations are located on the first level. Also located on the first level are the FEP Control Room, as described above, and the electrical equipment room.

The largest amount of solid waste generated at the IIFP Facility is the depleted uranium oxide that is a byproduct of the FEP process. This waste is managed using the equipment and facilities of the FEP Process Building and the FEP Oxide Staging Building. The use of these buildings and associated equipment in managing this oxide waste is described in Section 9.2.2.1, "Waste Management Procedures;" Chapter 9 of the IIFP License Application.

FEP Oxide Staging Building

The FEP Oxide Staging Building is adjacent to, and on the east-side of the FEP Process Building. The wall between the FEP Oxide Staging Building and the FEP Process Building is a fire barrier. This building is a two level building with a reinforced concrete floor on the first level with containment-type curbing. It is used for staging of oxide waste containers for loading into truck trailers and transporting to an off-site licensed waste disposal facility. Equipment in the building consists of enclosed container-loading stations, weighing equipment, electrical and instrumentation monitoring and alarm panels and controls, exhaust hood systems, piping and ductwork connections to the primary dust collector system.

DUF_4 Container Storage Building

Just east of, and adjacent to, the FEP Oxide Staging Building is the DUF_4 Container Storage Building. This building is used to store additional inventory of DUF_4 or shipping containers of DUF_4 that may be received from suppliers. This source of DUF_4 can be used in production of FEP products and/or de-converted to depleted uranium oxide.

FEP Product Storage and Packaging Building

The FEP Product Storage and Packaging Building is separated from, and located at the south side of the FEP Process Building. In this building, the purified SiF_4 and BF_3 products, which are chemically and physically separated from licensed material, are received for temporary storage and packaging. When a product cold trap in the FEP Process Building is ready to be unloaded, the respective product compressor and evaporator in the FEP Product Storage and Packaging Building is used to transfer the product to storage tubes in this building. The building contains two levels and has a reinforced concrete floor on the first level with containment-type curbing. The equipment in this building is used transfer product from temporary storage tubes to truck tube-trailers located in the Fluoride Products Trailer Loading Building or to package and store SiF_4 and BF_3 product gas in cylinders for shipment to customers. This building houses the FEP compressors and associated coolers, product evaporator vessels, storage systems, containment-type enclosures containing the packaging manifolds, and the exhaust hoods and ductwork that connect to an emergency scrubber. The FEP product gas storage system consists of 12-in. diameter by 30 ft long, high pressure, ASME coded and stamped storage tubes inside a common cooling area. Approximately 30 FEP product storage tubes that are configured in banks of five are provided, including the spare tubes.

FEP Building Dock

An elevated dock on the southeast side of the FEP Process Building provides access for truck loading for transporting oxide containers to licensed waste disposal facilities and for truck loading for shipping SiF_4 and BF_3 cylinders to customers.

Plant Potassium Hydroxide (KOH) Scrubbing System

A KOH liquid scrubbing system is used to remove residual fluorides from each process off-gas prior to venting the off-gas flows to the atmosphere. This Plant KOH Scrubbing System vents treated gases through a single stack. The system is utilized to treat final off-gas streams from the DUF_4 production process (DUF_6 to DUF_4) and the SiF_4 and BF_3 processes. The off-gas streams flow first through a concurrent-venturi where the gas contacts aqueous KOH solution and then flow is through a counter-current flow pack tower where further scrubbing with aqueous KOH solution occurs. Final scrubbing of the gas is achieved by flow through a bed of sized coke in contact with a counter-current flow of aqueous KOH solution, where the treated gas is then discharged through a vent stack to the atmosphere. The Plant KOH Scrubbing System stack is monitored to measure for traces of fluorides or uranium in the vent gas.

The spent liquors resulting from scrubbing the fluorides contain mainly potassium fluoride, water and some un-reacted KOH. The spent liquors are sent to the Environmental Protection Process (EPP) Building to regenerate the KOH liquid for recycle back to the scrubbing system.

The KOH venturi-type (primary), packed tower (secondary), and coke box (tertiary) scrubbers and pumps; KOH tanks and associated equipment; and dike pad that serve the DUF_4 process are located outside and adjacent to the east side of the DUF_4 Process Building. The system consists of two similar lines of three-stage in-series scrubbers.

The primary scrubber equipment (venturi-type) for the FEP process is located outside and on the west side of the FEP Process Building, with the venturi off-gas vents connected by piping to the packed towers of the scrubber system that serves the DUF_4 process. This configuration provides secondary and tertiary treatment of the final effluents from the FEP processes prior to venting to the atmosphere.

Environmental Protection Process Building

The Environmental Protection Process (EPP) Building is located east of the DUF_4 Container Storage Building and inside the EPP process dike area. The building equipment is used to treat fluoride bearing liquors for recycle and reuse in the plant processes. In this process, lime is reacted with spent KOH solution that is received from the Plant KOH Scrubbing System. The reaction results in regeneration of KOH and formation of calcium fluoride. The solid particle calcium fluoride (CaF_2) is filtered and dried for shipment to customers or disposal at an off-site licensed disposal facility. The regenerated KOH is pumped back to the Plant KOH Scrubbing System for reuse.

The building houses the EPP control systems, rotary vacuum filter, dryer feed screw, dryer, and discharge screw. Equipment for reacting lime with the fluoride bearing liquors includes the reaction tank, clarifier, pumps, regenerated KOH recycle tank, holding/feed tanks, and associated equipment. This equipment is located outside the EPP Building and within the process dike area.

AHF Staging Containment and Fluoride Products Trailer Loading Buildings

The AHF Staging Containment Building and the Fluoride Products Trailer Loading Building are located east of the DUF_4 Autoclave Building and south of the FEP Product Storage and Packaging Building. A fire barrier is located between the AHF Staging Containment Building and the Fluoride Products Trailer Loading Building, and between the FEP Product Storage and Packaging Building and the Fluoride Products Trailer Loading Building. A minimum number of sealed pipes and conduits penetrate the walls separating these buildings. Each building is constructed as a separate enclosed area. The buildings are not totally leak tight, but provide a level of secondary containment to suppress or inhibit an AHF, SiF_4 or BF_3 release in the event of a spill or leak.

The AHF Staging Containment Building houses four (4) 8,000 pound AHF storage tanks, piping and controls. The Fluoride Products Trailer Loading Building is used as an enclosed area for loading AHF trailers and for loading SiF_4 and BF_3 tube trailers for shipment to customers. Vent lines and relief valve lines on the storage tanks and from the trailer during loading are connected to the Plant KOH Scrubbing System described above.

The products are loaded from the storage tanks into approved Department of Transportation (DOT) tank trailers when inventories reach a level for shipment. A minimum number of product transfer lines from each process enter the Fluoride Products Trailer Loading Building.

The Fluoride Products Trailer Loading Building contains a truck entrance door on one side that remains sealed, closed and controlled except for short periods when the trailer is moved in and out. Safety precautions are taken to prevent the trailer from contacting the fill line by the installation of physical barriers, and to prevent inadvertent movement of the trailer during load-out.

Two positive-air-lock doors are located in each building. One air-lock in each building is an emergency exit to the outside. The other air-lock in each building is an exit and also an entrance to a separate control room, under positive pressure, where surveillance and operational controls for the two containment areas are managed.

In these buildings, the SiF_4, $BF_3$and AHF products have been chemically separated from licensed materials. These products in these buildings are also physically separated from licensed materials, such as not to affect licensed materials.

Draft

License Documentation Impact: ~~LA, Section 1.2.2 is being revised to remove du~~plicated descriptions that will be revised and moved to Section 1.2.2.1 above. Also, "Material Warehouse" description is being revised in Section 1.1.2.2 to identify its function as part of managing non-radioactive waste. The remaining text in the section will remain unchanged.

Decontamination Building

~~The Decontamination Build~~ing is located adjacent to, and on the north side of the DUF_4Process Building. The construction provides for a fire barrier between the Decontamination Building and ~~the DUF_4 Process Building. This building is used for decontamination of equipment for maintenance and removal of uranium from decontamination wash waters or from small volumes of contaminated liquors. The Decontamination Building contains an equipment cleaning~~ booth ~~and hood system, primary and secondary dust collector system in series, contaminated-water holding tanks, primary and polishing filters, associated pumps, piping, field equipment instrumentation panels, ion exchange columns and associated controls and backwash systems~~.

~~**DUF_4 Container Storage Building**~~

~~Just east of, and adjacent to, the FEP~~ Oxide Staging Building is the DUF_4 Container Storage Building. This building is used to store shipping containers of DUF_4 that may be received from ~~suppliers. This source of DUF_4 can be used in production of FEP products and/or de-converted to depleted uranium oxide.~~

~~**Material Warehouse**~~

The Material Warehouse is located just northeast of the Process Offices/Laboratory Building. This warehouse is used to receive and store such items as piping components, electrical conduit, wiring, equipment for capital construction projects and spare parts. Small quantities of chemicals such as paints, oils, and cleaning agents are stored in the warehouse, but the quantities are limited to meet New Mexico Commercial Building Code (NMCBC) and NFPA requirements. No licensed, raw, or in-process materials or finished products are stored in this building.

Part of the Material Warehouse is used for managing non-radioactive waste. This function is described in Section 9.2.2.1, "Waste Management Procedures;" Chapter 9 of the IIFP License Application.

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C. LA Section 1.1.3.2, Page 1-13, third full paragraph contains a description of the exothermic reaction of Depleted Uranium Hexafluoride (DUF_6) to Depleted Uranium Tetrafluoride (DUF_4) and Anhydrous Hydrogen Fluoride (AHF). Consistent with NUREG-1520, Section 1.1.4.3 (3), specify what reacts exothermically with the DUF_6. Specify where this reaction takes place, e.g., in the DUF_4 building, and specify which building listed in LA Table 1-2 contains the reaction vessel for this process.

RESPONSE: The standard heat of formation (enthalpy) for hydrogen and uranium hexafluoride reaction to form DUF_4 and AHF is considerably exothermic; approximately – 285 kilojoules/mol. In the DUF_6 to DUF_4 process, in order to ensure an efficient reaction, the reaction is initiated at about 300 ^oF, or above, at which the reaction is exothermic and sustains an efficient reaction temperature. Air cooling around the reaction vessel is employed to control the reaction at set temperature, while insulation around the reaction vessel and electrical heating around part of the reaction vessel are utilized for fine control of the reaction temperature. In the DUF_6 reaction vessel, hydrogen gas reacts with DUF_6 as an exothermic reaction to produce DUF_4. The DUF_6 reaction vessel is located in the DUF_4 Process Building.

License Documentation Impact: Section 1.1.3.2, paragraph 6 of the IIFP License Application will be revised to read:

The DUF_6 cylinder is placed in a containment-type autoclave; where the contents are vaporized. The DUF_6 vapor is then fed to ~~a~~ the DUF_6 reaction vessel, located in the DUF_4 Process Building, where it ~~undergoes exothermic~~ react~~sion~~ with hydrogen gas to produce DUF_4 and AHF. The reaction is exothermic which sustains an efficient reaction temperature. Air cooling around the reaction vessel is employed to control the reaction at set operating temperatures. Insulation around the reaction vessel and electrical heating around part of the reaction vessel are utilized for fine control of the reaction temperature. The DUF_4 solid powder is continuously withdrawn from the reaction vessel bottom through a cooling screw mechanism and transferred to storage hoppers. A two~~2~~-stage dust collector system is provided to control and recycle DUF_4 ~~dusts~~ dust that is generated by gas flows ~~are~~ internal to the solids handling equipment. ~~and generated by air or gas flows associated with the handling equipment.~~ The DUF_4 in the storage hoppers is transferred to the FEP plant for use as raw material feed in producing SiF_4 and BF_3.

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GI-7 *LA Pages 1-1 and 1-2 list the estimated average inventories for the major chemicals onsite and the limits for the agreement with the state of New Mexico. In addition, LA Section 1.3 contains Table 1-4 which indicates the maximum quantity of licensed material requested in the application. However, additional information is needed regarding the quantity of materials and their chemical and physical forms. Consistent with the acceptance requirements presented in NUREG 1.2.4.3(3), provide the following information:*

A. LA Table 1-1 lists the projected average for various chemicals used in the process. Each chemical is represented by a range of values. Clarify if the range of values is the minimum and maximum quantity. If not, describe how these ranges of values are calculated and how they represent an average. Add a description of the physical form (gas, powder, liquid) of licensed material listed in Table 1-1.

RESPONSE: The original Table 1-1, Revision A of the IIFP License Application, "General Information" Section, was prepared to show the typical range of inventories used in the IIFP Facility processes based on the estimated variable rates of production and the facility projected production capacity. The word "average" is a misnomer because the typical range is not necessarily derived from a calculated average of material inventory. The range of inventory amounts does not necessarily represent the minimum/maximum values. The range is derived from estimates of production through-put rates, plant process capacities and additional contingencies relative to inventory management.

The contingencies included in the estimate are operational and material delivery situations that may cause variations in the facility raw material, work-in-process and product inventories but would be controlled such as to not cause licensed materials possession limits to be exceeded. For example, the upper range of the DUF_4 inventory considers that production rates for DUF_4 would be a scenario where, the reaction vessel is operated at its optimum throughput for several consecutive days thereby accumulating a full inventory in the DUF_4 storage hoppers. Then, it considers the DUF_4 reaction vessel may be shutdown, perhaps for scheduling reasons or preventive maintenance, thus resulting in the inventory drawdown as that inventory is being fed as the raw material to the FEP process. This mode of operation would contribute to the DUF_4 inventory being at the upper amount then decreasing to the lower amount; typical in inventory management for industrial manufacturing facilities, particularly chemical plants. The normal variability in production scheduling caused by the operational inter-dependency of the facility various processes makes it necessary to estimate inventories as a projected range of values.

Some of the contingencies considered in estimating the subject range of inventories include unexpected changes and variations in market demand, uncertainties in shipping and transportation schedules, delivery lead-time variability, and abnormal outages on processes and utilities.

In the case of "total depleted uranium", the upper range value is the licensed possession limit. It is should be noted that State of New Mexico limits are agreed to at higher levels than the requested license possession limits for kilograms (kg) of total depleted uranium (as "U"). This difference is a result of the State considering that facility expansions and requests for higher possession limits ~~that~~ may occur under future and separate license requests and actions. The requested licensed materials possession limit for the current IIFP License Application is 750,000 kg uranium.

The other chemicals, that are not part of the licensed possession limit, do not have inventory limits, but are shown in Table 1-1 for reference to other aspects of the IIFP Facility operation.

We are revising Table 1-1 from a projected average to a table of estimated typical range of inventories for the facility projected (design) production capacity. An additional table column (number three) will be added to provide a description of the physical form of the materials listed in Table 1-1.

License Documentation Impact: The original Table 1-1 in Section 1, "General Information", Revision A of the IIFP License Application is being deleted in total and a new Table 1-1 is being added as shown below. The original paragraphs six (also modified in response to RAI GI-2) and seven along with Table 1-1 will read as follows (black text is original and red text is change or new):

IIFP is requesting a license authorizing up to 750,000 kilograms of depleted uranium (kg U) to be maintained at any one time in the facility inventory. IIFP is requesting the license authorization for up to 40 years and is plannings to operate the facility indefinitely and continue to renew the licenses as needed. IIFP also has a written agreement with the State of New Mexico on the maximum inventories of major chemicalsdepleted uranium oxide and total depleted uranium that can be maintained on site.

Table 1-1 provides the estimated average typical range of inventories of major chemical materials used at the IIFP Facility and the physical forms for each material. Also shown is and the maximum limit on the major chemical inventories as per the IIFP agreement with the State of New Mexico.

