OAK RIDGE NATIONAL LABORATORY

MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

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August 25, 2004

Mr. Bret Rogers
Director of Technical Services
Envirocare of Utah, Inc.
605 North 5600 West
Salt Lake City, UT 84101

Dear Mr. Rogers:

Proposed Revision 4, Radioactive Waste Profile 8014-02, "Oversized Debris," August 24, 2004

Please find enclosed a signed copy of the subject Profile including:

- Radioactive Waste Profile Record
- Attachment B.5 Physical Properties
- Attachment C.3 Radiological Evaluation, Continuation
- Low-Level Radioactive Waste Certification Attachment
- Special Nuclear Material Exemption Certification

The purpose of this revision is to include Tungsten 188 on Attachment C.3 continuation page and to amend the values for Tungsten 185 and Scandium 46 on attachment C.3 continuation page. In addition there is a typographical error on Revision 4 listing Scandium 46 as Se-46 instead of Sc-46.

Please contact me (865-574-5776) or Greg Larson (865-241-3273) if you have any questions regarding the revised profile.

Sincerely,

Kathy Carney, Director
Environmental Protection and Waste Services Division

KAC:sn

Enclosure

c/enc: D. L. Daugherty
G. R. Larson
J. E. Powell
L. C. Roddye, DOE-ORO
C. A. Schrof
S. D. Van Hoesen

c: K. J. Beierschmitt

ENVIROCARE of Utah, Inc.

RADIOACTIVE WASTE PROFILE RECORD

EC-0230, Revision 4

A. GENERATOR AND WASTE STREAM INFORMATION

GENERAL: Complete this form for one waste stream. Contact Envirocare at (801) 532-1330 if you have any questions while completing this form. Please indicate "N/A" if a category does not apply.

1. GENERATOR INFORMATION

Generator Name: U.S. DOE/UT-Battelle EPA ID #: TN1890090003

Generator Contact: John Powell Title: Manager-Laboratory Waste Services

Mailing Address: P.O. Box 2008 Oak Ridge, Tn. 37831-6021

Utah Site Access Permit #: 0209 001 601

Phone: 865-574-1514 Fax: 865-574-3515 Email: Powellje@ornl.gov

Contractor Name: UT-Battelle Location of Material (City, State): Oak Ridge, Tn

Name & Title of Person Completing Form: Greg Larson Rad WasteMgmt Team Lead Phone: 865-241-3273

2. WASTE STREAM INFORMATION

Waste Stream ID: 8014-02 Waste Stream Name: Oversized Debris

Revision: 4 Date: 08-24-2004 Volume (ft^3): 50,000 ft3 Delivery Date: Continuing

CHECK APPROPRIATE BOXES BELOW. Please verify the required forms requested below are completed and submitted with the Radioactive Waste Profile Record.

HAZARDOUS MATERIAL: Is the waste classified as hazardous waste as defined by 40 CFR 261?

Y ☐ N ☒ If No, complete and attach the "Low-Level Radioactive Waste Analysis Certification Attachment".
If Yes, complete and attach the "Hazardous Waste Analysis Certification Attachment" and check applicable box below.
Has the waste been treated to meet applicable treatment standards per 40 CFR 268? Y ☐ N ☐
Is the waste to be treated by Envirocare? Y ☐ N ☐

LOW-LEVEL RADIOACTIVE MATERIAL: Is the radioactivity contained in the waste material Low-Level Radioactive Waste as defined in the Low-Level Radioactive Waste Policy Amendments Act of 1985 or in DOE Order 435.1?

Y ☒ N ☐ If Yes, a current copy of a LLRW Compact Export letter authorizing export must be submitted if applicable. This authorization is applicable for non-DOE LLRW (i.e., Mixed Waste, NORM/NARM, 11e.(2) material, and waste from DOE do not require a Compact Export Letter).
If No, check appropriate box: NORM/NARM ☐ 11e.(2) Byproduct Material ☐ Other: _____

SPECIAL NUCLEAR MATERIAL: Does the waste stream contain material with uranium enriched in U-235 or any of the following radionuclides: U-233, Pu-236, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Pu-243, or Pu-244?

Y ☒ N ☐ If Yes, complete and attach the "SNM Exemption Certification" form (EC-0230-SNM). Supporting statements, analytical results, and documentation must be included with the submittal.

PCB MATERIAL: Does the waste contain Polychlorinated Biphenyls (PCB's) that are regulated for disposal per 40 CFR 761?

