International Isotopes Inc.

October 23, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Subject: Response to NRC's June 22, 2015 Generic Letter 2015-01, *Treatment of Natural Phenomena Hazards in Fuel Cycle Facilities*
Docket No.: 40-9086

The purpose of this letter is to provide International Isotopes Fluorine Products Inc. (IIFP), a wholly owned subsidiary of International Isotopes Inc. (INIS) response to the U.S. Nuclear Regulatory Commission's (NRC) June 22, 2015 Generic Letter (GL) 2015-01.

The NRC requested in GL 2015-01 that licensees submit information to demonstrate compliance with regulatory requirements and applicable license conditions regarding the treatment of natural phenomena events in the facilities' integrated safety analysis (ISA). Specifically GL-2015-01 requests that all addresses take the following actions:

(1) Within 90 days of the date of this letter, all addressees are requested to:

a. Submit the definitions of "unlikely," "highly unlikely," and "credible" in evaluating natural phenomena events in the ISA such as earthquakes, tornadoes, tornado missile impacts, floods, hurricanes, and other wind storms.

b. Submit a description of the licensee's safety assessment for the licensing and design basis natural phenomena events, including the following information:

i. likelihood and severity of the natural phenomena events, such as earthquakes, tornadoes, floods, hurricanes, and other wind storms

ii. accident sequences as a result of natural phenomena event impacts to facility structures and internal components

iii. assessment of the consequences for the accident sequences from item ii that result in intermediate and/or high consequence events

iv. items relied on for safety to prevent or mitigate the consequences of the events from items ii and iii

c. For facilities subject to 10 CFR Part 70, Subpart H requirements, submit a description of the results of the ISA review used to comply with 10 CFR 70.62(c). This requested documentation should have identified the characteristics of the licensing and design basis natural phenomena events applicable to the site. Additionally, the documentation should have evaluated possible changes in the methodology, likelihood, and severity of natural phenomena events with those used in the original design, evaluation, and licensing of the facility.

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d. Submit for staff review a summary of the results of any facility assessments or walk downs, if performed, to identify and address degraded, nonconforming, or unanalyzed conditions that can affect the performance of the facility under natural phenomena and have available for NRC inspection the documentation of the qualifications of the team

IIFP Response to (1) a.:

The definitions for "unlikely," "highly unlikely," and "credible" were provided in Chapter 3, Integrated Safety Analysis, Table 3-5 of the license application.

Table 3-1 Event Likelihood Categories

Likelihood	Likelihood Category	Frequency or Probability of Occurrence
Not Unlikely (Credible)	3	More than or equal to 10^{-4} per-event per-year
Unlikely (Credible)	2	Between 10^{-4} and 10^{-5} per-event per-year
Highly Unlikely	1	Less than or equal to 10^{-5} per-event per-year

Detailed discussion is provided in Section 3.2.5.5. Natural phenomena hazards (NPH) considered for evaluation included, earthquakes, hurricanes (including topical storms), tornados (including tornado missiles and extreme straight wind), volcanoes, flooding, snow and ice and precipitation.

IIFP Response to (1) b. i.-iv:

The IIFP Facility will have five (5) process buildings or other structures that contain licensed material or have processes or materials potentially affecting licensed materials and that may have IROFS and related Systems, structures and components (SSCs). These process buildings are: 1) the Autoclave Process Building, 2) the DUF_6 to DUF_4 Process Building, 3) the FEP Process Building, 4) the DUF_4 Container Storage Building and 5) the FEP Oxide Storage Building.

The IIFP Facility design has been developed with natural phenomena hazards (NPH) considered such that if an external event should occur, the health and safety of the public and the workforce from licensed material or chemicals produced from licensed material are maintained. SSCs that are determined to be IROFS are designed to withstand the effects of, and be compatible with, the environmental conditions associated with the IIFP Facility operation, maintenance, shutdown, testing and accidents for which the IROFS are required to function. Applicable federal, state and local codes and standards will be used by IIFP and the Design/Build Contractor during detailed design, engineering and construction of the IIFP Facility to ensure protection of the safety and health of the workers and the public. A listing of those codes and standards is provided above in Section 3.1.5 of the Chapter 3, Integrated Safety Analysis of the License Application (LA).

