This conservative analysis of cumulative intruder dose yields a dose less than the Part 20 dose limit of 100 mrem/yr to members of the public. This cumulative dose is unrealistic since it assumes the radioactivity from all three maximum scenarios is lined up in proximity together at the time of intrusion.

7.3 Sensitivity Analysis

The sensitivity analyses associated with References 1d, 1i, 1a, 2c, 2d, and 2a demonstrated that the dose estimates are not highly sensitive to small changes in parameters. Since the methods of calculating dose are the same as References 1d, 1e, 1f, 1i, 1j, 2c, and 2b, these sensitivity analyses remain valid for this third 20.2002 request.

8.0 NUCLEAR CRITICALITY SAFETY

Nuclear criticality safety assessments, NSA-TR-09-14 and NSA-TR-HDP-11-11 (References 8 and 9), demonstrate that the treatment and disposal of Hematite decommissioning waste at the USEI site can be safely performed. The assessments have determined that there are very large margins of safety under normal (i.e., expected) conditions and that there is considerable tolerance to abnormal conditions. Under all foreseen abnormal conditions a criticality event is considered either not credible or is precluded by controls in place at the Hematite site.

NSA-TR-HDP-11-11 includes assessment of the sanitary sludge being considered under this request.

This analysis applies to disposal of Hematite decommissioning wastes with a maximum average fissile nuclide concentration of 0.1g ^{235}U/L at the USEI site. This average fissile nuclide concentration is assessed on a per railcar basis. The conservative average of 0.1g^{235}U/L is derived based on the following analysis.

- NUREG/CR-6505 Vol. 1 derives a minimum critical infinite sea concentration of 1.4 g^{235}U/L (39.6 g^{235}U/ft^3) for a fictitious bounding medium consisting of only SiO_2 and ^{235}U.
- Section 10 of NUREG/CR-6505 (Ref. 15, pg. 45) concludes that a concentration factor of greater than ten is not considered credible for migration of 235U based on the hydrogeochemical modeling.

The treatment methods will not result in the waste exceeding an average of 0.1 g^{235}U/L, as described and analyzed in Nuclear Criticality Safety Assessments, NSA-TR-09-14 (Reference 8), NSA-TR-HDP-11-11 (Reference 9), and HEM-13-MEMO-090 (Reference 13). While the first two documents discuss five percent of the waste requiring treatment, the amount being treated is not a limitation to ensuring nuclear criticality safety, which is achieved on a concentration basis. The estimate of waste, approximately 22,000 m^3, requiring stabilization prior to disposal, will exceed the five percent estimate mentioned in the NCSAs.

As discussed in Section 1 above, non-HDP SNM material shipped to USEI has been below the average 0.1 g^{235}U/L concentration limit for HDP waste consigned to USEI. USEI disposal cell 15 includes not only HDP and non-HDP SNM waste, but approximately 1.7 million tons of other non-SNM soils and debris disposed between 2010 and 2012. Therefore, no additional impact needs to be evaluated.

9.0 RECORDS OF TRANSFER

10 CFR 70.42 (d)(2) requires a written certification by the transferee that the recipient is authorized by license or registration certificate to receive the type, form, and quantity of SNM to be transferred, specifying the license or registration certificate number, issuing agency, and expiration date. Since USEI would be exempted from the 10 CFR 70.3 requirement of an NRC licensee to possess SNM, the §70.42 requirement would not apply. However, Westinghouse will maintain as an alternative written registration certificate a copy of the permit issued to USEI by the State of Idaho and NRC approval of this alternate disposal request for specific HDP wastes. DOE/NRC Form 741, *Nuclear Material Transaction Report*, would be used by Westinghouse to document transfers of SNM to the disposal facility. USEI will report SNM receipts using its existing account with the Nuclear Materials Management & Safeguards System.

10.0 PHYSICAL SECURITY ASPECTS OF THE WASTE TO BE SHIPPED, HANDLED, TREATED AND DISPOSED AT USEI

Physical security aspects of this 20.2002 alternate disposal request are no different than the physical security aspects of the preceding 20.2002 requests (References 1a and 2a). From a physical security standpoint, this assessment considers the concentration and the enrichment of the SNM being shipped to USEI and handled there, the attractiveness of the form of the SNM being disposed, and the ability of an adversary to efficiently and timely segregate such material after acquisition. The activities considered in this assessment are: (1) shipment of the waste material via gondola cars to USEI; (2) unloading of the waste from the gondola cars on to trucks for treatment and disposal at the USEI burial cell, and (3) treatment and disposal of the waste material in the burial cells.

10.1 Concentration, Amount, and Enrichment

Each shipment (railcar) of waste to USEI will meet the transportation security requirements in 10 CFR §73.67(g), *In-Transit Requirements for Special Nuclear Material of Low Strategic Significance*, when quantities meeting those requirements are present in the shipment. A Formula Quantity of SNM or SNM of Moderate Strategic Significance will not be transferred to USEI. The 10 CFR 73 definition of SNM of Low Strategic Significance for U-235 is summarized below ('percent' is percent by weight):

(1) 15 to 999 grams of uranium-235 where enrichment is 20 percent or more; or

(2) 1,000 to 9,999 grams of uranium-235 where enrichment is 10 up to 20 percent; or

(3) 10,000 grams or more of uranium-235 where enrichment exceeds 0.72 up to 10 percent.

In addition to ensuring that the waste transferred to USEI does not exceed the criteria SNM of Low Strategic Significance, any waste containing highly enriched SNM will be Diffuse Material as defined in the Physical Security and Fundamental Nuclear Material Control Plans for HDP. No discrete material, which is material not meeting the definition of Diffuse Material, will be transferred to USEI.

Based on the average estimated amount of U-235 in the waste of 5.5 pCi/g (from Table 1) and a maximum railcar load weight of 225,000 lbs (102,058,283 g), the average railcar is expected to be less than 260 g ^{235}U. The waste proposed in this 20.2002 request is limited to

a maximum average fissile nuclide concentration of 0.1g ^{235}U/L. This average fissile nuclide concentration is assessed on a per railcar basis. The maximum shipping volume of the gondola car is 2700 ft^3 or 76,455 L. Thus, a single railcar could contain 7,646 g ^{235}U, provided the amount of U-235 in waste with enrichment of 20 percent or more does not exceed 1000 g.