Y ☐ N ☒ If Yes, complete and attach the "PCB Waste Certification" form (EC-98279)

ASBESTOS: Does the waste contain Asbestos Containing Material?

Y ☒ N ☐ If Yes, Asbestos Containing Material must be managed in accordance with 40 CFR 61. Provide a detailed description of the waste containing asbestos in Section B.5 of the waste profile.

ENVIROCARE of Utah, Inc.

RADIOACTIVE WASTE PROFILE RECORD

EC-0230, Revision 4

B. WASTE PHYSICAL PROPERTIES & PACKAGE INFORMATION

1. GENERAL CHARACTERISTICS

Does the waste contain free liquids? Y ☐ N ☒ If Yes, what is the percent of free liquid by waste volume? NA %

Does the waste contain absorbent? Y ☒ N ☐ Density range of the waste: 5 - 200 S.G. ☐ lb/ft3 ☒

List percentage of waste type by volume: Soil ____ % Concrete & Metal ____ % DAW ____ % Resins ____ % Sludge ____ %

Other constituents and percentage by volume? 80%metal, 2% fiberglass, 10% wood, 2% glass, 2% plastic, 4% misc ORNL Debris

2. MATERIAL SIZE

Gradation of Material: Indicate the percentage of waste material that would pass through the following grid sizes. For example, 95% of the material would pass through a 12" square, 90% passes through a 4" square, 80% passes through a 1" square, etc.

12" 10-100 % 4" 10-80 % 1" 0-40 % 1/4" 0-15 % 1/40" 0-1 % 1/200" 0-1 %

Does the waste stream contain oversize debris (i.e., no dimension < 10 inches and any dimension > 12 feet)? Y ☒ N ☐
If Yes, include a detailed description (i.e., weight, size, drawings, etc.) of the oversize debris in the narrative of Section B.5.

3. MOISTURE CONTENT

For soil or soil-like materials, please use **Std. Proctor Method ASTM D-698** to determine the optimum moisture content. The waste material must not exceed 3 percentage points above optimum moisture upon arrival at Envirocare's disposal facility unless approved by Envirocare.

Optimum Moisture Content: NA % at Maximum Dry Density (lb/ft^3): NA

Average Moisture Content: NA % Moisture Content Range: NA% - NA%

4. WASTE SHIPPING & PACKAGING

Transportation Mode: ☒ Highway ☐ Rail

Shipping & Container Packages: (Check all that apply) ☒ Drums (≤ 85 gallons) ☒ Boxes (≤ 100 ft^3) ☐ Soft-Sided Bags (≤ 10 yd^3)

☒ Intermodal ☒ Sealand ☐ Gondola* ☐ Box Car

Other: _____

*Dimensions of gondola railcars must be between 48 to 56.5 feet in length and 8.5 to 12.5 feet in height as measured from the top of the rail to the top of the railcar unless approved by Envirocare.

5. NARRATIVE DESCRIPTION AND HISTORY OF WASTE

Please submit a narrative description and history of the waste as an attachment to the Radioactive Waste Profile Record. This attachment should include the following:

- Process that generated the waste
- Waste material physical composition and characteristics
- Radiological and chemical characterization method
- Basis for determining manifested radionuclide concentrations
- Description and amounts of absorbents, if applicable
- Basis of non-hazardous or hazardous waste determinations
- Treatment processes, if applicable
- Product information or Material Safety Data Sheets associated with the waste as applicable
- Information requested in other sections of this form

ATTACHMENT B.5
PHYSICAL PROPERTIES

Generator Name: U.S. DOE/UT-Battelle Generator # / Waste Stream #:8014-02
Revision #: 4 Revision Date: August 24, 2004

Process That Generated The Waste: This low level radioactive waste stream is generated by operation, maintenance, remediation or demolition activities connected with the Department of Energy's facilities associated with the Oak Ridge National Laboratory (ORNL). The waste items included in this waste profile record are categorized as radioactively contaminated oversized debris. This waste is generated from a variety of buildings and facilities at ORNL and ORNL-occupied facilities at the Y-12 Plant.

Waste Material Physical Composition and Characteristics: This waste stream is composed primarily of oversized metal debris but includes a wide variety of materials. Much of the waste would be considered as general building demolition/cleanout debris such as, but not limited to, desks, chairs, tables, metal storage cabinets, file cabinets, tools, equipment, refrigerators (certified freon free and oil removed), pumps, motors, wire, piping, valves, steel plates, tanks, and other general debris/materials removed from buildings undergoing renovation and/or remediation.

