



## International Isotopes Inc.

March 25, 2014

ATTN: Document Control Desk  
Director, Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2738

Subject: Response to Request for Additional Information; (TAC No. L36021)

The following responses to your requests for additional information are provided to support our request to amend NRC license SUB-1587. In addition Revision C of the Final Status Survey Report is enclosed and has been revised where indicated in the responses below.

RAI 1. In the 1359 Final Status Survey Report (FSSR), dated June 25, 2013, the licensee, International Isotopes, Inc. (INIS) states that the final status surveys were performed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Consistent with acceptance criteria 4.5.2 of NUREG-1757, Volume 2, Rev. 1, "Consolidated Decommissioning Guidance", provide:

RAI 1.i. Description of the method by which the number of "direct surveys" was determined. Also, consistent with NUREG-1575, Rev. 1, MARSSIM, demonstrate that a sufficient number of measurements were taken in each survey unit.

Response: The number of direct survey measurements obtained was based on the size of the survey unit and the operational history of the facility which included data collected during the routine surveys performed throughout the facility during operation. Survey units 1 through 6 were identified as Class 3 areas. Survey Unit 1 consisted of Room 201 (conference room) and the stair case leading to the conference room. This room was not utilized during operations. Random scans were conducted on the stair case and the conference room, a direct measurement was obtained at the highest scan location identified in each room. Similar methodology was utilized to determine the number of direct scans to obtain in Survey Units 2 through 6. Survey Units 7 and 8 were categorized as Class 2 area. The number of direct survey measurements obtained in these areas was dictated by the size of the survey unit.

After the final status surveys were obtained the number of direct surveys collected was verified to be sufficient utilizing the statistical methods described in MARSSIM. Survey Units 1 and 2 were combined into a single survey unit for analysis. This was considered to be acceptable because both survey units were designated as administrative areas, both survey units were categorized as Class 3 areas and the reference area background was not subtracted from the final survey results in these units.

---

4137 Commerce Circle, Idaho Falls, Idaho 83401  
Phone: 208-524-5300, 800-699-3108 Fax: 208-524-1411  
Website: [www.intisoid.com](http://www.intisoid.com)

445501

Survey Units 5 and 6 were combined because they were both categorized as Class 3 areas and were the “non-process” areas in the back portion of the facility and could be described as one contiguous area surrounding Survey Units 3, 4, 7 and 8. Section 3.0 of the FSSR provided the data analysis of the final status surveys, sample size was verified adequate utilizing the values provided in Tables I.2a and I.2b of MARSSIM.

RAI 1.ii. Description of the survey units, including:

RAI 1.ii.a) a map or drawing of the survey units showing:

- The reference system and random start systematic sample locations for Class 1 and 2 survey units,
- Random locations for Class 3 survey units,
- Reference areas.

RAI 1.ii.b) Areas scanned for Class 2 and 3 survey units.

Response: The information requested in RAI 1.ii. a and b was included in Revision B of the Final Status Survey Report (FSSR Rev. B) dated February 21, 2014. Section 1.0 of this report provides a general description of Building 1359 including a list of rooms and function, Section 2.2 of this report provides a Table listing the MARSSIM Classification of the Building 1359 rooms and process area, Section 2.6.1 provides a table linking the Building 1359 rooms and process area to specific survey units including the square footage of each survey unit. Section 2.6.5 provides schematics of each survey unit that includes the location of the direct measurements and the area scanned in the survey unit. The location of the reference area measurements are included on the facility drawing provided as Figure 1.

While there were no Class 1 areas, Survey units 7 and 8 were classified as Class 2 areas, in hindsight, Survey Unit 8 would have been more appropriately classified as a Class 3 area given its operational history. Survey Unit 7, Room 304, DU Handling consisting of 21.4 m<sup>2</sup> of floor area and was divided into 15 sectors. Survey Unit 8, the count room, was the smallest survey unit and consisted of 9.7 m<sup>2</sup> of floor area.

Maps showing the location of the areas scanned are provided in Section 2.6.5.

