U.S. NUCLEAR REGULATORY COMMISSION
DOCKET 40-8989
ENVIROCARE OF UTAH, INC.
SAFETY EVALUATION REPORT
REGARDING THE REVISION TO EXEMPTION FROM
REQUIREMENTS OF 10 CFR PART 70
June 2005

1. INTRODUCTION

Envirocare of Utah, Inc (Envirocare) operates a low-level waste disposal facility in Clive, Utah. This facility is licensed by the State of Utah, an Agreement State, under a 10 CFR Part 61 equivalent license (Utah License 2300249). Section 274 of the Atomic Energy Act of 1954, as amended, permits Agreement States to license special nuclear material (SNM) in quantities not sufficient to form a critical mass. The quantities are set forth in U.S. Nuclear Regulatory Commission (NRC) regulations (at 10 CFR 150.11). For SNM quantities greater than the 10 CFR 150.11 limits, a 10 CFR Part 70 license issued by the NRC is required.

The NRC issued an Order to Envirocare on May 7, 1999, that allowed Envirocare, under specified conditions, to possess waste containing SNM in greater mass quantities than specified in 10 CFR Part 150 without obtaining an NRC license pursuant to 10 CFR Part 70. Nine conditions were incorporated into Section III of the Order to ensure safety and a low risk of inadvertent criticality of SNM. The Order was published in the *Federal Register* on May 21, 1999 (64 FR 27826). The Order became effective when the conditions of the Order were incorporated into Envirocare's State of Utah Radioactive Material License. On July 3 and 29, 2002, Envirocare requested that some of the conditions in the Order be modified. On January 30, 2003, the NRC issued an Order modifying the exemption, and it was published in the *Federal Register* on February 13, 2003 (68 FR 7399). The NRC staff prepared Safety Evaluation Reports (SERs) and Environmental Assessments for the original May 1999 Order and the January 2003 Order modification.

In a letter dated July 8, 2003, Envirocare proposed that the NRC further amend the Order modified in January 2003. The NRC staff has evaluated this request in two phases. In the first phase, the NRC staff evaluated the following requests from Envirocare to: (1) modify the table in Condition 1 to include limits for uranium and plutonium in waste without magnesium oxide; (2) modify the units of the table from picocuries of SNM per gram of waste material to gram of SNM per gram of waste material; and (3) revise the language of Condition 5 to be consistent with the revised units in the table in Condition 1. The NRC staff approved these requests, and an Order modifying the exemption was issued on December 16, 2003, and published in the *Federal Register* on December 29, 2003 (68 FR 74986). The NRC staff prepared a related SER (dated September 23, 2003) for the first phase encompassed in the December 2003 Order.

In the second phase, which is the subject of this SER, the NRC has evaluated the remaining revisions that were requested by Envirocare in its June 8, 2003, letter. These revisions involve: (1) modifying the table in Condition 1 to include criticality-based limits for uranium-233 and plutonium isotopes in waste containing up to 20 percent of materials listed in Condition 2 (*e.g.*, magnesium oxide); (2) adding criticality-based limits in the table in Condition 1 for

plutonium isotopes in waste with unlimited materials in Condition 2, and in waste with unlimited quantities of materials in Conditions 2 and 3 (*e.g.*, beryllium); (3) providing criticality-based limits for uranium-235 as a function of enrichment in waste containing up to 20 percent of materials listed in Condition 2 and in waste containing none of the materials listed in Condition 2; and (4) including additional mixed waste treatment technologies. Detailed descriptions of these requests are provided in the "Evaluations" section below.

2. PROPOSED ACTION

The proposed action is consideration of Envirocare's amendment request concerning Conditions 1, 2, and 3 to the January 2003 Order, to include the modifications in the second phase of its July 8, 2003 request, as discussed above.

3. EVALUATIONS

In evaluating the safety of the proposed action, the NRC staff considered the SERs dated May 7, 1999, January 14, 2003, and September 23, 2003. Furthermore, the NRC staff has previously evaluated limits for material without magnesium oxide. This evaluation was documented in a November 21, 2001 SER prepared for a similar exemption for Waste Control Specialists, LLC (WCS).