~~**Table 1-1 IIFP Facility Inventories**~~

~~**Material**~~	~~**Maximum Limit Agreement with New Mexico**~~[1]	~~**Projected Average**~~
~~Total Depleted Uranium (DUF_6, DUO_2 and DUF_4)~~[2]	~~4,851,000 lbs (2,200,000 Kg)~~	~~See Note~~ [2]
~~DUF_6~~	~~Not Applicable~~	~~15-20 full cylinders~~
~~DUF_6 in Process~~	~~Not Applicable~~	~~43,000-66,000 lbs (19,500-30,000 Kg)~~
~~DUF_4~~	~~Not Applicable~~	~~140,000-300,000 lbs (63,600-136,400 Kg)~~
~~Uranium Oxides as DUO_2~~	~~2,205,000 lbs (1,000,000 Kg)~~	~~340,000-470,000 lbs (154,500-213,600 Kg)~~
~~HF (aqueous)~~	~~Not Applicable~~	~~10,000-15,000 lbs (4,500-6,800 Kg)~~
~~AHF~~	~~Not Applicable~~	~~31,000-35,000 lbs (14,000-15,900 Kg)~~
~~SiF_4 (Packaged + in process)~~	~~Not Applicable~~	~~48,000-70,000 lbs (21,800-31,800 Kg)~~
~~BF_3 (Packaged + in process)~~	~~Not Applicable~~	~~17,000-33,000 lbs (7,800-15,000 Kg)~~
~~KOH~~	~~Not Applicable~~	~~15,000-17,000 lbs (6,800-7,700 Kg)~~
~~CaF_2~~	~~Not Applicable~~	~~45,000-50,000 lbs (20,400-22,700 Kg)~~

[1] ~~Memorandum of Agreement Between International Isotopes, Inc. and the New Mexico Environment Department, October 22, 2009.~~

[2] ~~Projected Averages: see individual breakdowns for DUF_6 in cylinders and in process; DUF_4 and DUO_2. Maximum limits of Total Depleted Uranium include limits for DUF_6 in cylinders and in process; DUF_4 and DUO_2.~~

Table 1-1 IIFP Facility Inventories of Major Chemicals

Material	Maximum Limit Agreement with New Mexico[1]	Physical Form: Liquid(l), Solid or Powder(s), Vapor or Gas(g)	Typical Range of Inventory Based on Projected Production Capacity and Requirements (kg)
Total Depleted Uranium as "U"	4,851,000 lbs (2,200,000 Kg)	l, s, g	678,200-1,653,750 (307,575-750,000)
DUF_6	Not Applicable (NA)	l, s, g	275,600-1,105,000 (125,000-501,200)
DUF_4	NA	s	363,500-515,000 (164,900-233,600)
Uranium Oxides as DUO_2	2,205,000 lbs (1,000,000 Kg)	s	350,000-525,000 (158,700-238,100)
Hydrofluoric Acid (Hydrogen Fluoride)	NA	l, g	31,000-80,000 (14,100-36,300)
SiF_4 (Packaged + in process)	NA	s, g	8,000-14,400 (3,600-6,500)
BF_3 (Packaged +in process)	NA	s, g	7,200-54,800 (3,300-24,900)
KOH	NA	l	14,000-54,000 (6,300-24,600 Kg)
CaF_2	NA	s	2,400-80,500 lbs (1,100-36,500 Kg)
$Ca(OH)_2$	NA	s	25,000-100,000 (11,300-45,300)

[1] Memorandum of Agreement of International Isotopes, Inc. and the New Mexico Environment Department, October 22, 2009.

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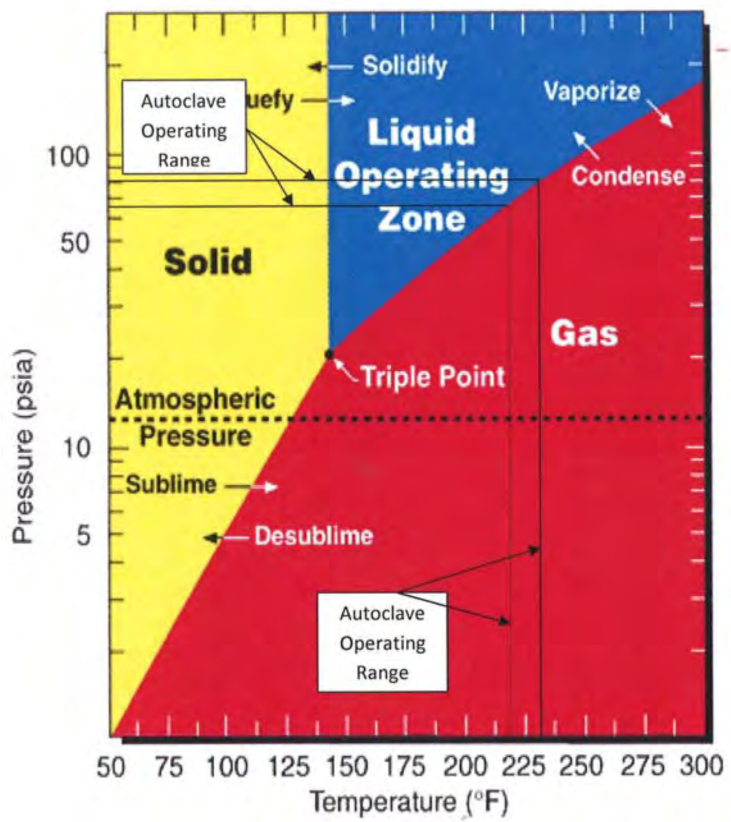
B. Section 2.4.1 of the ISA, first paragraph, indicates that the DUF_6 is vaporized via steam. State whether the DUF_6 will be sublimed or passed through a liquid phase, and indicate the location and maximum quantity of liquid DUF_6 that will be produced throughout the facility.

RESPONSE: Liquid DUF_6 is formed only at temperatures and pressures greater than the triple point as shown below in the UF_6 Phase Diagram. Below the triple point, solid DUF_6 will change phase directly to DUF_6 gas (vapor) by sublimation when the temperature is raised and/or the pressure is lowered at continuous points along the solid/gas interface line. In the IIFP DUF_6 feed process at the process operating conditions, the DUF_6 passes through a liquid phase because the operating pressure required to feed the DUF_4 reaction vessel is greater than the triple point pressure of 22 pound per square inch absolute (psia).

Pure UF_6 follows its phase diagram (shown below) consistently regardless of isotopic content. The liquid DUF_6 phase and gas (vapor) phase are in equilibrium at autoclave operating temperatures. The gas (vapor) phase is transferred from the cylinder to the process through a pigtail attached to the autoclave feed manifold with the DUF_6 cylinder valve at the 12:00 o'clock position.



UF_6 Phase Diagram

The ~~IIFP Facility maximum quantity of liquid DUF_6 will be found in autoclaves at op~~erating temperature. The maximum amount of liquid DUF_6 expected to be in components during operations is approximately 56,000 pounds or about two full DUF_6 cylinders at operating temperatures and is contained within the autoclaves. All autoclaves are housed in the DUF_6 Autoclave Building.

License Documentation Impact: Paragraph one (paragraph one becomes paragraphs one, two and three, following paragraphs will shift down accordingly) and former paragraph two of Section 2.4.1 of the IIFP Integrated Safety Analysis Summary will be revised to read as follows:

2.4.1 DUF_6 Autoclave Building

The DUF_6 Autoclave Building is one level and includes a large overhead area to accommodate a bridge crane. The building contains two containment-type autoclaves that use controlled steam to safely vaporize the solid depleted UF_6 for feeding to the DUF_4 Pprocess Building. As steam is admitted to the autoclave containing a cylinder with solid contents, the cylinder temperature rises. DUF_6 solid beg~~ins to vap~~orize and the vapor pressure in the cylinder increases until the solid-liquid-vapor triple point is reached at about 22 pound per square inch absolute (psia). At the triple point the solid begins to melt forming liquid in addition to the solid and vapor physical states. There is essentially no further increase in pressure or temperature of the DUF_6 in the cylinder until the solid DUF_6 is melted to liquid, i.e., virtually all of the heat absorbed by the cylinder contents is used to melt the DUF_6 solid. After the solid is melted, the continuation of heating evaporates liquid DUF_6 and increases both the temperature and pressure in the cylinder along the UF_6 vapor pressure curve. When the DUF_6 in the cylinder reaches the temperature of the steam in the autoclave, there is no further increase in either temperature or pressure. When the cylinder reaches the desired operating (feed) pressure, the cylinder and feed header piping valves are opened to provide feed to the DUF_4 reaction vessel. The liquid DUF_6 phase and vapor phase are in equilibrium at autoclave operating temperature (approximately 220 ^oF-235 ^oF). The vapor is transferred to the process through a pigtail attached to the autoclave feed manifold with the DUF_6 cylinder valve at the 12:00 o'clock position. Further discussion of vaporizing and feeding DUF_6 is provided in Section 3.1.2.3 of the IIFP ISA Summary. Safety controls relative to steam, pressure, and temperature for the autoclave system that are Items Relied on For Safety (IROFS) are identified in Table 6-1 of the ISA Summary.

The IIFP Facility maximum quantity of liquid DUF_6 will be found in the cylinders inside the containment-type autoclaves at operating temperature. The maximum liquid DUF_6 in inventory for the IIFP at any one time for the IIFP Facility being licensed is approximately 56,000 pounds or about two full DUF_6 cylinders at operating temperatures.

Also included are two cold boxes cooled by refrigeration systems and sized to contain one 48Y-type cylinder each. One cold box is used to collect DUF_6 cylinder heels after cylinders have been fed out to the DUF_4 process. The other cold box is the receiving vessel for the purge and evacuation system that serves the DUF_4 process.

Two rail mounted cylinder carts and weigh scales are provided in the autoclave area. One cart and scale are located between the two autoclaves, and the other cart and scale are located between the cold boxes. An overhead bridge crane is installed to hoist the DUF_6 cylinders into and out of the autoclaves and hot cold boxes. The crane path is defined to permit lateral movement without traveling above an autoclave or cold box containing a DUF_6 cylinder.

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C. Each 48Y cylinder can contain as much as 22 kg (IAEA-TECDOC-750 "Interim guidance for the safe transport of reprocessed uranium," pg 55) of heal. Address whether Technetium-99 and transuranics will be present in the cylinder tails from previous operations.

RESPONSE: The IIFP facility in Hobbs, New Mexico receives depleted uranium hexafluoride (DUF_6) in a solid physical state contained in 14-ton type 48-Y (or 48-G) cylinders typically owned by the supplier (IIFP toll de-conversion customer). IIFP will contract with commercial enrichment plant suppliers (customers) who have requirements and licenses for their facilities to receive and process UF_6 that has resulted from natural uranium feed that at a minimum, meets or exceeds the definition of commercial natural UF_6 for enrichment with the requirements of American Society of Testing and Materials (ASTM) C787-03, "Standard Specification for Uranium Hexafluoride for Enrichment" (ASTM, 2003).

Under the current IIFP License Application and commitments, it is highly unlikely that IIFP would receive DUF_6 cylinders that contain technetium (Tc) or transuranics (TRU). IIFP is not requesting a possession license to receive DUF_6 tails from facilities that enrich reprocessed uranium. Also with the current license request and the technology described in the current License Application, IIFP will not receive DUF_6 tails from the Department of Energy (DOE) stockpile; for the reasons discussed below. IIFP will assure these requirements are met through contractual arrangement, technical specifications, terms and conditions of the contract and auditing of the enrichment facility license. If IIFP in the future has the opportunity for receiving and processing (de-conversion) of DOE stockpiled DUF_6 and determines it to be feasible, then IIFP will prepare and submit a separate licensing amendment and action.

It is important to understand, under the current licensing request, why receipt of Tc or TRU in DUF_6 by IIFP for de-conversion would be highly unlikely. The following summary of the credible technical studies by government national laboratories and the DOE helps explain the basis for this determination.

Studies conducted at Oak Ridge National Laboratory and results of a peer review by Lawrence Livermore National Laboratory state that "the only plausible pathway for TRU and technetium to end up in the depleted UF_6 cylinders is by way of heels from prior use of the cylinders to store reactor return feed." ("Strategy for Characterizing Transuranics and Technetium Contamination in Depleted UF_6 Cylinders", Oak Ridge National Laboratory, J.R. Hightower, et al, October 2000 and "A Peer Review of the Strategy for Characterizing Transuranics and Technetium Contamination in Depleted Uranium Hexafluoride Tails Cylinder", Lawrence Livermore National Laboratory, G.P. Brumbaugh, et al, September 1, 2000).

The Department of Energy (DOE) in preparing their Environmental Impact Statement for the DOE De-conversion facilities built at their Paducah, Kentucky and Portsmouth, Ohio sites, commissioned the Oak Ridge National Laboratory and Lawrence Livermore Laboratory to conduct the studies referenced above. DOE knew that because reprocessed uranium was enriched in the early years of the government owned gaseous diffusion plants that some of the DOE stockpile of depleted UF_6 (DUF_6) was possibly contaminated with small amounts of technetium (Tc) and transuranic (TRU) elements plutonium (Pu), neptunium (Np) and americium (Am).

Appendix B of the Portsmouth DUF_6 Conversion Final EIS (can be found on the DOE website) thoroughly addresses and explains the basis for the Oak Ridge National Laboratory study and conclusions and the extent of Tc and TRU contamination in DOE DUF_6 cylinders.

The following excerpt is from the referenced DOE Portsmouth EIS:

"B.1.3 Extent of Transuranic and Technetium Contamination in the DUF_6 (**referring to DOE) Cylinders"***

> *"Both the ORNL team and the peer review team reviewed the previous characterization studies conducted on the tails cylinders. The ORNL team also interviewed some staff members who worked at the Portsmouth and Paducah Gaseous Diffusion Plant sites when the recycled uranium was being fed to the cascades. On the basis of those reviews and the characterization performed in the period December 1999 to August 2000, it was concluded that the level of contamination in the tails cylinders is very limited. The peer review team stated that the only plausible pathway for the TRU and Tc to get into the DUF_6 cylinders was by way of the heels from prior use of the cylinders to store reactor return feed. It was discovered during the investigations that some cylinders that were used to store reprocessed UF_6 were emptied into the cascades for reenriching the UF_6. The same cylinders were later filled with DUF_6 without first being cleaned. The TRU contamination in the feed cylinders consisted mainly of nonvolatile fluorides. Therefore, they were concentrated in the heels of the feed cylinders. Any TRU isotopes that were carried into the cascades were thought to have plated out and been captured in the cascades; thus, they never made it into the tails cylinders. Similarly, nonvolatile compounds of Tc stayed in the heels, while the volatile components, because of their low molecular weight compared with UF_6, moved up the cascades and either were released in the purge stream or stayed with the enriched product.*
>
> *The number of reprocessed uranium feed cylinders that were later used to store DUF_6 was not known, but it was estimated to be in the hundreds (Hightower et al. 2000). This number represents only a portion of the total of approximately 60,000 DUF_6 cylinders that are used to store DOE's inventory of DUF_6 at the three storage sites — Portsmouth, Paducah, and East Tennessee Technology Park.*
>
> *It is believed that when the cylinders with contaminated heels were filled with DUF_6, the liquid DUF_6 entering the cylinder stirred the heels and caused some fraction of the contamination to be mixed with the DUF_6. It is also possible that a small fraction of the TRU that had been captured in the cascades may have re-volatized during the cascade improvement projects and was carried into some DUF_6 cylinders. Therefore, TRU and Tc could be found both in the heels and in the bulk of a small, but unknown, number of DUF_6 cylinders in the DOE inventory."*

Therefore, IIFP will require suppliers of cylinders that are used for depleted tails and received by IIFP to preclude use of cylinders that in the past have contained reprocessed UF_6, unless those cylinders have been decontaminated and verification is made that such cylinders do not contain Tc and TRU contaminants. Suppliers of DUF_6 to IIFP will be required to provide written evidence as to the origin of the cylinders that are filled with DUF_6 and shipped to the IIFP Facility. Also, periodic audits of suppliers will be performed to provide assurance that these requirements are satisfied.

License Documentation Impact: Additional paragraphs will be added to Section 1.4 (also revised in response to RAI GI-2) of the IIFP License Application (LA) to address the Tc and TRU question. Also, Section 1.3 and Table 1-4(see also RAI GI 7-D for further revisions) of the

License Application will be revised to add a small amount of natural uranium for use in laboratory standards and methods. Additionally, in the next LA revision, the new references shown in the text will be added to the respective LA chapter reference page. The following revisions (changes in red text) will be made to Sections 1.3 and 1.4 of the LA.

1.3 Type, Quantity, and Form of Licensed Material

IIFP proposes to acquire, deliver, receive, possess, produce, use, transfer, and/or store source material meeting the criteria of *Source Material* as described in 10 CFR 40.4, "Definitions" (CFR, 2008a). Details of the source material are provided in Table 1-4, "Type, Quantity, and Form of Licensed Source Material." Also ~~It~~ it is anticipated that some license materials may be used for instrument calibrations. As those needs are identified during the detailed design phase, IIFP will prepare a license amendment as needed. A small amount of natural uranium for use in laboratory standards and methods is included in the licensed material request.

Table 1-4 Type, Quantity, and Form of Licensed Source Material

Source Material	**Physical and Chemical Form**	**~~Maximum Amount by this~~ Licensed Material to be Possessed at any One Time**
Depleted u~~U~~ranium ~~(depleted)~~ and daughters ~~products~~	Physical: solid, liquid, and gas Chemical: UF_6, UF_4, ~~UO_2F_2~~, uranium oxides, and other trace compounds	750,000 Kilograms as uranium
Natural uranium and daughters	Physical: solid, liquid, and gas Chemical: UF_6, UF_4, , uranium oxides, and other trace compounds	50 Kilograms as uranium
Any byproduct material with atomic numbers 1 through 83 and any source material	Sealed Source	*Not to exceed 10.0 mCi per source, and 1.0 Ci total

*millicuries (mCi) and curie (Ci)

1.4 Requested Licenses and Authorized Uses

The Source Material license for the material described in Table 1-4 of Section 1.3 above is requested to be authorized for up to 40 years. IIFP plans to operate the facility indefinitely and continue to renew the license as needed.

