

MAY 19 1994

Mr. Charles A. Judd
Executive Vice President
Envirocare of Utah, Inc.
American Towers Commercial
46 W. Broadway, Suite 240
Salt Lake City, Utah 84101

Dear Mr. Judd:

On March 1, 1994, Envirocare of Utah, Inc. (Envirocare) submitted, for U.S. Nuclear Regulatory Commission review and approval, a request to amend Source Material License SMC-1559, along with supporting page changes to the current license application. In addition, Envirocare submitted additional page changes to the application on April 19, 1994, as a result of an April 5, 1994, telephone conference call with the NRC staff. The staff has reviewed your submittals and determined that additional information is required before the review can be completed. NRC staff comments are provided in Enclosure 1.

In order to support our review schedule, please provide your response to the enclosed comments within 60 days of the date of this letter. If you are unable to meet that date, please provide your schedule for responding within 10 days of the date of this letter. Should you have any questions regarding the enclosure, please contact the NRC Project Manager, Sandra L. Wastler at (301) 415-6724.

Sincerely,

137

Joseph J. Holonich, Chief
High Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

NRC FILE CENTER COPY

cc: D. Hiller

W. Sinclair, Utah

Docket Number: 40-8989

License Number: SMC-1559

Distribution: See attached list

SUBJECT ABSTRACT: COMMENTS ON ENVIROCARE'S MARCH 1, 1994 AMENDMENT REQUEST

Mark Small Boxes in Concurrence Block to Define Distribution Copy Preference.
In small Box on "OFC:" line enter: C = Cover E = Cover & Enclosure N = No Copy

OFC	HLUR	E	HLUR	E	HLUR			
	Wastler		OGillett MFliegel		JHolonich			
DATE	05/13/94	H	05/18/94	H	05/19/94	/	/94	/ /94

S:\HLUR\SLW\AMDLTR.509

OFFICIAL RECORD COPY

In small Box on "DATE:" line enter: M = E-Mail Distribution Copy H = Hard Copy

9406070061 940519
PDR ADOCK 04008989
C PDR

NLIT

PDR : YES X NO
ACNW: YES X NO
IG: YES NO X

Category: Proprietary or CF Only
Delete file after distribution Yes X No

Distribution: (For Envirocare Letter dated: MAY 19 1994)

Central File#

NMSS r/f
HLUR r/f
PDR
ACNW
HThompson
RBernero
GArlotto
MKnapp
JGreeves
JHolonich
MBell
JSurmeier
JAustin
DGillen
SWastler
AMullins
EBrummett
CMcKinney
LGerke, OCA
RFonner, OGC
STurk, OGC
TCombs, OSP
KStablein, EDO
RHall, RIV, URFO
CHackney, RIV, SLO
JGilliland, RIV, PAO
RDoda, RIV, SAPO
BSpitzberg, RIV

U.S. NUCLEAR REGULATORY COMMISSION

REQUEST FOR ADDITIONAL INFORMATION
ON THE

LICENSE AMENDMENT REQUEST

BY

ENVIROCARE OF UTAH, INC.

DATED MARCH 1 AND APRIL 19, 1994

1. License Condition 10.2(b) of Source Material License SMC-1559 requires Envirocare of Utah, Inc. (Envirocare) to measure key radon attenuation model parameter values in the 11e.(2) byproduct material and the radon barrier portion of the cover, during placement in the cell. These actual measurements will be compared to the design values given in the license application which were used as input to a computer model to verify that the design radon flux limit in Criterion 6 of Appendix A to 10 CFR Part 40 will be achieved. The staff considers these measurements essential because: 1) the characteristics of the 11e.(2) byproduct material can only be estimated until specific material is accepted for disposal, and 2) the cover soil has not been fully characterized.

In its March 1, 1994, submittal, however, Envirocare requested that License Condition 10.2(b) be deleted based on its sensitivity analysis in Appendix A-2. This analysis used some of the default parameters in the computer modeling to estimate the long-term radon (Rn-222) flux from the cover, as recommended in the NRC Regulatory Guide 3.64 entitled "Calculation of Radon Flux Attenuation by Earthen Mill Tailings Covers."