Some items may be a component of a larger piece of equipment. This assembly could include manifolds, cabinets, control units with small quantities of circuit boards, etc. Additionally, some of these assemblies could contain glass tubing attached in various configurations. It is probable that this glass will be broken in packaging and/or transport releasing small particles of glass in the shipping container. This profile may also include drained and purged gas cylinder carcasses. All of these cylinders have been de-valved and many have been drilled as well.

Other individual large items may include, but are not limited to, large diameter piping, piping in varying lengths and diameters, and miscellaneous equipment. Piping is open at both ends and has no residuals. Empty spaces within the piping may be used to add more material that was lighter and smaller such of bags of personal protective equipment (PPE). Some of this filler material would be considered normal debris in size and would be utilized where possible to fill void space in containers. Generators document the contents of each container/shipment of materials with a log/inventory sheet that describes the contained waste.

Radioactive surface-contaminated metals include carbon steel and stainless steel (which only contain chromium and nickel as a raw manufactured material), aluminum and copper. Additionally, painted surfaces may contain lead, chromium, cadmium, and/or barium, etc.

Some pieces of equipment or furniture (i.e. fire-proof safe) may contain asbestos material. Asbestos may also be in some miscellaneous materials such as transite siding, and floor and ceiling tile. Asbestos containing waste will be managed in accordance with 40 CFR 61.

Prohibited Materials: Materials that are prohibited from being placed in containers for this profile include, but are not limited to, Resource Conservation and Recovery Act (RCRA) hazardous wastes, PCB free liquids, transuranic (TRU) radioisotopes in concentrations greater than 10 nCi/g of the waste matrix, and sealed radioactive sources. Additionally, all fluids, including but not limited to refrigerants, oils, hydraulic fluids, etc will have been removed prior to the item being placed in the container. During packaging and loading of waste, all items will be visually inspected to verify prohibited items will not be placed in the container and that all fluids have been drained from equipment.

Radiological and Chemical Characterization Methods: The general approach for achieving radiological characterization starts with process knowledge (PK) information. In essence, if acceptable PK is available, the waste can be adequately characterized. If PK alone is insufficient for characterization, but radionuclide identities and relative concentrations can be determined from PK, sampling and analysis (S&A), and/or gamma spectroscopy, then gross radiation measurements (and scaling factors, if necessary) may be used to develop an adequate radiological characterization. When radionuclide identities and their relative concentrations are unknown, S&A or gamma spectroscopy (if gamma radiation is present) may be used to determine the radiological characterization.

Currently there are several methods that may be utilized at ORNL for calculating activity present in solid radioactive waste. These methodologies are addressed in UT-Battelle procedure ORNL-WC-507 , "Radiological Characterization of Solid Radioactive Waste", latest revision.

Isotopes that have been identified as being potentially present in waste items are listed in the C.1 Attachment.

For surface-contaminated objects, measured surface contamination levels and estimated surface area are usually recorded on a logsheet. Activity is calculated by applying the known radionuclide distribution (usually from sampling and analysis) to the activity per unit area, and multiplying by the surface area. Items are sorted, then packaged (note: special attention and positioning is given to minimize shifting in transit) in bulk containers. The total activity per container will be determined by summing the activities of all the individual items. The container's total activity is divided by the total mass of material to obtain activity per unit mass.

Due to the physical form of the waste stream, "oversized debris", sampling as described in Section A2 and section D, the "Low Level Radioactive Waste Certification Attachment". (Requiring Chemical Laboratory Analysis), can not be performed. ORNL generators use "Guidance for Characterization of Hazardous, Polychlorinated Biphenyl, and Low-level Mixed Waste" (ORNL-WC-406) guidance document for making hazardous/non hazardous waste determinations. For SLLW, the non hazardous waste designation is based on the generator's process knowledge (PK) of the waste stream (known constituents, known chemical or physical properties, known waste generation processes, known reactions, etc.), analyses of the waste stream, or a combination of both. All waste determinations whether via PK and/or analyses are documented.

Basis For Determining Manifested Radionuclide Concentrations: see radiological and characterization methods above.

