OAK RIDGE NATIONAL LABORATORY
MANAGED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U.S. DEPARTMENT OF ENERGY

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

May 28, 1993

40-8989

Mr. Allan T. Mullins
U.S. Nuclear Regulatory Commission
MS 5E4, OWFN
Washington, DC 20555-0001

Dear Allan:

I am pleased to provide you with the deliverable for Subtask B of Task 1 for the Envirocare EIS project. The deliverable is in the form of an Appendix A, which can be directly included into the Final EIS. As you suggested, we have placed copies of the comment letters on the left-hand sides of the pages, and have placed the corresponding responses on the right.

In accordance with the Task Proposal for Task Order 1, ORNL has reviewed the comments on the Draft EIS and has prepared draft responses to each of those comments as shown in Appendix A. ORNL acknowledges the receipt of preliminary responses from NRC. In many cases in Appendix A, ORNL has elected to break the comments into more subparts than did NRC in its preliminary responses. ORNL believes that this will highlight the separate responses to those comments expressing multifaceted concerns.

ORNL has used the NRC responses as input and has modified, expanded, and/or edited them for use in the enclosed Appendix A; however, ORNL has not attempted to modify those NRC responses dealing with regulatory policy.

ORNL's technical input to the responses is limited to information on-hand at ORNL, but does not include review of the Draft EIS calculations from NRC or PNL. For a number of the comments in which NRC refers to the Safety Evaluation Report (SER), ORNL has no particular insight and has not modified the NRC response. The enclosed deliverable represents ORNL's best effort at preparing an adequate set of responses.

Also, attached to this letter is a set of suggestions and observations from ORNL on improvements and text additions that could be made in the Final EIS to enhance its readability; this attachment offers suggestions in light of specific concerns reflected in comments received on the Draft EIS. ORNL is prepared to incorporate any or all of these suggestions into the Final EIS at your direction. ORNL would appreciate an opportunity to further discuss these items with you.

4th Encl

02-109

Add: A.T. Mullins 11

NL16
1/1

I look forward to receiving NRC's comments on the enclosed material on June 14, 1993, as scheduled. Please phone me at (615) 574-5815 if I can provide additional details or explanations about ORNL's responses.

Sincerely,

Gregory P. Zimmerman
Project Leader

Enclosures

cc: J.B. Cannon
L.N. McCold
D.G. O'Connor
C.E. Pugh
R.M. Reed
B.A. Walker
File-RC

May 28, 1993

SUGGESTIONS AND OBSERVATIONS ON THE ENVIROCARE DRAFT EIS

ORNL's suggestions to NRC for text changes to the Draft EIS, in addition to Appendix A, *Responses to Comments*, are presented below.

GENERAL SUGGESTIONS

The following suggestions are made to improve the readability of the EIS, but not to address any specific comment received on the Draft EIS.

- Where the NRC's responses refer to analyses conducted as part of the Safety Review and/or where the reader is referred to the Safety Evaluation Report, NRC should, if possible, summarize the relevant findings or environmental information and include that summary, thereby strengthening the applicable responses in Appendix A.

- Clarifying material should be added to Sect. 5.2.8.4 in regard to worker protection from gamma radiation doses; add the following paragraph at the end of the section, on p. 5.26:

  "Worker exposure to gamma radiation will be mitigated by two design features. First, each 30 cm (1 ft) of compacted soil covering in the disposal cells will reduce the projected maximum ambient gamma exposure rate of 3.6×10^{-7} C/kg·hr (1400 μR/hr) by a factor of 10. Second, steel construction equipment—such as trucks, bulldozers, and earth moving vehicles—will also provide significant shielding and protection from gamma radiation."

ADDITIONAL SUGGESTIONS FOR RESPONSES TO SPECIFIC COMMENTS

ORNL suggests that certain responses would be strengthened by including a statement similar to "Additional text has been added to Sect. X.X.X in response to the comment." In each of the items below, ORNL offers suggestions for new text to be included in the Final EIS.

- In response to Comment C2-3, changes are suggested to Sect. 5.2.8 to more clearly define the dose calculation method and the implications of the calculated values. In Sect. 5.2.8.4, p. 5.25, delete the last five lines on the page, beginning with the sentence "These estimated doses are significant . . . ." Also, delete the first four lines at the top of p. 5.26, through ". . . residential housing (see Section 4.1)." Replace the deleted material with five new paragraphs:

  "These estimated doses were calculated by ratio and proportion from the Allowable Limit on Intake in Appendix B of 10 CFR Part 20, using measured gross-alpha activity values at the site boundary and on-site locations. These estimates are made for the period of active disposal, and they represent the result of a string of assumptions purposely meant to be conservative (i.e., not to underestimate the magnitude of any radiological impacts).

Mathematical estimates of dose to both groups result in values which would be unacceptable in practice. However, the doses are clearly overestimates, based on maximum sampled concentrations, hypothetical individuals, and other maximizing assumptions. The estimated doses could be considerably less for actual site conditions and waste characteristics."

"As a mitigation measure for reducing on-site exposure, workers in the disposal area must wear respirators, thus precluding the greatest proportion of inhaled particles. Inhalation doses are reduced by factors of 10 to 1000 depending on respirator type and correctness of use."

"As for off-site individuals, the appropriate regulations are found in 40 CFR Part 192.41(d): "[o]perations . . . shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 mrems to the whole body, 75 mrems to the thyroid and 25 mrems to any other organ of any member of the public . . . ." There are no off-site individuals within many kilometers of the site. Hence, with off-site individuals nearby, there can be no actual 9.72 mSv/vr (972 mrem/yr). Doses to off-site individuals are expected to be negligible due to dispersion and deposition of any airborne particulates near the site."