The staff has reviewed Envirocare's analysis presented in Appendix A-2 and determined that it does not follow the regulatory guide's recommendation of assuming a specific gravity value of 2.65 and a porosity value of 40 percent for both the tailings and cover material. Therefore, the staff does not consider the analysis to be conservative. However, even if conservative values had been chosen for the analysis, Envirocare must still demonstrate that the parameter values of the 11e.(2) byproduct material placed in the disposal cell, and the radon barrier soil compare favorably with the design parameter values estimated in the license application, as stated above. While the radon barrier soil could be tested prior to placement, the 11e.(2) byproduct material must still be tested as it is received for disposal. As a result, the staff has concluded that the licensee has not provided sufficient justification to support the deletion of License Condition 10.2(b). Therefore, the licensee must provide additional justification to support its proposed deletion of License Condition 10.2(b) or the NRC staff will maintain the condition in the license.

2. In the April 19, 1994, submittal in support of its license amendment request, Envirocare provided changes to pages 18-19a of section 16 to clarify how 11e.(2) byproduct material would be placed in the cell, and how the distribution of radionuclide concentrations in the byproduct material would be evaluated. This submittal, however, does not contain

sufficient information to ensure that the radon barrier design will be achieved in accordance with License Condition 10.2(c). As discussed in the Safety Evaluation Report, this condition requires Envirocare to characterize the distribution of Ra-226 and Th-230 (parent of Ra-226) concentrations by placement lift (1-foot-layers) in the upper/outer 3.3 meters (10 feet) of contaminated material, and present the average value for each of these radionuclides for each lift. This condition was imposed to prevent the licensee from maintaining the 500 pCi/g Ra-226 limit in the upper 3.3 meters by averaging occasional values over the entire thickness. The distribution of Ra-226 concentration can be important because the radon flux from the surface of the disposed material is less sensitive to the Ra-226 (parent of Rn-222) concentration of deeper material.

Specifically, the staff has found the following deficiencies in the discussion on revised pages 18 and 19 of section 16:

- a. The third paragraph on page 18 of section 16 states that the radium and thorium limits are applicable to 11e.(2) byproduct material placed within 10 and 2 feet of the top or sides of the disposal cell. This wording is confusing since the top 2 feet of the disposal cell will be the soil/rock cover. These limits presumably refer to the top or sides of the disposed 11e.(2) byproduct material (not disposal cell). The licensee must correct the license application to reflect the correct application of these radionuclide concentration limits.
- b. The last portion of the third paragraph states that an approved model for radon emanation will be run after completion of the upper lifts, prior to placement of the radon barrier, to confirm that any layering of wastes with average concentration of more than 500 pCi/g per lift will meet the design criterion. The licensee also indicates that the model will consider radon contributions from the top 16 feet of the cell. The modeling should, however, take into consideration the radon emanation from the top 16 feet of contaminated material, not the contribution from the cover materials. The licensee must correct the license application to reflect the correct application of the flux limit.
- c. In accordance with License Condition 12.6, the licensee should provide the results of the model determinations as part of the annual report. The license application must be corrected to reflect this requirement.
- d. The first full paragraph on page 19 of section 16 discusses that gamma exposures at the surface of the clay cover are not affected by burial of byproduct material at ten feet below the top of the byproduct material placed in the cell, and that the cover will attenuate the gamma levels. The licensee, however, must demonstrate that the disposal cell cover will meet the requirement in Criterion 6 to reduce gamma exposure to background levels. Therefore, the licensee should revise the license application to include a program to monitor the gamma levels upon completion of the cover, and the method of documenting the gamma values. NRC staff will be verifying the gamma

levels during the inspection of the final cover.