Discussions of natural phenomena hazards relative to extreme weather and related hazard assessments and design bases are provided in the IIFP LA Revision B: 1) Chapter 1 Section 1.7.3.3 and the ISA Summary Section 1.3.2.3 for extreme winds, including tornadoes and

straight winds, 2) the ISA Summary Section 1.3.2.6 and Chapter 1 Sections 1.7.3.3 and 1.7.3.4 for floods, 3) the ISA Summary Section 1.3.2.7 and Chapter 1 Section 1.7.3.3 for snow and 4) Chapter 1 Section 1.7.3.3 for lightning.

IIFP will follow the guidance in DOE-STD-1020-2002 to determine seismic design criteria for IROFS including the process buildings. The process buildings will be designed based on, and consistent with, the methods outlined in DOE-STD-1020-2002. By definition, DOE Performance Category 3 (PC-3) buildings and other structures are buildings and other common structures not classified as PC-4 structures but do 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 energy is similar to a large Category A reactor (>200MW_t). For the purposes of evaluating risks and determining design basis criteria relative to NPH events, IIFP conservatively used DOE-STD-1020-2002 and the equivalent PC-3 category for the IIFP process buildings and other structures containing licensed material or for process buildings containing processes or materials potentially affecting licensed materials. DOE-1020-2002 outlines a methodology to demonstrate compliance to a target performance goal of 1×10^{-4} annual probability for a PC-3 facility by designing to a seismic hazard of 4×10^{-4} annual probability. The difference between the design level and the performance target is accounted for in the detailed design process by using a risk reduction factor of 4. The risk reduction factor is obtained through conservatism in the design as detailed in Appendix "C" of DOE-1020-2002.

The design basis earthquake (DBE) for the IIFP process buildings that are assumed to withstand seismic events has been selected as the 2,500-year return period earthquake. IIFP will apply, at a minimum, the risk reduction factor of 4 to achieve the PC-3 performance goal of 1×10^{-4}. Therefore, consistent with guidance in NUREG-1520 Revision 1, using the DOE-STD-1020-2002 standard approach will satisfy the "highly unlikely" requirement for accidents caused by the bounding NPH that involves a building collapse or a structural deformation that may compromise the effective function of an IROFS SSC. In this approach, the affected process building designs that prevent the accident as an engineered feature for reducing the likelihood of the consequences of the NPH event are designated as IROFS.

The process buildings and the IROFS within those buildings will be designed and maintained and will have management measures to remain available and reliable during any of the postulated NPH events. IIFP is committed to the use of management measures as stated in Section 3.1.3 of LA Chapter 3. The process buildings IROFS design integrity will be maintained using: 1) graded Quality Level 1 (QL-1) or Quality Level 2 (QL-2) requirements and 2) the management measures applied as described in Revision B of the IIFP Quality Assurance Program Description and in Chapter 11 Revision B of the IIFP License Application.

Accident sequences from a natural phenomenon events that result in intermediate and/or high consequence events are included in Tables 3-7, 3.8, and 3-9 of the ISA Summary and have been provided below.

Accident Identifier	Description
101.09 Solid DUF_6 cylinder impacted by tornado missile	Missile generated by tornado event results in cylinder breach and release of DUF_6 and HF.
101.16 Design-basis earthquake	Earthquake causes multiple DUF_6 cylinders and process equipment to breach and release of DUF_6 and HF.
102.38 Design-basis earthquake	NPH event causes DUF_6 liquid release.
103.30 Design-basis earthquake	NPH at DUF_6 Autoclave Building causing release of process equipment vapor.
104.30 Design-basis earthquake	NPH event at DUF_4 to DUF_6 Process Building causes DUF_4 product storage bin or process equipment breach and release of DUF_4, DUF_6, HF and H_2.
104.31 Design-basis earthquake	NPH event at DUF_4 Container Storage Building. Multiple DUF_4 drums stored in secondary containment box are damaged and leak/spill contents when containment box and drums are impacted by building structural member.
106.51 Design-basis earthquake	NPH event at DUF_4 Process Building causes HF Recovery system process equipment breach and release of liquid/vapor HF and H_2.
107.19 Design-basis earthquake	NPH event at DUF_4 Process Building causes dust collection system process equipment breach and release of uranium particulates.
201.44 Design-basis earthquake	NPH event at FEP Process Building causes calciner process equipment breach and release of uranium particulates, SiF_4 and HF.
202.28 Design-basis earthquake	NPH event at FEP Process Building causes oxide collection system process equipment breach and UO_2, SiO_2, SiF_4 and HF release.
204.70 Design-basis earthquake	NPH event at FEP Process Building causes SiF_4 collection system process equipment breach and SiF_4 release.
301.52 Design-basis earthquake	NPH event at FEP Process Building causes BF_3 reaction system process equipment breach and UO_2, B_2O_3, BF_3 and HF release.
302.20 Design-basis earthquake	NPH event at FEP Process Building causes oxide collection system process equipment breach and UO_2, B_2O_3, BF_3 and HF release.
302.21 Multi-drums of oxide breached during NPH event	Multiple steel drums of oxide stored in the FEP Oxide Staging Building are damaged and leak/spill contents when impacted by building structural member.

