# 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.


Source: Natural Resources Conservation Service, U.S. Department of Agriculture

**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 plan~~s~~ning 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 chemicals~~depleted 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 the applicant's financial 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, interest, waste disposition, decommissioning, and any replacement 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 application, 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 License 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 Decommissioning 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.

# General Information

*GI-6*

*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**<br><br>**(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 curbing to function as a containment-type barrier. Located in the northeast corner of the 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 $DUF_4$ shipping 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 Building 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 buildings$DUF_4$ Process Building and the FEP Process Building are multi-story buildings where necessary to provide requirements for equipment space and to provide elevations for permitting gravity flow of particulate solids through equipment and piping, where applicable. The upper floors are configured such as to provide adequate room for equipment 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. Other upper floor 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 Control 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 equipment. 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 outdoor cylinder storage pads. Protective anchored concrete filled pipe bollards are installed 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.

**License Documentation Impact:** LA, Section 1.1.2.2 is being revised to remove duplicated 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 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 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.

# General Information

*GI-6*

*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 $BF_3$.

# General Information

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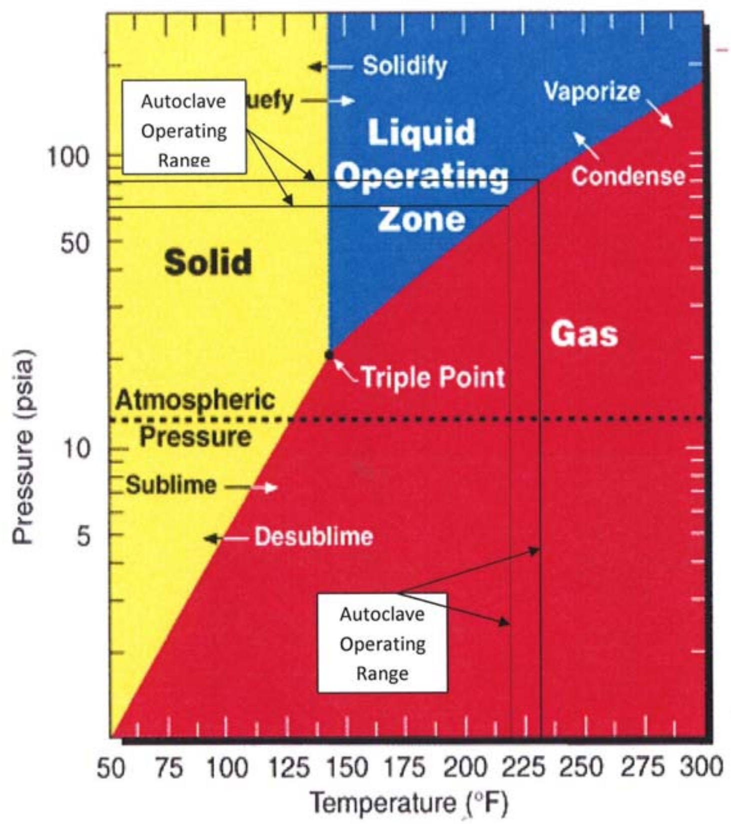
B. *Section 2.4.1 of the ISA, first paragraph, indicates that the $DUF_6$ is vaporized via steam. State whether the $DUF_6$ will be sublimed or passed through a liquid phase, and indicate the location and maximum quantity of liquid $DUF_6$ that will be produced throughout the facility.*

**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 operating 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 $DUF_4$ P~~p~~rocess Building. As steam is admitted to the autoclave containing a cylinder with solid contents, the cylinder temperature rises. $DUF_6$ solid begins to vaporize 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 $^{o}$F-235 $^{o}$F). 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. Brumbaurgh, 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 UF6, 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<br>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<br>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. Brumbaugh, 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.

Upon 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 temporary~~the Full $DUF_6$ Cylinder S~~s~~torage Pad~~yard~~ until it is scheduled for feed to the de-conversion process.

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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 u~~U~~ranium ~~(depleted)~~ and daughters ~~products~~ | Physical: solid, liquid, and gas<br>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<br>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)

# 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.

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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.

# General Information

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*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 ~~eleven~~twelve 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.