"Furthermore Envirocare is, through the medium of mitigative measures, required to perform off-site monitoring to ensure compliance with the above regulations during disposal operations. Consequently, if conditions and zoning laws change to allow people to live near the proposed disposal site, Envirocare will have to take steps to ensure that the dose limits to actual residents are not exceeded."

"After closure, dust will be considerably reduced. Similar disposal operations took place during the emplacement of the Vitro material. Measurements of gross-alpha activity in the air were made during operation and after closure of the facility demonstrated that, after closure, only about 1% of the activity was found in the same location on-site. Off-site exposure should be similarly reduced [to 0.097 mSv/yr (9.7 mrem/yr)]. Therefore, in regard to demonstration of compliance with regulations, on-going measurements during disposal coupled with the fact that the nearest public individual is many kilometers from the site will afford the opportunity for compliance under 40 CFR Part 192. After closure, and before acceptance of the site by the DOE, an extensive measurement program will demonstrate radon flux rate levels and dose rates at the site boundaries. Envirocare must be in compliance with all applicable regulations before DOE takes possession of the facility."

- In response to Comment C2-4, NRC should add new text to Sect. 5.2.8 to display and/or summarize the information referenced in NRC's response; that is, text should be included to detail the statement that "[T]he applicant has addressed the issue of potential food chain pathway for human exposure from sheep grazing in the area and found the exposure is not significant."

- In response to Comment C3-4, changes are suggested to Sect. 4.8.2, p. 4.41: add the following new paragraph to the end of the section:

  "The Interstate is about 3 km (2 miles) to the north of the disposal area. The South Clive site is about 1300 m (4270 ft) above sea level, but elevations of 1370 to 1670 m (4500 to 5500 ft) can be found nearby to the south, southwest and southeast of the site. This local topographical relief provides a visual backdrop for the site when viewed from the Interstate. The existing Vitro site—which includes an above-grade mound—is not easily noticeable from the Interstate. Although the proposed Envirocare disposal mound would be somewhat higher, it would have the same general visual impact as the Vitro site."

- In response to Comment C3-12, changes are suggested to Sect. 2.3.2.3, p. 2.9; add the following sentence to the end of the first paragraph:

  "Any sludge in the evaporative tanks will be properly disposed."

- In NRC's response to Comment C3-6, it is unclear how the proposal in the comment "would reduce the amount of material which can be disposed in the cell without providing a corresponding increase in the stability of the material disposed." No supporting discussion is contained in the EIS.

  ORNL suggests that NRC add new text to the EIS regarding this conclusion. A related conclusion—about Alternative 2 requiring a greater amount of acreage to dispose of the same volume of waste as Alternative 1—is contained in Sect. 2.2.2. Section 3.2 contains a similar conclusion: Alternative 2 would have a lower disposal rate per unit of land area than Alterative 1. Both of these latter conclusions appear to warrant brief explanations that are not now included in the EIS.

- In response to Comment C3-13, changes are suggested to Sect. 2.3.2.6, *Support Facilities*, p. 2.10; add the following new paragraph at the end of the subsection on *Decontamination Areas*:

  "The Department of Transportation (DOT) regulations for removable contamination and gamma doses for transportation containers are codified in 49 CFR Part 173. The state of Utah also has decontamination requirements that are, in some cases, more stringent than DOT's. Prior to exiting the site, trucks and rail cars used in transportation of disposal material will be radiologically surveyed and decontaminated to satisfy the state of Utah regulations."

- In response to Comment C3-14, changes are suggested to Sect. 2.3.2.6, *Excavated Materials Area*, p. 2.12; add the following one-sentence paragraph just before the last existing paragraph of the subsection:

  "The overburden and topsoil stockpiles will be protected from erosion by chemical suppressants or by a vegetative cover."

Appendix A

COMMENTS RECEIVED ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND THE RESPONSES TO THOSE COMMENTS

A.1 INTRODUCTION

This appendix provides copies of all letters received from agencies and the public commenting on the Draft Environmental Impact Statement (DEIS); see Table A.1. The letters are separately displayed on the left-hand side of the following pages. Individual comments from each agency or person were assigned numbers as shown in the left margins of each letter. The notation for comments is as follows: C3-2 means comment number 2 in letter number 3. The response to each numbered comment appears on the right-hand side of the page, beside the comment letter; the notation for responses is similar to that of the comments: R3-2 means response to comment number 2 in letter number 3.

The last set of comments in Table A.1 represents seventeen individual letters from members of a "Thorium Action Group" located in the vicinity of West Chicago, Illinois. The seventeen letters unanimously urge that favorable consideration be given to the license application for the proposed Envirocare 11e.(2) disposal facility. Because of the similarity of the comments contained in those letters, they are not reproduced verbatim in this appendix, but rather are paraphrased and responded to collectively.

It should be noted that many comments on the DEIS are concerned with safety or technical issues that are beyond the scope of an environmental review; however, as noted in the individual responses, the issues are of concern to NRC and are being addressed in an on-going Safety Review as a separate part of the licensing process. The Safety Review will result in the preparation of a Safety Evaluation Report (SER). The completed SER can be found with other related documents at the locations indicated on the inside front cover of this Final EIS.