All shipments to USEI containing fissile material will meet the fissile exempt requirements as described in 49 CFR 173.453, *Fissile Material – Exceptions.*

10.2 Rail Transport and Tracking

For all shipments to USEI, the contents of each gondola railcar will be entirely enclosed in form-fitting, sift-proof, and closable wrappers meeting U.S. Department of Transportation (DOT) Industrial Type-I Package (IP-1) requirements. The IP-1 package precludes dispersal of waste to the air or loss of material during transport. A tamper indicating device will be placed on the closure(s) for the wrappers.

When the quantity of fissile material in a shipment meets the criteria of SNM of Low Strategic Significance, security measures for transport of this SNM will be implemented as discussed in the HDP Physical Security Plan (Reference 10) and the Waste Management and Transportation Plan (Reference 11).

Westinghouse is responsible for the safe and secure transport of the material in accordance with the provisions of the Decommissioning, Physical Security and Fundamental Nuclear Material Control Plans until it is accepted by USEI for treatment and disposal.

Prior to the shipment leaving the facility, HDP will receive confirmation from USEI that they will be ready to accept the railcar shipment at the planned time and location. This confirmation may be in the form of an email.

The Hematite Decommissioning Project (HDP) receives via email from the Railroad a railcar status report each day following departure of shipments. In addition, HDP personnel can log into a Railroad website to obtain the most recent status of railcars in shipment. Thus, HDP is aware of the location of the shipments and the reasons for any delays. Requests can be made of the Railroad in furtherance of the railcar reaching its destination as soon as possible. A trace investigation will be completed if receipt acknowledgment is not received within 20 days after the shipment departs HDP. The results of the trace investigation will be reported to the NRC within 2 weeks of completion of the investigation as required by 10 CFR 20, Appendix G.III.E. A search will be conducted for any shipment that is determined to be lost or unaccounted for. The NRC Operations Center will be notified within one hour after discovery of the loss of the shipment and within one hour after recovery or accounting for such lost shipment in accordance with the provisions of 10 CFR 73.71, Reporting of Safeguards Events.

Pursuant to 49 CFR 172.800 et seq., USEI maintains security at its waste handling, treatment and disposal facilities for hazardous materials. Such areas are enclosed in a 6-foot chain link fence, topped with barb-wire, posted with warning signs. Security personnel are continuously on duty monitoring access, including after hours patrols and inspections. Potential employees are subject to a background check. Upon hire, employees are trained on USEI's security policy, including the requirements to report suspicious behavior or objects

and to restrict unauthorized entry to waste handling and management areas. All visitors are required to sign in before entering the facility.

10.3 Attractiveness

Due to the difficulty, time, and necessary equipment required to separate 7.6 kg of SNM from 110 tons of waste and due to the additional processing that would be required to make the SNM useful in either an improvised nuclear device or a radiological dispersal device, this waste is considered to be highly unattractive to adversaries. The SNM present in the waste is not in a useful form because it is mixed with dirt and sanitary sludge. Thus, the timely and efficient removal of the SNM during transport or during USEI handling/treatment by an adversary for unauthorized purposes is improbable. The combination of the existing railroad security, physical security at the USEI site, and the effort to identify SNM under such conditions effectively prevent any opportunities for extracting SNM prior to burial.

The difficulty of recovering SNM from the waste would increase considerably after burial compared to the recovering the material prior to burial. The increased difficulty is because of having to find and extract the waste from the burial cell, with dimensions of 30 acres of area by 49-foot depth. This waste will be intermixed with waste from other sources, further diluting the SNM concentration. Potential adversaries would have to excavate the burial cell, identify SNM-bearing materials, and then separate these SNM materials. The timely and efficient removal of the SNM from the disposal site by an adversary for unauthorized purposes is improbable.

11.0 REFERENCES

Note: The "ML#" is the accession number for the NRC ADAMS document database that is accessible via the internet.

1. Documents associated with SNM-33 License Amendment 58, specifically:
   a. NRC (McConnell) letter to Westinghouse (Hackmann), dated October 27, 2011, Issuance of Hematite Amendment No. 58 Approving Westinghouse Hematite Request for Alternate Disposal of Soil and Debris and Granting Exemptions to 10 CFR 30.3 and 10 CFR 70.3, (ML112560105, ML111441087).
   b. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-11-16, dated February 18, 2011, Revised Technical Basis for Characterization of Decommissioning Soils Waste That is Subject to the Alternate Disposal Request for U.S. Ecology Idaho, Inc. (ML110530153)
   c. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-10-135, dated December 21, 2010, "Waste Characterization for Alternate Disposal Request for Decommissioning Soils" (ML103570023)
   d. Westinghouse and NRC Teleconferences on June 21, 2010, and June 25, 2010, Regarding 20.2002 Exemption Request (ML110560334)
   e. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-10-46, dated May 24, 2010, "Additional Information and Clarifications Concerning l0 CFR 20.2002 Alternate Waste Disposal Authorization and Exemption for Specific Hematite Decommissioning Project Waste" (ML101450240)
   f. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-10-38, dated March 31, 2010, "Additional Information for Alternate Waste Disposal Authorization and Exemption" (ML100950386)
   g. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-10-9, dated January 21, 2010, "Corrected Compact Disks Concerning Alternate Waste Disposal" (No ML number)
   h. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-10-6, dated January 20, 2010, "Additional Information Concerning Alternate Waste Disposal" (ML100221416)
   i. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-09-146, dated December 29, 2009, "Response to Request for Additional Information - Alternate Waste Disposal" (ML100320540)
   j. Westinghouse (Hackmann) letter to NRC (Document Control Desk), HEM-09-52, dated May 21, 2009, "Request for Alternate Disposal Approval and Exemptions for Specific Hematite Decommissioning Project Waste" (ML091480071)
2. Documents associated with SNM-33 License Amendment 60, specifically:
   a. NRC (Camper) letter to Westinghouse (Richardson), dated April 11, 2013, Issuance of Hematite Amendment No. 60 Approving Westinghouse Hematite Request for

Alternate Disposal of Specified Low-Activity Radioactive Material and Granting Exemptions to 10 CFR 30.3 and 10 CFR 70.3 (ML12158A372, ML12158A401).

b. Westinghouse (Copp) letter to NRC (Document Control Desk), HEM-12-121, October 17, 2012, Further Information for the Final Responses Dated July 24, 2012, to NRC Requests for Additional Information Dated May 1, 2012, on the January 16, 2012, Hematite 20.2002 Alternate Disposal Request" (ML12293A029).