Description and Amounts of Absorbents, if Applicable: Where appropriate, a sufficient amount of absorbents may be used to ensure no free liquids accumulate in the containers. The majority of absorbent used at ORNL is inert and consists primarily of radsorb or vermiculite.

Basis for non Hazardous Determination: For debris, non-hazardous waste determinations are largely process knowledge (PK)-based due to the heterogeneity of the waste stream and the difficulty of sampling oversized debris. Some of the metal contaminants found on table 1 of 40 CFR 261.24 (b) are inherent to the structure, design, and fabrication of some of the metal components in this waste stream. Although the majority of the metal debris consists of carbon steel, small quantities of stainless steel, inconel, and monel that contain cadmium and chromium as alloys, may be present. Others could contain low levels of nickel. These would not leach regulated levels of metals under the conditions of SW-846 Test Method 1311 (TCLP). Portions of the metals may have thin layers of paint and prior analyses has indicated that lead, chromium, cadmium, and/or barium may be present in the paint. Oversized debris items that are painted will be evaluated by mass balance for RCRA compliance. This calculation will be performed over the entire shipping container.

Since this waste stream does not contain RCRA-regulated materials and is not amenable to chemical sampling and analysis (primarily metal oversized debris), it is requested that Envirocare waive the RCRA chemical analysis requirements.

Treatment Processes: Not Applicable

Product Information or Material Safety Data Sheets associated with the waste as applicable:
Generally, this waste stream does not contain specific commercial products. Therefore, no MSDS's are included or necessary for this waste stream.

Information Requested in other sections of this form;

This profile is essentially the same as 8014-02 (originally mapped from profile #9024-03). This request is simply a revision to the original profile and mainly consists of broadening and adding Isotopes to the list. It will look differently as it has been converted to the new Envirocare forms.

Lift Criteria: This waste material, by item, exceeds the regular sized debris criteria (less than 10 inches in at least one dimension and no longer than 12 feet in any dimension when separated from the disposal package and placed into the disposal cell). When feasible, items loaded into a container will be weighed prior to placement inside. Otherwise, the weight of the entire container, with contents, will be obtained and subtracted from the tare weight of the container to obtain a total net weight of the material.

Packaging and Transportation: This waste material will be packaged in various types of re-usable bulk type shipping containers that include sea-lands, intermodals, roll-offs, B-25 boxes, and other DOT approved cargo containers and/or overpacks. Reasonable care will be taken while loading containers in order to minimize the potential for unloading difficulty or container damage. All containers will be loaded with the heaviest debris items on the bottom and positioned with subsequent items so that shifting cannot occur in transit.
.It is possible that some articles could act as their own container. These articles will act as their own container and will be placed on the back of a flatbed, double or single drop trailer or truck for transport to Envirocare. Articles with low level radioactive surface contamination may be shrink wrapped (or some other method of over packing to control external contamination) for shipping to control any possible release of external contaminants.

ENVIROCARE of Utah, Inc.

RADIOACTIVE WASTE PROFILE RECORD

EC-0230, Revision 4

C. RADIOLOGICAL INFORMATION

Obtain sufficient samples to adequately determine a range and weighted average of activity in the waste. Attach the gamma spectroscopy or radiochemistry data supporting the radionuclide information listed below.

1. Does the waste material contain accessible surfaces with contact dose rates greater than 500 mR/hr? Y ☐ N ☒

2. Does the waste material contain any of the following isotopes: Aluminum-26, Berkelium-247, Calcium-41, Californium-249, Californium-250, Chlorine-36, Rhenium-187, Terbium-157, or Terbium-158? Y ☒ N ☐

3. Please list the following information for each isotope associated with the waste. The manifested concentration on the Uniform LLRW Manifest Form 541 must not exceed the upper concentration range listed below for each isotope. Provide an explanation in the narrative description of Section B.5 if the waste contains localized "hot spots" or elevated concentrations that significantly exceed the upper concentration range. Envirocare's license assumes that short-lived decay products of specified isotopes are present in concentrations equal to the parent. Consequently, these short-lived isotopes do not need to be listed below. If additional space is needed, provide an Attachment C.3 to this profile record formatted as below.