IIFP will not store or process Special Nuclear Material (SNM) at the FEP/DUP facility. Therefore, no licenses and authorized uses for SNM are requested. SNM is defined in 10 CFR 70.4, "Definitions," (2008d).

IIFP will contract with commercial enrichment plant suppliers (customers) who have requirements and licenses for their facilities to receive and process UF_6 that has resulted from natural uranium feed. Under the current IIFP License Application and commitments, it is highly unlikely that IIFP would receive DUF_6 cylinders that contain technetium (Tc) or transuranics (TRU). IIFP is not requesting a possession license to receive DUF_6 tails from facilities that enrich reprocessed uranium. Also with the current license request and the technology described in the current License Application, IIFP will not receive DUF_6 cylinders from the Department of Energy (DOE) stockpile for reasons discussed in the DOE "Portsmouth DUF_6 Conversion Final EIS, Appendix B" (DOE, 2000). IIFP will assure these requirements are met through contractual arrangement, technical specifications, terms and conditions of the contract and auditing of the commercial enrichment facility license. If IIFP in the future has the opportunity for receiving and processing (de-conversion) cylinders from the DOE DUF_6 stockpile and determines it to be feasible, then IIFP will prepare and submit a separate licensing amendment and action.

Studies conducted at Oak Ridge National Laboratory and results of a peer review by Lawrence Livermore National Laboratory state that "the only plausible pathway for TRU and technetium to end up in the depleted UF_6 cylinders is by way of heels from prior use of the cylinders to store reactor return feed." ("Strategy for Characterizing Transuranics and Technetium Contamination in Depleted UF_6 Cylinders", Oak Ridge National Laboratory, J.R. Hightower, et al, October 2000 and "A Peer Review of the Strategy for Characterizing Transuranics and Technetium Contamination in Depleted Uranium Hexafluoride Tails Cylinder", Lawrence Livermore National Laboratory, G.P. Brumbaugrh, et al, September 1, 2000).

Therefore, IIFP will require suppliers of cylinders that are used for depleted tails and received by IIFP to preclude use of cylinders that in the past have contained reprocessed UF_6, unless those cylinders have been decontaminated and verification is made that such cylinders do not contain Tc and TRU contaminants. Suppliers of DUF_6 to IIFP will be required to provide written evidence as to the origin of the cylinders that are filled with DUF_6 and shipped to the IIFP Facility. Also, periodic audits of suppliers will be performed to provide assurance that these requirements are satisfied.

License Documentation Impact: The following revisions (changes in red text) will be made in Section 3.1.2.2 of the IIFP Integrated Safety Analysis (ISA) Summary.

3.1.2.2 Receipt of Depleted Uranium Hexafluoride (DUF_6)

The IIFP F~~f~~acility in Hobbs, New Mexico receives DUF_6 materials in a solid physical state, typically contained in 14-ton type 48-Y cylinders owned by the supplier (the IIFP de-conversion customer). These cylinders are built to American National Standards Institute (ANSI) standards (ANSI, 2001) and are transported by truck trailers that are Department of Transportation (DOT) approved. The type 48-Y cylinders are approved for multi-shipments, provided the ANSI standards, which include a 5-year hydrostatic test requirement, are met. Empty cylinders are returned to the supplier/customer following de-conversion.

The type 48-G cylinders are typically used for on-site storage of DUF_6 but have been utilized ~~for~~ in the past by the U.S. government for transport.~~ by the Department of Energy.~~ Under the current IIFP license request, cylinders of DUF_6 from the U.S. Department of Energy stockpile will not be received.

Shipment of the type 48-G cylinders to the IIFP F~~f~~acility may require the supplier/customer to obtain a DOT Special Permit. The type 48-G cylinders are a one-time use cylinder. Disposition of the empty cylinder would require the complete removal of DUF_6. One option under consideration would be to qualify the empty 48-~~Y~~ G cylinders as Industrial Packages (IP) and utilize them as a DU oxide transport and disposal container.

Up~~on receipt, full cylinders of DUF$_6$ are visually inspected for damage and surveyed~~ for radiation and removable contamination. Documents that contain information regarding cylinder identification, weight, and uranium assay that accompany the shipment are reviewed and verified for accuracy. Uranium assay is qualitatively verified by performing a non-destructive gamma survey measurement. Once accepted for receipt, the cylinders are unloaded using the facility cylinder hauler vehicle and placed in on a temporarythe Full DUF$_6$ Cylinder Sstorage Padyard until it is scheduled for feed to the de-conversion process.

GI-7

D. *Table 1-4 lists uranyl fluoride (UO_2F_2) as a chemical form for the process. In response to the RAI provide a description of where this chemical form occurs in the process and whether or not it is described in Chapter 1. Provide a description in the LA of the quantity and conditions which result in production of UO2F2 in the licensed operation. (Note: UO_2F_2 is mentioned as occurring in air effluents, but not as a part of the process.) Clarify whether UO2F2 is actually part of the process or incidental due to reaction with moisture in the air. Since UO_2F_2 is soluble, indicate the quantity of UO_2F_2 produced, the possible exposure to staff, and precautions implemented to prevent inadvertent exposure.*

RESPONSE: DUO_2F_2 is formed by the reaction of DUF_6 and moisture. Small amounts of DUO_2F_2 that are formed in the process would only be incidental to the process. Equipment and piping that contain DUF_6 are evacuated and purged using the DUF_4 Process Building Purge and Evacuation System prior to opening for maintenance to minimize the potential for DUO_2F_2 formation. Workers wear protective respiratory equipment and clothing per Radiological Procedures and Permits to prevent exposure to any trace or small amounts of residual DUO_2F_2.

License Documentation Impact: In the IIFP LA, Section 1.3, remove UO_2F_2 from Table 1-4 (modifications were made in response to RAI GI-7C) owing to it being incidental to the process only.

Table 1-4 Type, Quantity, and Form of Licensed Source Material

Source Material	Physical and Chemical Form	Maximum Amount by this Licensed Material to be ~~Possessed at any One Time~~
Depleted uUranium (depleted) and daughters	Physical: solid, liquid, and gas Chemical: UF_6, UF_4,UO_2F_2,	750,000 Kilograms as uranium
products ~~Natural~~ uranium and daughters	uranium oxides, and other trace compounds Physical: solid, liquid, and gas Chemical: UF_6, UF_4, , uranium	50 Kilograms as uranium
Any byproduct material with atomic numbers 1 through 83	oxides, and other trace compounds Sealed Source	*Not to exceed 10.0 mCi per source, and 1.0 Ci total
and any source material *millicuries (mCi) and curie (Ci)		

General Information

GI-8 Sections 1.1.1 and 1.1.2 contain site maps and a description of the site layout. The application distinguishes between a 40-acre plot and a 640-acre plot, but does not make a clear distinction between the site boundary, controlled area, and restricted area. Consistent with the requirements in 20.1003, 70.61(f) and the acceptance criterion in NUREG-1520, Section 1.3.4.3(1), provide the following information:

In the LA and other licensing documents, define what part of the International Isotopes Fluorine Products (IIFP) will be the controlled area, e.g., 40-acre plot, in accordance with the definitions in 20.1003 "Controlled area." Clarify in the application whether the 640-acres, excluding the 40-acre plot, represent a buffer zone between the site boundary and the controlled area. Add a paragraph to the LA and other licensing documents, as appropriate, describing in general terms the controlled area and access controls. The ISA Summary in particular should contain information on the controlled area and boundary definitions [70.61(f)], including information on whether the 640-acres will be fenced and marked and information on whether the controlled area entrance will have access controls such as gates or security checkpoints.

RESPONSE: The IIFP Facility property boundary is the 640- acres. The property boundary will not be fenced. The facility site "Controlled Area" will be within the approximately 40-acre perimeter fence but consists of areas that are not within Restricted Areas. The "Controlled Area" will be marked at the perimeter fence and will have access controls, gates and security checkpoints. Restricted Areas will be within the perimeter fence and will be further limited from access for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

The same added definitions and descriptive information being placed in the LA (as below), will also be incorporated into Section 2 of the ISA "Facility Description" in the next revision of the license application documents.

License Documentation Impact: New paragraphs will be inserted between exiting paragraphs 1 and 2 in Section 1.1.2 of the IIFP License Application, "General Information" and will read (new text is red) as follows:

1.1.2 Facility Description

The facility and infrastructure are typical of specialty chemical and industrial facilities. Buildings, in addition to the process buildings, are included for administration, laboratory, maintenance shop, stores inventories, security checkpoints, utilities and powerhouse, and warehousing. Figure 1-5 shows the facility site plan and layout of the buildings, roads and major infrastructure.

The Site Boundary and Unrestricted Area are defined below:

- The IIFP Lea County, New Mexico property boundary is approximately 640- acres. The facility site is approximately 40-acres that are fenced within the 640-acre property boundary. The remainder of the property boundary is not fenced, but is a buffer zone around the 40-acre facility site. The property ownership of the buffer zone prevents other industries or the public from establishing extended or permanent occupancy close to the 40-acre facility site.

- NRC regulation 10 CFR 20.1003 defines an unrestricted area as an area, access to which is neither limited nor controlled by the licensee. The area adjacent to the 40-acre facility site and outside the fenced area where the IIFP does not normally exercise access control is an Unrestricted Area. This area can be accessed by members of the public, indigenous wildlife, or by facility personnel. The Unrestricted Area is governed by the limits in 10 CFR 20.1301. The total effective dose equivalent to individual members of the public from the licensed operation may not exceed 1 milli-Sievert (mSv) or 100 millirem (mrem) in a year (exclusive of background radiation). The dose in any Unrestricted Area from external sources may not exceed 0.02 mSv (2 mrem) in any one hour. In addition to the NRC limit, the Environmental Protection Agency, in 40 CFR 190, imposes annual dose equivalent limits of 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid, and 0.25 mSv (25 mrem) to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials to the general environment from uranium fuel cycle operations and to radiation from these operations.

The Controlled and Restricted Areas are defined as below:

- In 10 CFR 20.1003, the NRC defines a “Controlled Area” as an area, outside of a Restricted Area but inside the site boundary, access to which can be limited by the licensee for any reason. The NRC defines a restricted area as an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.
- The IIFP Facility site Controlled Area is within the approximately 40-acre perimeter fence but consists of area that is not within Restricted Areas. The Controlled Area is marked at the perimeter fence and has access controls, gates and security checkpoints. The area of the plant within the perimeter fence but outside any Restricted Area is part of the Controlled Area. Facility employees and contractors have authorized access to the Controlled Area based on specific applicable pre-authorization procedures and training.
- Due to the presence of the owner controlled area fence, members of the public and site visitors do not have direct access to this Controlled Area of the site and must be processed by security and authorized to enter the site. Training for access to a Controlled Area is provided commensurate with the radiological hazard. Site visitors may include delivery people, tour guests and service personnel who are temporary, transient occupants of the Controlled Area. Area monitoring demonstrates compliance with public exposure limits for such visitors.
- Examples of Restricted Areas include staging/storage areas for DUF_6, DUF_4 and depleted uranium oxide, and the DUF_4 Process Building. Personnel who have not been trained in radiation protection procedures are not allowed to access a Restricted Area without escort by trained personnel.
- All personnel are required to monitor themselves prior to exiting Restricted Areas that have the potential for contamination, using monitoring instruments that detect contamination.
- Access control to Restricted Areas and some of the type of areas that may exist within Restricted Areas are discussed in the IIFP License Application Section 4.7.15, “Access Control.” These areas may be temporary or permanent. The areas are posted to inform workers of the potential hazard in the area and to help prevent the spread of

contamination. These areas are conspicuously posted in accordance with the requirements of 10 CFR 20.1902.

The 40-acre facility site is surrounded by security fence with a surveillance road just inside the fence. Pole mounted security lighting is installed around the perimeter of the security fence.

The entrance to the facility is from the west via a paved road (approximately 3/4 mile) that intersects with NM 483. The road connects with the plant road system at the main gate and guard station.

General Information

GI-9 Sections 1.6.2.1-1.6.2.3 provide information on the local demographics. Consistent with the acceptance criteria in NUREG 1.3.4.3 (2), provide the following information:

A. LA Section 1.6.2.1 provides the population of Gaines and Andrews Counties. However, the population of Lea County is not provided. Provide the latest census numbers for the population of Lea County.

Response: The License Application Section, former 1.6.2.1 - new Section 1.7.2.1 (in response to RAI RP-13) will be revised to include the population of Lea County along with the latest population estimates for the three counties.

License Documentation Impact: The License Application former Section 1.6.2.1 - new Section 1.7.2.1 will be revised as follows:

~~1.6.2.1 Latest Census Results~~1.7.2.1 Latest Census Results

According to the U. S. Census Bureau, the population of Lea County was 55,511 in 2000 with a population density of 4.9 people per square kilometer. ~~the~~ The population of Andrews County was 13,004 in 2000 with a population density of 3.3 people per square kilometer (see IIFP ER). Its population experienced a similar growth/decline pattern as that of Lea County. The population of Gaines County in 2000 was 14,467 with a population density of 3.7 people per square kilometer. Unlike in Andrews County, the population of Gaines County was relatively stable during the 1990's. The total population of the three principal counties in the region of influence was nearly 83,000 in 2000. The area did not experience the population increase that occurred in other areas of New Mexico and Texas. The latest U.S. Census Bureau estimates for 2008 as reported in the ER (IIFP, 2009b) were 59,155 for Lea County, 13,645 for Andrews County, and 15,081 for Gaines County.

General Information

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B. Section 1.6.2.1 provides the population density per kilometer for Andrews County. For consistency, provide the population density for Gaines and Lea Counties also.

RESPONSE: Former Section 1.6.2.1 - new 1.7.2.1 (in response to RAI RP-13) will be revised to include the population density for Gaines and Lea Counties.

License Documentation Impact: Former Section 1.6.2.1 – new Section 1.7.2.1 of the License Application will be revised as shown in the License Documentation Impact for RAI GI-9A.

GI-9

C. LA Section 1.6.2.3 contains information on schools. This information appears to have discrepancies with the data in the ER in the first full paragraph above Table 3-52. Correct any discrepancies and provide the location and capacity of the nearest hospitals. Provide a sentence indicating where the nearest pre-schools, day cares, and nursing homes are located. (Note: Some of this information exists in the ER. This information may be referenced rather than repeated in the LA, if desired.)

Response: License Application former Section 1.6.2.3 – new Section 1.7.23 (in response to RAI RP-13) will be revised to reflect the correct number of educational institutions in Hobbs, NM. The section will also be revised to address nearest pre-schools, daycares, and nursing homes.

License Documentation Impact: License Application, Revision A, Chapter 1, former Section 1.6.2.3 –new Section 1.7.2.3, paragraph one will be revised as follows and a new paragraph two will be inserted and the former paragraph two will shift accordingly.

Urban development is relatively sparse in the vicinity of the proposed IIFP site. The nearest city, Hobbs, New Mexico, is approximately 22.5 m (14 mi) to the east. Within Hobbs, New Mexico, several educational institutions are available for the education of personnel in the local community. There are three colleges including a community vocational junior college, a high school and an alternative high school, three junior high middle schools, and eleventwelve elementary schools as well as two private schools.

There are fourteen nursing homes or senior living facilities in Hobbs. There are 21 daycare providers and preschool centers in Hobbs.

As mentioned above, there are no state or federal parks are located within five (5) miles of the IIFP site.

GI-9

D. Emergency Plan, Section 3.0 lists four facilities within a five-mile radius. The LA Section 1.6.2.4 only lists one of these facilities. Add the other three facilities listed in Emergency Plan to the LA. In the LA, provide the average number of employees who work at these facilities (for separate facilities and combined), and indicate how this number changes with each shift.

Response: Former Section 1.6.2.4 – new Section 1.7.2.4 (in response to RAI RP-13) of the License Application will be revised to correct the name of the Xcel Energy Cunningham Station and to add the three other facilities listed in the Emergency Plan. The average number of employees who work at the facilities will be added as Table 1-5 to this section.