c. Westinghouse (Copp) letter to NRC (Document Control Desk), HEM-12-88, dated July 24, 2012 "Final Responses to NRC Requests for Additional Information Dated May 1, 2012, on the January 16, 2012, Hematite 20.2002 Alternate Disposal Request" (ML122090321)

d. Westinghouse (Copp) letter HEM-12-67 to NRC (Document Control Desk), dated June 19, 2012, "Partial Response to NRC Requests for Additional Information dated May 1, 2012, on the January 16, 2012, Hematite 20.2002 Alternate Disposal Request" (ML121740265)

e. Westinghouse (Copp) letter to NRC (Document Control Desk), HEM-12-2, dated January 16, 2012, "Request for Additional Alternate Disposal Approval and Exemptions for Specific Hematite Decommissioning Project Waste at US Ecology Idaho" (ML12017A188, ML12017A189, and ML12017A190)

3. NRC (Hayes) letter to Westinghouse (Copp), dated February 26, 2013, "Disposal of Sanitary Waste Solids and Water Treatment Materials at U.S. Ecology Idaho" (ML13036A331)

4. NRC (Hayes) letter to Westinghouse (Copp), dated March 18, 2013, "The U.S. Nuclear Regulatory Commission's Assessment of Westinghouse Hematite Unreviewed Safety Question Involving the Shipment of Radiologically Contaminated Waste Containing Volatile Organic Compounds for the Treatment of the Organics at U.S. Ecology" (ML13038A141)

5. NRC (McConnell) letter to Humboldt Bay (Conway) dated April 25, 2012, "Humboldt Bay Power Plant Unit 3 – Request for 10 CFR 20.2002 Alternate Disposal Approval and 10 CFR 30.11 Exemption for Plant Waste Disposal at US Ecology Idaho" (ML120620454)

6. NRC (Camper) letter to USEI (Weismann) dated December 19, 2012, "Request for 10 CFR 20.2002 Alternate Disposal Approval and Exemptions from 10 CFR 30.11 and 10 CFR 70.17 for Humboldt Bay Plant Waste Disposal at US Ecology Idaho" (ML12299A056)

7. Westinghouse (Copp) letter to NRC (Document Control Desk), HEM-12-77, dated July 30, 2012, "Additional Information on the Hematite Nuclear Criticality Safety Assessment of the US Ecology Idaho (USEI) Site for the Land Fill Disposal of Decommissioning Waste from the Hematite Site, Revision 6, July 2012" (ML12215A351)

8. NSA-TR-09-14, "Nuclear Criticality Safety Assessment of the US Ecology Idaho (USEI) Site for the Land Fill Disposal of Decommissioning Waste from the Hematite Site"

9. NSA-TR-HDP-11-11, "Nuclear Criticality Safety Assessment of the US Ecology Idaho (USEI) Site for the Land Fill Disposal of Additional Decommissioning Waste from the Hematite Site
10. Physical Security Plan (ML11214A106)
11. Waste Management and Transportation Plan (ML110330370), and Resolution of NRC Request for Additional Information on the Waste Management and Transportation Plan (ML111880290)
12. Westinghouse (E. K. Hackmann) letter to Document Control Desk (NRC), HEM-09-94, dated August 12, 2009, "Decommissioning Plan and Revision to License Application" (ML092330136, ML092870417, ML092870418)
13. HEM-13-MEMO-090, Stabilization of Soil Comprising Chemical Constituents Received from the Hematite Site for treatment at US Ecology Idaho (USEI)

Appendix A
HDP and USEI Occupational Injury and Illness Data

Work-related injuries at the HDP

Year	Work Hours	Injuries	OSHA Recordable Injury/Illness	Fatalities	Injuries per 10,000 hours
2001	438,404	67	50	0	1.5
2002	115,832	11	5	0	1.0
2003	86,736	1	0	0	0.1
2004	52,208	0	0	0	0
2005	169,739	18	3	0	1.1
2006	144,480	26	1	0	1.8
2007	57,760	0	0	0	0
2008	114,000	0	0	0	0
2009	120,623	0	0	0	0
2010	111,015	1	1	0	0.2
2011	146,727	5	0	0	0.3
2012	161,813	15	6	0	0.9
TOTAL	**1,719,337**	**144**	**66**	**0**	**N/A**

Work-related injuries at the USEI

Year	Work Hours	Injuries	OSHA Recordable Injury/Illness	Fatalities	Injuries per 10,000 hours
2001	87,362	9	5	0	1.0
2002	81,707	8	3	0	1.0
2003	93,490	18	2	0	1.9
2004	94,872	16	3	0	1.7
2005	121,048	20	4	0	1.6
2006	158,800	22	5	0	1.4
2007	180,683	40	7	0	2.2
2008	179,072	30	3	0	1.7
2009	149,929	16	3	0	1.1
2010	117,151	14	2	0	1.2
2011	133,366	5	2	0	0.4
2012	120,251	12	3	0	1.0
TOTAL	**1,517,731**	**210**	**42**	**0**	**N/A**

Appendix B
USEI Waste Acceptance Criteria

USEI Part B Permit
EPA ID. No.: IDD073114654
Revision Date: September 25, 2008

C.3 WASTE ACCEPTANCE CRITERIA

C.3.1 Pre-acceptance Review

The preacceptance protocol has been designed to ensure that only hazardous and radioactive material that can be properly and safely stored, treated and/or disposed of by USEI are approved for receipt at the facility. A two-step approach is taken by USEI. The first step is the chemical and/or radiological and physical characterization of the candidate waste stream by the generator. The second step is the preacceptance evaluation performed by USEI to determine the acceptability of the waste for receipt at the facility. Figure C-2 presents a logic diagram of the preacceptance protocol that is utilized at the facility.

C.3.2 Radioactive Material Waste Acceptance Criteria

The following waste acceptance criteria are established for accepting radiological contaminated waste material that is generally or specifically exempted from regulation by the Nuclear Regulatory Commission (NRC) or an Agreement State under the Atomic Energy Act of 1954 ("AEA"), as amended. Material may also be accepted if it is not regulated or licensed by the NRC or has been authorized for disposal by the IDEQ and is within the numeric waste acceptance criteria. Waste acceptance criteria are consistent with these restrictions.