Conceptually, the conditions of the Order are:

SNM isotope concentration limits (Condition 1)
bulk chemical limits (Condition 2)
unusual moderator limits (Condition 3)
soluble uranium limits (Condition 4)
mixed waste processing limits (Condition 5)
waste characterization and certification requirements (Condition 6)
waste receipt sampling condition (Condition 7)
NRC notification and approval (Conditions 8 and 9)

Conditions 1 through 4 specify four sets of technical criticality safety limits. Condition 6, waste characterization and certification requirements, assures that these limits will not be exceeded. The waste sampling plan of Condition 7 provides for detection of erroneous shipment of waste not complying with the concentration limits. Condition 5 addresses the methods Envirocare may use in processing and stabilizing any mixed waste that contains SNM.

3.1 Modification of concentration limits in the table in Condition 1

Envirocare has requested that the table in Condition 1 be revised to contain limits that are based on criticality risks for uranium-233 and plutonium isotopes. The concentration limits for uranium-233 and plutonium isotopes in the original Order and the first revision of the Order to Envirocare were based on limits established by the State of Utah. In applying these limits to liquids, Envirocare found that the uranium-233 and plutonium isotopes were restrictive. Envirocare proposed establishing limits for uranium-233 and plutonium isotopes that were based on criticality risk, with the understanding that these limits do not supersede limits from the State of Utah when averaged over the volume of the container.

Envirocare also requested concentration limits that did not consider adding magnesium oxide (MgO), as well as limits that did consider treatment with MgO. The concentration limits that did not consider MgO have been evaluated previously by the NRC staff in a SER for WCS in November 2001, and were added to the Order for Envirocare issued on December 29, 2003. However, the evaluation for WCS did not consider the presence of MgO or other materials listed in Condition 2, which can act as moderators. Therefore, the concentration limits for uranium-233 and plutonium isotopes that consider MgO and other Condition 2 materials were not changed in the December 2003 Order.

Using the method described in the 1999 SER, the NRC staff has developed concentration limits for uranium-233, plutonium-239, and plutonium-241 that consider and allow up to 20 percent of materials listed in Condition 2 (*e.g.*, MgO) in the waste matrix. The NRC staff has modified the table in Condition 1 to include these limits.

The NRC staff considered changing the title for Column 3 in Table A of Condition 1 to "maximum 20% Condition 2 materials and 1% of Condition 3 materials." The 20% MgO does bound Condition 2 materials, but the 1% beryllium does not bound Condition 3 materials. The NRC staff has since determined that deuterium (heavy water [D_2O]) is the bounding material in Condition 3. Therefore, the column title for this set of limits states "Maximum 20 weight percent of materials listed in Condition 2 and no more than 1 weight percent of beryllium."

Also, the December 2003 revision to the Envirocare SER did not include the proper limit on Condition 3 materials in waste containing no MgO. The limits in the WCS SER state that no more than 0.1% of Condition 3 materials may be present. The December 2003 Envirocare SER limited Condition 3 materials to 1%. This limit in Condition 3 has been changed to 0.1%.

As the State of Utah is an Agreement State with regulatory authority for the Envirocare facility, the NRC staff is relying on the State of Utah safety evaluations relative to the proposed action for all aspects of safety other than criticality safety.

3.2 Revision of plutonium limits in the table in Condition 1

Envirocare has requested that the table in Condition 1 be revised to include limits for plutonium-239 and plutonium-241 in waste containing unlimited quantities of materials listed in Condition 2, and in waste containing an unlimited quantity of materials listed in both Conditions 2 and 3. Using the method described in the 1999 SER, the NRC staff has developed the requested concentration limits for these plutonium isotopes. The NRC staff has modified the table in Condition 1 to include these limits.

The limits for uranium isotopes in the September 2003 Envirocare SER for unlimited MgO and beryllium (Be) can not be directly used for "unlimited Condition 2 materials" or for "unlimited Condition 2 and 3 materials." The "unlimited MgO and Be" limits were calculated using pure BeO, which was found to be bounding for mixtures of MgO and Be. However, they are overly restrictive for only Condition 2 materials, and not restrictive enough for Condition 3 materials. In order to present limits for any quantity of Condition 2 materials, new limits were calculated using pure MgO as the matrix. These limits carry the same requirement for less than 0.1% of Condition 3 materials. The new limits for any quantity of Condition 3 materials were calculated using pure D_2O, which was found to be the bounding matrix for Condition 3 materials.