RAI 1.iii. A statement that a given survey unit satisfied the Derived Concentration Guideline Level (DCGL<sub>w</sub>) and elevated measurement comparison if any sample point exceeded the DCGL<sub>w</sub>

Response: Section 2.6.5 of the FSSR states that “No single gross activity measurement exceeded the Derived Concentration Guideline Level (DCGL<sub>w</sub>) of 1100 dpm/100 cm<sup>2</sup>. Based on the direct survey measurements the conclusion the survey unit meets the release criterion made.” Section 3.0 of the FSSR Rev. B provides the same conclusion for Survey Units 1&2, Survey Unit 3, Survey Unit 4, Survey Units 5&6, Survey Unit 7 and Survey Unit 8.

RAI 2. Section 2.5 of the FSSR states that contaminated, or potentially contaminated, equipment/components that have no residual value have been packaged as described in Section 2.4 of the same report. Section 2.5 also states that these

equipment/components were transferred to the 4137 Warehouse for storage and subsequent disposal at the U.S. Ecology's Richland, Washington waste disposal facility (which will be done during the next waste disposal campaign.)

RAI 2.i. Provide information demonstrating that these equipment/components will meet the waste acceptance criteria for the disposal facility

Response: The equipment/components and the remaining depleted uranium that could be disposed of meets the WAC and licensing requirements of the US Ecology's waste disposal site. Attached is an email correspondence documenting this acceptance.

RAI 2.ii. Confirm whether the stated disposal campaign has already taken place and if not provide the proposed schedule for the next waste disposal

Response: The disposal campaign has not taken place and is scheduled for the June-August 2014 time frame.

RAI 3. In an addendum to the 1359 FSSR, dated January 18, 2014, INIS states that some individual measurements exceeded the average DCGLw. Consistent with MARSSIM Section 4.4; this indicates that those survey units would be considered Class 1 areas.

RAI 3.i. Justify why these areas were not reclassified as Class 1 areas or consider reclassifying them as Class 1 survey units and perform additional measurements and analysis as appropriate

Response: The January 18, 2014 Addendum was superseded by FSSR Rev. B. The DCGLw was re-calculated at 1100 dpm/100 cm<sup>2</sup>, using the default Building Occupancy parameters except that a resuspension factor (Rf) of 1E-6 m<sup>-2</sup> was utilized as recommended by NUREG-1720 *Re-evaluation of the Indoor Resuspension Factor for the Screening Analysis of the Building Occupancy Scenario for NRC's License Termination Rule*. There were no measurements in any survey unit that exceeded the DCGLw.

RAI 4. MARSSIM recommends in Section 5.5.2.2 that "the number of data points should be increased by 20%, and rounded up, over the values calculated using equation 5-1 to obtain sufficient data points to attain the desired power level with the statistical tests and to allow for possible lost or unusable data". It appears that INIS has not applied the 20% recommended correction factor.

RAI 4.i. As recommended in the MARSSIM guidance, if INIS determines that the 20% increase in number of measurements is excessive, demonstrate that the survey design provides adequate capability to support the decision

Response: Section 3.0 of the FSSR provided the data analysis of the final status surveys, sample size was verified adequate utilizing the values provided in Tables I.2a and I.2b of MARSSIM. An additional 20% was added to the values from Tables I.2a and I.2b of MARSSIM and

RAI 4.ii. To demonstrate compliance with the radiological criteria for unrestricted release as specified in Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1402 and to estimate the impact on other future decommissioning activities consistent with Appendix K of NUREG-1757, provide the potential post-decommissioning annual dose from Building 1359.

Response: Building 1359 was decommissioned and released for unrestricted use to support a revision to NRC license SUB-1587 that would remove Building 1359 from an authorized location for use and to limit authorized activities to possession and storage of the source material. The potential post decommissioning annual dose from Building 1359 has been demonstrated through final status surveys to be below the 25 mrem/year release criteria. The highest single gross direct survey measurement identified during final status surveys was 511.65 dpm/100 cm<sup>2</sup>. Subtracting the lowest reference area background measurement of 127.9 dpm/100 cm<sup>2</sup> from this measurement yields a maximum net measurement of 383.75 dpm/100 cm<sup>2</sup>. A conservative estimate of the potential post-decommissioning annual dose from Building 1359 assuming the building was uniformly contaminated at a level of 383.75 dpm/100 cm<sup>2</sup> would be 7.0 mrem/year. This dose was calculated by multiplying the DandD modeled dose of 20 mrem/year at 1100 dpm/100cm<sup>2</sup> by  $(383.75 \div 1100)$ .