The following five tables establish types and concentrations of radioactive materials that may be accepted. These tables are based on categories and types of radioactive material not regulated by the NRC based on statute or regulation or specifically approved by the NRC or an Agreement State for alternate disposal. The criteria are consistent with these restrictions and detailed analyses set forth in *Waste Acceptance Criteria and Justification for FUSRAP Material*, prepared by Radiation Safety Associates, Inc. (RSA) as subsequently refined, expanded and updated in *Waste Acceptance Criteria and Justification for Radioactive Material*, prepared by USEI.

Material may be accepted if the material has been specifically exempted from regulation by rule, order, license, license condition, letter of interpretation, or specific authorization under the following conditions: Thirty (30) days prior to intended shipment of such materials to the facility, USEI shall notify IDEQ of its intent to accept such material and submit information describing the material's physical, radiological, and/or chemical properties, impact on the facility radioactive materials performance assessment, and the basis for determining that the material does not require disposal at a facility licensed under the AEA. The IDEQ will have 30 days from receipt of this notification to reject USEI's determination or require further information and review. No response by IDEQ within thirty (30) days following receipt of such notice shall constitute concurrence. IDEQ concurrence is not required for generally exempted material as set forth in Table C.4a.

Based on categories of waste described in the waste acceptance criteria, the concentration of the various radionuclides in the conveyance (e.g., rail car gondola, other container etc.) shall not exceed the concentration limits established in the WAC without the specific written approval of the IDEQ unless generally exempted as set forth in Table C.4a. Radiological surveys will be performed as outlined in ERMP-01 to verify compliance with the WAC. If individual "pockets" of activity are detected indicating the limits may be exceeded, the RSO or RPS shall investigate the discrepancy and estimate the extent or

volume of the material with the potentially elevated radiation levels. The RPS or RSO shall then make a determination on the compliance of the entire conveyance load with the appropriate WAC limits. If the conveyance is determined not to meet the limits, USEI will notify IDEQ's RCRA Program Manager within 24 hours of a concentration based exceedance of the facility WAC to evaluate and discuss management options. The findings and resolution actions shall then be documented and submitted to the IDEQ.

The radioactive material waste acceptance criteria, when used in conjunction with an effective radiation monitoring and protection program as defined in the USEI *Radioactive Material Health and Safety Plan* and *Exempt Radioactive Materials Procedures* provides adequate protection of human health and the environment. Included within this manual are requirements for USEI to submit a written summary report of Table C.1 through C.2 radioactive material waste receipts showing volumes and radionuclide concentrations disposed at the USEI site on a quarterly basis. USEI will also submit a Table C.3 through C.4b annual report of exempted products devices, materials or items within 60 (sixty) days of year end (December 31st). The annual report will provide total volumes or mass of isotopes and total activity by isotope listing the activity of each radionuclide disposed during the preceding year, and the cumulative total of activity for each radionuclide disposed at the facility. The report will include an updated analysis of the impact on the facility performance assessment.

These criteria and procedures are designed to assure that the highest potential dose to a worker handling radioactive material at USEI shall not exceed 400 mrem/year TEDE dose, and that no member of the public is calculated to receive a potential post closure dose exceeding 15 mrem/year TEDE dose, from the USEI program. TEDE is defined as the "Total Effective Dose Equivalent", which equals the sum of external and internal exposures. The public dose limit during operation activities is limited to 100 mrem/yr TEDE dose. An annual summary report of environmental monitoring results will be submitted to IDEQ by June 1st for the preceding year.

Materials that have a radioactive component that meets the criteria described in Tables C.1 through C.4b and are RCRA regulated material will be managed as described within this WAP for the RCRA regulated constituents.

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Table C.1: Unimportant Quantities of Source Material Uniformly Dispersed* in Soil or Other Media**

	Status of Equilibrium	Maximum Concentration of Source Material	Sum of Concentrations Parent(s) and all progeny present
a	Natural uranium in equilibrium with progeny	<500 ppm / 167 pCi/g (^{238}U activity)	≤ 3000 pCi/g
	Refined natural uranium	<500 ppm / 167 pCi/g (^{238}U activity)	≤ 2000 pCi/g
	Depleted Uranium	<500 ppm / 169 pCi/g	≤ 2000 pCi/g
b	Natural thorium	<500 ppm / 55 pCi/g (^{232}Th activity)	≤ 2000 pCi/g
	^{230}Th (with no progeny)	0.1 ppm / ≤2000 pCi/g	
	Any mixture of Thorium and Uranium	Sum of ratios ≤ 1****	≤2000 pCi/g

*Refined Uranium includes ^{238}U, ^{235}U, ^{234}U; ^{234Th}, ^{234m}Pa, ^{231}Th

Table C.2: Naturally Occurring Radioactive Material Other Than Uranium and Thorium Uniformly Dispersed* in Soil or Other Media**

	Status of Equilibrium	Maximum Concentration of Parent Nuclide	Sum of Concentrations of Parent and All Progeny Present
a	^{226}Ra or ^{228}Ra with progeny in bulk form [1]	500 pCi/g	≤ 4500 pCi/g
b	^{226}Ra or ^{228}Ra with progeny in reinforced IP-1 containers [1]	1500 pCi/g	13,500 pCi/g
c	^{210}Pb with progeny(Bi & ^{210}Po)	1500 pCi/g	4500 pCi/g
	^{40}K	818 pCi/g	N/A
	Any other NORM		≤3000 pCi/g

[1] Any material containing ^{226}Ra greater than 222 pCi/g shall be disposed at least 6 meters from the external point on the completed cell.

Table C.3: Particle Accelerator Produced Radioactive Material

Acceptable Material	Activity or Concentration
Any particle accelerator produced radionuclide.	All materials shall be packaged in accordance with USDOT packaging requirements. Any packages containing iodine or volatile radionuclides will have lids or covers sealed to the container with gaskets. Contamination levels on the surface of the packages shall not exceed those allowed at point of receipt by USDOT rules. Gamma or x-ray radiation levels may not exceed 10 millirem per hour anywhere on the surface of the package. All packages received shall be directly disposed in the active cell. All containers shall be certified to be 90% full.

*Average over conveyance or container. The use of the phrase "over the conveyance or container" is meant to reflect the variability on the generator side. The concentration limit is the primary acceptance criteria.

**Unless otherwise authorized by IDEQ, other Media does not include radioactively contaminated liquid (except for incidental liquids in materials). See radioactive contaminated liquid definition (definition section of Part B permit).