Using the method described in the 1999 SER, staff has developed the requested concentration limits for these plutonium isotopes and revised the limits for uranium-235. Limits also were added for uranium-233. The staff has modified the table in Condition 1 to include these limits.

As documented in the SER for WCS, the NRC staff found that because the minimum critical masses for the other plutonium isotopes, except plutonium-241, are significantly higher than for plutonium-239, the concentration limits for the other plutonium isotopes will not contribute significantly to criticality. Therefore, in applying the SNM concentration limits to waste containing plutonium, Envirocare needs only to evaluate plutonium-239 and plutonium-241.

3.3 Addition of uranium-235 limits as a function of enrichment to the table in Condition 1

The current Order for Envirocare provides concentration limits for uranium enriched below 10 weight percent and for uranium enriched at or above 10 weight percent in uranium-235. In the letter from Envirocare dated July 8, 2003, an increase in the number of uranium-235 enrichment divisions was requested. Envirocare specifically asked for limits at 5 percent, 20 percent, and 50 percent, at a minimum. They also expressed interest in concentration limits that were expressed as a function of uranium-235 enrichment.

Building on the method described in the 1999 SER, the NRC staff has calculated uranium concentration limits for enrichment levels ranging from 100% to 1.05% in several increments. The method described in the 1999 SER used infinite homogeneous calculations to develop limits. This is appropriate for enrichment values down to around 10 percent. Below 10 percent enrichment, the minimum critical masses for heterogeneous systems are known to be significantly smaller than for homogeneous systems. Therefore, for enrichments below 10 percent, a heterogeneity correction was employed. The newly calculated concentration limits for 50% and 20% enrichments are shown in Table 1.

Table 1. Newly Calculated Operational Limits

Uranium-235 enrichment	Operational Limit Without Materials listed in Condition 2 (g U-235/g waste)	Operational Limit With Maximum 20 weight percent of materials listed in Condition 2 (g U-235/g waste)
50%	6.87E-04	6.06E-04
20%	8.26E-04	7.35E-04

For the homogeneous calculations, mixtures of silicon dioxide, uranium, and water were used to calculate system infinite multiplication factors (k-inf's). The subcritical uranium limit was placed at the maximum uranium concentration for which the system k-inf stayed below 0.95 for any water volume fraction up to a maximum of 0.40. These subcritical limits were then multiplied by an operational uncertainty factor of 0.7 to produce operational limits. Other materials such as magnesium oxide or beryllium were placed into the mixture as appropriate for the particular calculation.

The heterogeneous calculations used uranium metal spheres of various radii surrounded by a concentric spherical mixture of silicon dioxide and water. The water volume fraction was equal to the fraction that produced the subcritical limit for the given enrichment in the homogeneous case. The outer boundary of this spherical unit cell was reflected so as to represent an infinite

lattice of such spheres. The SCALE control module CSAS1X was used to search for the radius of the silicon dioxide/water mixture that resulted in a calculated k-inf of 0.95. This was done for a range of uranium metal sphere radii. Using the resulting radius of the outside mixture and the radius of the metal sphere, the average uranium concentration over the unit cell was calculated. At a particular sphere size, the unit cell uranium concentration would reach a minimum. This minimum unit cell uranium concentration became the subcritical limit for heterogeneous systems at that particular value of uranium enrichment. These subcritical limits were then multiplied by an operational uncertainty factor of 0.7 to produce operational limits. The calculated operational limits for both homogeneous and heterogeneous systems are given in Tables 2 and 3.