License Documentation Impact: Section 1.6.2.4, "Near-by Industrial Facilities," of the License Application will be revised as follows:

Land around the proposed site has been mostly developed by the oil and gas industry. The lone nearby industrial facility is the New Mexico Power and Light Company plant on the west boundary (New Mexico Highway 483) of the IIFP proposed property line. Nearby ind~~ustrial facilities are the Xcel Energy Cunningham Station plant on the west boundary (New Mex~~ico ~~Highway 483), approximately 1.6 km (1.0 mi) fromof the IIFP Site, the X~~cel Energy Maddox Station 3.7 km (2.3 mi) to the east, the Colorado Energy Station approximately 2.4 km (1.5 mi) northeast of the site, and the DCP Midstream Plant ~~5~~ km (3.1 mi) southeast of the site. The average number of employees who work at these facilities are shown in Table 1.5.

Table 1.5 Nearby Industrial Facilities

Company	Employees on Days	Employees on Shift
~~DCP Midstream Linam Ranch Plant~~	~~67~~	~~2~~
Colorado Energy Station	14	3
Xcel Energy Maddox Station	12	2
Xcel Energy Cunningham Station	25	3

License Documentation Impact: Former Section 1.6.2.5 – new Section 1.7.2.5, "Land Use within a Five Mile Radius," will be revised as follows:

As mentioned above, the site is undeveloped and utilized for oil and gas wells. Several power lines and underground power lines run generally east to west and several gas pipelines run north and west as well as east to west.

Surrounding property consists of vacant land, and the New Mexico Power and Light Company power plant on the west boundary of the IIFP proposed property line. three power companies and the gas processing plant mentioned above. Ca~~ttle grazing on nearby sites occur throughout the year. Land around the proposed site has been mostly developed by the~~ oil and gas industry. The nearest residence is situated west northwesteast of the site 8.52.6 km (5.31.6 mi) from the north boundary.

GI-10 LA Section 1.6.3, ER Section 3.6, and ISA Summary Section 1.3 contain information on the meteorology for the site. Some of this information contains minor typos or requires clarification. Consistent with the requirements in NUREG-1520, Section 1.3.4.3(3), provide the following information:

A. Some of the temperatures in Table 1-6 of the LA, Table 3-17 of ER, and Table 1-2 of ISA Summary are reported as positive when they should be negative. In addition, some of the temperatures in Table 3-14 of the ER should have negatives. Review all the temperatures in all the tables throughout the submittals and verify that they have the correct sign.

RESPONSE: IIFP concurs that some of the temperatures are incorrect as shown. The tables listed will be corrected and other tables will be reviewed for similar errors.

License Documentation Impact: Temperatures in Table 3-14 of Revision A of the IIFP Environmental Report will be revised as follows:

21.7 ^{0}C will be revised to -21.7 ^{0}C for January

18.9 ^{0}C will be revised to -18.9 ^{0}C for February

-17.2 ^{0}C will be revised to -18.3 ^{0}C for December

License Documentation Impact: Temperatures in Table 3-17 of Revision A of the IIFP Environmental Report will be revised as follows:

21.7 ^{0}C will be revised to -21.7 ^{0}C for January

23.9 ^{0}C will be revised to -23.9 ^{0}C for February

16.1 ^{0}C will be revised to –16.1 ^{0}C for December

License Documentation Impact: Measurements in Table 3-18 of Revision A of the IIFP Environmental Report will be revised as follows:

.025 will be changed to 0.25 for mean snowfall for October

12.95 cm (5.1 in) will be changed to 11.93 cm (4.7 in) for the Annual mean snowfall.

License Documentation Impact: Former Table 1-5 – new Table 1-6 (in response to RAI GI-9D) of Revision A of the IIFP License Application will be deleted and replaced with revised ER Table 3-18 above and be numbered as Table 1-6.

Temperatures in former Table 1-6 – new Table 1-7 (in response to RAI GI-9D) of Revision A of the IIFP License Application will be revised as follows:

21.7 ^{0}C will be revised to -21.7 ^{0}C for January

23.9 ^{0}C will be revised to -23.9 ^{0}C for February

16.1 ^{0}C will be revised to –16.1 ^{0}C for December

License Documentation Impact: Table 1-1 of Revision A of the IIFP Integrated Safety Analysis Summary will be deleted and replaced with revised ER Table 3-18 above and be numbered as Table 1-1.

Temperatures in Table 1-2 of Revision A of the IIFP Integrated Safety Analysis Summary will be revised as follows:

21.7 ^{0}C will be revised to -21.7 ^{0}C for January

23.9 ^{0}C will be revised to -23.9 ^{0}C for February

16.1 ^{0}C will be revised to –16.1 ^{0}C for December

General Information

GI-10

B. The design basis precipitation is stated at 3.5-4 inches for the 100-year timeframe in LA Section 1.1.5.3 and ISA Summary Section 1.3.2.8. The design basis precipitation appears to be based on the data in ER Table 3-21. Incorporate or reference this table in the LA and ISA Summary. In addition, ER Sections 3.4.11.3 and 3.4.11.4, and LA Section 1.6.3.3, and ISA Summary Section 1.3.2.8 indicate that the IIFP is not within the 500-year flood plain. In response to this RAI, provide the basis for this determination. Also, if possible, consistent with the 100-year data in ER Table 3-21, provide similar precipitation data for the 500-year flood.

RESPONSE: Table 3-21 in the ER shows 100-year return period one-hour point precipitation information from NOAA Precipitation Frequency Data Server for three weather stations in the general vicinity of the proposed IIFP. Also, the coordinates for the IIFP site were entered into the NOAA Precipitation Frequency Data Server and corresponding estimates for that specific location were obtained. Based on this information, a 100-year one-hour precipitation event of 4.0 inches was selected for stormwater sewer design. The selected precipitation event is greater than the 90% confidence upper limit values for any of these four locations. Table 3-21 will also be revised to include one-hour precipitation information for a 500 year return period.

It was also determined that the information provided regarding Floods in former section 1.3.2.8 (now Section 1.3.2.6, in response to RAI GI-10D) of Revision A of the IIFP Integrated Safety Analysis Summary was insufficient in its scope. This section was expanded to explain design basis flooding considerations. A preliminary flood hazard assessment for the proposed IIFP facility was performed using Department of Energy (DOE) documents DOE-STD-1020-2002, DOE-STD-1022-94 and DOE-STD-1023-95, and it was determined that a comprehensive flood hazard assessment is not required. Preliminary screening indicates that flooding is not a design basis event other than in consideration of stormwater runoff which is included in the detailed facility design.

Sections 3.4.11.3 and 3.4.11.4 of the ER and section 1.6.3.3, subheading "Floods" of the LA will be addressed under License Documentation Impact in response to question GI-10 C below.

License Documentation Impact: Section 1.1.5.3, subheading "Storm Sewers" of Revision A of the IIFP License Application will be revised as follows:

1.1.5.3 Sewer Systems and Collection Basins

<u>Storm Sewers</u>

The IIFP F~~f~~acility storm sewer systems design assumes a 100-year return period ~~storm of 8.9 to 10.2 cm (3.5 to 4-in) rain of 1-hour duration for the Hobbs, New Mexico area~~ one-hour precipitation event of 4.0 inches. Information obtained from the NOAA Precipitation Frequency Data Server is provided in Table 3-21 of the Environmental Report for three weather stations in the Hobbs, NM area. These data show mean 100-year one-hour rainfalls of 3.33 to 3.40 inches with a maximum 90% upper confidence limit of 3.77 inches. Preliminary engineering of the drainage system size and layout was done to estimate costs and determine requirements and info~~rmation for additional detailed design later. The early design encompasses an area~~ of the facility that includes the process buildings, auxiliary buildings, pads, roads, parking lot and the water treatment and electrical substation areas in the back acreage of the facility. All the storm sewer systems are inside the inner fenced area and collect rainwater runoff from an estimated 20-25 acres including roadways, building roofs and pads.

License Documentation Impact: Former Section 1.3.2.8 – new Section 1.3.2.6 (in response to RAI GI-10D) of Revision A of the IIFP Integrated Safety Analysis Summary will be deleted and replaced with the following:

1.3.2.81.3.2.6 Floods

~~The II~~FP site does not fall within 100-year or 500-year floodplains (IIFP, 2009). The site is located in a semi-arid location with limited bodies of water.The site is located in an area which ~~has a semi-arid climate with an average rainfall of 12 to slightly less than 16 inches per year~~ as ~~recorded for Hobbs city (15.93 in/yr), Hobbs airport (12.35~~ in/yr), Pearl, NM (13.91 in/yr), and Roswell, NM (14.66 in/yr). This information was obtained from the Western Regional Climate Center website. The nearest river is the Pecos River to the southwest which is approximately 50 miles or greater from the site. Point precipitation information for coordinates of the site location (32.716 degrees latitude, -103.33 degrees longitude) as presented in the NOAA Precipitation Frequency Data Server are 3.40 in. (with 90% CLs of 2.98 and 3.77) for a one-hour rain with an Average Recurrence Interval (ARI) of 100 yr. For a 500 yr ARI, the values are 4.33 in. (with 90% CLs of 3.74and 4.82). The same type of data for three weather stations in and around Hobbs, NM is very similar and is displayed in Table 3-21 of the ER. According to the Federal Emergency Management Agency (FEMA) Mapping Information Platform, the site lies in a FEMA Flood Zone D which means that floodplain mapping has not been performed for this area.

Since there are no significant bodies of water or rivers within several miles of the site, it is expected that any flooding would be due to extreme short-term precipitation which could result in flash flooding. According to information obtained from NOAA National Climate Date Center (NCDC) Storm Events, there have been 68 flood events in Lea County, New Mexico between 1/1/1950 and 2/28/2010, an average of approximately one per year. Of these 68 events, there were no deaths reported, and property damage was reported for only 14 of the events, all of which occurred in the cities and towns of Lea County. Twenty-nine of the 68 events were reported for Hobbs which is located at an elevation from 125 to 170 feet lower than the site and approximately 11.4 miles to the east. The Hobbs airport is at an elevation of about 125 feet lower and some 6.9 miles southeast of the site, and it is also in FEMA Zone D and unmapped. The IIFP site would be expected to receive some drainage from highway 483 on the west and possibly from the north as parts of these areas are at slightly higher elevations than the proposed facility location. However, site topography would indicate that water would drain away from the site toward the east and south as gradual elevation declines occur in those directions for several miles. While the area where the IIFP Facility is located has not been mapped, the site does not lie within areas which have been mapped and lie within the 100-year floodplain in and around Hobbs, New Mexico according to information provided in the FEMA Mapping Information Platform.

Guidelines in the following Department of Energy (DOE) documents were used to perform a preliminary flood hazard assessment for the proposed IIFP facility near Hobbs, NM: DOE-STD-1020-2002, DOE-STD-1022-94 and DOE-STD-1023-95. Based on the information included herein and the guidance provided in these documents, it was determined that a comprehensive floo~~d hazard assessment is not required. Preliminary screening indicates that flooding~~ is not a design basis event other than in consideration of stormwater runoff which is included in the detailed facility design for storm sewer loading.

Based upon the above precipitation data for the site and information presented in Table 3-21 of the IIFP "Environmental Report" an estimate of a 4.0 inch one-hour rainfall was used for storm sewer design. The facility is designed to prevent flooding from extreme precipitation of short duration. Structures containing SSCs are constructed above grade level and above the level of plant roadways. They are curbed to prevent internal spills from leaving the structure, and this curbing also serves as flood barriers for those structures. The terrain is contoured around the site to improve drainage away from or diversion around the facility. In this way, the structures are physically removed from potential sources of flooding.

License Documentation Impact: Table 3-21in Section 3.6.1.3 of the IIFP Environmental Report, Revision A will be revised to include 500 year return period data with current updates for the 100-year data.

Table 3- 21 Estimates of the 24-Hour 100-Year and 500-Year Rain Event in Hobbs, New Mexico

Station	**Rainfall Frequency Estimates 1-Hour Event (24-Hour Event) In Inches[1]**		
	Mean (90% Confidence Interval)	**Lower Limit (90% Confidence Interval)**	**Upper Limit (90% Confidence Interval)**
100-year information			
Hobbs	3.35 (7.07)3.33 (7.03)	2.93 (6.21)2.91 (6.17)	3.74 (7.81)3.73 (7.76)
Hobbs FAA Airport	3.40 (6.47)3.38 (6.95)	2.99 (5.75)2.95 (6.11)	3.78 (7.10)3.76 (7.67)
Hobbs 13 W	~~3.41 (6.60)~~3.40 (6.43)	~~3.00 (5.82)~~2.98 (5.73)	~~3.77 (8.36)~~3.77 (7.04)
500-year			
information			
Hobbs	4.25 (9.27)	3.66 (7.98)	4.76 (10.26)
Hobbs FAA Airport	4.31 (9.17)	3.71 (7.90)	4.80 (10.15)
Hobbs 13 W	4.33 (8.47)	3.74 (7.38)	4.82 (9.31)
Source: WRCC, 2006NOAA Precipitation Frequency Data Server			
[1] 1 inch = 2.54 centimeters			

License Documentation Impact: Section 1.4.5 of Revision A of the IIFP Integrated Safety Analysis Summary will be revised as follows:

The IIFP FEP/DUP Ssite is located outside the 100-year flood-plain.; has not been mapped but does not lie within areas which have been mapped and are in the 100-year floodplain in and around H~~obbs, New Mexico according to information provided in the~~ FEMA Mapping Information Platform. Hhowever, a flood of any magnitude was considered credible during the accident analysis performed in the ISA. The likelihood of any major flood at the plant site was low and the consequences were limited (due to no fissile material existing at the site). Thus, flood type accidents are not a significant risk for plant operations.

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C. *The basis quoted in ER Figure 3-27 for IIFP being outside the 100-year flood plain is based on data provided by the Economic Development Corporation (EDC) of Lea County, NM. In response to this RAI, provide a basis for the credibility of the information. Indicate if the EDC is qualified to develop these reports, or specify that the EDC compiled the information from nationally recognized sources. In addition, in the LA, ISA Summary, and ER, provide a basis for the statement that the IIFP is outside the 500-year flood plain.*

RESPONSE: The FEMA Mapping Information Platform was used to determine that the area where the IIFP site is located is in Zone D and has not been mapped. Mapping is performed on a priority basis. Certain areas in general vicinity of the IIFP site have been mapped and those maps may be seen at this same site. Areas of potential flooding are shown in and around Hobbs, NM. A topographic view of the area indicates that the IIFP site is 125 to 170 feet above these locations. The site is also approximately 125 feet higher than the Lea County Airport which is also in Zone D and has not been mapped. Based on this information, it is safe to say that the site is not in areas which have been mapped and lie within the 100-year floodplain (Zone A) in and around Hobbs, New Mexico and is at a higher elevation than areas which have been mapped. FEMA is the source of the EDC floodplain information as documented on the map provided to IIFP. The 500-year information is not shown either in the information provided by the EDC or on maps located using the FEMA Mapping Information Platform. References to the 500-year floodplain have been removed as appropriate.

License Documentation Impact: The source reference for the floodplain information shown in Section 3.4.1.1, Figure 3-27 of Revision A of the IIFP Environmental Report will be changed from the EDC to include provider to EDC, FEMA and USGS.

Source: EDCLC, 2008, Drawing provided by Gordon Environmental Inc. to EDC of Lea County, Floodplain information FEMA and Topographical Information: U. S. Geological Survey.

License Docu~~menta~~tion Impact: Section 3.4.11.3 of Revision A of the IIFP Environmental Report will be deleted and replaced with the following:

3.4.11.3 Floodplain Description/Flood Control Measures

Site grade is above the elevation of the 100-year and the 500-year flood elevations. See Figure 3-27, "Watercourses, Floodplains, and Playas Map" for location of FEMA Zone A (areas inundated ~~during 100-year flood event) northeast of the site or northwest of Hobbs, New Mexico around the Hobbs Industrial Air Park. The IIFP site storm system is designed to accommodate a 100-year return period precipitation event. No additional flood control measures are proposed for the IIFP facility.~~

~~Site grad~~e is significantly above areas which have been mapped and are in the 100-year floodplain in and around Hobbs, New Mexico according to information provided in the FEMA Mapping Information Platform. These mapped areas and topographical data are displayed in Section 3.4.1.1, Figure 3-27, "Watercourses, Floodplains, and Playas Map" for location of FEMA Zone A (areas inundated during 100-year flood event). This map was provided to the Economic Development Council of Lea County by Gordon Environmental Inc. who references FEMA as the source for floodplain information and the U. S. Geological Survey (USGS) as the source for topographical information.