Table A.1. Comments Received on the Draft Environmental Impact Statement

Letter Number	Agency/Person Commenting	Comment Numbers	Pages in This Appendix
1	U.S. Environmental Protection Agency	C1-1 and C1-2	A.2
2	U.S. Department of Health and Human Services	C2-1 to C2-5	A.3 and A.4
3	Perkins Coie (Counsel for U.S. Ecology, Inc.)	C3-1 to C3-31	A.5 to A.22
4	Members of the "Thorium Action Group"	C4-1	A.23

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

0509

SANDRA WASTLER
SBER 11692
7/24/92
USNRC
OFFICE OF SECRETARY

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Ref: 8WM-EA

APR 26 1993

Michael Lesar, Acting Chief
Rules Review and Directives Branch
Division of Freedom of Information
and Publication Services
Mail Stop P-223
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Draft Environmental Impact Statement
to Construct and Operate a Facility
to Receive, Store, and Dispose of
11E.(2) Byproduct Material near
Clive, Utah

Dear Mr. Lesar:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Region VIII office of the Environmental Protection Agency (EPA) has reviewed the subject draft environmental impact statement (DEIS) submitted by the Nuclear Regulatory Commission (NRC). The EPA commends the NRC for presenting a thorough evaluation of the project and related environmental effects. The NRC has sufficiently addressed scoping comments sent by the EPA in response to the notice of intent to prepare the DEIS (letter from Robert R. DeSpain to Sandra L. Wastler, 7/12/91).

C1-1

Based on the procedures EPA uses to evaluate the environmental impacts of the proposed action and alternatives and the adequacy of information provided in EISs, the EPA Region VIII rates the DEIS as category LO (lack of objections).

C1-2

If you may have any questions, please contact Larry Kimmel of my staff at (303) 293-1697.

Sincerely,

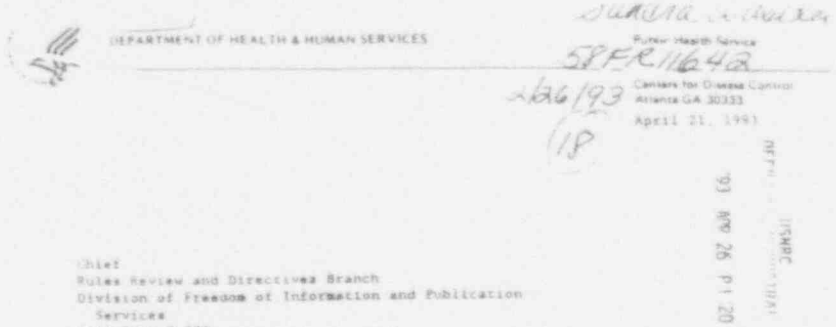
Robert R. DeSpain

Robert R. DeSpain, Chief
Environmental Assessment Branch
Water Management Division

Printed on Recycled Paper

R1-1. The comment is noted.

R1-2. The comment is noted.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

April 21, 1993

58 FR 11642
2/26/93
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RECEIVED
USNRC

Chief
Rules Review and Directives Branch
Division of Freedom of Information and Publication Services
Mail Stop P-223
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir or Madam:

We have completed our review of the Draft Environmental Impact Statement (DEIS) to Construct and Operate a Facility to Receive, Store, and Dispose of 11E.(2) Byproduct Material Near Clive, Utah. We are responding on behalf of the U.S. Public Health Service. Technical assistance for this review was provided by the Radiation Studies Branch (RSB), Division of Environmental Hazards and Health Effects, National Center for Environmental Health, Centers for Disease Control and Prevention.

The RSB reviewed the Draft EIS for potential radiological health impacts. The following comments are offered for your consideration.

The DEIS section 5.2.8 discusses potential radiological health impacts (workers and offsite public) resulting from the construction of the radioactive waste disposal facility near Clive, Utah, managed and operated by Envirocare of Utah.

Paragraph 5.2.8.1 states "the potential radiation doses can, in a statistical sense, increase the potential for individual and population health effects (excess fatal cancers) above those expected from normal causes. It is assumed that environmental systems will be adequately protected against any adverse radiological impacts if workers and members of the public are adequately protected against the same impacts."

C2-1 Page 4.7 of the DEIS presents a wind rose out to greater than 5 kilometers (km) or 2.5 miles from the proposed facility, showing nearest residences (Table 4.3). This Table suggest that there are a considerable number of residents that live outside 2.5 miles of the proposed facility. The DEIS does not discuss emergency warning systems for members of the public or how the public will be protected in the event of a large waste-product release. The

C2-2 assumption in section 5.2.8.1, paragraph one, as stated above, needs to be explained.

R2-1. Section 4.6 states that in 1990, the closest residents "... lived 24 to 32 km (15 to 20 miles) to the northeast of the site." The release of a large quantity of waste-product is not a credible event, and an emergency warning system is therefore not needed for on-site releases. However, because a spill of 11e.(2) byproduct material is possible, clean-up procedures will be in effect to limit potential exposures. In addition, emergency plans will be prepared in accordance with Department of Transportation requirements for potential accidents along off-site transportation corridors.

In regard to the data in Table 4.3, the table simply shows that no people live within 5 km (3.1 miles) of the site, but it contains no information regarding the number or location of people living outside that zone.

R2-2. No regulatory guidelines have been established concerning the acceptable limits of radiation exposure for the protection of species other than humans. It is, however, generally recognized that the limits for humans are also conservatively protective for those species.

The NRC staff agrees with the assumption that by providing measures to adequately protect human health against any adverse radiological impacts, environmental systems will also be adequately protected.