While SUB-1587 has not been terminated there is no reason to suspect that subsequent activities necessary to terminate SUB-1587 would result in a change to the post decommissioning annual dose of Building 1359. All of the source material that is possessed under SUB-1587 is packaged and stored in the Building 4137 Warehouse for subsequent disposal, release for unrestricted use, or transfer to SUB-1011, once this facility is constructed. This remaining material can be screened out as potential sources of residual radioactivity and pathways to Building 1359 using Appendix L of NUREG-1757.

RAI 5. Consistent with NUREG-1757 Section 6.3, provide a description in the FSSR of how the Good Housekeeping practices were employed to achieve the final activity levels were as low as reasonably achievable

Response: All radioactive material, equipment, ventilation ducting, furniture, and tools were removed from the building prior to commencing the final status surveys with the exception of the computer, furniture and counting equipment located in Room 303, Count Room. Counting equipment located in this room was utilized during the final status surveys conducted in Survey Units 1-7. Counting equipment was removed from Room 303 prior to performing the final status surveys in Survey Unit 8. Routine cleaning of the facility during the course of operations did not necessitate aggressive cleaning such as power washing. The following statement has been added to the 4<sup>th</sup> paragraph of Section 1.0 of the FSSR; "The facility has been well maintained and routinely cleaned during the course of operations".

Prior to conducting final status surveys the process floors and Rooms 301 and 302 were swept and cleaned using a Clarke® Encore 20L floor cleaner. The water collected from the cleaning was transferred to the evaporator in the 4137 Commerce Circle building. Prior to conducting final status surveys in Rooms 303, 304, 401 and 402, the floors were swept and cleaned with a Swiffer® Sweeper with the wet cloth.

The following statement has been added to the 1<sup>st</sup> paragraph of Section 2.6 of the FSSR; "Prior to performing final status surveys the facility floors were swept of debris resulting from the dismantling efforts. The process floors and Rooms 301

and 302 were swept and cleaned using a Clarke® Encore 20L floor cleaner. The water collected from the cleaning was transferred to the evaporator in the 4137 Commerce Circle building. The floors were swept and cleaned with a Swiffer® Sweeper with the wet cloth prior to conducting final status surveys in Rooms 303, 304, 401 and. No cleaning was conducted on the walls of building 1359".

The Clarke® Encore 20L floor cleaner had been used to clean the 1359 building process floor during operations and continues to be used to clean the 4137 building process floor. Swiffer® Sweeper with the wet cloth had been used routinely during operations to clean Rooms 301, 302, 303 and 304.

In addition to the revision to the Final Status Survey Report, a duplicate reference cited in Section 5.0 was replaced with the correct reference.

Please contact me at 208.524.5300 or via email at [jjmiller@intisoid.com](mailto:jjmiller@intisoid.com) if you have any questions or comments regarding this request.

Sincerely,

A handwritten signature in black ink, appearing to read 'John J. Miller', with a long horizontal flourish extending to the right.

John J. Miller, CHP  
Radiation Safety Officer  
JJM-2014-13  
Enclosures as Stated

**John J. Miller**

---

**From:** David Kania <dkania@usecology.com>  
**Sent:** Tuesday, February 4, 2014 2:41 PM  
**To:** John J. Miller  
**Cc:** Mike Ault; Sean Murphy  
**Subject:** RE: Depleted Uranium Disposal

Greetings John,

It is confirmed. US Ecology, Washington has the inventory to take the quantities of Uranium listed on your maximum amount table.

If you have any questions please let me know.

R/David

---

**From:** John J. Miller [mailto:jjmiller@intisoid.com]  
**Sent:** Tuesday, February 04, 2014 1:34 PM  
**To:** David Kania  
**Subject:** RE: Depleted Uranium Disposal

Hi David,

Did you get any word back on this? I am addressing this issue in a final survey report and I wanted to include a table:

The maximum amount of uranium that would be disposed is provided in the table below:

	Mass	Activity	Activity Remaining on WN-I019-2
U-238	1109.6 kg	372.91 mCi	
U-235	2.21 kg	4.78 mCi	Not applicable
U-234	0.01kg	69.06 mCi	

John

---

**From:** David Kania [mailto:dkania@usecology.com]  
**Sent:** Thursday, January 30, 2014 9:37 AM  
**To:** John J. Miller  
**Cc:** Mike Ault; Sean Murphy  
**Subject:** RE: Depleted Uranium Disposal

Good Morning John,

That amount of Uranium should not be a problem for US Ecology WA to receive. I will do some checking and confirm that on Tuesday 2/4 next week.