Table 2. Heterogeneity Correction for Waste Without Materials in Condition 2

Enrichment (%) [a]	Homogeneous operational limit (g U235/g waste)	Heterogeneous operational limit (g U235/g waste)	Heterogeneity correction factor
1.05	1.05E-02	5.05E-03	0.48
1.1	8.12E-03	4.54E-03	0.56
1.2	5.88E-03	3.57E-03	0.61
1.35	4.76E-03	2.80E-03	0.59
1.5	3.48E-03	2.30E-03	0.66
2.0	2.34E-03	1.73E-03	0.74
3.0	1.65E-03	1.33E-03	0.81
5.0	1.27E-03	1.08E-03	0.85
10.0	9.87E-04	9.87E-04	1.00

a - Percentage value refers to weight percent enrichment in U-235. For enrichments that fall between identified values in the table, the higher value is the applicable value (*e.g.*, for an enrichment of 14 weight percent U-235, the applicable concentration limit is that for 20 weight percent U-235).

Table 3. Heterogeneity Correction for Waste With Maximum 20 Weight Percent of Materials in Condition 2

Enrichment (%) [a]	Homogeneous operational limit (g U235/g waste)	Heterogeneous operational limit (g U235/g waste)	Heterogeneity correction factor
1.05	9.59E-03	4.89E-03	0.51
1.1	7.63E-03	4.23E-03	0.55
1.2	5.52E-03	3.28E-03	0.59
1.35	4.44E-03	2.56E-03	0.58
1.5	3.22E-03	2.17E-03	0.67
2.0	2.14E-03	1.56E-03	0.73
3.0	1.51E-03	1.19E-03	0.79
5.0	1.14E-03	9.66E-04	0.85
10.0	8.82E-04	8.82E-04	1.00

a - Percentage value refers to weight percent enrichment in U-235. For enrichments that fall between identified values in the table, the higher value is the applicable value (*e.g.*, for an enrichment of 14 weight percent U-235, the applicable concentration limit is that for 20 weight percent U-235).

3.4 Additional Mixed Waste Processes Technologies

Condition 5 of the current Envirocare Order includes four waste processing technologies (stabilization, micro-encapsulation and macro-encapsulation with low density and high density polyethylene, and thermal desorption). Additional requirements are included for the thermal desorption process to maintain safety. Envirocare has requested that the following technologies be added to Condition 5: spray-washing; compaction; organic destruction using the Solvent Electron Technology (SET) and CerOx process; and macro-encapsulation with a cementitious mix.

The NRC staff has reviewed each of the technologies that Envirocare is proposing and has found them acceptable, provided that certain conditions are met. The following is a summary of the staff's review and conclusions regarding the proposed waste processing technologies.

Spray-washing consists of spraying surface-contaminated debris with pressurized water to remove hazardous contaminants. The water is collected, treated if necessary, and solidified prior to disposal. Debris waste may not need to undergo confirmatory testing by Envirocare as discussed in Condition 7, provided the SNM concentration of the waste does not exceed one-tenth of the concentration values in Condition 1. It is anticipated that much of the SNM material associated with debris waste would be surficial deposited and would be removed during the spray washing. To maintain safety, Envirocare shall confirm that the water collected meets the requirements for liquid waste in Condition 1. Evaporation of the rinse water could increase the concentration of SNM; therefore, the evaporated product must comply with the requirements in Condition 1. Solidification of the waste would decrease the SNM concentration; thus making the waste less of a criticality concern.

Compaction of the waste would be accomplished by mechanically compressing the waste. It is anticipated that the waste density would increase from about 10 lbs/ft^3 to 20 lbs/ft^3. Because the concentration limits are based on a gram of SNM per gram of waste basis and the weight of the waste will not change, compaction is not anticipated to change the concentration of SNM in the waste. In developing the original Order, the NRC staff considered a range of waste densities. Compaction is not anticipated to produce conditions that were not considered in the original Order.

The CerOx process electrochemically destroys organic contaminants that remain in pre-treated (*i.e.*, thermal desorption) waste streams generated by Envirocare. The pre-treated waste stream is sampled to determine the concentrations of radionuclides (as required by Condition 5) before the waste would be treated in the CerOx process. In a letter dated January 6, 2004, Envirocare provided additional information on the CerOx process. Envirocare committed to developing and implementing procedures to track SNM concentration in the CerOx process and suggested sampling of process tanks when the SNM concentrations reached 85 percent of the concentrations allowed in Condition 1. The NRC staff considers this approach to be acceptable provided the uranium-235 concentration limit is based on 10 percent enrichment. Similarly, SET uses sodium to strip chlorine from hydrocarbons. Given the oxidation state changes in the SET process, Envirocare shall confirm that the SNM concentrations meet the requirements in Condition 1 following treatment to maintain safety.