The IIFP site stormwater system is designed to accommodate a 100-year return period precipitation event. An estimate of a 4.0 inch one-hour rainfall was used for storm sewer design. See Section 1.3.2.6 “Floods” of the ISA. The facility is designed to prevent flooding from extreme precipitation of short duration. Structures containing SSCs are constructed above grade level and above the level of plant roadways. They are curbed to prevent internal spills from leaving the structure, and this curbing also serves as flood barriers for those structures. The site terrain is contoured to improve drainage away from or diversion around the facility. In this way, the structures are physically removed from potential sources of flooding.

License Documentation Impact: Section 3.4.11.4 of Revision A of the IIFP Environmental Report will be deleted and replaced with the following:

3.4.11.4 Design-Basis Flood Elevation

~~Site grade is above the 500-year flood elevations.~~

The IIFP site has not been mapped but does not lie within areas which have been mapped and are in the 100-year floodplain in and around Hobbs, New Mexico according to information provided in the FEMA Mapping Information Platform. Preliminary screening indicates that flooding is not a design basis event other than in consideration of stormwater runoff which is included in the detailed facility design. See section 1.3.2.6, “Floods” of the ISA.

License Documentation Impact: Former Section 1.6.3.3 – new Section 1.7.3.3, subheading “Floods” (in response to RAI RP-13) of Revision A of the IIFP License Application Section will be deleted and replaced with the following:

Floods

~~The IIFP site does not fall within 100-year or 500-year floodplains (see IIFP ER). The site is located in a semi-arid location with limited bodies of water.~~

The IIFP Site has not been mapped but does not lie within areas which have been mapped and are in the 100-year floodplain in and around Hobbs, New Mexico according to information provided in the FEMA Mapping Information Platform. Preliminary screening indicates that flooding is not a design basis event other than in consideration of stormwater runoff which is included in the detailed facility design. See section 1.3.2.6 “Floods” of the ISA.

General Information

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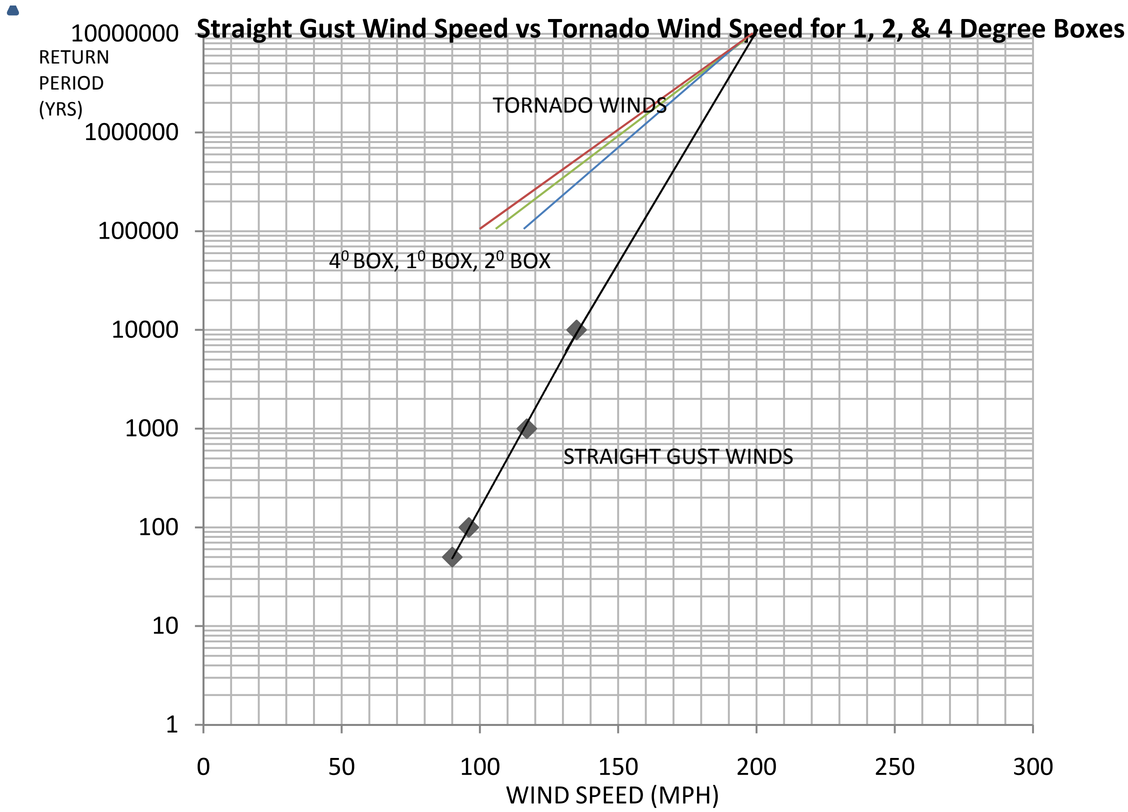
D. For the design basis wind strength in the ISA Summary, provide a return year period and maximum wind speed for both intermediated term (100-500 years) and long term (>1000 years). Specify the basis for both the maximum wind speed and return year period for the information, e.g., a site-specific study, national weather service, etc. In addition, Table 3-22 in the ER has a very limited timeframe (82-97). Justify that this limited timeframe is adequate for the design basis wind. Demonstrate that the wind assessments were from a recognized source and the method used for analyzing high-wind hazard is a commonly used and accepted method.

RESPONSE: The determination of design basis wind speed has been reevaluated using a different methodology and under a different set of criteria than those addressed in Question GI-10 D. A discussion of that methodology is provided in this response.

The evaluation of tornadoes and straight winds was made based on NUREG/CR-4461, Revision 2 (February, 2007) including data in Appendices A, B and C of the NUREG. This NUREG guide provides calculations based upon 46,800 tornado segments occurring from January 1, 1950 through August 2003 of which more than 39,600 had sufficient information on location, intensity, length, and width to be used in the analysis included in this report. NUREG/CR-4461, Revision 1 had been published in April 2005. The National Weather Service changed from using the Fujita Scale to the Enhanced Fujita Scale in February 2007. Revision 2 incorporates the Enhanced Fujita Scale in its methodology and calculations. Specifically, Chapter 5 of the NUREG has been revised to show 10^{-5}, 10^{-6}, and 10^{-7} probability design wind speeds for the contiguous United States estimated using the above database and the Enhanced Fujita Scale. (NCDC, 2010b)

The two-degree box where the INIS site is located is in Region 2. While the two-degree and four-degree boxes are considered to be more reliable since they contain data for more events, the document does allow the use of the one-degree data if the number of events is large enough to provide accurate calculations. Instructions for using the NUREG Appendix C, Results for one-degree boxes state that the data set should contain a minimum of 10 events with 20 or more events being desirable. There were 76 events reported for the one degree box whose SE corner is the $32^0/103^0$ gridline. Of these, 56 were used in the calculations. The four-degree box uses data from 364 events of the 435 events observed.

The data from the above NUREG appendices for the one-degree, two-degree, and four-degree boxes are used. The maximum tornado wind speeds versus return period for each box are plotted on the same chart with the straight gust wind speed data (DOE-1020-2002, Table 3-2) versus return period for sites with basic gust wind speed of 90 mph (per USGS maps as adopted by the model building codes). All three tornado wind speed curves intersect the straight gust wind speed curve at approximately a 10^7 year return period or a probability of exceeding of 10^{-7}. DOE-STD-1022-2002, Appendix D, Paragraph D.2 states that, generally, straight and hurricane winds control the criteria for probabilities down to about 10^{-4}. Therefore, straight gust wind speeds will be used as the wind design basis for building design at the IIFP facility.



Legend: 4° Box - Red; 1° Box - Green; 2° Box - Blue

Note: See the discussion of straight winds below for the derivation of basic gust wind speeds versus probability used in the plots discussed above.

Design wind speeds for all buildings and structures that do not contain licensed material or for buildings and structures containing chemicals or processes that do not affect licensed material will be determined in accordance with the applicable model building codes (New Mexico Commercial Building Code (NMCBC, 2006) and American Society of Civil Engineers (ASCE 7-05) or latest editions adopted by the State of New Mexico at time of design). Specifically, these buildings and structures will be designed for a minimum straight gust wind speed of 90 mph.

Design wind speeds for all buildings and structures containing licensed material or buildings and structures containing chemicals or processes affecting licensed material are determined in accordance with NUREG-1520, Revision 1 and by reference to DOE-STD-1020-2002.

DOE-STD-1020-2002 Table 3-2 lists recommended peak gust wind speeds for Category C exposure and for tornadoes at 10m (33 ft) above the ground versus Performance Category and Annual Probability of Exceedance for 23 DOE sites across the United States.

By definition, DOE Performance Category 3 (PC-3) buildings and other structures are buildings and other common structures not classified as PC-4 structures which contain sufficient quantities of toxic or explosive substances to be dangerous to the public if released. PC-4 SSCs are designated as “reactor like” in that the quantity of hazardous material and energetics is similar to a la~~rge Category A reactor (>200MW$_t$). It is determined that IIFP process buildings an~~d other structures containing licensed material or process buildings containing processes or materials potentially affecting licensed materials are properly categorized as PC-3. This designation is consistent with Occupancy Category III buildings and structures as defined in ASCE 7-05 Table 1-1.(DOE G 420.1-2, 3/28/00)

DOE-STD-1020-2002, Table 3-2 lists design wind speeds and probabilities of exceeding the speeds for straight winds and for tornadoes for several DOE sites for Performance Categories PC-1 thru PC-4 structures. DOE Performance Categories are used below for illustrative purposes in determining the design wind speed and probability of exceeding the speed for the IIFP Facility site. The design wind speeds listed in DOE-STD-1020-2002, Table 3-2 for PC-1 structures (2 x 10^{-2} probability of exceeding the speed) are consistent with the USGS wind speed maps adopted by the International Building Code (IBC-2006) and ASCE 7-05. For all cases cited, where the design wind speed for PC-1 structures per the USGS wind speed maps is 90 mph (2 x10^{-2}), the design wind speed per DOE-STD-1020-2002, Table 3-2 for PC-2 structures is 96 mph (10^{-2}), for PC-3 structures is 117 mph (10^{-3}) and for PC-4 structures is 135 mph (10^{-4}).

Per Table D-2 in DOE-STD-1020-2002, Appendix D, the performance goal for a PC-3 facility is to design for the facility to withstand a straight-line wind load that occurs at a frequency of 10^{-4}. This criteria can be met in two ways: 1) design the facility to survive the force of winds with an occurrence probability of 10^{-4} (135 mph), or 2) design the facility to withstand a straight-line wind load of 10^{-3} (117 mph), but incorporate factors of safety such that the Ratio of Hazard to Performance Probability is equal to or greater than 10 using the methodology in Appendix D of DOE-STD-1020-2002. IIFP decided to use the first approach for meeting the performance criteria by designing PC-3 structures to withstand a 135 mph straight-line wind. At this design wind speed and probability of exceeding the speed, no credit is taken for the Ratio of Hazard to Performance Probability allowed in DOE-STD-1020-2002, Appendix D, Table D-2, even though conservatism will be achieved in the design due to factors of safety inherent in the design process and in material allowable stress specifications. From the evaluation that was performed, it was determined that the likelihood of a tornado generating winds at 135 mph was much lower for this area with a probability of less than 10^{-5}. Also, according to Appendix A of NUREG/CR-4461, Rev.2, the two-degree box which contains the IIFP site has a tornado strike probability of 8.444 x 10^{-5} yr^{-1}. Strike probabilities for the one-degree and four-degree boxes are 5.235 x $10^{-5}yr^{-1}$ and 3.975 x 10^{-5} yr^{-1} respectively. Therefore, facility design of PC-3 structures to a 135 mph wind speed at the 10^{-4} probability level represents a conservative approach with respect to wind speed.

The IIFP Facility building and structures that contain hazardous radiological and chemical (if applicable) materials that must be controlled or mitigated to meet the performance criteria given in 10 CFR part 70.61, “Performance Requirements,” are defined as PC-3 structures per the Natural Phenomena Hazard Evaluation methods prescribed in DOE-STD-1020-2002. As mentioned above, those structures will meet the performance category of 10^{-4}, which is designed to withstand a 10^{-4} probability per year occurrence straight-line wind event. Hence, based on the order of magnitude scale for determining event likelihood using the ISA methodology in NUREG-1520, Rev. 1, the collapse or loss of the building integrity is considered to be highly unlikely and meets the qualitative frequency scale of 10^{-5} per year or less. Events that occur at a highly unlikely frequency meet the performance criteria for acceptable risk without the need to further reduce the likelihood of hazardous release or mitigate its consequences. Therefore, designing the PC-3 facilities to withstand straight-line wind events with an occurrence frequency of 10^{-4} per year meets ISA risk acceptance levels regardless of the hazardous material inventories within the facilities and without consideration to mitigation of any hazardous release.

License Documentation Impact: Section 1.3.2.3 of Revision A of the IIFP Integrated Safety Analysis Summary will be deleted and replaced with the following:

1.3.2.3 Extreme Winds

~~Wind speeds over the State of New Mexico are usually moderate, although relatively strong winds often accompany occasional frontal activity during late winter and spring months and sometimes occur just in advance of thunderstorms. Frontal winds may exceed 30 mile/hr for several hours and reach peak speeds of more than 50 mile/hr.~~

This section describes the basis for evaluation of wind loading on the structures at the IIFP Facility in Lea County, New Mexico. Three sources of wind loading are evaluated; wind loading from a hurricane, straight wind loading and wind loading from a tornado.

Hurricanes

The IIFP Facility site is located in the extreme southeastern portion of New Mexico and over 500 miles inland from the Gulf of Mexico. Hurricane winds dissipate over Louisiana and Texas enough to prevent a wind damage threat to the IIFP Facility site as evidenced by the following information provided by NOAA, National Climatic Data Center (NCDC).

According to NOAA/ NCDC, of the 155 thunderstorm events recorded between 01/01/59 and 02/28/10, the maximum thunderstorm wind speed recorded for Lea County was 80 knots (92.1 mph) on 07/14/89. Some of these thunderstorm events likely would have been the result of dissipated hurricanes. (NCDC, 2010a)

Tornadoes and Straight Winds

NOAA NCDC Storm Events includes information for 527 tornado events reported for the state of New Mexico for the period 1950-2010 for an average of 8.78 events per year. Lea County reported 92 tornadoes for the same period for an average of 1.53 tornadoes per year. Of these 92 tornado events for Lea County between 01/01/50 and 01/31/10, 63 - F0, 20 - F1, 8 - F2, and one-F3 tornadoes were reported. During this same sixty-year period, no F4 or F5 tornadoes were reported. (NCDC, 2010a)

The evaluation of tornadoes and straight winds was made based on NUREG/CR-4461, Revision 2 (February, 2007) including data in Appendices A, B and C of the NUREG, DOE-1020-2002 and DOE-STD-1022-2002 including Appendix D. It was determined from this evaluation that straight gust wind speeds will be used as the design basis for buildings and structures at the IIFP Facility.

Design wind speeds for all buildings and structures that do not contain licensed material or for buildings and structures containing chemicals or processes that do not affect licensed material will be determined in accordance with the applicable model building codes (New Mexico Commercial Building Code (NMCBC, 2006) and American Society of Civil Engineers (ASCE 7-

05) or latest editions adopted by the State of New Mexico at time of design). Specifically, these buildings and structures will be designed for a minimum straight gust wind speed of 90 mph.

Design wind speeds for all buildings and structures containing licensed material or buildings and structures containing chemicals or processes affecting licensed material are determined in accordance with NUREG-1520, Revision 1 and by reference to DOE-STD-1020-2002 which, in Table 3-2, lists recommended peak gust wind speeds for Category C exposure and for tornadoes at 10m (33 ft) above the ground versus Performance Category and Annual Probability of Exceedance for 23 DOE sites across the United States.

By definition, DOE Performance Category 3 (PC-3) buildings and other structures are buildings and other common structures not classified as PC-4 structures which contain sufficient quantities of toxic or explosive substances to be dangerous to the public if released. PC-4 SSCs are designated as “reactor like” in that the quantity of hazardous material and energetics is similar to a large Category A reactor (>200MW_t). It was determined that IIFP process buildings and other structures containing licensed material or process buildings containing processes or materials potentially affecting licensed materials are properly categorized as PC-3. This designation is consistent with Occupancy Category III buildings and structures as defined in ASCE 7-05 Table 1-1.(DOE G 420.1-2, 3/28/00)

DOE-STD-1020-2002, Table 3-2 lists design wind speeds and probabilities of “exceedance” for straight winds and for tornadoes for several DOE sites for Performance Categories PC-1 thru PC-4 structures. The design wind speeds listed in Table 3-2 for PC-1 structures (2 x 10^{-2} probability of “exceedance”) are consistent with the USGS wind speed maps adopted by the International Building Code (IBC-2006) and ASCE 7-05. For all cases cited, where the design wind speed for PC-1 structures per the USGS wind speed maps is 90 mph (2 x10^{-2}), the design wind speed per Table 3-2 for PC-2 structures is 96 mph (10^{-2}), for PC-3 structures is 117 mph (10^{-3}) and for PC-4 structures is 135 mph (10^{-4}).