Page 2 Chief, RRDB

C2-3 Furthermore, on page 3.25 of the DEIS, the statement is made that the presence of ^{232}Th and decay products in the airborne pathway will contribute significantly to the offsite dose via inhalation (912 mrem/year to 1 rem/year). The DEIS should show how these high inhalation doses are calculated, i.e., distance from the facility and dose conversion factors used. As stated on page 5.26, "Envirocare will need to consider potential radiation doses from particulate inhalation of ^{232}Th in demonstrating compliance with the public dose limit in 10 CFR part 20.1301".

C2-4 Most of the land within a 10 mile radius of the South Clive site is public domain administered by the U.S. Bureau of Land Management (BLM) (Section 5.1.1, Land Use). 5.1.1 states clearly that this land is used for sheep grazing, transportation, hunting, and recreational activities. Are the sheep part of a potential food chain pathway for human exposure? If so, what are the potential doses to humans from consumption of sheep?

C2-5 For public health purposes, the DEIS should address the potential for offsite radionuclide exposures to the public through air pathways, food chain pathways, accidents, and recreational activities within the BLM public domain which surrounds the proposed facility. The fact that "the Department of Energy (DOE) did not calculate potential population doses because no residents live within 10 km of the site" (pages 5.17, 5.19) does not exclude potential health risks to the hunter, camper, or visitor to the area.

Thank you for the opportunity to review and comment on this document. Please ensure that we are included on your mailing list to receive a copy of the Final EIS, and future EIS's which may indicate potential public health impacts and are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental
Health and Injury Control

cc:
Felix Rogers, RSB

R2-3. The dose values of 9.72 mSv/yr (972 mrem/yr) and 0.03 Sv/yr (3 rem/yr), as reported in Sect. 5.2.8.4, were estimates for off-site individuals and on-site workers, respectively. These values were based on approximation and analogy with the gross-alpha activity values reported for the Vitro disposal site. Because Thorium-232 was not a major constituent in the Vitro material, the doses for Thorium-232 and its decay products were calculated by ratio and proportion from the Allowable Limit on Intake in Appendix B of 10 CFR Part 20. The location for off-site doses was taken as the site boundary.

The Safety Evaluation Report addresses radiation doses in detail. The appropriate regulations for doses to off-site individuals are found in 40 CFR Part 192. The applicant will be required by license condition to be in compliance with 10 CFR Part 20 and 40 CFR Part 192.

R2-4. As stated in Sect. 4.1, historically the immediate area around the South Clive site has not been heavily utilized for grazing; it is a very dry and arid desert area. The BLM areas are open for use by the public. While sheep and cattle grazing does occur on nearby BLM land, it represents an infrequent activity.

The applicant has addressed the issue of potential food chain pathway for human exposure from sheep grazing in the area and found the exposure is not significant. The low level of potential contamination and the scarcity of vegetation both contribute to the absence of significant impacts.

R2-5. As stated in Sect. 5.2.8.4, doses to off-site individuals are expected to be negligible. Potential radiation doses to casual visitors to the area (such as hunters, campers, and recreational vehicle users) would also be negligible due to the combination of the small doses beyond the site boundary and to the small exposure time, if any, for such individuals.

During any dusty activities associated with disposal operations, the applicant will be required to perform off-site measurements to ensure that any potential exposure to off-site individuals does not exceed the limits of 40 CFR Part 192.

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May 4, 1993

VIA CERTIFIED MAIL
Chief, Rules Review and Directives Branch
Division of Freedom of Information
and Publication Services
Mail Stop P-223
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: **Comments of US Ecology, Inc. on the Nuclear Regulatory Commission's Draft Environmental Impact Statement Regarding Envirocare of Utah, Inc.'s License Application to Dispose of 11e.(2) Byproduct Materials**

Dear Sir:

Please find enclosed a revised version of the Comments of US Ecology, Inc. on the Nuclear Regulatory Commission's Draft Environmental Impact Statement Regarding Envirocare of Utah, Inc.'s License Application to Dispose of 11e.(2) Byproduct Materials. A previous version of this document was supplied to you on April 30, 1993, however, it contained several inadvertant errors, which are corrected in the current version found herein.

I apologize for any inconvenience this may have caused you. In order to avoid confusion, I suggest you discard the previous version supplied to you.

As always, please call if you have any questions or comments regarding these materials.

Very truly yours,

Anthony J. Thompson

AJT:clc
Enclosure

COMMENTS OF US ECOLOGY, INC. ON THE

NUCLEAR REGULATORY COMMISSION'S

DRAFT ENVIRONMENTAL IMPACT STATEMENT

REGARDING ENVIROCARE OF UTAH, INC.'s LICENSE

APPLICATION TO DISPOSE OF IIe.(2) BYPRODUCT MATERIAL

General Comments.

C3-1 1. US Ecology regrets that its comments on the Draft Environmental Impact Statement (DEIS) regarding Envirocare of Utah, Inc.'s application to dispose of high volume, low-activity, IIe.(2) by-product material are filed after the date comments were due (April 26, 1993). The notice of availability of the DEIS published by the Nuclear Regulatory Commission (NRC) (58 Fed. Reg. 11642, February 26, 1993), contained no date by which comments would be due. The notice of the due date for comments was published by the Environmental Protection Agency (EPA) (58 Fed. Reg. 13597, March 12, 1993) in a tiny blurb that provided a difficult to find and confusing vehicle for public notice of the time frame for filing comments. In any event, US Ecology appreciates NRC's stated willingness to consider these comments.

C3-2 2. US Ecology observes that in evaluating Alternative 1 (an above-ground embankment) and Alternative 2 (a below-ground embankment) for disposal at the South Clive, Utah

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R3-1. The schedule allowed the comments of Perkins Coie to be included in the FEIS.