*** $\frac{\text{Conc. of U in sample}}{\text{Allowable conc. of U}} + \frac{\text{Conc. of Th in Sample}}{\text{Allowable conc. of Th}} \leq 1$

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Table C.4a: NRC Exempted Products, Devices or Items

Exemption 10 CFR Part*	Product, Device or Item	Isotope, Activity or Concentration
30.15	As listed in the regulation	Various isotopes and activities as set forth in 30.15
30.14, 30.18	Other materials, products or devices specifically exempted from regulation by rule, order, license, license condition, concurrence, or letter of interpretation	Radionuclides in concentrations consistent with the exemption
30.19	Self-luminous products containing tritium, ^{85}Kr, ^{3}H or ^{147}Pm	Activity by Manufacturing license
30.20	Gas and aerosol detectors for protection of life and property from fire	Isotope and activity by Manufacturing license
30.21	Capsules containing ^{14}C urea for *in vivo* diagnosis of humans	^{14}C, one µCi per capsule
40.13(a)	Unimportant quantity of source material: see Table C.1	≤0.05% by weight source material
40.13(b)	Unrefined and unprocessed ore containing source material	As set forth in rule
40.13(c)(1)	Source material in incandescent gas mantles, vacuum tubes, welding rods, electric lamps for illumination	Thorium and uranium, various amounts or concentrations, see rules
40.13(c)(2)	(i)Source material in glazed ceramic tableware (ii)Piezoelectric ceramic (iii) Glassware not including glass brick, pane glass, ceramic tile, or other glass or ceramic used in construction	≤20% by weight ≤2% by weight ≤10% by weight
40.13(c)(3)	Photographic film, negatives or prints	Uranium or Thorium
40.13(c)(4)	Finished product or part fabricated of or containing tungsten or magnesium-thorium alloys. Cannot treat or process chemically, metallurgically, or physically.	≤4% by weight thorium content.
40.13(c)(5)	Uranium contained in counterweights installed in aircraft, rockets, projectiles and missiles or stored or handled in connection with installation or removal of such counterweights.	Per stated conditions in rule.
40.13(c)(6)	Uranium used as shielding in shipping containers if conspicuously and legibly impressed with legend "CAUTION RADIOACTIVE SHIELDING – URANIUM" and uranium incased in at least 1/8 inch thick steel or fire resistant metal.	Depleted Uranium
40.13(c)(7)	Thorium contained in finished optical lenses	≤30% by weight thorium, per conditions in rule.
40.13(c)(8)	Thorium contained in any finished aircraft engine part containing nickel-thoria alloy.	≤4% by weight thorium, per conditions in rule.

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Table C.4b: Materials Specifically Exempted by the NRC or NRC Agreement State

Exemption	Materials	Isotope, Activity or Concentration*
10 CFR 30.11**	Byproduct material including production particle accelerator material exempted from NRC or Agreement State regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.***	Byproduct material at concentrations consistent with the exemption
10 CFR 40.14**	Source material exempted from NRC or Agreement State regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.***	Source material at concentrations consistent with the exemption.
10 CFR 70.17	Special Nuclear Material (SNM) exempted from NRC regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.***	SNM at concentrations consistent with the exemption.

*Sum of all isotopes up to a maximum concentration of 3,000 pCi/gm.

** Alternate disposals authorized by Agreement States also require an NRC exemption for the purposes of disposal in the State of Idaho.

*** Similar material not regulated or licensed by the NRC may also be accepted. Sum of all isotopes up to a maximum concentration of 3,000 pCi/gm. IDEQ shall be notified prior to the receipt of Special Nuclear Material not regulated or licensed by the NRC.

Additional Information for USEI's Waste Analysis Plan

1. US Ecology Idaho, Inc. (USEI) may receive contaminated materials or other materials as described in Tables C.1 - C.4b above. USEI may not accept for disposal any material that by its possession would require USEI to have a radioactive material license from the Nuclear Regulatory Commission (NRC).

2. Unless approved in advance by USEI and IDEQ, average activity concentrations may not exceed those concentrations enumerated in Tables C.1 and C.2. Additionally, for Tables C.1 and C.2, individual pockets of material may exceed the WAC for the radionuclides present as long as the average concentration of all radionuclides within the package or conveyance remains at or below the WAC and the highest dose rate measured on the outside of the unshielded package or conveyance does not exceed those action levels enumerated in ERMP-01.

3. Other items, devices or materials listed in Table C.4a, which are exempted in accordance with 10 CFR Parts 30, 40 or equivalent Agreement State regulations or 10 CFR Part 70 may be accepted at or below the activities (per device or item) or concentrations specified in those exemptions.

4. 10CFR20.2008 authorizes disposal of certain byproduct material as defined in Section 11.e(3) and 11.e(4) of the Atomic Energy Act, as amended, at disposal facilities authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, as authorized under the Energy Policy Act of 2005.

5. The generator of particle accelerator produced waste must specify that the waste meets applicable acceptance criteria.

6. In accordance with permit requirements, notification of any exceedance of the WAC will be provided to the RCRA Program Manager within 24 hours, in accordance with the permit.

Appendix C
Microshield Calculations

Case Summary of USEI Stab. Worker — Page 1 of 3

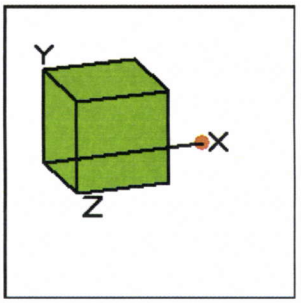
MicroShield 7.02
Westinghouse Electric Company (08-MSD-7.02-1424)

Date	By	Checked

Filename	Run Date	Run Time	Duration
HDP Stabilization Operator.ms7	May 21, 2013	6:15:57 PM	00:00:01

Project Info	
Case Title	USEI Stab. Worker
Description	USEI SSPA, Density=1.69 g/cc
Geometry	13 - Rectangular Volume

Source Dimensions	
Length	385.572 cm (12 ft 7.8 in)
Width	385.572 cm (12 ft 7.8 in)
Height	385.572 cm (12 ft 7.8 in)



Dose Points			
A	X	Y	Z
#1	665.988 cm (21 ft 10.2 in)	0.0 cm (0.0 in)	0.0 cm (0.0 in)

Shields			
Shield N	Dimension	Material	Density
Source	5.73e+07 cm³	Concrete	1.69
Air Gap		Air	0.00122