Per Table D-2 in DOE-STD-1020-2002, Appendix D, the performance goal for a PC-3 facility is to design for the facility to withstand a straight-line wind load that occurs at a frequency of 10^{-4}. This 10^{-4} performance goal is met at the IIFP facility by designing PC-3 structures using a 135 mph straight wind gust at the 10^{-4} probability level where no credit is taken for the Ratio of Hazard to Performance Probability allowed per Table D-2. Therefore, the IIFP design basis wind speed is one order of magnitude more conservative than the design basis required by DOE for PC-3 structures where a hazard probability of 10^{-3} with a Ratio of Hazard to Performance Probability of 10 may be used to meet the performance goal of 10^{-4}.

From the evaluation that was performed, it was determined that the likelihood of a tornado generating winds at 135 mph is at a probability level of less than 10^{-5}. Also, according to Appendix A of NUREG/CR-4461, Rev.2, strike probabilities for the one-degree, the two-degree and the four-degree boxes containing the IIFP site are 5.235 x $10^{-5}yr^{-1}$, 8.444 x 10^{-5} yr^{-1} and 3.975 x 10^{-5} yr^{-1} respectively. Therefore, selection of a design basis wind speed for IIFP PC-3 structures of 135 mph at the 10^{-4} probability level represents a conservative approach.

The IIFP Facility building and structures that contain hazardous radiological and chemical (if applicable) materials that must be controlled or mitigated to meet the performance criteria given in 10 CFR part 70.61, “Performance Requirements,” are defined as PC-3 structures per the Natural Phenomena Hazard Evaluation methods prescribed in DOE-STD-1020-2002. As men~~tioned above, those structures will meet~~ Draft ~~performance category of 10^{-4}, and be~~ designed to withstand a 10^{-4} probability per year occurrence straight-line wind event. Hence, based on the order of magnitude scale for determining event likelihood using the ISA methodology in NUREG-1520, Rev. 1, the collapse or loss of the building integrity is considered to be highly unlikely and meets the qualitative frequency scale of 10^{-5} per year or less. Events that occur at a highly unlikely frequency meet the performance criteria for acceptable risk without the need to further reduce the likelihood of hazardous release or mitigate its consequences. Therefore, designing the PC-3 facilities to withstand straight-line wind events with an occurrence frequency of 10^{-4} per year meets ISA risk acceptance levels regardless of the hazardous material inventories within the facilities and without consideration to mitigation of any hazardous release.

License Documentation Impact: Sections 1.3.2.6 and 1.3.2.7, of Revision A of the IIFP Integrated Safety Analysis Summary have been incorporated above in Section 1.3.2.3 "Extreme Winds" as subsections "Hurricanes" and "Tornadoes and Straight Winds", respectively. The Sections will be removed in their entirety and subsequent Sections and subsections will be renumbered accordingly.

1.3.2.6 Tornadoes

~~Tornadoes are occa~~sionally reported in New Mexico, most frequently during afternoon and early evening hours from May through August. There is an average of nine tornados a year in New ~~Mexico. Tornadoes occur infrequently in the vicinity of the IIFP site. Only two tornadoes were reported in Lea County from 1980 to 1989. Only one tornado was reported in Andrews County, Texas in the same period.~~

~~1.3.2.7 Tropical Storms~~ and Hurricanes

~~Hurricanes are low pressure weather system~~s that develop over the tropical oceans and as they move inward they lose their intensity quickly once they make landfall. The IIFP site is ~~approximately 500 mile from the nearest coast, it is likely that any hurricane that moved in that direction would have downgraded to a tropical depression before it reached IIFP.~~

~~**License Documentation Impact:** Section 1.6.3.3, "Extreme Winds" of Revision~~ A of the IIFP License Application (now Section 1.7.3.3, in response to RAI RP-13) will be revised as follows to include marked paragraphs:

Extreme Winds

Wind speeds over the State of New Mexico are usually moderate, although relatively strong winds often accompany occasional frontal activity during late winter and spring months and sometimes occur just in advance of thunderstorms. Frontal winds may exceed 30 mile/hr for several hours and reach peak speeds of more than 50 mile/hr.

Design wind speeds for all buildings and structures that do not contain licensed material or for buildings and structures containing chemicals or processes that do not affect licensed material will be determined in accordance with the applicable model building codes (New Mexico Commercial Building Code (NMCBC, 2006) and American Society of Civil Engineers (ASCE 7-05) or latest editions adopted by the State of New Mexico at time of design). Specifically, these buildings and structures will be designed for a minimum straight gust wind speed of 90 mph.

The IIFP Facility building and structures that contain hazardous radiological and chemical (if applicable) materials that must be controlled or mitigated to meet the performance criteria given in 10 CFR part 70.61, "Performance Requirements," are defined as PC-3 structures per the Natural Phenomena Hazard Evaluation methods prescribed in DOE-STD-1020-2002. These structures will be designed to withstand a straight gust wind speed of 135 mph at the 10^{-4} probability of "exceedance" level. Hence, based on the order of magnitude scale for determining event likelihood using the ISA methodology in NUREG-1520, Rev. 1, the collapse or loss of the building integrity is considered to be highly unlikely at this design basis.

General Information

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E. Regarding the design basis threat for a tornado, provide the source of the information that 9 tornados occur annually in New Mexico, e.g., National Oceanic and Atmospheric Administration. Provide the source of the information which indicates that two tornados occurred in Lea County. Specify the probability frequency of a tornado hitting an IIFP building and provide the basis for this information. Indicated if this frequency information or some other reason is used as a basis for not assigning Items Relied on for Safety (IROFS) for tornados in the ISA.

RESPONSE: NOAA NCDC Storm Events provides data for 527 tornado events in New Mexico over a 60 year period for an average of 8.78 tornadoes per year. Lea County reported 92 tornadoes for the same period for an average of 1.53 tornadoes per year. Of these 92 tornado events for Lea County between 01/01/50 and 01/31/10, 63 - F0, 20 - F1, 8 - F2, and one- F3 tornadoes were reported.

Also, according to Appendix A of NUREG/CR-4461, Rev.2, strike probabilities for the one-degree, the two-degree and the four-degree boxes containing the IIFP site are $5.235 \times 10^{-5} yr^{-1}$, $8.444 \times 10^{-5} yr^{-1}$ and $3.975 \times 10^{-5} yr^{-1}$ respectively.

The design basis wind speed for the IIFP facility is 135 mph at a 10^{-4} probability level. According to data provided in NUREG/CR-4461, Rev. 2, it is highly unlikely that a tornado with winds exceeding 135 mph will occur in this locale. Also, all strike probabilities for the one-degree, two-degree and four-degree boxes in Appendix A are at a less than 10^{-4} probability level.

License Documentation Impact: Section 1.3.2.6 of Revision A of the IIFP Integrated Safety Analysis Summary will be deleted has been incorporated into Section 1.3.2.3, subheading "Tornadoes and Straight Winds (see RAI GI-10D).

License Documentation Impact: Former Section 1.6.3.3, "Tornadoes" (now Section 1.7.3.3, in response to RAI RP-13) of Revision A of the IIFP License Application will be revised to read as follows:

Tornadoes are occasionally reported in New Mexico, most frequently during afternoon and early evening hours from May through August. ~~There is an average of nine tornadoes a year in New Mexico. Tornadoes occur infrequently in the vicinity of IIFP. Only two tornadoes were reported in Lea County from 1880 to 1989. Only one tornado was reported in Andrews County, Texas in the same period.~~ NOAA National Climate Data Center (NCDC) Storm Events includes information for 527 tornado events reported for the state of New Mexico for the period 1950-2010 for an average of 8.78 events per year. Lea County reported 92 tornadoes for the same period for an average of 1.53 tornadoes per year. Of these 92 tornado events for Lea County between 01/01/50 and 01/31/10, 63 - F0, 20 - F1, 8 - F2, and one- F3 tornadoes were reported. During this same sixty-year period, no F4 or F5 tornadoes were reported. (NCDC, 2010a)

License Documentation Impact: Paragraph three from section 3.6.1.6 of Revision A of the IIFP Environmental Report will be revised to read as follows:

Tor~~nadoes are occasionally reported in New Mexico, most frequently during afternoo~~n and early evening hours from May through August. There is an average of nine tornadoes a year in New Mexico. Tornadoes occur infrequently in the vicinity of IIFP. Only two tornadoes were reported in Lea County from 1880 to 1989. Only ~~one tornado was reported in Andrews County, Texas in the same period. From NOAA National Climate Data Center (NCDC) Storm Events, it was determined that 527 tornado events were reported for the state of New Mexico for the period 1950-2010 for a~~n average of 8.78 per year. Lea County reported 92 tornadoes for the same period for an average of 1.53 tornadoes per year. Of the 92 tornado events between 01/01/50 and 01/31/10, 63 - F0, 20 - F1, 8 - F2, and one- F3 tornadoes were reported in Lea County. During this sixty-year period, no F4 or F5 tornadoes were reported. See Figure 3-60 showing the Tornado Probability Map of the United States.

General Information

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F. *In response to this RAI, provide information from the Process Hazards Assessment (PHA) which demonstrates that the Accident Analysis 101.9 from ISA Table 4-3 has a correct value of 10-4. Indicate whether this number is based on the probability of a tornado striking the facility. Add information to the description in the ISA Summary Section 1.3.2.6 which indicates the source of information for determining the tornado data.*

RESPONSE: According to Appendix A of NUREG/CR-4461, Rev.2, the two-degree box which contains the IIFP site has a strike probability of 8.444 x 10^{-5} yr^{-1}. Strike probabilities for the one-degree and four-degree boxes are 5.235 x $10^{-5}yr^{-1}$ and 3.975 x 10^{-5} yr^{-1} respectively.

The design basis wind speed for the IIFP facility is 135 mph at a 10^{-4} probability level. According to data provided in NUREG/CR-4461, Rev. 2, it is highly unlikely that a tornado with winds exceeding 135 mph will occur in this locale (less than 10^{-5} probability). Also, all strike probabilities for the one-degree, two-degree and four-degree boxes in Appendix A are at a less than 10^{-4} probability level. The assignment of a likelihood index of -4 is a conservative estimate based upon strike probabilities of less than 1 x 10^{-4} but greater than 1 x 10^{-5}.

License Documentation Impact: Former Section 1.3.2.6 of Revision A of the IIFP Integrated Safety Analysis Summary will be deleted and incorporated in Section 1.3.2.3, "Tornadoes and Straight Winds" as shown in Response to RAI GI-10 D and GI 10-E.

General Information

GI-10

G. *Considering the population density in Lea County, the record of only 2 damaging lightning strikes since 1950 does not provide adequate evidence of limited risk. Consistent with 70.64(a)(2), add a statement to the LA and ISA Summary that demonstrates the proposed IIFP and the associated power systems are designed and built with heavy grounding or lightning protection to handle lightning strikes. Also, in response to the RAI, provide information from the PHA which demonstrates that the accident analysis for a lightning strike at the IIFP is low consequence, taking into account the average yearly thunderstorms.*

RESPONSE: Information taken from NOAA indicates that Lea County is in a region that has an average flash density of 4 to 5 flashes/km^2/yr. The conversion of this flash density to a 40 acre basis for the IIFP fenced area indicates that the site could expect 0.65 to 0.81 flashes per year (equivalently less than one flash per year). IIFP structures, equipment and associated power systems will be designed and built with heavy grounding and/or lightning protection to handle lightning strikes.

License Documentation Impact: Section 1.6.3.3 “Lightning” of Revision A of the IIFP License Application (now Section 1.7.3.3, “Lightning”, in response to RAI RP-13) will be revised to read as follows:

Only two lightning events having sufficient intensity to cause loss of life, injury, significant property damage, and/or disruption to commerce were reported in Lea County, New Mexico, between January 1, 1950 and April 30, 2004 (see IIFP ER). The closest lightning event occurred in Hobbs with minor property damage of $3,000 on August 12, 1997. The second occurred in Lovington on August 8, 1996, causing two deaths.

The NOAA database indicates that Lea County is in a region that has an average flash density of 4 to 5 flashes/km^2/yr. The conversion of this flash density to a 40 acre basis for the IIFP fenced area indicates that the site could expect 0.65 to 0.81 flashes per year (equivalently less than one flash per year). IIFP structures, equipment and associated power systems will be designed and built with heavy grounding and/or lightning protection to handle lightning strikes. (http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf)

License Documentation Impact: Section 1.3.2.5 of Revision A of the IIFP Integrated Safety Analysis Summary will be revised to read as follows:

Only two lightning events having sufficient intensity to cause loss of life, injury, significant property damage, and/or disruption to commerce were reported in Lea County, New Mexico, between January 1, 1950 and April 30, 2004 (see IIFP ER). The closest lightning event occurred in Hobbs with minor property damage of $3,000 on August 12, 1997. The second occurred in Lovington on August 8, 1996, causing two deaths.

The NOAA database indicates that Lea County is in a region that has an average flash density of 4 to 5 flashes/km^2/yr. The conversion of this flash density to a 40 acre basis for the IIFP fenced area indicates that the site could expect 0.65 to 0.81 flashes per year (equivalently less than one flash per year). IIFP structures, equipment and associated power systems will be designed and buil~~t with heavy grounding and/or lightning protection to handle lightning strikes.~~ (http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf)

General Information

GI-11 LA Sections 1.6.3.4-1.6.3.8 contain information on ground water. Consistent with the acceptance criteria in NUREG-1520, Section 1.3.4.3(4), provide the following information:

A. The third full paragraph in LA Section 1.6.3.4 indicates runoff from the site will not travel to a river. For completeness, in this same paragraph, specify the distance to the nearest river. Also, modify this commitment to be consistent with the statement in ER Section 3.4.11.5 that "IIFP plant has no direct outfall to a surface water body." Clarify the meaning of direct outfall.

RESPONSE: The distance to the nearest river (Pecos River) from the IIFP facility site is approximately 50 miles. This information along with the referenced statement in ER Section 3.4.11.5 and the definition of "direct outfall" will be added and clarified in the LA Section 1.6.3.4.

License Documentation Impact: Paragraph three of former LA Section 1.6.3.4, "Characteristics of Nearby Rivers, Streams and other Bodies of Water" (now a subheading under 1.7.3.4 in response to RAIs RP-13 and GI-5) will be revised to read as follows:

Surface drainage at the site is contained within two local playa lakes that have no external drainage. The nearest river to the IIFP facility site is 50 miles, or greater, away (the Pecos River) and rRunoff does not from the site is unlikely to drain to this river.one of the state's major rivers. Surface water is likely lost through evaporation, resulting in high salinity conditions and the water~~s~~ in soil~~s associ~~ated with the playas. These conditions are not ~~favorable for the development~~ of viable aquatic or riparian habitats. The IIFP facility has no direct outfall to a natural body of surface water. IIFP defines "direct outfall" as a discharge of facility water directly into a natural body of surface water such as a river or stream, or as a water discharge normally identified as an "outfall" in a National Pollutant Discharge Elimination (NPDES) permit. At the IIFP Facility, process water and cooling water are either recycled back into the process systems or evaporated in the Environmental Protection Process (EPP) Facility as part of the treatment. Process areas where hazardous chemicals or licensed materials are processed and handled have sealed dikes, curbs and pumps, where necessary, to collect and transport leaks or spills in those areas back into the process or to the EPP for treatment as process water. Sanitary wastewater from toilets, lavatories and showers receives primary, secondary and tertiary treatment and is used to water an on-site tree farm in accordance with New Mexico ground-water permit requirements, where applicable. Disposition of sanitary water and collected rain or storm water is further described in Section 1.1.5.3 above. There is no designated FEMA Zone "A" area that would be inundated during a 100-year flood event.

General Information

GI-11

B. *The ER Section 4.4.7 refers to a Stormwater Pollution Prevention Plan (SWPPP). This plan does not appear to be a commitment addressed in the LA. Since the ER is not part of the license application, incorporate the commitment to maintain the SWPPP into the LA. Add a commitment similar to ER Sections 3.4.11.4 and 3.4.11.5 to the LA.*

RESPONSE: The information relative to a Stormwater Pollution Prevention Plan (SWPPP) for the IIFP Facility operations that is described in the IIFP ER Section 4.4.7 will be included as a new paragraph five in the former LA Section 1.6.3.6 "Groundwater Hydrology" (now subheading under 1.7.3.4 in response to RAIs RP-13 and GI-5.) The information in the IIFP ER for commitment to a SWPPP is found in ER Section 3.4.10; not the referenced ER Sections 3.4.11.4 and 3.4.11.5. The SWPPP commitment in ER Section 3.4.10 will be added appropriately as paragraph four in LA Section subheading "Groundwater Hydrology in the new 1.7.3.4.