Envirocare already stabilizes debris waste in its low-level waste cell using cement grout. These activities are not subject to the NRC Order. Envirocare uses cement grout in its stabilization process authorized under the Order. However, using cement grout in encapsulation processes

is not specifically authorized by the current Order. Using a cementitious mix for encapsulation will not result in a condition that has not been previously analyzed. Therefore, encapsulating waste with a cementitious mix is considered acceptable.

3.5 Additional Modifications based on Discussions with State of Utah

In addition to the staff's review, the State of Utah held discussions with Envirocare regarding conditions in the Order. Based on these discussions, the State of Utah and Envirocare agreed to add requirements that address: (1) the approach to account for and the method for addressing the analytical uncertainty in determining the enrichment percentage for U-235; and (2) sampling and analysis of the liquid effluent system associated with spray washing. The NRC staff reviewed the agreed-upon requirements and found them acceptable. Conditions 1, 5, and 7 of the Order were revised to include these requirements.

4. SUMMARY AND CONCLUSION OF SAFETY EVALUATION

Based on its review, the NRC staff has determined that Envirocare's requests are acceptable with modifications, as discussed above. The NRC staff has revised the conditions of the December 16, 2003 Order to incorporate the modifications requested by Envirocare. These conditions would be included in an Order to Envirocare and would be incorporated by the State of Utah into its Radioactive Material License.

5. REVISED EXEMPTION CONDITIONS

The Order is contingent on Envirocare complying with the following conditions:

1. For waste with no more than 20 weight percent of materials listed in Condition 2, concentrations of SNM in individual waste containers must not exceed the following values at time of receipt:

Table A.

SNM Nuclide	Maximum SNM concentration in waste containing the described materials (g SNM/g waste)	
	No materials listed in Condition 2	Maximum of 20 weight percent of materials listed in Condition 2 and no more than 1 weight percent of beryllium
U-235 (>50%) [a]	6.2E-4	5.4E-4
U-235 (=50%)	6.9E-4	6.1E-4
U-235 (=20%)	8.3E-4	7.4E-4
U-235 (=10%)	9.9E-4	8.8E-4
U-235 (=5%)	1.0E-3	9.6E-4
U-235 (=3%)	1.3E-3	1.1E-3
U-235 (=2%)	1.7E-3	1.5E-3

U-235 (=1.5%)	2.3E-3	2.1E-3
U-235 (=1.35%)	2.8E-3	2.5E-3
U-235 (=1.2%)	3.5E-3	3.2E-3
U-235 (=1.1%)	4.5E-3	4.2E-3
U-235 (=1.05%)	5.0E-3	4.8E-3
U-233	4.7E-4	4.3E-4
Pu-239	2.8E-4	2.6E-4
Pu-241	2.2E-4	1.9E-4

a - Percentage value refers to weight percent enrichment in U-235. For enrichments that fall between identified values in the table, the higher value is the applicable value (*e.g.*, for an enrichment of 14 weight percent U-235, the applicable concentration limit is that for 20 weight percent U-235).

For waste with more than 20 weight percent of materials listed in Condition 2, concentrations of SNM in individual waste containers must not exceed the following values at time of receipt:

Table B.

Radionuclide	Maximum SNM concentration in waste containing the described materials (g SNM/g waste)	
	Unlimited quantities of materials listed in Condition 2	Unlimited quantities of materials listed in Conditions 2 and 3
U-235 (>50%)	3.4E-4	1.2E-5
U-235	N/A	3.1E-4 [a]
U-233	2.9E-4	1.1E-5
Pu-239	1.7E-4	7.5E-6
Pu-241	1.3E-4	5.3E-6

a - for uranium at any enrichment with the sum of materials listed in Conditions 2 and beryllium not exceeding 45 percent of the weight of the waste

Plutonium isotopes other than Pu-239 and Pu-241 do not need to be considered in demonstrating compliance with this condition. When mixtures of these SNM isotopes are present in the waste, the sum-of-the-fractions rule, as illustrated below, should be used.