4. As per 10 CFR § 20.1902(a), "The licensee shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words, 'CAUTION, RADIATION AREA'" (emphasis added). The radiation area created by the radioactive source, in this case, the shipment vehicle(s), needs to be clearly delineated, and, thus, not only the source of radiation needs to be posted. Also, radiation areas may be caused by the geometry between multiple sources. The license application on pages 17-18 of Section 16.2.2, High-Activity Shipments, however, addresses only posting of the source of the radiation area and, only on an individual shipment vehicle basis. The licensee must revise the license application to demonstrate compliance with 10 CFR § 20.1902(a).
5. Pages 7 and 8 of section 17 have been revised by the amendment to state "the estimated annual average total activity disposed of would be 337 Curies for each of the radionuclides." Based on an assumption of an average concentration of 500 pCi/g and an annual disposal rate of 454,000 tonnes (500,000 short tons) of 11e.(2) byproduct material, the estimated total activity should be 227 Ci, not 337 Ci. Since its radiological analysis is based on 227 Ci (500 pCi/g times 454,000 tonnes), the licensee must correct the estimated total activity value or provide justification for the value of 337 Ci as presented in the amendment request.
6. The normalized airborne concentrations tables (i.e., Appendix A-2, Table 6.1) have values of zero in the middle of tabulations of linear equations. For example, Table 6.1 has the following data listed on page 47 for particulate and radon at 67 degrees:

Distance (km)	Particulate	Radon
1.5	1.370E-06	1.766E-03
2.5	0.000E+00	0.000E+00
3.5	8.972E-07	1.269E-03
4.5	6.598E-07	9.584E-04

It appears that the calculations of the normalized airborne concentrations should result in a linear reduction in concentration with distance. The tables contain data points, as above, that do not fit this assumption. The amendment request should include discussion of any abnormal results from the model. As a corollary comment, there isn't any discussion of why calculation of concentrations are discontinued after a certain distance in particular directions. For example, concentrations are calculated to 75 km for the 90 degree aspect from the Rollover Waste Receiving Operations, with a final particulate concentration of 1.49E-09 pCi/m³ per pCi/g, but concentrations are only calculated to 2.5 km for the 112.5 degree aspect, with the final concentration being 1.619E-08 pCi/m³ per pCi/g. The licensee must correct the normalized airborne concentrations values and

provide an explanation of the calculational distances, or provide justification for the values presented in the amendment request.

7. It appears there are errors in the source and receptor locations listed in Table 1 and Table 2 of Appendix A-2. The coordinates listed for Waste Disposal Cells D and E do not correspond with the facility drawing in Figure 1. It also appears that the Cartesian Coordinates are incorrect for receptor location 21, "E1." The current Y coordinate is 0.08 km, while it appears it should be 0.80 km after comparison with the other receptor locations. The licensee should provide the correct source and receptor locations.
8. Some receptor locations have been listed with normalized air concentrations of zero. For example, receptor location 22, "E3," has been given a normalized airborne concentration of zero for particulate, radon, and thoron from the Rollover Waste Receiving Operations. The receptor located 400 meters directly to the north, "NE," has a calculated value of 7.005×10^{-05} pCi/m³ for particulate, and "E2," the receptor located 400 meters directly south, has a particulate air concentration of 4.110×10^{-07} pCi/m³. The licensee must provide the correct normalized air concentrations for these receptor locations, or provide justification to support normalized air concentrations of zero.
9. The normalized air concentrations for direct disposal operations are listed as zero at all locations for particulate. All other types of operations at the facility (except for estimations of releases after cover placement) have particulate releases. The licensee must provide the basis for this zero release of particulate during direct disposal.
10. Tables 11.2e and 11.2f, which list the normalized air concentrations for the 26 receptor locations from active waste operations in disposal section E and F, respectively, are identical. The two source locations are 400 meters apart. The licensee should provide corrected tables or provide justification for the tables being identical.
11. The licensee should estimate annual release rates per pCi/g, for particulate, radon and thoron, from each of the potential release operations. Most of the operations delineate the estimated source terms for radon and thoron, but do not supply the source term for particulate. For example, Section 2.2 Waste Storage, delineates the source terms for radon and thoron on page 62, but does not delineate the source term for particulate. The only reference is to the procedure used to estimate the particulate release rate.
12. For each release point, Appendix A-2 has tables and figures of radial normalized air concentrations by distance. It is not apparent as to the reference point for these tables and figures. The wording in the Section 2.1a, Rollover Facility, implies that the release point is the initial point for the tables and figures (pg. 42). In Section 2.2, Waste Storage, the wording implies that the tables are based on the release point, but the text states that the figures are a function of distance from the site marker at the southwestern corner (pg. 62). The licensee must specify the

reference point for the Appendix A-2 tables and figures of radial normalized air concentrations and correct the above referenced appendix and sections of the license application.