License Documentation Impact: New paragraphs 4 and 5 will be added to the IIFP LA former Section 1.6.3.6 (new 1.7.3.4) subheading "Groundwater Hydrology."

A NPDES--Construction General Permit for stormwater discharge is required because construction of the IIFP plant will involve the grubbing, clearing, grading or excavation of one or more acres of land. This permit is required prior to certain pre-construction activities and to construction activities and will be administered by the Environmental Protection Agency (EPA) with oversight review by the New Mexico Water Quality Bureau. Various land clearing activities such as off-site borrow pits for fill material are covered under this general permit. IIFP construction contractors will be clearing approximately 40 acres during the construction phase of the project. IIFP will develop a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent (NOI) with the EPA, at least seven days prior to the commencement of construction activities, in accordance with regulatory requirements

A Spill Prevention Control and Countermeasure (SPCC) plan will be implemented for the facility to identify potential spill substances, sources and responsibilities. In addition, storm water discharges during plant operation will be controlled by a Stormwater Pollution Prevention Plan (SWPPP) to assure that runoff released to the environment will be of acceptable water quality.

Integrated Safety Analysis Summary

ISA-5. [CLOSED]

Radiation Protection

RP-1 *(1) NUREG-1520, Section 4.4.3.3, Bullet 5 states that an application is acceptable if it "describes the minimum training requirements and qualifications for the radiation protection staff." Sections 2.3.3 and 4.3 contain commitments pertinent to this requirement, but these sections do not appear to adequately address the minimum training and qualification for radiation protection staff other than the RPM and ESHM. Revise Section 4.3 of the application to clarify the training requirements and qualifications for other radiation protection staff. This is needed to assure compliance with 10 CFR 40.32(b).*

RESPONSE: Training r equirements and qualifications for other radiation protection st aff is clarified below.

License Documentation Impact: A new second and third paragraph will be added to Section 4.5.3 of the IIFP License Application, Revision A. The Section will be amended; as follows to clarify the training requirements for radiation protection staff.

The radiation protection staff shall be trained in the following radiation protection areas:

- Radiological Fundamentals
- Biological Effects
- Radiation Limits
- ALARA Program
- Personnel Monitoring Programs
- Radiological Access and Control Postings
- Radiological Emergencies
- Practical Factors (e.g., RWPs, Dosimeters, Contamination Control, Emergency Response, Protective Clothing)

In addition, radiation protection staff will be trained on all applicable RPP procedures and policies and receive appropriate on-the-job training (OJT) based on their job requirements. Training materials as well as those qualified to provide the training will be approved by the RPM.

License Documentation Impact: Section 4.3 of the License Application, will be revised to include the following RP staff personnel qualifications as new paragraphs 5 and 6 of the Section.

Staff Health Physicists shall have as a minimum a bachelor's degree in engineering or a scientific field and experience commensurate with Health Physics and Radiation Protection duties.

Staff Radiation Control Technicians shall have a high school diploma and experience commensurate with Radiation Control duties.

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RP-2 *(2) NUREG-1520, Section 4.4.5.3, Bullet 6 states that an application is acceptable if it commits to "evaluate the effectiveness and adequacy of the training program curriculum and instructors." The application indicates that the training program curriculum is reviewed bi-annually and tests are given to verify the effectiveness and adequacy of training; however, it is unclear how the applicant verifies the effectiveness and adequacy of the instructors. Clarify in Section 4.5, or a subsection, whether the evaluation for effectiveness is addressed in Section 11.3.8 of the application or if another process is utilized. This is needed to assure compliance with 10 CFR 40.32(b).*

RESPONSE: Evaluation for effectiveness of training program curriculum is clarified below.

License Documentation Impact: Section 4.5.4 of the IIFP License Application, Revision A will be revised to add as a new second paragraph the following statement.

As described in Chapter 11 Section 11.3.8, the Radiation Protection Safety Training Program is systematically evaluated to measure the program's effectiveness in producing competent employees. The RPM will review the evaluation information and implement changes in the training program as necessary.

RP-3 *(3) NUREG-1520, Section 4.4.7.3, Bullet 9 states that an application is acceptable if it commits to "implement the facility's corrective action program when the results of personnel monitoring or contamination surveys exceed the applicant's administrative personnel contamination levels." Although the application addresses corrective actions in the event of personnel contamination (Section 4.7.10), it does not appear to adequately discuss documentation of such events, determination and rectification of causes, and tracking and trending of occurrences. Revise Section 4.7.10 of the application to provide additional clarification regarding tracking and trending of personnel contamination events and when causes of contamination will be investigated and rectified. This is needed to assure compliance with 10 CFR 40.32(c).*

RESPONSE: Section 4.7.10 of the application is revised below to provide additional clarification regarding tracking and trending of personnel contamination events and when causes of contamination will be investigated and rectified.

License Documentation Impact: The LA, Section 4.7.10 will be revised to address further corrective actions regarding personnel contamination events by adding the following as a new second paragraph of the subject section.

Personnel contamination events that exceed a facility Administrative Control Level will be recorded, tracked, and managed through the Corrective Action Process described in the IIFP License Application Chapter 11, Section 6 "Incident Investigations and Corrective Action Process." The Corrective Action Process will require investigation of the contamination event and implementation of corrective actions to rectify any deficiencies. Contamination events that are managed through the Corrective Action Process will be reported to the ALARA Committee and reviewed as described in Section 4.2.3 "ALARA Committee." Tracking and trending will be performed in accordance with the ALARA program as stated in Section 4.2.2 "ALARA Goals."

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RP-4 *(4) NUREG-1520, Section 4.4.7.3, Bullet 12 states that an application is acceptable if it commits to "establish policies to ensure equipment and materials removed from restricted areas to unrestricted areas are not contaminated above the specified release levels in NRC Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, April 1993." The required reference is present in Section 4.7.13 of the application but so is reference to the use of ANSI/HPS N13.12. ANSI/HPS N13.12 is not sufficient to demonstrate regulatory compliance for generic clearance of materials. Provide the specific criteria suitable for volumetric clearance of a product stream or waste stream along with possible uses and/or excluded uses of the material. The justification for the criteria should include sufficient detail to determine that clearance determinations are suitable for the intended final use of the material. This is needed to assure compliance with 10 CFR 40.32(d) and 10 CFR 20.1302.*

RESPONSE: Specific criteria suitable for volumetric clearance of a product stream or waste stream and appropriate justification for the criteria are provided.

License Documentation Impact: Section 4.7.13 "Policies for Removal of Equipment and Materials from Radiological Controlled Areas (RCAs)" will be revised, by modifying paragraph one and inserting three additional paragraphs. Section 4.7.13 will read as follows:

When removing equipment and materials from RCAs, with the exception of hazardous chemicals produced from licensed operations, the guidance contained in NRC Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" (April 1993b1993) will be and ANSI/HPS N13.12 1999, "Surface and Volume Radioactivity Standards for Clearance" (ANSI, 1999) arefollowed.Per approved written procedure(s), the radiation protection staff has to approve release of equipment and/or materials from RCAs. Volumetrically contaminated materials will be released if the uranium concentration of the material does not exceed 30 pCi/g or the dose to a member of the public, taking into consideration the subsequent use of the material, does not exceed 1 mrem per year. The radiation protection staff must approve the release of equipment and/or materials from RCAs. The equipment and material screening and evaluation process will be governed by approved written procedures.

Hazardous chemicals produced from licensed materials, as defined in 10 CFR 70.4, will be considered "separated from licensed materials" by meeting the exemptions described in 10 CFR 40.13(a) for "unimportant quantities of source material." The term "Unimportant quantities of source material" is defined as "… source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution, or alloy."

Environmental health and safety controls and regulations associated with the storage, handling, transportation, and disposal of these hazardous chemicals result in more restrictive controls than those necessary to protect the worker, public, and environment from the radiological hazard associated with source material at a concentration of one-twentieth of 1 percent (0.05 percent or 500 ppm) in the hazardous chemical. For example, uranium at a concentration of 500 ppm in anhydrous hydrogen fluoride (AHF) would result in a dose of 0.09 mrem to an individual exposed to AHF at the ACGIH TLV-STEL of 2 ppm for 15 minutes. In the more extreme case, the lowest lethal concentration of HF, considered to range between 50 and 250 ppm for 5 minutes, would result in a dose between 0.75 and 3.8 mrem, respectively.

The analytical methods applied to determine the concentration of source material in hazardous chemicals will be governed by approved written procedures.

RP-5 *(5) NUREG-1520, Section 4.4.7.3, Bullet 13 states that an application is acceptable if it commits to "Leak-test all sealed sources in accordance with the following NRC Branch Technical Positions: (1) "License Condition for Leak-Testing Sealed Byproduct Material Sources," April 1993, (2) "License Condition for Leak-Testing Sealed Plutonium Sources," April 1993, (3) "License Condition for Plutonium Alpha Sources," April 1993, (4) "License Condition for Leak-Testing Sealed Source Which Contains Alpha and/or Beta-Gamma Emitters," April 1993, and (5) "License Condition for Leak-Testing Sealed Uranium Sources," April 1993." The applicant proposes to perform leak tests consistent with guidance in International Organization for Standardization (ISO) 2919:1999 as per Section 4.7.14 of the application. In addition to compliance with the ISO guidance, provide administrative limits, the required actions if the administrative limits are exceeded, and the frequency of leak tests. These commitments should be consistent with the branch technical positions (BTPs) cited in NUREG-1520. Please revise Section 4.7.14 of the application to address this topic. This is needed to assure compliance with 10 CFR 31.5 and 10 CFR 20.1501(a)(2).*

Response: Clarification to leak-test requirements is provided.

License Documentation Impact: Section 4.7.14, "Sealed Sources" of the License Application, will be revised to add the following as paragraphs two and three of the subject section.

Sealed sources will be leak checked at intervals not to exceed that specified on the sealed source and device registration certificate using a quantitative analysis requiring that instrumentation used to analyze the sample be capable of detecting 185 Becquerel (Bq) (0.005 microcuries) of radioactivity.

Leak tests will not be required if:

- Sources contain only H-3;
- Sources contain only licensed material with a half-life of less than 30 days;
- Sources contain only a radioactive gas;
- Sources contain 3.7 MBq (100 microcuries) or less of beta-emitting or gamma-emitting material or 370 kBq (10 microcuries) or less of alpha-emitting material; or
- Sources are stored and are not being used (must be leak tested before use or transfer).

RP-6 *(7) In Section 4.2.3 of the license application, the applicant references several Regulatory Guides as the basis upon which the facility's as low as is reasonably achievable (ALARA) Committee formulates its goals. This list notably excludes Regulatory Guide 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning." Revise this section to incorporate Regulatory Guide 4.21 as a guidance document for the facility's ALARA Committee or else provide additional descriptions that demonstrate how the facility design and procedures for operations will minimize contamination and the generation of radioactive waste. This is needed to assure compliance with 10 CFR 20.1406.*

RESPONSE: Regulatory Guide 4.21 is included as a guidance document for the Facility's ALARA Committee.

License Documentation Impact: Section 4.2.3, paragraph one, of the IIFP License Application will be revised as follows:

The IIFP ALARA Committee is a part of the overall Facility Safety Review Committee (FSRC). The ALARA Committee consists of key members of plant management, supervision, and the workforce and will meet periodically on a frequency established in the RPP ALARA Program. The ALARA Committee uses the guidance provided in Regulatory Guides ~~8.10~~4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning" (NRC, ~~1977~~2008), 8.10 (NRC, 1977), and 8.37 (NRC, 1993) ~~for~~ to ~~formulating~~ formulate ~~plant~~ facility operating philosophy in reducing exposures. Membership of the ALARA Committee includes:

- The COO/Plant Manager,
- The Radiation Protection Manager,
- Selected department managers,
- The ESH Manager, and
- Selected supervisors and hourly personnel.

RP-7 *(8) In Section 4.4.1 of the license application, the applicant states that "routine work involving licensed materials will be administered by the use of approved written practices and procedures as described in Chapter 11, Management Measures." Please provide the specific citation in Chapter 11 so that this statement can be verified. This is needed to assure compliance with 40.32(c).*

RESPONSE: Section 4.4.1 will be revised as below.

License Documentation Impact: Revise paragraph one of the License Application, Revision A, Section 4.4.1 to read as follows:

Routine work involving licensed materials is administered by the use of approved written practices and procedures as described in Chapter 11, Management Measures. IIFP uses a structured procedure development, review and control systems approach to ensure safety and health requirements are appropriately incorporated into working procedures, for example, use of cross-discipline reviews in the development or change of procedures. The IIFP process for developing and controlling procedures is described in the IIFP License Application Chapter 11, Sections 11.4.2, 11.4.3, 11.4.4 and 11.4.5. Non-routine activities, particularly those performed by non-IIFP employees generally not covered by approved written procedures, are administered by the Radiation Work Permit (RWP) system. The RWP provides a description of the work to be performed defining the authorized activities. The RWP specifies the necessary radiation safety controls, as appropriate, to include personnel monitoring devices, attendance of radiation protection staff, protective clothing, respiratory protective equipment, special air sampling, and additional precautionary measures to be taken. The RWP also contains a description of the radiological conditions in the immediate work area covered by the RWP. The RWP requires approval by the Radiation Protection Manager or designee. The designee must meet the qualification requirements of Radiation Protection Manager. RWPs have a predetermined period of validity with a specified expiration or termination time. Standing RWPs may be issued for routinely performed activities, such as tours of the plantFacility.

RP-8 *(9) In Section 4.6.1 and applicable subsections of the license application, the applicant discusses the ventilation design and effluent treatment systems. Notably absent in this discussion is any commitment to design the ventilation system so that air flow will be from areas of low contamination potential towards areas of higher contamination potential (although it is present in Section 4.7.8 "Minimization of Contamination"). Also, the application states that general ventilation systems for areas where U is processed or handled consists of a series of fresh air intakes and a series of roof exhaust fans. Revise this section to include discussion on how the ventilation design will contribute to contamination control and how the applicant plans to monitor for effluents such as the general ventilation roof exhaust for radioactive materials (e.g., consistent with Regulatory Guide 4.16). This is necessary to assure compliance with 10 CFR 20.1101(d) and 10 CFR 20.1406.*

RESPONSE: Ventilation design requirements and the effluent monitoring description are clarified by the changes below.

License Documentation Impact: Paragraph 10 of the IIFP License Application, Revision A, Section 4.6.1.1 will be revised as follows:

Building v~~V~~entilation systems ~~for the various buildings~~ control the temperature and the humidity of the indoor air ~~inside the building~~. ~~The G~~general ventilation systems used in areas where uranium is processed or handled consist~~s~~ of ~~a series of~~ fresh-air intakes and ~~a series of~~ roof exhaust fans. Roof exhaust fans, and other gaseous effluent emission sources, in buildings where uranium is processed or handled, will be equipped with exhaust monitoring. The effluent monitoring program is described in the IIFP Environmental Report (ER) Chapter 6, Section 6.1.1; more specifically in Section 6.1.1.1 and Table 6-1, "Gaseous Effluent Sampling Program."

License Documentation Impact: The last paragraph of the License Application, Revision A, Section 4.6.1.3 will be revised as follows:

Design of building ventilation systems in process areas and control rooms are sized with adequate flows and pressure differentials for comfort and to ensure potential airborne concentrations of radioactivity do not exceed the derived air concentration (DAC) values specified by the International Commission on Radiological Protection (ICRP)-68 (ICRP, 1995). The ventilation system is designed so that air flow will be from areas of low contamination potential towards higher areas of higher contamination potential to minimize the spread of contamination.

RP-9 *(10) While the commitments in Chapter 4 of the license application generally address the radiological concerns for uranium, there is no discussion of evaluations of plant processes which may concentrate uranium daughter products and other radiological contaminants. Describe how IIFP plans to evaluate these situations so that the proper administrative controls and methods for monitoring are in place should non-uranium radioactive materials become a concern (e.g., thorium and radium isotopes)? Revise the appropriate sections of the license application to address this topic. This is necessary to assure compliance with 10 CFR 20.1204.*

RESPONSE: Chapter 4 of the LA will be revised to address monitoring of plant processes for non-uranium radioactive material concentration.