Isotopes	Manifested Concentration Range (pCi/g)			Weighted Avg. per Container (pCi/g)	Isotopes	Manifested Concentration Range (pCi/g)			Weighted Avg. per Container (pCi/g)
U-234	0.0	to	300,000	500	I-125	0.0	to	30,000	100
U-235	0.0	to	1,190	100	I-129	0.0	to	100	2
U-236	0.0	to	50,000	100	Fe-99	0.0	to	100	2
U-238	0.0	to	60,000	1,500	Mn-54	0.0	to	40,000	4,000
Tc-99	0.0	to	10,000	470	Ag-110m	0.0	to	250,000	26,000
Pu-239/240	0.0	to	4,000	40	Pu-236	0.0	to	50	1
Pu-238	0.0	to	6,000	55	Ag-108m	0.0	to	50	2
Np-237	0.0	to	1000	5	Ba-133	0.0	to	3,500	350
Am-241	0.0	to	4,500	10	C-14	0.0	to	1,000,000	500
Th-230	0.0	to	1,000	100	Ce-141	0.0	to	100	1
Th-232	0.0	to	200	20	Kr-85	0.0	to	300	10
U-233	0.0	to	66,000	6,600	Pb-210	0.0	to	25,000	250
Cs-134	0.0	to	35,000	1,000	Po-210	0.0	to	200	5
Cs-137	0.0	to	60,000	2,000	Ra-228	0.0	to	100	5
Sr-89/90	0.0	to	25,000	3,000	Ra-226	0.0	to	100	10
Cm-244	0.0	to	9,000	4,500	Sr-85	0.0	to	10,000	500
Co-57	0.0	to	40,000	200	H-3	0.0	to	10,000	100
Co-58	0.0	to	6,000	10	Y-88	0.0	to	16,000	1,700
Co-60	0.0	to	30,000	10,000	Zr-95	0.0	to	10,000	15
Eu-152	0.0	to	20,000	5,000	DU	0.0	to	30,000	1,000
Eu-154	0.0	to	27,000	6,100	Pu-241	0.0	to	210,000	210
Eu-155	0.0	to	21,000	2,100	Ce-139	0.0	to	50	5
K-40	0.0	to	1,000	50	Cm-242	0.0	to	500	5
Ru-106	0.0	to	170,000	17,000	Cm-243	0.0	to	5,000	50
Sb-125	0.0	to	500	100	Cm-245	0.0	to	450	5
Na-22	0.0	to	40,000	4,000	Cr-51	0.0	to	60,000	6,000
Cd-109	0.0	to	2,000	100	Fe-55	0.0	to	20,000	150
Ce-144	0.0	to	20,000	200	Hg-203	0.0	to	100	1

ATTACHMENT C.3
RADIOLOGICAL EVALUATION, CONTINUATION

Generator Name: U.S. DOE/UT-Battelle Generator # / Waste Stream # 8014-02 :
Revision #: 4 Page 2 Revision Date: 08/24/04

Isotopes	Manifested Concentration Range (pCi/g)			Weighted Avg per Container (pCi/g)	Isotopes	Manifested Concentration Range (pCi/g)			Weighted Avg per Container (pCi/g)
Ni-63	0.0	to	4,200	42			to		
Pu-242	0.0	to	50	5			to		
Pu-244	0.0	to	275	3			to		
Zn-65	0.0	to	63,000	6,300			to		
Ac-225	0.0	to	450	3			to		
Am-243	0.0	to	2,000	100			to		
Cf-249	0.0	to	100	10			to		
Cf-250	0.0	to	100	10			to		
Cf-252	0.0	to	450	30			to		
Cm-248	0.0	to	100	10			to		
Co-56	0.0	to	100	10			to		
Hf-175	0.0	to	450	47			to		
Ir-192	0.0	to	70,000	500			to		
Os-191	0.0	to	500	300			to		
S-35	0.0	to	3,000	300			to		
Se-75	0.0	to	5E−07	1,500,000			to		
Sc-46	0.0	to	100	10			to		
Sm-145	0.0	to	450	300			to		
Sn-113	0.0	to	1000	10			to		
Ta-182	0.0	to	14,000	1,400			to		
Th-229	0.0	to	450	1			to		
U-232	0.0	to	21,000	2,100			to		
W-188	0.0	to	2e7	500000			to		
Zr-88	0.0	to	100	10			to		
I-131	0.0	to	200	50			to		
Ni-59	0.0	to	1000	103			to		
Be-7	0.0	to	12,000	1,200			to		
Cl-36	0.0	to	1,500	40			to		
U Natural	0.0	to	360,000	2,000			to		
W-185	0	to	2e7	500000			to		
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RADIOACTIVE WASTE PROFILE RECORD

EC-0230, Revision 4

HAZARDOUS WASTE ANALYSIS CERTIFICATION ATTACHMENT

This form is required only if the checkbox for Hazardous Material on page one has been checked YES. Envirocare may waive the chemical laboratory analyses if the material is not amenable to chemical sampling and analysis (e.g., debris items including metal pieces, concrete, plastic, etc.). Justification for waiving the chemical analyses must be provided in Section B.5.