R3-2. As stated in Criterion 3 of Appendix A to 10 CFR Part 40, ". . . below grade disposal may not be the most environmentally sound approach, such as might be the case if a groundwater formation is relatively close to the surface." As discussed in Sect. 3.6.1, the depth to groundwater was the major concern with all of the alternatives evaluated. Conformance with Criterion 3 is addressed in the Safety Evaluation Report.

site, the DEIS makes no reference to the fact that under Criterion 3 in 10 C.F.R. Part 40, Appendix A, the "prime option" for disposal of tailings is below grade disposal. (DEIS 2.4-.5). The DEIS merely indicates that Alternative 2, while viable, is not preferred because the design places the waste closer to the water table (i.e., within five feet) and would require a greater amount of acreage to dispose of the same volume of waste, increasing unit costs and land requirements.

C3-3 The alternatives that are addressed are rather cut and dried and the solution to the "questions" presented seems to be a forgone conclusion. For example, the DEIS also indicates that no "detailed design" was even made for Alternative 2. This hardly constitutes a rigorous explanation of why the "prime option" (or some modification thereof) is so cavalierly brushed aside.

C3-4 3. Placing the tailings below grade at the proposed site could be important because it is located within a few hundred meters of a major U.S. Interstate Highway (I-80). A high-profile site reclaimed with rock rip-rap not otherwise available in the area might prove to be an attractive nuisance which would lure inadvertent intruders who could access an unpatrolled and unguarded site and remove the rock for personal use.

R3-3. Consideration of the "prime option" of below grade disposal in Criterion 3 is not a NEPA requirement and does not preclude another option from being identified as the "preferred alternative." The DEIS does consider and evaluate other alternatives to the proposed action, as required by NEPA. The level of detailed and/or conceptual designs for each alternative were adequate for the purpose of determining the extent and magnitude of potential environmental impacts, as well as for comparing impacts among and between alternatives. See also the response to Comment C3-2.

R3-4. The proposed Envirocare facility and the completed Vitro facility are remote from travelled roads and will both eventually be fenced and under the control of the Department of Energy or the State of Utah. The fences will be clearly labeled with signs indicating that radioactive material is present; this will provide a deterrent for any casual visitors to the site.

The Interstate is about 3 km (2 miles) to the north of the disposal area. The South Clive site is about 1300 m (4270 ft) above sea level, but elevations of 1370 to 1670 m (4500 to 5500 ft) can be found nearby to the south, southwest and southeast of the site. This local topographical relief provides a visual backdrop for the site when viewed from the Interstate. The existing Vitro site—which is mostly an above-grade mound—is not easily noticeable from the Interstate. Although the proposed Envirocare disposal mound would be somewhat higher, it would have the same general visual impact as the Vitro site.

C3-5 4. There should at least be an in-depth discussion of the trade-off between placing the bottom of the facility within five feet of the groundwater, which is of notably poor quality (DEIS at 4.32), and the erosion potential associated with a mound that is 44 feet above the surface. Additionally, there is no discussion of whether or not a modified, shallower below-grade disposal

C3-6 alternative that would result in more of a buffer between the facility liner and the groundwater, and that would accordingly result in a lower profile surface mound, would be a preferable option.

For example, the cell could be designed using a balanced cut-and-fill to ensure that a significant portion of the tailings will be place below grade. The additional excavated soil materials could be used to construct protective containment berms around the cell that would provide some degree of wind protection (and thus reduce dusting potential) and prevent the release of tailings should the site experience a large-magnitude precipitation event (e.g., the PMP).

C3-7a 5. NRC should also factor into this analysis whether Envirocare should install a state-of-the-art liner system pursuant to Criterion 5A(1). The installation of a double liner system with attendant drains would facilitate placement of the tailings in close proximity

R3-5. As discussed in Sect. 3.6.1, the provision of a large buffer distance between the bottom of the facility and groundwater was an important factor in distinguishing between Alternatives 1, 2, and 3. Section 2.3.3.3 discusses wind and water erosion of the proposed embankment; because of the arid nature of the South Clive site, erosion of the cover mound—especially a mound protected by rock armor—is not expected to be significant.

R3-6. The proposal in the comment would reduce the amount of material which can be disposed in the cell without providing a corresponding increase in the stability of the material to be disposed. The design of Alternative 1 does provide such a balance.

Cut-and-fill placement of the disposal material is planned.

R3-7a. Criterion 5A(1) applies to "surface impoundments", which are defined in Appendix A of 10 CFR Part 40 as natural and man-made facilities designed to hold an accumulation of liquid wastes or wastes containing free liquids. The proposed disposal facility is not a surface impoundment because it will not receive liquid wastes or wastes containing free liquids. Therefore, compliance with 10 CFR Part 40, Appendix A, Criterion 5A, is not required.

to the Class IV ground water that underlies the site. The two-foot thick clay liner proposed by Envirocare does not comport with NRC's Criterion 5 requirements for liners for uranium tailings disposal sites, which mandates for liner system consisting of an upper drain, an upper synthetic liner, a leachate detection/collection system, and a lower liner consisting of either a synthetic liner or three feet of recompacted clay having a hydraulic conductivity of $1x10^{-7}$ cm-sec or less. These requirements are essentially the same as those used in RCRA disposal cells (pursuant to 40 CFR 264.221). And, since the proposed plan has no apparent provisions for collecting the precipitation that will inevitably fall on and infiltrate the tailings and collect on the cell bottom, the upper drain would facilitate this necessary task.