License Documentation Impact: Paragraph one of LA, Section 4.7.1 will be revised to read as follows:

In accordance with 10 CFR 20.1501(a) and (b) (CFR, 2008f), IIFP conducts radiation surveys and radiation area monitoring with instrumentation or area dosimetry that (1) ~~are necessary to comply with the~~satisfy applicable regulations, (2) ~~and~~ are ~~reasonable~~ adequate to evaluate the magnitude and extent of radiation levels, concentrations, or quantities of radioactive material and (3) can identify ~~the~~ potential radiological hazards or the accumulation of radioactivity. Section 4.7.6, "Air Sampling Program," discusses air sampling, and Section 4.7.8, "Minimization of Contamination," discusses the Contamination Survey Program.

License Documentation Impact: The first sentence of paragraph one of the License Application, Revision A, Section 4.7.9 will be revised to read as follows:

Routine surveys are performed in areas that are most likely to be contaminated or where contamination from licensed processes, licensed material decay products or other radionuclide contaminates may concentrate. The radiation protection staff determines survey frequencies, compares the survey results to action guide values as specified in approved written procedures, and ensures the appropriate responses are taken. If the results exceed the action guide values, the Radiation Protection Manager (or designee) is informed, and he/she determines if an investigation and/or corrective actions are necessary.

RP-10 *(11) In Section 4.7.4.1 of the application, it is not specified whether the applicant will be running the bioassay laboratory or if the samples will be sent to a qualified contract laboratory. Revise this section to state how bioassay samples will be processed and what performance standards the bioassay laboratory will be held to (e.g., ANSI/HPS N13.22, ANSI/HPS N13.30, etc.). This is necessary to assure compliance with 10 CFR 20.1204.*

RESPONSE: Bioassay sample processing is clarified as discussed in License Application document revisions below.

License Documentation Impact: Paragraph one of LA, Section 4.7.4 will be revised as follows:

The Personnel Monitoring Program is designed and implemented for internal occupational radiation exposures based on the requirements of 10 CFR 20.1201 (CFR, 2008h), 10 CFR 20.1204, "Determination of Internal Exposure" (CFR, 2008t) 10 CFR 20.1502(b) (CFR, 2008g), and 10 CFR 20.1704(i), "Further Restrictions on the Use of Respiratory Protection Equipment" (CFR, 2008u). Intakes are assigned to individuals based upon one or more types of measurements as follows: air sampling, in vitro bioassay (i.e. urinalysis or fecal) and/or in vivo bioassay (i.e. lung counting). The type and frequency of measurement~~(s)~~ for an individual ~~is~~ are determined by their job function and properties of the licensed material associated with a known or suspected intake. The measurements are commensurate with the amount of time an individual spends working with or near radioactive material. Intakes are converted to committed dose equivalent (CDE) and committed effective dose equivalent (CEDE) for the purposes of limiting and recording occupational doses. Action levels are established in approved written procedures to prevent an individual from exceeding the occupational exposure limits specified in 10 CFR 20.1201 (CFR, 2008h). Work activity restrictions are imposed when an individual's exposure exceeds 80 percent of the 10 CFR 20.1201 (CFR, 2008h) limit. Control actions include temporarily restricting the individual from working in an area containing airborne radioactivity, and actions are taken as necessary to prevent recurrence.

License Documentation Impact: Section 4.7.4.1 of the IIFP License Application, Revision A, will be revised (including heading title) to read as follows:

4.7.4.1 ~~Urinalysis Program~~In Vitro Bioassay Program

The In Vitro (urinalysis and/or fecal) Bioassay~~Urinalysis~~ Program is conducted primarily to evaluate the intake of soluble uranium to assure the 10 CFR 20.1201(e) (CFR, 2008h) intake limit of 10 milligram (mg) per week is not exceeded. Personnel assigned to work in areas where soluble airborne uranium compounds are present in concentrations likely to result in intakes in excess of 10 percent of the applicable limits in 10 CFR 20.1201 (CFR, 2008h) are monitored by urinalysis and/or fecal bioassay methods. The minimum sampling frequency for these individuals is specified in approved written procedures. ~~Urinalysis~~ In vitro monitoring may also be used to monitor individuals involved in non-routine operations, perturbations, or incidents.

~~Urine~~ In vitro sampling frequencies and action levels are established in approved written procedures based on the appropriate bio-kinetic models for the ~~present~~ uranium compounds present. Results above the applicable action level are investigated. Work activity restrictions are imposed when an individual's exposure (TEDE) exceeds 80 percent of the occupational dose limit in 10 CFR 20.1201(a) (CFR, 2008h). Exceeding an action level~~s~~ will result in a temporary work restriction for the individual to prevent additional exposure and allow a more accurate assessment of the intake.

License Documentation Impact: A third paragraph will be added to LA, Section 4.7.4.1 that states:

An off-site laboratory that meets the performance standards specified in ANSI/HPS N13.22 and ANSI/HPS N13.30 will be utilized to process and analyze in vitro bioassay samples.

RP-11 (12) In Section 4.7.4.2 of the application, it is not specified whether the applicant will be running the in-vivo lung counting equipment or if a qualified contractor will be performing this work. Revise this section to state how in-vivo lung counting will be performed and what performance standards the process will be held to (e.g., ANSI/HPS N13.35 or similar). This is necessary to assure compliance with 10 CFR 20.1204.

RESPONSE: In-vivo lung counting description is clarified below.

License Documentation Impact: Paragraph one of the License Application, Revision A, Section 4.7.4.2 will be revised with the new text shown below:

In vivo lung counting will be conducted as necessary to supplement or verify in vitro bioassay results. ~~In vivo lung counting frequencies are established for personnel who regularly work in areas where insoluble uranium compounds are processed or handled. Baseline and termination counts are typically performed. Lung counting frequencies are based on individual airborne exposure assignments and prior counting results. The minimum count frequency for individuals with an assigned intake greater than 10 percent of the annual limit intake (ALI) is annually.~~

License Documentation Impact: Add a new paragraph three to the License Application, Revision A, Section 4.7.4.2 to read as follows:

In-vivo lung counting will be performed by qualified contractors in accordance with ANSI/HPS N13.35 performance standards.

RP-12 Please provide information regarding ventilation rates, return air fractions, room volumes, and licensed material inventories by room/area sufficient to estimate the impact of releases of licensed materials inside the facility to workers. This is needed to verify accident analyses performed to support the ISA and confirm compliance with 10 CFR 70.61.

RESPONSE: To determine worker exposure for indoor releases, the entire Source Term is assumed to be evenly distributed throughout the building volume. No building ventilation rates or return air exchanges are assumed. Building volumes are cited in Table 2.1of the ISA Summary, and source terms are determined from process flow rates or hazardous material inventory data cited in NSA-TR-10-11, "Accident Consequence Evaluation" (ACE).

License Documentation Impact: No changes are required to be made in the license documentation.

RP-13 (6) Section 4.6.1.3 of the application (last sentence) indicates that ventilation design criteria that are intended to assure that airborne concentrations do not exceed derived air concentration (DAC) values in International Commission on Radiological Protection (ICRP)-68. This appears to be the only reference to the use of ICRP-68 DAC and ALIs in the license application. The use of ICRP-68 instead of the values in 10 CFR 20, Appendix B requires granting an exemption to the regulations. Consistent with NUREG-1520 Revision 1, Section 1.2.3 "Areas of Review" and Section 1.2.4.3.5 "Special Exemptions or Special Authorizations," describe the exemptions that will be requested. In addition, clarify whether INIS does not intend to request exemption from the labeling requirements in 10 CFR 20.1904.

RESPONSE: IIFP will not request exemption from the labeling requirements in 20.1904. Exemption requests will be added as necessary and the IIFP License Application, Revision A, Chapter 1 will be amended as follows.

License Documentation Impact: A new Section 1.5 will be added to the IIFP License Application (LA) Chapter 1, as "Special Exemptions or Special Authorizations". The original Section 1.5 of LA, Revision A, Chapter 1, "Security of Classified Information" will be changed to Section 1.6 and subsequent sections and subsections will be renumbered in sequence, accordingly. The new Section 1.5, "Special Exemptions or Special Authorizations" will read as follows:

1.5 Special Exemptions or Special Authorizations

IIFP requests a special exemption to allow for the use of International Commission on Radiation Protection (ICRP)-68 derived air concentration (DAC) and annual limit intake (ALI) values in lieu of the values in 10 CFR 20, Appendix B in determination of dose due to radioactive effluents.

RP-14 Section 3 of the application (last paragraph of the introductory material), states that "hazardous chemicals will be [considered] separated from licensed materials if the source material...is less than 0.05 percent of the total weight of the chemical mixture." This Part 40 criterion appears to have been based on national security interests and, by itself, may not be an acceptable release criterion for public health and safety. As such, it should not be used as a release criterion for materials separated from licensed material. However, LA Section 4.7.13, references ANSI/HPS N13.12 (presumably 30 pCi/g U) as an alternate release criterion. Define a consistent release criterion throughout the application and provide a justification for the criterion based on public health and safety. This is needed to assure compliance with 10 CFR 70.62, 10 CFR 20.1101, and consistency with guidance established in NUREG-1520, Section 4.4.7.3 bullet 12 and Regulatory Guide 8.24.

RESPONSE: The proposed IIFP operations are unique in that they will provide services to the uranium enrichment industry for converting (de-conversion) depleted uranium hexafluoride (DUF_6) into uranium oxide for long-term stable disposal at the same time recovering the fluorine in order to produce commercial quantities of specialty fluoride gas products for sale. The front end of the process involves the handling of depleted uranium compounds and is best described as a radiological operation. Once the fluorine has been extracted from the source material the IIFP operations are consistent with that of a chemical manufacturing facility. It is the dual aspect of the IIFP operations that we believe warrants two distinct release criteria.

As mentioned in Section 4.7.13 of the license application; developing site specific procedures incorporating the methodology cited in ANSI/HPS N13.12 and Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, issued April 1993 to govern the removal of equipment and materials from radiological controlled areas is a fairly standard and accepted practice utilized at radiological facilities. It is the one that IIFP intends to implement during licensed operations. As stated in Section 4.7.13, the process of releasing equipment and materials will be controlled through the use of approved written procedures. The purpose of using approved written procedures is to ensure that the methodology and instrumentation utilized to release equipment and materials from radiological areas takes into account the physical variations one would anticipate between the types of equipment and materials.

It is the chemical operations associated with the proposed IIFP facility that the 10 CFR 40.13(a) criterion is most applicable. In addition to being valuable products, the high-purity silicon tetrafluoride (SiF_4) and boron trifluoride (BF_3) manufactured utilizing the fluorine derived from the de-conversion of DUF_6 as well as the anhydrous hydrogen fluoride (AHF) produced during the de-conversion are all hazardous chemicals produced from licensed material that will subsequently be sold and transferred to customers. A majority of these customers will not have an NRC or Agreement State license to possess source material. For these fluorine products, IIFP believes it is more appropriate and justifiable to apply the 0.05% by weight exemption provided in 10 CFR 40.13(a) in lieu of the 30 pCi/g U clearance level ANSI/HPS N13.12. The justification and applicability of the 10 CFR 40.13 criterion is two-fold.

First the 0.05% (500 ppm) provides a definitive parameter that is missing from the definition of *hazardous chemicals produced from licensed materials*. As defined in 10 CFR 70.4 “Hazardous chemicals produced from licensed materials” means substances having licensed material as precursor compound(s) or substances that physically or chemically interact with licensed materials; and that are toxic, explosive, flammable, corrosive, or reactive to the extent that they can endanger life or health if not adequately controlled. These include substances commingled with licensed material, and include substances such as hydrogen fluoride that is produced by the reaction of uranium hexafluoride and water, but do not include substances prior to process addition to licensed material or after process separation from licensed material. There is however no criteria provided in Title 10 Code of Federal Regulations Part 70 that defines what “or after process separation” means. And there is no discussion in the Federal Registers 64 FR 41338 or 65 FR 56211 nor is there guidance in NUREG 1520 that establishes such criteria. It is necessary to define this “process separation” in order to determine which regulatory authority, NRC or OSHA, has jurisdiction over certain processes and facilities associated with the IIFP operations. The importance of identifying jurisdictional boundaries allows IIFP to determine whether an Integrated Safety Analysis as prescribed by Title 10 CFR 70.62 or a Process Hazard Analysis prescribed by Title 29 CFR 1910.119 applies to specific operations or processes. Identifying jurisdictional boundaries is also consistent with the intent of the 1988 NRC-OSHA Memorandum of Understanding.

A second and equally important aspect associated with the 10 CFR 40.13(a) criterion is that it is an exemption currently provided by regulation that supports the portion of the IIFP business model of supplying fluorine compounds produced from source material to persons that are not otherwise licensed by the NRC, an Agreement State or, in the case of foreign customers, an equivalent regulatory agency.

While the reviewer’s comment, “This Part 40 criterion appears to have been based on national security interests…” is consistent with the narrative found in Section 3.2 of NUREG 1717, “Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials,” an evaluation conducted by the NRC of the 10 CFR 40.13(a) exemption did not result in a recommendation to revise or remove the exemption. The second half of the reviewer’s sentence, “…and, by itself, may not be an acceptable release criterion for public health and safety” has not been overlooked or disregarded by IIFP. IIFP has taken into account that the chemical hazards associated with the fluorine compounds produced by the IIFP processes require health and safety controls that are far more stringent than those associated with the products evaluated in NUREG 1717 Section 3.2 or any other materials that may contain source material at concentrations up to 0.05% by weight. To illustrate this point consider uranium at a concentration of 500 ppm in AHF. An individual exposed to the ACGIH TLV-STEL of 2 ppm for 15 minutes would receive a dose of 0.09 mrem. In the more extreme case the lowest lethal concentration of HF, considered to range between 50 and 250 ppm for 5 minutes, would result in a dose between 0.75 and 3.8 mrem, respectively. Controls implemented to mitigate chemical exposures are more than adequate to protect chemical workers as well as members of the public.

We do believe additional clarification is required to the license application to justify the use of two distinct release criteria. These clarifications are described in the changes below.

License Documentation Impact: Section 4.7.13 of the IIFP License Application, Revision A will be revised, by modifying paragraph one and inserting three additional paragraphs to read as follows.

4.7.13 Policies for Removal of Equipment and Materials from Radiological Controlled Areas

When removing equipment and materials from RCAs, with the exception of hazardous chemicals produced from licensed operations, the guidance contained in NRC Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" (~~NRC, 1993b~~April 1993) (~~NRC, 1993b) and ANSI/HPS N13.12 1999, *Surface and Volume Radioactivity Standards for Clearance* (ANSI, 1999) are~~ will be followed. ~~Per approved written procedure(s), the radiation protection staff has to approve release of equipment and/or materials from RCAs.~~ Volumetrically contaminated materials will be released if the uranium concentration of the material does not exceed 30 pCi/g or the dose to a member of the public, taking into consideration the subsequent use of the material, does not exceed 1 mrem per year. The radiation protection staff must approve the release of equipment and/or materials from RCAs. The equipment and material screening and evaluation process will be governed by approved written procedures.

Hazardous chemicals produced from licensed materials, as defined in 10 CFR 70.4, will be considered "separated from licensed materials" by meeting the exemptions described in 10 CFR 40.13(a) for "unimportant quantities of source material." The term "Unimportant quantities of source material" is defined as "… source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution, or alloy."

Environmental health and safety controls and regulations associated with the storage, handling, transportation, and disposal of these hazardous chemicals result in more restrictive controls than those necessary to protect the worker, public, and environment from the radiological hazard associated with source material at a concentration of one-twentieth of 1 percent (0.05 percent or 500 ppm) in the hazardous chemical. For example, uranium at a concentration of 500 ppm in anhydrous hydrogen fluoride (AHF) would result in a dose of 0.09 mrem to an individual exposed to AHF at the ACGIH TLV-STEL of 2 ppm for 15 minutes. In the more extreme case, the lowest lethal concentration of HF, considered to range between 50 and 250 ppm for 5 minutes, would result in a dose between 0.75 and 3.8 mrem, respectively.

The analytical methods applied to determine the concentration of source material in hazardous chemicals will be governed by approved written procedures.

License Documentation Impact: Revise the last paragraph of the License Application, Revision A, Section 3, "Integrated Safety Analysis" to read as follows:

For the purposes of ~~this~~ ISA and subsequent licensed operations, hazardous chemicals will be considered "separated from licensed materials" if the source material in any chemical mixture, compound or solution is less than one-twentieth of 1 percent (0.05 percent) of the total weight of the chemical mixture, compound or solution, consistent with the criteria specified in ~~§~~10 CFR 40.13 "Unimportant quantities of source material." The environmental health and safety controls and regulations associated with the storage, handling, transportation and disposal of the hazardous chemicals associated with the IIFP licensed operations is more restrictive than those controls that would be necessary to protect the worker, public and environment from the radiological hazard associated with source material at a concentration of 500 ppm and provides additional justification to utilize the 10 CFR 40.13(a) criteria.