D. MINIMUM REQUIRED CHEMICAL ANALYSIS

The following parameters must be analyzed by a Utah or NELAC certified laboratory. Typical SW-846 analytical methods have been listed. Other approved methods are acceptable. Attach the most recent or applicable chemical analytical results representing the waste.

1. GENERAL CHEMICAL PARAMETERS

	SW-846 Analytical Methods
Soil pH: NA	**Method 9045** Please provide the range of the pH analyses performed.
PFLT: NA Pass / Fail	**Method 9095** Not applicable for liquid radioactive waste streams.
Reactive Sulfide: NA mg/kg	**Method 9034**
Reactive Cyanide: NA mg/kg	**Method 9014** If the Reactive Cyanide is > 50 mg/kg , total and amenable cyanide are required.
	Method 9010 Total cyanide: _____ mg/kg Amenable cyanide: _____ mg/kg
TOX: NA mg/kg	**Method 9020** TOX or Method 8260 & 8270 analyses (totals). If TOX >200 mg/kg, Method 8260 & 8270 analyses (totals) are required.

Has the waste been analyzed for volatile or semi-volatile constituents (Method 8260 or 8270)? Y ☐ N ☐

Any distinguishing color or odor? Y ☐ N ☐ If Yes, color: _____; odor: _____

2. HAZARDOUS WASTE CODES AND TREATMENT STANDARDS (40 CFR 268)

List all hazardous waste codes and treatment standards. Include hazardous waste codes that have been removed through treatment and indicate "Former" in the second column. Worst-case concentrations only need to be provided for concentration based treatment standards. If additional space is needed, provide an Attachment D.2 to this profile record formatted as below. Include a description of hazardous waste determinations and any variances, exclusions, etc. in the narrative requested in Section B.5.

EPA HW Codes	Description, Constituent of Concern, or Subcategory	Treatment Standard (mg/kg unless noted as mg/L TCLP or Technology Code)	Worst-Case Concentration (mg/kg unless noted as mg/L TCLP)

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RADIOACTIVE WASTE PROFILE RECORD

EC-0230, Revision 4

D. 2. HAZARDOUS WASTE CODES AND TREATMENT STANDARDS (Continued)

EPA HW Codes	Description, Constituent of Concern, or Subcategory	Treatment Standard (mg/kg unless noted as mg/L TCLP or Technology Code)	Worst-Case Concentration (mg/kg unless noted as mg/L TCLP)

3. UNDERYLYING HAZARDOUS CONSTITUENTS (40 CFR 268.48)

List all underlying hazardous constituents (UHCs) and treatment standards. Include UHCs that have been removed through treatment. Worst-case concentrations only need to be provided for concentration based treatment standards. If additional space is needed, provide an Attachment D.3 to this profile record formatted as below.

Underlying Hazardous Constituents	Treatment Standard (mg/kg unless noted as mg/L TCLP or Technology Code)	Worst-Case Concentration (mg/kg unless noted as mg/L TCLP)

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Special Nuclear Material Exemption Certification

EC-0230-SNM, Revision 4

The Special Nuclear Material Exemption Certification form must be completed and signed by each generator certifying to the following conditions. Please attach this form and all required information to the Radioactive Waste Profile Record (EC-0230). **A completed and signed copy of this form must also accompany each waste manifest.**

Waste Stream ID: 8014-02 Manifest No._____

1. Check applicable category below for the waste stream:

√	Uranium Enrichment Percent	Weight Percent of Chemicals in Condition 2c	Weight Percent of Materials in Condition 2d	U-235 Concentration (pCi/g)	Measurement Uncertainty* (pCi/g)
☐	< 10 %	≤ 20 %	≤ 1 %	≤ 1,900	≤ 285
☒	Unlimited	≤ 20 %	≤ 1 %	≤ 1,190	≤ 179
☐	Unlimited	Sum of both ≤ 45 % of waste by weight		≤ 680	≤ 102
☐	Unlimited	Unlimited	Unlimited	≤ 26	≤ 10
☐	Not Applicable - Enriched U-235 is not present in the waste.				