A reference list of IROFS was provided in Table 4.2 of the ISA Summary. Those IROFS associated with mitigating the consequences of an NPH event are provided below:

IROFS Identifier	IROFS	IROFS Safety Function
DUF-60	DUF_6 Autoclave Building Design	Building structure and foundation is designed to withstand the design basis earthquake and the design integrity is maintained in accordance with the IIFP QAPD and Management Measures
DUF-61	DUF_6 to DUF_4 Process Building Design	
DUF-62	DUF4 Container Storage Building Design	
SF4-60	FEP Process Building Design	
SF4-61	FEP Oxide Staging Building Design	
APS-12	Process Buildings Evacuation Procedure	Written procedure contains specific actions and workers are trained for evacuation in the event of natural hazard events including seismic event.

The results of the Risk Assessment performed for each accident sequence identified in the Process Hazard Analysis as having Consequence Categories of 2 or 3 are summarized in Table 4-3, Table 4-4, Table 4-5 and Table 4-6 of the ISA Summary. The table below was developed from these tables.

Accident Identifier	Initiating Event[1]	U/C[2]	Likelihood[3][4]		Consequence[5]		Risk Index[6]
			Index	Category	Evaluation Number	Category	
101.09	Tornado-generated missile impact	U	-4	2	DUF-CH-01	2	4
Solid DUF_6 cylinder damaged by tornado missile							
		C	-4	2		2	4
101.16	NPH at Full Cylinder Storage Area	U	>-4	3	DUF-CH-03	2	6
A design-basis earthquake occurs							
		C	-4	2		2	4
	Not following (or error in use of) written procedure that precludes lifting of of cylinders containing liquid DUF_6						
		C	-8	1		3	3
102.38		U	>-4	3	DUF-CH-04	3	9
A design-basis earthquake occurs	NPH at DUF_6 Autoclave Building causes DUF_6 release						
		C	-5	1		3	3

Accident Identifier	Initiating Event[1]	U/C[2]	Likelihood[3][4]		Consequence[5]		Risk Index[6]
			Index	Category	Evaluation Number	Category	
103.30 A design-basis earthquake occurs	NPH at DUF_6 Autoclave Building causes release of vapor DUF_6 from process equipment	U	>-4	3	DUF-CH-10	3	9
		C	-5	1		2	2
104.30 A design-basis earthquake occurs	NPH at DUF_6 to DUF_4 Process Building	U	>-4	3	DUF-CH-12	3	9
		C	-5	1		2	2
104.31 A design-basis earthquake occurs	NPH at DUF_4 Container Storage Building	U	>-4	3	APS-CH-14	3	9
		C	-5	1		2	2
106.51 A design-basis earthquake occurs	NPH at DUF_6 to DUF_4 Process Building	U	>-4	3	DUF-CH-25	2	6
		C	-5	1		1	1
107.19 A design-basis earthquake occurs	NPH at DUF_6 to DUF_4 Process Building	U	>-4	3	DUF-CH-29	2	6
		C	-5	1		1	1
201.44 A design-basis earthquake occurs	NPH at FEP Process Building	U	-4	3	SF4-CH-03	2	6
		C	-5	1		1	1
204.70 A design-basis earthquake occurs	NPH at FEP Process Building	U	>-4	3	SF4-CH-10	2	6
		C	-5	1		1	1
301.52 A design-basis earthquake occurs	NPH at FEP Oxide Staging Building	U	>-4	3	BF3-CH-05	2	6
		C	-5	1		1	1
302.20 A design-basis earthquake occurs	NPH at FEP Oxide Staging Building	U	>-4	3	BF3-CH-08	3	9
		C	-5	1		2	2

Accident Identifier	Initiating Event[1]	U/C[2]	Likelihood[3][4]		Consequence[5]		Risk Index[6]
			Index	Category	Evaluation Number	Category	
302.21	NPH at FEP Oxide Staging Building	U	-2	3	APS-CH-01	3	9
A design-basis earthquake occurs							
		C	-5	1		2	2