$$\frac{\text{U-233 conc}}{\text{U-233 limit}} + \frac{\text{100wt\%U-235 conc}}{\text{100wt\%U-235 limit}} + \frac{\text{10wt\%U-235 conc}}{\text{10wt\%U-235 limit}} + \frac{\text{Pu-239 conc}}{\text{Pu-239 limit}} + \frac{\text{Pu-241 conc}}{\text{Pu-241 limit}} \leq 1$$

The concentration values in Condition 1 are operational values to ensure criticality safety. Where the values in Condition 1 exceed concentration values in the

corresponding conditions of the State of Utah Radioactive Material License (RML), the concentration values in the RML, which are averaged over the container, may not be exceeded. Higher concentration values are included in Condition 1 to be used in establishing the maximum mass of SNM for non-homogeneous solid waste and liquid waste.

The measurement uncertainty values should be no more than 15 percent of the concentration limit, and represent the maximum one-sigma uncertainty associated with the measurement of the concentration of the particular radionuclide. When determining the applicable U-235 concentration limit for a specific enrichment percentage, the analytical uncertainty shall be added to the result (*e.g.,* for a measurement value of U-235 enrichment percentage of 1.1 +/- 0.2, the U-235 concentration limit corresponding to an enrichment percent of 1.35 shall be used). This shall be applied to analytical methods employed by the generator prior to receipt and by Envirocare upon receipt.

The SNM must be homogeneously distributed throughout the waste. If the SNM is not homogeneously distributed, then the limiting concentrations must not be exceeded on average in any contiguous mass of 600 kilograms of waste.

Liquid waste may be stabilized provided the SNM concentration does not exceed the SNM concentration limits in Condition 1. For containers of liquid waste with more than 600 kilograms of waste, the total mass of SNM shall not exceed the SNM concentration in Condition 1 times 600 kilograms of waste. Waste containing free liquids and solids shall be mixed prior to treatment. Any solids shall be maintained in a suspended state during transfer and treatment.

2. Except as allowed by Tables A and B in Condition 1, waste must 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. These chemicals would be added to the waste stream during processing, such as at fuel facilities or treatment such as at mixed waste treatment facilities. The presence of the above materials will be determined by the generator, based on process knowledge or testing.

3. Except as allowed by Tables A and B in Condition 1, waste accepted must not contain total quantities of beryllium, hydrogenous material enriched in deuterium, or graphite above one tenth of one percent of the total weight of the waste. The presence of the above materials will be determined by the generator, based on process knowledge, physical observations, or testing.

4. Waste packages must not contain highly water soluble forms of uranium greater than 350 grams of uranium-235 or 200 grams of uranium-233. The sum of the fractions rule will apply for mixtures of U-233 and U-235. 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. The presence of the above materials will be determined by the generator, based on process knowledge or testing.

5. Waste processing of waste containing SNM will be limited to stabilization (mixing waste with reagents), micro-encapsulation and macro-encapsulation using low-density and high-density polyethylene, macro-encapsulation with cementitious mix, spray-washing, organic destruction (Solvent Electron Technology and CerOx process), and thermal desorption.

   Envirocare shall confirm the SNM concentration in the rinse water does not exceed the limits in Condition 1 following spray-washing, prior to further treatment. If the rinse water is evaporated, the evaporated product must comply with the requirements in Condition 1. Envirocare shall perform sampling and analysis of the liquid effluent collection system at a frequency of one sample per 300 gallons or when the system reaches capacity, whichever is less.

   Envirocare shall track the SNM mass of waste treated using the CerOx process. When the total concentration of SNM is 85 percent of the sum of the fraction rule in Condition 1, Envirocare shall confirm the SNM concentration in the phase reactor tank and replace the solutions. The 10 percent enriched limit shall be used for uranium-235. The contents of the phase reactor tank should be solidified prior to disposal.

   When waste is processed using the thermal desorption process and Solvent Electron Technology process, Envirocare shall confirm the SNM concentration following processing and prior to returning the waste to temporary storage.

6. Envirocare shall require generators to provide the following information for each waste stream:

   <u>Pre-shipment</u>

   Waste Description. The description must detail how the waste was generated, list the physical forms in the waste, and identify uranium chemical composition.