Source Input: Grouping Method - Standard Indices
Number of Groups: 25
Lower Energy Cutoff: 0.015
Photons < 0.015: Included
Library: Grove

Nuclide	Ci	Bq	µCi/cm³	Bq/cm³
Ac-227	1.9593e-007	7.2496e+003	3.4182e-009	1.2647e-004
Ac-228	1.1372e-004	4.2076e+006	1.9839e-006	7.3404e-002
Bi-210	6.8637e-005	2.5396e+006	1.1974e-006	4.4304e-002
Bi-211	1.9498e-007	7.2141e+003	3.4015e-009	1.2585e-004
Bi-212	1.1326e-004	4.1905e+006	1.9758e-006	7.3105e-002
Bi-214	9.5787e-005	3.5441e+006	1.6711e-006	6.1829e-002
Fr-223	2.7039e-009	1.0004e+002	4.7171e-011	1.7453e-006
Pa-231	4.5093e-007	1.6685e+004	7.8667e-009	2.9107e-004
Pa-234	2.7514e-006	1.0180e+005	4.8000e-008	1.7760e-003
Pa-234m	1.7196e-003	6.3627e+007	3.0000e-005	1.1100e+000
Pb-210	6.8654e-005	2.5402e+006	1.1977e-006	4.4315e-002
Pb-211	1.9498e-007	7.2141e+003	3.4015e-009	1.2585e-004
Pb-212	1.1326e-004	4.1905e+006	1.9758e-006	7.3105e-002
Pb-214	9.5787e-005	3.5441e+006	1.6711e-006	6.1829e-002
Po-210	6.8167e-005	2.5222e+006	1.1892e-006	4.4001e-002

Po-211	5.3228e-010	1.9695e+001	9.2860e-012	3.4358e-007
Po-212	7.2563e-005	2.6848e+006	1.2659e-006	4.6839e-002
Po-214	9.5767e-005	3.5434e+006	1.6707e-006	6.1816e-002
Po-215	1.9498e-007	7.2142e+003	3.4015e-009	1.2585e-004
Po-216	1.1326e-004	4.1905e+006	1.9758e-006	7.3105e-002
Po-218	9.5807e-005	3.5448e+006	1.6714e-006	6.1842e-002
Ra-223	1.9498e-007	7.2142e+003	3.4015e-009	1.2585e-004
Ra-224	1.1326e-004	4.1905e+006	1.9758e-006	7.3105e-002
Ra-226	9.5806e-005	3.5448e+006	1.6714e-006	6.1841e-002
Ra-228	1.1372e-004	4.2076e+006	1.9839e-006	7.3404e-002
Rn-219	1.9498e-007	7.2142e+003	3.4015e-009	1.2585e-004
Rn-220	1.1326e-004	4.1905e+006	1.9758e-006	7.3105e-002
Rn-222	9.5807e-005	3.5448e+006	1.6714e-006	6.1842e-002
Tc-99	2.6364e-003	9.7548e+007	4.5994e-005	1.7018e+000
Th-227	1.9264e-007	7.1277e+003	3.3607e-009	1.2435e-004
Th-228	1.1326e-004	4.1906e+006	1.9759e-006	7.3107e-002
Th-230	3.9207e-006	1.4507e+005	6.8399e-008	2.5308e-003
Th-231	5.3309e-004	1.9724e+007	9.3000e-006	3.4410e-001
Th-232	1.1464e-004	4.2418e+006	2.0000e-006	7.4000e-002
Th-234	1.7196e-003	6.3627e+007	3.0000e-005	1.1100e+000
Tl-207	1.9444e-007	7.1944e+003	3.3922e-009	1.2551e-004
Tl-208	4.0693e-005	1.5056e+006	7.0991e-007	2.6267e-002
U-234	1.0890e-002	4.0293e+008	1.8998e-004	7.0293e+000
U-235	5.3309e-004	1.9724e+007	9.3000e-006	3.4410e-001
U-238	1.7196e-003	6.3627e+007	3.0000e-005	1.1100e+000

Buildup: The material reference is Source Integration Parameters	
X Direction	20
Y Direction	20
Z Direction	20

Results					
Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.916e+07	3.760e-12	4.132e-12	3.225e-13	3.544e-13
0.02	7.341e+01	3.641e-13	4.281e-13	1.261e-14	1.483e-14
0.03	2.892e+06	1.194e-05	1.657e-05	1.184e-07	1.642e-07
0.04	4.301e+04	1.263e-06	2.076e-06	5.587e-09	9.181e-09
0.05	6.182e+05	4.306e-05	8.113e-05	1.147e-07	2.161e-07
0.06	2.614e+06	3.032e-04	6.735e-04	6.022e-07	1.338e-06
0.08	5.034e+06	1.088e-03	2.886e-03	1.721e-06	4.566e-06
0.1	6.433e+06	2.053e-03	6.049e-03	3.141e-06	9.254e-06
0.15	3.282e+06	1.927e-03	6.083e-03	3.174e-06	1.002e-05
0.2	1.485e+07	1.307e-02	4.067e-02	2.307e-05	7.178e-05

0.3	1.840e+06	2.846e-03	8.234e-03	5.399e-06	1.562e-05
0.4	1.464e+06	3.395e-03	9.155e-03	6.616e-06	1.784e-05
0.5	6.548e+05	2.088e-03	5.313e-03	4.099e-06	1.043e-05
0.6	3.079e+06	1.277e-02	3.085e-02	2.493e-05	6.022e-05
0.8	1.884e+06	1.190e-02	2.660e-02	2.263e-05	5.060e-05
1.0	4.235e+06	3.726e-02	7.872e-02	6.868e-05	1.451e-04
1.5	1.253e+06	2.033e-02	3.895e-02	3.421e-05	6.554e-05
2.0	9.630e+05	2.418e-02	4.373e-02	3.739e-05	6.763e-05
3.0	1.503e+06	6.933e-02	1.160e-01	9.406e-05	1.574e-04
Totals	**1.318e+08**	**2.026e-01**	**4.141e-01**	**3.300e-04**	**6.877e-04**

Case Summary of Case 1 Page 1 of 3

MicroShield 7.02 Westinghouse Electric Company (08-MSD-7.02-1424)		
Date	**By**	**Checked**