C3-7b

6. It is unclear from an evaluation of the diagrams included in the DEIS whether the proposed disposal areas would comply with the requirements of 40 C.F.R. Section 61.252(b)(1) or (2) which requires (1) phased disposal of tailings in lined impoundments that are no more than 40 acres in area at operational tailings disposal facilities, or (2) continuous disposal and dewatering with no more than 10 acres of tailings exposed at any time. The DEIS indicates that the disposal cell will be 1776 x 1809 feet (EIS at 5.15) which is substantially

C3-8

R3-7b. It is acknowledged that a small amount of water is likely to collect on the cell bottom and partially saturate the liner. However, compared to the degree of saturation and driving heads available in a surface impoundment, the potential for this water to enter groundwater is negligible. Furthermore, in the arid environment, partial saturation of the liner is likely to reduce or eliminate cracking of the liner and enhance its performance. It is unlikely that the tailings would become a long-term source of seepage, since the cover is designed to limit infiltration of water.

R3-8. As stated in the response to Comment C3-7a, the Envirocare site is not a surface impoundment, and therefore 10 CFR Part 40, Appendix A, Criterion 5A is not applicable. However, Envirocare has chosen to put in a liner and as a result, is required to meet Criterion 5E. The disposal cell will use phased disposal techniques, as discussed more fully in the Safety Evaluation Report.

larger than 40 acres. This is clearly an issue that the EIS should address.

C3-9 7. The proposal includes a significant buffer zone (300 feet between the closest edge of any embankment and the outside site boundary or property line), as well as a buffer zone of 100 feet between the closest edge of any embankment and the Vitro site fence. (EIS 2.9). The EIS also indicates that the perimeter berm during construction would be replaced by a perimeter ditch, four feet deep and forty feet wide around the tailings impoundment. US Ecology wonders whether there has been a written affirmation by DOE that it will take title to the berm and/or the buffer zones at the time of final closure. The DEIS merely assumes that site ownership will be transferred to DOE and that DOE will accept it. (DEIS at 5.34). The question is: what constitutes the "site?"

This issue does not appear to be discussed in the DEIS although it is a question of some significance considering the fact that there are multiple sites at the South Clive facility. The sites include the DOE Vitro site, the proposed 11e.(2) site, a NORM/Low-Level Radioactive Waste (LLRW) disposal site (which is not owned nor committed to be owned by either the State of Utah or the Federal Government) and a mixed waste

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R3-9. Section 83 of the Atomic Energy Act of 1954, as amended, and Criterion 11C of Appendix A to 10 CFR Part 40 requires Federal or state ownership and custody of a site after closure. The Department of Energy (DOE) is presently the designated Federal Agency for this role. It is clear that DOE understands its responsibilities to take the site for long-term custodial care, if the state of Utah does not. The DEIS only discusses the 11e.(2) site. Long-term responsibility for the other separate adjacent disposal sites (NORM and LLW) is not an appropriate part of the environmental assessment made in the DEIS.

The perimeter ditch around the site would be part of the erosion protection system and as such, would be included in the area to be taken into custodial care by DOE. A perimeter road and fencing, if constructed, would also fall into this category. Any larger buffer zone can be used by Envirocare to show compliance with standards (primarily 10 CFR Part 20) during the life of the facility; however, post-closure compliance does not require the use of this buffer zone.

disposal facility (which also has no commitments regarding long-term federal or state ownership although it will contain LLRW). As a result of the potentially conflicting regulatory requirements, and the potential difficulties that may stem therefrom (e.g., such as determining the source and responsibility for any releases outside various cell boundaries whether within the site boundary or not), it would appear that the DEIS is flawed in not discussing what portion of this site DOE has formally agreed to accept.

Additionally, the most recent draft version of the NRC's Staff Technical Position (STP) entitled "Alternate Concentration Limits for Title II Uranium Mills" (December 1992), would require written concurrence from DOE if a licensee proposes to include lands beyond the tailings or impoundment boundary (ies) as part of the land to be transferred for long-term care. It would appear that this requirement would apply equally to the buffer zone and diversion channels if they are to become part of the final landform.

C3-10 8. The discussion of the Alternative 1, while describing the proposed stabilization plan in very general terms, nowhere mentions whether it would comply with NRC's recently "Final Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium

R3-10. In regard to long-term erosion protection, the reclamation design meets the criteria provided in the Staff Technical Position (STP). A discussion of compliance with the STP can be found in the Safety Evaluation Report.

Mill Tailings Sites (August, 1990)." Current Title II licensees all were recently required to revise their proposed reclamation plans in light of NRC's Final Staff Technica' Position, and a discussion of how the Envirocare proposal would comply with NRC's current stabilization criteria would appear to be appropriate in an NRC DEIS.

Specific Comments.

C3-11 1. The DEIS contains scant discussion of the proposed seven-foot thick clay cover to be acceptable, the cover should both reduce radon emanation to acceptable levels and retard the infiltration of moisture from precipitation. The second point is important because Envirocare proposes to use a rock armor as the final cover. The rock armor will act as a mulch and will trap and hold moisture from snow and rainfall that would otherwise blow away or evaporate. It is therefore likely that the cover would quickly saturate, even under the low areal precipitation. Once saturated, moisture would infiltrate through the cover and recharge the tailings. The saturated tailings would then become a long-term source of seepage and ground-water radionuclide contamination.

R3-11. Section 2.3.3 describes the use of a 15-cm (6-inch) filter zone beneath the rock armor; this filter zone is intended to drain much of the accumulated precipitation. In addition, Sect. 2.3.3.3 describes the top of the embankment to be convex with a gentle (2% or less) slope to promote drainage. These design features are discussed further in Sect. 5.3.4.