R/David

---

**From:** John J. Miller [<mailto:jjmiller@intisoid.com>]  
**Sent:** Thursday, January 30, 2014 8:31 AM  
**To:** David Kania  
**Subject:** RE: Depleted Uranium Disposal

Hi David,

If I sent you all of the DU I have in inventory it would be:

	Mass		Activity	
Mass of U-238	1109.5979	kg	<b>372.91</b>	<b>mCi</b>
Mass of U-235	2.2125248	kg	4.78	mCi
Mass of U-234	0.0111182	kg	69.06	mCi
			<b>446.75</b>	<b>mCi</b>

If I keep our best DUF4 material for testing at our Hobbs NM facility I would need to dispose of:

	Mass		Activity	
Mass of U-238	814.02169	kg	<b>273.57</b>	<b>mCi</b>
Mass of U-235	1.6231495	kg	3.51	mCi
Mass of U-234	0.0081565	kg	50.66	mCi
			<b>327.74</b>	<b>mCi</b>

John

---

**From:** David Kania [<mailto:dkania@usecology.com>]  
**Sent:** Wednesday, January 29, 2014 9:35 AM  
**To:** Tray Caldwell; John J. Miller  
**Cc:** Mike Ault  
**Subject:** RE: Depleted Uranium Disposal

Greetings John,

Depending on the amount of Ci you have we will need to discuss that with WA state and possibly reopen the EIS. To get an idea of magnitude could you provide the source term you are looking at disposing for U-234 and U-238.

Thank you.

R/David

*David L. Kania | Assistant Facility Manager*

## **USEcologyWashington**

1777 Terminal Drive  
Richland, WA 99354  
Tel: 509.377.2411 | Fax: 509.377.2244  
[dkania@USEcology.com](mailto:dkania@USEcology.com)

---

**From:** Tray Caldwell  
**Sent:** Wednesday, January 29, 2014 7:37 AM  
**To:** John J. Miller  
**Cc:** David Kania  
**Subject:** RE: Depleted Uranium Disposal

Hi John,

I will copy this email to our Assistant Site Manager, David Kania. He should be able to get you this answer if Mike hasn't responded before he gets back to the office.

**Tray Caldwell** | *Rate Analyst, Site Accountant*

## **USEcologyWashington**

1777 Terminal Drive  
Richland, WA, 99354-4952  
Tel: 509.946.4945 | Fax: 509.946.5495  
[tcaldwell@usecology.com](mailto:tcaldwell@usecology.com)

This email and all attachments are intended for the person or entity to which they are addressed. The information in these emails/attachments may be privileged, confidential, or otherwise protected from disclosure and all persons are advised that they may face penalties under state or federal law for sharing this information with unauthorized individuals. If you received this information in error, please delete immediately and call this office at (509) 946-4945.

---

**From:** John J. Miller [<mailto:jjmiller@intisoid.com>]  
**Sent:** Wednesday, January 29, 2014 6:01 AM  
**To:** Tray Caldwell  
**Subject:** FW: Depleted Uranium Disposal

Hi Tray,

I sent the email below to Mike, maybe you can answer the question regarding the amount of DU remaining on your license.

John

---

**From:** John J. Miller [<mailto:jjmiller@intisoid.com>]  
**Sent:** Tuesday, January 28, 2014 3:23 PM  
**To:** Mike Ault  
**Subject:** Depleted Uranium Disposal

Hi Mike,

We have decommissioned our Depleted Uranium Tetra Fluoride R&D facility in Idaho Falls. We plan to make a byproduct disposal run this year and will want to include some equipment contaminated with DU and some DU oxide waste we generated. I could dispose of some DUF4 as well. Some of the DUF4 we will transfer to the facility in Hobbs NM once we



have that constructed. So I need to know relative to your license limits how much mass is left in the U-238 and U-234 bins.

John J. Miller CHP  
International Isotopes Inc.  
Ph.: 208.524.5300  
Cell: 208.589.1580  
[www.intisoid.com](http://www.intisoid.com)