* A concentration value is used for the maximum measurement uncertainty limit rather than a percentage value to allow greater flexibility for generators with waste having very low SNM concentrations.

2. Certify to the following requirements by checking each box:

☒ a. Concentrations of SNM in individual waste containers do not exceed the applicable values listed in the above table and SNM isotope concentrations listed in Table 1.

☒ b. The SNM is homogeneously distributed throughout the waste <u>or</u> the SNM concentrations in any contiguous mass of 600 kilograms (1,323 lbs) do not exceed on average the specified limits. (Based on process knowledge or testing).

☒ c. Except as allowed by Condition 1, the waste does not contain "pure forms" of chemicals containing carbon, fluorine, magnesium, or bismuth in bulk quantities (e.g., a pallet of drums, a B-25 box). By "pure forms," it is meant that mixtures of the above elements such as magnesium oxide, magnesium carbonate, magnesium fluoride, bismuth oxide, etc. do not contain other elements. (Based on process knowledge or testing).

☒ d. Except as allowed by Condition 1, the waste does not contain total quantities of beryllium, hydrogenous material enriched in deuterium, or graphite above one percent of the total weight of the waste. (Based on process knowledge, physical observations, or testing).

☒ e. Waste packages do not contain highly soluble forms of uranium greater than 350 grams of uranium-235 or 200 grams of uranium-233. If the waste contains mixtures of U-233 and U-235, the waste meets the sum of the fractions rule. Highly soluble forms of uranium include, but are not limited to: uranium sulfate, uranyl acetate, uranyl chloride, uranyl formate, uranyl fluoride, uranyl nitrate, uranyl potassium carbonate, and uranyl sulfate. (Based on process knowledge or testing).

☒ f. For containers of <u>liquid waste</u> with more than 600 kilograms of waste, the total activity (pCi) of SNM in the manifested container does not exceed the SNM concentration in the above table or Table 1 times 600 kilograms of waste (based on process knowledge or testing). For example, the maximum activity of Pu-239 in any manifested container of liquid waste is 6.0 mCi (6.0E+09 pCi) as shown below:

$$10{,}000\,\frac{pCi}{g} \times 600{,}000\,g = 6.0\text{X}10^{9}\ pCi = 6.0\ mCi\ Pu\text{-}239$$

ENVIROCARE
of Utah, Inc.

Table 1. Maximum concentrations of SNM in individual waste containers (refer to above table for U-235 limits).

Radionuclide	Maximum Concentration (pCi/g)	Measurement Uncertainty (pCi/g)	Radionuclide	Maximum Concentration (pCi/g)	Measurement Uncertainty (pCi/g)
U-233	75,000	11,250	Pu-241	350,000	50,000
Pu-236	500	75	Pu-242	10,000	1,500
Pu-238	10,000	1,500	Pu-243	500	75
Pu-239	10,000	1,500	Pu-244	500	75
Pu-240	10,000	1,500			

3. **Indicate that the following information is attached to the Radioactive Waste Profile Record by checking each box. (Note: Only the two-page Special Nuclear Material Exemption Certification form needs to be included with each manifest).**

☒ a. Provide a description of how the waste was generated, list the physical forms in the waste, and identify the uranium chemical composition.

☒ b. Provide a general description of how the waste was characterized (including the volumetric extent of the waste, and the number, location, type, and results of any analytical testing), the range of SNM concentrations, and the analytical results with error values used to develop the concentration ranges.

☒ c. Describe the process by which the waste was generated showing that the spatial distribution of SNM must be uniform, or other information supporting spatial distribution.

☒ d. Describe the methods to be used to determine the concentrations on the manifests. These methods could include direct measurement and the use of scaling factors. Describe the uncertainty associated with sampling and testing used to obtain the manifest concentrations.

4. **Generator's certification of compliance with the SNM exemption:** I certify that the information provided on this form is complete, true, and correct and is based on process knowledge, physical observations, or approved laboratory testing. I also certify that sampling and radiological testing of waste containing SNM was performed in accordance with Envirocare's Radioactive Material License and that any supporting documentation and analytical results have been submitted to Envirocare of Utah, Inc.

[signature]	G.R. Larson	UT-Battelle Radiwaste Management Team Lead	8/18/04
Authorized Signature	Printed Name	Title	Date