Because of these design features—and the high evaporation and the low annual precipitation rates in the vicinity of the site—there is little basis to assume that the cover will saturate quickly.

In regard to long-term seepage, see the response to Comment C3-7b.

2. **Section 2.3.2.3 Support Facilities.**

C3-12 Gray water from showers, etc., will likely be contaminated with 11e.(2) material and should therefore be considered byproduct material for the purposes of treatment and disposal. That is, it should be used only for dust control on the disposed tailings or evaporated in lined ponds specifically constructed for that purpose. The byproduct sludge from these ponds should also be placed in the final cell at the end of operations.

3. **Section 2.3.2.4 Support Facilities.**

C3-13 Decontamination Areas: No mention is made of radiological surveys of decontaminated equipment which should be conducted prior to releasing any trucks or rail cars that transport 11e.(2) materials to the site for unrestricted use. NRC should address this issue.

C3-14 Excavated Materials Area: Native vegetation should be used to stabilize the overburden and topsoil stockpiles. If vegetable growth cannot be sustained, the facility should use a commercial dust palliative to prevent particulation and excessive dust emissions.

R3-12. The NRC concurs with the comment; Sect. 2.3.2.3 of the DEIS states "Gray water from showers, . . . will be collected and piped to tanks. This water will be applied as dust suppressant to the disposed 11e.(2) byproduct material or to the adjacent LARW cell or will be placed in the evaporative tanks." Any sludge in the evaporative tanks will be properly disposed of.

R3-13. The Department of Transportation (DOT) regulations for removable contamination and gamma doses for transportation containers are codified in 49 CFR Part 173. The state of Utah also has decontamination requirements that are, in some cases, more stringent than DOT's. Prior to exiting the site, trucks and rail cars used in transportation of disposal material will be radiologically surveyed and decontaminated to satisfy the state of Utah regulations.

R3-14. The NRC concurs; overburden and topsoil stockpiles will be protected from erosion by chemical suppressants or by a vegetative cover.

4. Section 2.3.3 Principal Design Features.

C3-15 Excavating to a depth of 8 feet will not provide adequate berm material to construct cells of adequate size to contain the tailings. It appears that a significant portion of the waste is to be placed above grade - without protection from wind and water erosion - and covered later. Without wind protection, or continuous wetting, or the continuous application of a dust control agent, the tailings will blow and contaminate a large area outside the designated disposal cell(s). Further, in the event of a large rainfall occurrence, such as the PMP, berms that exceed the height of the tailings would both protect the tailings from the wind and would contain the full volume of tailings should an extreme precipitation event occur. It is likely that NRC would find a similar design (without berms) for a conventional tailings disposal cell inadequate, even for dewatered tailings, since byproduct material could be released under an extreme runoff event such as the PMP. The DEIS does not fully address these issues.

R3-15. Protection is provided against the Probable Maximum Precipitation (PMP) during the operational period by a berm configured and designed to contain the entire runoff from a local 6-hour PMP event. This is in accordance with the operational criteria contained in the NRC Staff Technical Position, WM-8201, *Hydrologic Design Criteria for Tailings Retention Systems* (January 1983). All rainfall occurring inside the berms will be contained, and no off-site releases of rainfall runoff will occur. If erosion of tailings occurs, it will occur inside the berms; no tailings will be released off-site. Additional discussion of the design of the berms can be found in the Safety Evaluation Report. Wind erosion will be controlled by the use of chemical suppressants and soil covers as appropriate.

Detailed consideration of these issues is being conducted as part of the Safety Review; further information can be found in the Safety Evaluation Report.

5. Section 2.3.3.1 Water.

C3-16 The DEIS dismisses the potential for significant recharge of the tailings due to infiltration. However, U.S. Ecology is aware that DOE sites reclaimed with rock covers in arid areas of the west have experienced significant recharge thought to be caused by the rock protection used to stabilize the piles for the long term. Further, experience using the EPA HELP model at DOE sites indicates around 1/2 inch of infiltration (recharge) would occur each year at the Clive area, assuming a vegetated surface. However, the Clive site will be protected with rock which may enhance recharge. Nonetheless, if one nonconservatively assumes 1/2-inch of recharge per year, the tailings would resaturate after relatively few years because of the relatively low tailings porosity. The resaturated tailings would then begin to seep and eventually saturate the liner. Further, if the processed clay liner proposed for the cell bottom is significantly less permeable than the cover, the cells will become "bathtubs" and exacerbate seepage by creating a significant driving head. Hence, NRC's arguments are not very convincing, especially given its own

R3-16. See the response to Comment C3-11 in regard to the infiltration of moisture from precipitation.

See the response to Comment C-7b in regard to long-term seepage.

The bottom liner is designed to have a hydraulic conductivity that is at least equal to the hydraulic conductivity of the cover. The applicant will be required to address the bathtubbing effects and demonstrate, prior to NRC's issuance of a license, that an unacceptable head build-up will not take place in the disposal cell.

Detailed consideration of this issue is being conducted as part of the Safety Review; further information can be found in the Safety Evaluation Report.

overriding concerns with infiltration at Title II sites.

6. 2.3.3.2 Radon Barrier.

C3-17 As noted previously, the rock cover that will ostensibly reduce potential drying of the recompacted clay will actually act as a water conserving mulch and thus promote moisture infiltration.