   Waste Characterization Summary. The data must include 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.

   Uniformity Description. A description of the process by which the waste was generated showing that the spatial distribution of SNM must be uniform, or other information supporting spatial distribution.

   Manifest Concentration. The generator must 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. The generator must describe the uncertainty associated with sampling and testing used to obtain the manifest concentrations.

   Envirocare shall review the above information and, if adequate, approve in writing this pre-shipment waste characterization and assurance plan before permitting the shipment of a waste stream. This will include statements that Envirocare has a written copy of all

the information required above, that the characterization information is adequate and consistent with the waste description, and that the information is sufficient to demonstrate compliance with Conditions 1 through 4. Where generator process knowledge is used to demonstrate compliance with Conditions 1, 2, 3, or 4, Envirocare shall review this information and determine when testing is required to provide additional information in assuring compliance with the Conditions. Envirocare shall retain this information as required by the State of Utah to permit independent review.

At receipt

Envirocare shall require generators of SNM waste to provide a written certification with each waste manifest that states that the SNM concentrations reported on the manifest do not exceed the limits in Condition 1, that the measurement uncertainty does not exceed the uncertainty value in Condition 1, and that the waste meets Conditions 2 through 4.

7. Sampling and radiological testing of waste containing SNM must be performed in accordance with the following: one sample for each of the first ten shipments of a waste stream; or one sample for each of the first 100 cubic yards of waste up to 1,000 cubic yards of a waste stream, and one sample for each additional 500 cubic yards of waste following the first ten shipments or the following the first 1,000 cubic yards of a waste stream. Sampling and radiological testing of debris waste containing SNM (that is exempted from sampling by the State of Utah) can be eliminated if the SNM concentration is lower than one tenth of the limits in Condition 1. Envirocare shall verify the percent enrichment by appropriate analytical methods. The percent enrichment determination shall be made by taking into account the most conservative values based on the measurement uncertainties for the analytical methods chosen.

8. Envirocare shall notify the NRC, Region IV office within 24 hours if any of the above conditions are not met, including if a batch during a treatment process exceeds the SNM concentrations of Condition 1. A written notification of the event must be provided within 7 days.

9. Envirocare shall obtain NRC approval prior to changing any activities associated with the above conditions.

REFERENCES

Envirocare of Utah, Inc., Letter to Susan Frant, Nuclear Regulatory Commission, “Request for revision to Envirocare’s current SNM Exemption Order,” July 8, 2003. [ADAMS Accession No. ML031950334]

U.S. Nuclear Regulatory Commission (NRC), “Envirocare of Utah, Inc., Safety Evaluation Report Regarding Exemption from Requirements of 10 CFR Part 70,” May 7, 1999. [ADAMS Legacy Library Accession No. 9905140064]

NRC, “Waste Control Specialists LLC, Safety Evaluation Report Regarding the Proposed Exemption from Requirements of 10 CFR Part 70,” November 21, 2001. [ADAMS Accession No. ML030130085]

NRC, “Envirocare of Utah, Inc., Safety Evaluation Report Regarding the Revision to Exemption from Requirements of 10 CFR Part 70,” January 14, 2003. [ADAMS Accession No. ML023470587]

NRC, “Envirocare of Utah, Inc., Safety Evaluation Report Regarding the Revision to Exemption from Requirements of 10 CFR Part 70,” September 23, 2003. [ADAMS Accession No. ML032680942]

NRC, “Re: Envirocare SNM Order,” electronic mail from James Park to John Hultquist, State of Utah, July 8, 2005. [ADAMS Accession No. ML051920104]

DISTRIBUTION: NMSS/DWMEP r/f EPAD r/f

Log No.:
ML041190003 *See previous concurrence

OFC	DWMEP		DWMEP		OGC		DWMEP	
NAME	JPark*		BJDavis*		STreby*		SFlanders	
DATE	1/7/05		4/28/05		1/04/05		6/24/05	

OFFICIAL RECORD COPY

* No Legal Objection. See previous concurrence.

This document **should**/should not be made available to the PUBLIC JRP 1/7/05
(Initials) (Date)