

## **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 31<sup>st</sup>). 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 1<sup>st</sup> 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.

**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 ( <sup>238</sup> U activity) | ≤ 3000 pCi/g  |
|   | Refined natural uranium ( <sup>238</sup> U, <sup>235</sup> U, <sup>234</sup> U, <sup>234</sup> Th, <sup>234m</sup> Pa, <sup>231</sup> Th) | <500 ppm / 333 pCi/g                              | ≤ 2000 pCi/g  |
|   | Depleted Uranium ( <sup>234</sup> Th, <sup>234m</sup> Pa)   | <500 ppm / 169 pCi/g                              | ≤ 2000 pCi/g  |
| b | Natural thorium ( <sup>232</sup> Th + <sup>228</sup> Th)  | <500 ppm / 110 pCi/g                              | ≤ 2000 pCi/g  |
|   | <sup>230</sup> Th in equilibrium with progeny   | <0.01 ppm / 200 pCi/g                             | ≤2000 pCi/g   |
|   | <sup>230</sup> Th (with no progeny)   | 0.1 ppm / ≤2000 pCi/g                             |   |
|   | Any mixture of Thorium and Uranium  | Sum of ratios ≤ 1****                             | ≤2000 pCi/g   |

**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 | <sup>226</sup> Ra or <sup>228</sup> Ra with progeny in bulk form <sup>1</sup>                  | 500 pCi/g                               | ≤ 4500 pCi/g  |
| b | <sup>226</sup> Ra or <sup>228</sup> Ra with progeny in reinforced IP-1 containers <sup>1</sup> | 1500 pCi/g                              | 13,500 pCi/g  |
| c | <sup>210</sup> Pb with progeny (Bi & <sup>210</sup> Po)  | 1500 pCi/g                              | 4500 pCi/g  |
|   | <sup>40</sup> K  | 818 pCi/g                               | N/A   |
|   | Any other NORM   |   | ≤3000 pCi/g   |

<sup>1</sup> Any material containing <sup>226</sup>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).

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

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, <sup>85</sup> Kr, <sup>3</sup> H or <sup>147</sup> 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 <sup>14</sup> C urea for <i>in vivo</i> diagnosis of humans   | <sup>14</sup> C, one μCi per capsule                              |
| 40.13(a)               | Unimportant quantity of source material: see table above  | ≤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<br>(ii) Piezoelectric ceramic<br>(iii) Glassware not including glass brick, pane glass, ceramic tile, or other glass or ceramic used in construction                        | ≤20% by weight<br>≤2% by weight<br>≤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.                    |

**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.

\*\*Also includes equivalent Agreement State regulation where applicable.

\*\*\* 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.