# General Information

*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 industrial facilities are the Xcel Energy Cunningham Station plant on the west boundary (New Mexico Highway 483), approximately 1.6 km (1.0 mi) from~~of~~ the IIFP Site, the Xcel 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. Cattle 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 northwest~~east~~ of the site ~~8.5~~2.6 km (~~5.3~~1.6 mi) from the north boundary.

# General Information

*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 information 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:

### ~~1.3.2.8~~1.3.2.6 Floods

~~The IIFP 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 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 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 Hobbs, 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.

# General Information

*GI-10*

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 Documentation 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 grade 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:

**<u>Floods</u>**

~~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

*GI-10*

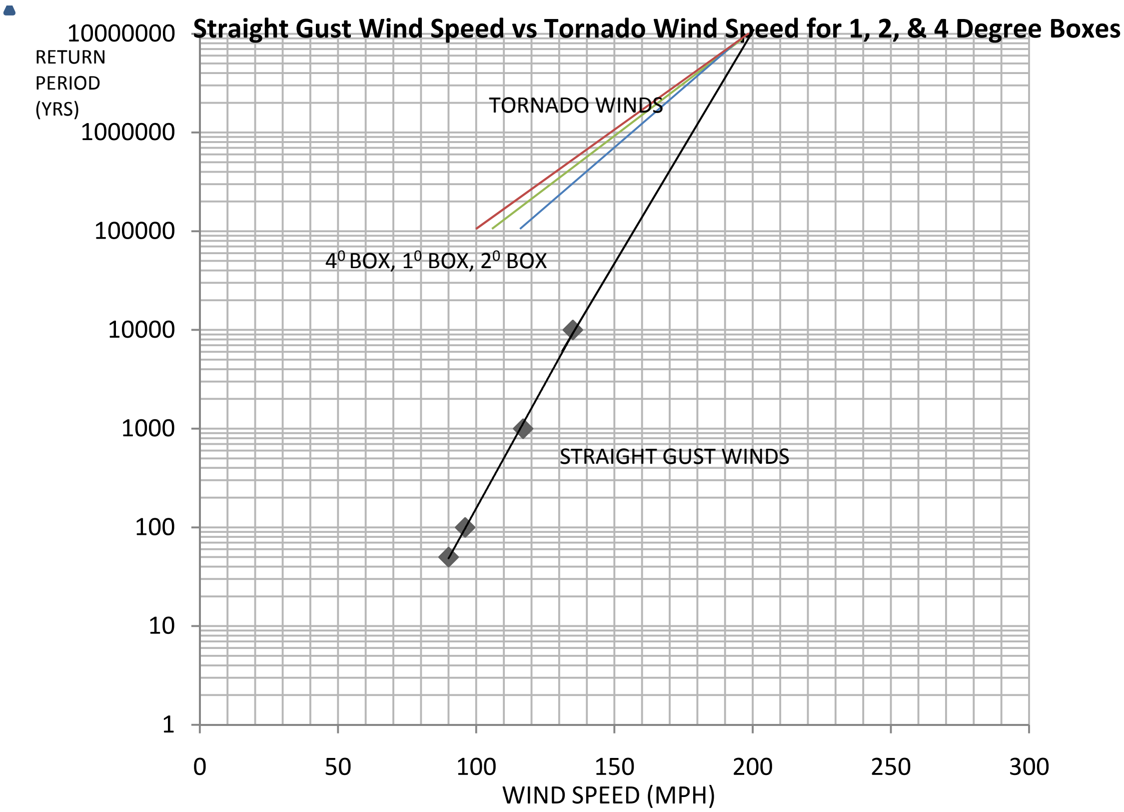
*D. For the design basis wind strength in the ISA Summary, provide a return year period and maximum wind speed for both intermediated term (100-500 years) and long term (>1000 years). Specify the basis for both the maximum wind speed and return year period for the information, e.g., a site-specific study, 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: $4^o$ Box - Red; $1^o$ Box - Green; $2^o$ 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 large Category A reactor (>200MW$_t$). It is 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 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 x$10^{-2}$), 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 (>200$MW_t$). 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 x$10^{-2}$), 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 mentioned above, those structures will meet the 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 occasionally 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 systems 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:

**<u>Extreme Winds</u>**

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.

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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 x $10^{-5}yr^{-1}$, 8.444 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. 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:

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. 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 an 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.

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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.

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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 built 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 r~~R~~unoff ~~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 waters in soils associated 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.~~

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*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.