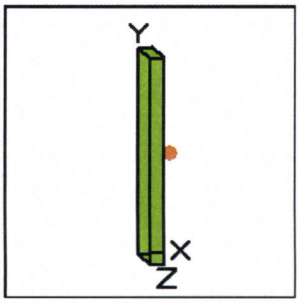
Filename	Run Date	Run Time	Duration
SoilApGondSurveyorRev1.ms7	May 20, 2012	12:53:51 PM	00:00:01

Project Info	
Case Title	Case 1
Description	Case 1
Geometry	13 - Rectangular Volume

Source Dimensions	
Length	121.92 cm (4 ft)
Width	274.32 cm (9 ft)
Height	1.8e+3 cm (60 ft)

Dose Points			
A	X	Y	Z
#1	222.714 cm (7 ft 3.7 in)	914.4 cm (30 ft)	137.16 cm (4 ft 6.0 in)

Shields			
Shield N	Dimension	Material	Density
Source	6.12e+07 cm³	Concrete	1.69
Shield 1	.794 cm	Iron	7.86
Air Gap		Air	0.00122



Source Input: Grouping Method - Standard Indices
Number of Groups: 25
Lower Energy Cutoff: 0.015
Photons < 0.015: Excluded
Library: Grove

Nuclide	Ci	Bq	µCi/cm³	Bq/cm³
Ac-227	1.8358e-007	6.7925e+003	3.0015e-009	1.1105e-004
Ac-228	1.2091e-004	4.4738e+006	1.9769e-006	7.3144e-002
Bi-210	7.0398e-005	2.6047e+006	1.1510e-006	4.2586e-002
Bi-211	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Bi-212	1.2021e-004	4.4476e+006	1.9653e-006	7.2715e-002
Bi-214	1.0234e-004	3.7865e+006	1.6731e-006	6.1906e-002
Fr-223	2.5334e-009	9.3737e+001	4.1420e-011	1.5325e-006
Pa-231	4.4509e-007	1.6468e+004	7.2769e-009	2.6925e-004
Pa-234	2.9359e-006	1.0863e+005	4.8000e-008	1.7760e-003
Pa-234m	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000
Pb-210	7.0418e-005	2.6055e+006	1.1513e-006	4.2598e-002
Pb-211	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Pb-212	1.2021e-004	4.4476e+006	1.9653e-006	7.2715e-002
Pb-214	1.0234e-004	3.7865e+006	1.6731e-006	6.1906e-002

Po-210	6.9845e-005	2.5843e+006	1.1419e-006	4.2251e-002
Po-211	4.9849e-010	1.8444e+001	8.1501e-012	3.0155e-007
Po-212	7.7016e-005	2.8496e+006	1.2592e-006	4.6589e-002
Po-214	1.0232e-004	3.7857e+006	1.6728e-006	6.1893e-002
Po-215	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Po-216	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Po-218	1.0236e-004	3.7872e+006	1.6735e-006	6.1919e-002
Ra-223	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Ra-224	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Ra-226	1.0236e-004	3.7872e+006	1.6735e-006	6.1918e-002
Ra-228	1.2091e-004	4.4738e+006	1.9769e-006	7.3145e-002
Rn-219	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Rn-220	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Rn-222	1.0236e-004	3.7872e+006	1.6735e-006	6.1919e-002
Tc-99	2.8744e-003	1.0635e+008	4.6994e-005	1.7388e+000
Th-227	1.8044e-007	6.6764e+003	2.9501e-009	1.0915e-004
Th-228	1.2021e-004	4.4477e+006	1.9654e-006	7.2718e-002
Th-230	3.8699e-006	1.4319e+005	6.3270e-008	2.3410e-003
Th-231	5.6883e-004	2.1047e+007	9.3000e-006	3.4410e-001
Th-232	1.2233e-004	4.5262e+006	2.0000e-006	7.4000e-002
Th-234	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000
Tl-207	1.8210e-007	6.7377e+003	2.9772e-009	1.1016e-004
Tl-208	4.3190e-005	1.5980e+006	7.0613e-007	2.6127e-002
U-234	1.1620e-002	4.2995e+008	1.8998e-004	7.0294e+000
U-235	5.6883e-004	2.1047e+007	9.3000e-006	3.4410e-001
U-238	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000

Buildup: The material reference is Source Integration Parameters	
X Direction	20
Y Direction	20
Z Direction	20

Results					
Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	3.959e+04	1.902e-164	4.032e-30	1.632e-165	3.459e-31
0.02	7.170e+01	2.631e-80	1.149e-32	9.113e-82	3.981e-34
0.03	3.085e+06	2.798e-27	6.708e-27	2.773e-29	6.648e-29
0.04	4.565e+04	2.448e-16	8.421e-16	1.083e-18	3.724e-18
0.05	6.554e+05	2.899e-10	1.523e-09	7.723e-13	4.058e-12
0.06	2.789e+06	2.750e-07	1.907e-06	5.462e-10	3.788e-09
0.08	5.362e+06	6.234e-05	5.175e-04	9.865e-08	8.189e-07
0.1	6.863e+06	5.757e-04	4.742e-03	8.807e-07	7.255e-06
0.15	3.501e+06	1.949e-03	1.341e-02	3.209e-06	2.209e-05

0.2	1.584e+07	1.921e-02	1.146e-01	3.391e-05	2.022e-04
0.3	1.959e+06	5.493e-03	2.682e-02	1.042e-05	5.087e-05
0.4	1.563e+06	7.446e-03	3.155e-02	1.451e-05	6.147e-05
0.5	6.960e+05	4.938e-03	1.875e-02	9.692e-06	3.681e-05
0.6	3.281e+06	3.211e-02	1.114e-01	6.267e-05	2.175e-04
0.8	2.004e+06	3.253e-02	9.871e-02	6.188e-05	1.878e-04
1.0	4.511e+06	1.085e-01	2.986e-01	2.000e-04	5.505e-04
1.5	1.335e+06	6.537e-02	1.531e-01	1.100e-04	2.577e-04
2.0	1.029e+06	8.233e-02	1.758e-01	1.273e-04	2.718e-04
3.0	1.595e+06	2.483e-01	4.719e-01	3.369e-04	6.403e-04
Totals	**5.615e+07**	**6.088e-01**	**1.520e+00**	**9.714e-04**	**2.507e-03**

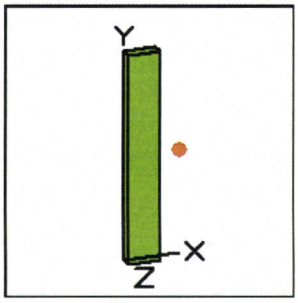
Case Summary of Case 1 Page 1 of 3

MicroShield 7.02 Westinghouse Electric Company (08-MSD-7.02-1424)		
Date	**By**	**Checked**