(1)	Consistent with the methods outlined in DOE-STD-1020-2002, "Natural Phenomena Hazards Design and Evaluation Criteria for U.S. Department of Energy Facilities", the IIFP process buildings will be designed to withstand a 10,000 year earthquake. The affected process buildings are determined to be Performance Category 3 (PC-3) as defined in the DOE standard. Based on this approach, the building collapse or a structural deformation that might compromise the effective function of an IROFS SSC is considered "highly unlikely" per NUREG-1520, Rev 1.
(2)	Uncontrolled "U" and Controlled "C" (following application of prevention IROFS)
(3)	Likelihood index is a summation of the failure frequency index and IROFS failure probability indices
(4)	Likelihood Category: 3 = not unlikely, 2 = unlikely, 1 = highly unlikely
(5)	Comparison of the accident consequences to the performance requirements of 10 CFR 70.61 and designation of each as a high consequence event (i.e., Consequence Category 3) or intermediate consequence event (i.e., Consequence Category 2). Accident sequences with consequences that are of no regulatory concern (i.e., Consequence Category 1) are not included.
(6)	Risk index that is the product of Likelihood Category and Consequence Category

IIFP Response to (1) c.:

The IIFP Facility design will be developed with natural phenomena hazards considered such that if an external event should occur, the health and safety of the public and the workforce from licensed material (or chemicals that may affect licensed materials) are maintained. IROFS will be designed to withstand the effects of, and be compatible with, the environmental conditions associated with operation, maintenance, shutdown, testing and accidents for which the IROFS will be required to function. Consideration of the effects of natural phenomena hazards on the IIFP Plant is included in Section 3 and also summarized in the IIFP LA, Revision B Chapter 3 Subsection 3.2.4.3. Discussion includes impacts of earthquake, tornado, flood, lightning, ice and snow, extreme temperatures and high winds on operations, such as the following criteria:

- Design and engineering with respect to seismic events and consequences will be based on "g-force" lateral movement relative to a minimum 2,500 year-return period. Consistent with the methods outlined in DOE-STD-1020-2002, and applying engineering safety margins as provided by the DOE-1020 standard, the IIFP process buildings will be designed to withstand a 10,000 year earthquake. The process buildings will be IROFS that will be maintained at the design integrity by the use of management measures and graded levels of quality assurance to be reliable and available to function as discussed in the IIFP LA, Revision B Chapter 3 Subsection 3.2.4.3. The process building IROFS are SF4-60, SF4-61, DUF-60, DUF-61 and DUF-62.

- Storm water sewer systems will be designed for a 100-year return period maximum 1-hour rainstorm.

Engineering design requirements for all active and passive IROFS will include adequate protection from natural phenomena events. Seismic, wind and lightning hazards will be specifically addressed through implementation of building code design requirements. Table 4-10 and Table 4-11 present examples of how the design incorporates natural phenomena hazards for engineered IROFS.

In Section 3.1.2 of Chapter 3 of the LA, IIFP commits to implementing programs to maintain the ISA and supporting documentation so that it is accurate and up-to-date. After the IIFP License is approved, changes to the ISA Summary are submitted to the NRC in accordance with 10 CFR 70.72, *Facility Changes and Change Process*. The ISA update process accounts for design safety basis changes made relative to licensed materials or hazards, including natural phenomena hazards, potentially affecting licensed materials. The update will also verify that the initiating event likelihoods and IROFS reliability values that are assumed in the ISA remain valid. Any changes to the ISA required as a result of the update process will be included in a revision to the ISA and ISA Summary. Change management measures used to prepare and document revisions to the ISA are described in LA, Revision B Chapter 11. ISA methods are used for the evaluation of any facility changes or changes in the process safety information that may alter the parameters of an accident sequence.

IIFP Response to (1) d.:

The IIFP facility has not yet been constructed or designed, as such IIFP has not conducted any additional assessments to identify and address degraded, nonconforming or unanalyzed conditions that could affect the performance of the facility under natural phenomena events.

Please contact me at 208.524.5300 or via email at jjmiller@intisoid.com if you have any questions or comments regarding this request.

Sincerely,

John J. Miller, CHP
Radiation Safety and Regulatory Compliance Officer
JJM-2015-36

I declare under penalty of perjury that the information provided herein is true and correct.
Executed on 23 October 2015

cc: Mr. Osiris Siurano-Perez
TWFN, Mailstop 4 A60, NMSS/FCSE/ECB