Filename	Run Date	Run Time	Duration
SoilApGondOpRev1.ms7	May 20, 2012	12:54:33 PM	00:00:01

Project Info	
Case Title	Case 1
Description	Case 1
Geometry	13 - Rectangular Volume

Source Dimensions	
Length	274.32 cm (9 ft)
Width	121.92 cm (4 ft)
Height	1.8e+3 cm (60 ft)



Dose Points			
A	X	Y	Z
#1	476.86 cm (15 ft 7.7 in)	914.4 cm (30 ft)	60.96 cm (2 ft)

Shields			
Shield N	Dimension	Material	Density
Source	6.12e+07 cm³	Concrete	1.69
Shield 1	2.54 cm	Iron	7.86
Air Gap		Air	0.00122

Source Input: Grouping Method - Standard Indices
Number of Groups: 25
Lower Energy Cutoff: 0.015
Photons < 0.015: Excluded
Library: Grove

Nuclide	Ci	Bq	µCi/cm³	Bq/cm³
Ac-227	1.8358e-007	6.7925e+003	3.0015e-009	1.1105e-004
Ac-228	1.2091e-004	4.4738e+006	1.9769e-006	7.3144e-002
Bi-210	7.0398e-005	2.6047e+006	1.1510e-006	4.2586e-002
Bi-211	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Bi-212	1.2021e-004	4.4476e+006	1.9653e-006	7.2715e-002
Bi-214	1.0234e-004	3.7865e+006	1.6731e-006	6.1906e-002
Fr-223	2.5334e-009	9.3737e+001	4.1420e-011	1.5325e-006
Pa-231	4.4509e-007	1.6468e+004	7.2769e-009	2.6925e-004
Pa-234	2.9359e-006	1.0863e+005	4.8000e-008	1.7760e-003
Pa-234m	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000
Pb-210	7.0418e-005	2.6055e+006	1.1513e-006	4.2598e-002
Pb-211	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Pb-212	1.2021e-004	4.4476e+006	1.9653e-006	7.2715e-002
Pb-214	1.0234e-004	3.7865e+006	1.6731e-006	6.1906e-002

Po-210	6.9845e-005	2.5843e+006	1.1419e-006	4.2251e-002
Po-211	4.9849e-010	1.8444e+001	8.1501e-012	3.0155e-007
Po-212	7.7016e-005	2.8496e+006	1.2592e-006	4.6589e-002
Po-214	1.0232e-004	3.7857e+006	1.6728e-006	6.1893e-002
Po-215	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Po-216	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Po-218	1.0236e-004	3.7872e+006	1.6735e-006	6.1919e-002
Ra-223	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Ra-224	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Ra-226	1.0236e-004	3.7872e+006	1.6735e-006	6.1918e-002
Ra-228	1.2091e-004	4.4738e+006	1.9769e-006	7.3145e-002
Rn-219	1.8260e-007	6.7562e+003	2.9854e-009	1.1046e-004
Rn-220	1.2021e-004	4.4476e+006	1.9653e-006	7.2716e-002
Rn-222	1.0236e-004	3.7872e+006	1.6735e-006	6.1919e-002
Tc-99	2.8744e-003	1.0635e+008	4.6994e-005	1.7388e+000
Th-227	1.8044e-007	6.6764e+003	2.9501e-009	1.0915e-004
Th-228	1.2021e-004	4.4477e+006	1.9654e-006	7.2718e-002
Th-230	3.8699e-006	1.4319e+005	6.3270e-008	2.3410e-003
Th-231	5.6883e-004	2.1047e+007	9.3000e-006	3.4410e-001
Th-232	1.2233e-004	4.5262e+006	2.0000e-006	7.4000e-002
Th-234	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000
Tl-207	1.8210e-007	6.7377e+003	2.9772e-009	1.1016e-004
Tl-208	4.3190e-005	1.5980e+006	7.0613e-007	2.6127e-002
U-234	1.1620e-002	4.2995e+008	1.8998e-004	7.0294e+000
U-235	5.6883e-004	2.1047e+007	9.3000e-006	3.4410e-001
U-238	1.8349e-003	6.7892e+007	3.0000e-005	1.1100e+000

Buildup: The material reference is Source Integration Parameters	
X Direction	20
Y Direction	20
Z Direction	20

Results					
Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	3.959e+04	0.000e+00	1.921e-30	0.000e+00	1.647e-31
0.02	7.170e+01	4.188e-232	5.474e-33	1.451e-233	1.896e-34
0.03	3.085e+06	3.429e-75	5.208e-28	3.398e-77	5.162e-30
0.04	4.565e+04	1.368e-37	2.044e-29	6.050e-40	9.038e-32
0.05	6.554e+05	8.155e-22	7.599e-21	2.172e-24	2.024e-23
0.06	2.789e+06	1.531e-14	2.277e-13	3.041e-17	4.522e-16
0.08	5.362e+06	9.083e-09	1.825e-07	1.437e-11	2.888e-10
0.1	6.863e+06	1.403e-06	2.857e-05	2.146e-09	4.371e-08
0.15	3.501e+06	4.149e-05	6.453e-04	6.832e-08	1.063e-06

0.2	1.584e+07	7.556e-04	9.451e-03	1.334e-06	1.668e-05
0.3	1.959e+06	3.368e-04	3.115e-03	6.389e-07	5.909e-06
0.4	1.563e+06	5.592e-04	4.190e-03	1.090e-06	8.164e-06
0.5	6.960e+05	4.224e-04	2.685e-03	8.290e-07	5.271e-06
0.6	3.281e+06	3.022e-03	1.682e-02	5.899e-06	3.284e-05
0.8	2.004e+06	3.518e-03	1.603e-02	6.691e-06	3.049e-05
1.0	4.511e+06	1.295e-02	5.097e-02	2.388e-05	9.395e-05
1.5	1.335e+06	9.158e-03	2.834e-02	1.541e-05	4.769e-05
2.0	1.029e+06	1.262e-02	3.402e-02	1.952e-05	5.261e-05
3.0	1.595e+06	4.185e-02	9.559e-02	5.678e-05	1.297e-04
Totals	**5.615e+07**	**8.524e-02**	**2.619e-01**	**1.321e-04**	**4.244e-04**