C3-18 Placing clay materials in 12 inch loose lifts has generally been frowned on by NRC at Title II sites. NRC usually prefers to see covers placed in loose lifts that do not exceed nine-inches and compact to 6 inches. Further, placing the clay material in thicker layers may require that the licensee test more frequently to assure that they attain 95 percent of maximum dry density. It is not clear whether NRC finds these proposed construction specifications acceptable for this site or why. This issue should be clarified in the DEIS.

R3-17. See the response to Comment C3-11.

R3-18. Construction via 30-cm (12-inch) thick loose layers of contaminated material will be satisfactory when the required degree of compaction is attained (not less than 95 percent of maximum dry density, as discussed in Sect. 2.3.3.2).

Detailed consideration of this issue is being conducted as part of the Safety Review; further information can be found in the Safety Evaluation Report.

7. 2.3.3.3 Erosion Barrier

C3-19 Again, the rock armor will serve as an infiltration-promoting mulch which will enhance tailings recharge and exacerbate potential long-term seepage.

8. 2.3.3.8 Long-term Maintenance

C3-20 Given its apparent concern with water quality at Title I sites, has DOE passed on the adequacy of the limited proposed liner design?

2.3.3.9 Construction Considerations

C3-21 NRC historically has not approved placement or compaction of soil materials in tailings embankments at less than 95 percent of maximum density and should explain why compaction at 90 percent of maximum density is acceptable in this instance.

C3-22 Also, NRC does not say whether the proposed site will have sufficient runoff storage to contain and evaporate the contaminated water that would accumulate if a significant precipitation event (e.g., 100 year return interval or greater) were to occur.

R3-19. See the response to Comment C3-11.

R3-20. The section referenced in the comment, Sect. 2.3.3.8, addresses the minimal long-term maintenance requirements for the embankment design. Nowhere does this section discuss a "limited proposed liner design;" it is unclear what the comment refers to in that regard.

DOE does not approve or concur with design aspects of NRC licensee submittals.

R3-21. NRC has historically accepted 90 percent compaction levels for contaminated fill at Title I sites. As discussed in Sect. 2.3.3.2, higher degrees of compaction (95 percent) have been used for structural berms, covers, etc.

R3-22. The site will have sufficient storage to contain the water from a significant precipitation event. See the response to Comment C3-15.

9. Section 4.4.1.3 Synthetic Flood Analyses

C3-23 The PMP analysis says nothing about the ability of the site to contain and/or evaporate the contaminated water that would accumulate if the PMP were to occur during operations. Also, NRC has not analyzed runoff velocities across the site, the tailings or the cell berms during operations. NRC should correct this deficiency. Further, if berms are not constructed to the full height required to contain the disposed tailings and PMP rainfall, the resulting runoff could erode and release a significant quantity of tailings.

C3-24 Also, as mentioned previously, the proposed cell has no drain to effect tailings dewatering. The porous tailings will inevitably absorb moisture during even incidental precipitation events and would absorb significant quantities of water if a large precipitation event were to occur. This moisture would return to the cell liner. NRC should examine this apparent deficiency and ensure that the design will comply with its 10 C.F.R. Section 40, Appendix A, criterion 5A requirements..

10. US Ecology notes that the DEIS does not contain any

C3-25 assessment of whether or not the facility will

R3-23. In regard to the ability of the design to contain and/or evaporate water, see the response to Comment C3-15.

As stated in Sect. 2.3.2.8, a discussion of runoff velocities and flow rates from severe rainfall and flooding was included in the analyses contained in the applicant's Environmental Report.

R3-24. See the responses to Comments R3-8 and R3-11. Criterion 5A of Appendix A to 10 CFR Part 40 is not applicable. Detailed consideration of this issue is being conducted as part of the Safety Review; further information can be found in the Safety Evaluation Report.

R3-25. Regulations contained in 40 CFR Part 61 specifically state (in Paragraph 250) that ". . . this subpart does not apply to the disposal of tailings." Control of residual radioactivity will be done in accordance with regulations in 40 CFR Part 192.

Furthermore, compliance with 10 CFR Part 20 is addressed in the Safety Evaluation Report and will be demonstrated by either measurement (monitoring) or calculations. The applicant is required to be in compliance with 10 CFR Part 20 to obtain and keep a license. These requirements will ensure that the applicant will comply with radiological dose criteria at all times.

comply during operations with the radon emission limit (20 pCi/m^2/s) contained in 40 C.F.R. Section 61.252(a). In addition, the DEIS states that, in general, "site specific assessments of potential radiological impacts from the proposed Envirocare 11e.(2) by-product material disposal facility are not sufficiently advanced to estimate occupational and public doses with confidence." (DEIS at 5.14). Indeed, the estimated radiological impacts appear to rely entirely upon the analysis prepared by DOE for the Vitro facility (DEIS at 5.16-.17). The discussion of DOE's evaluation appears to rely primarily on potential radiological impacts at the Vitro facility after closure as the flux rate from uncovered tailings at Vitro was assumed to be on the order of 560 pCi/m^2/s. This number would greatly exceed EPA's operational flux limit of 20 and the DEIS assumes that final cover will begin to be applied about 4 or 5 years after facility operations begin.

C3-26

C3-27

Further, it is evident that the radiological impact assessment appears substantially deficient when compared to similar assessments performed by applicants for uranium milling licenses. Since the site is essentially a uranium mill tailings disposal

R3-26. The estimated radiological impacts evaluated in the DEIS for the proposed disposal facility were based on actual environmental and occupational monitoring data for the Vitro facility reported during the period of disposal activity before the tailings were covered. The DEIS impact assessment took into consideration the anticipated source terms of the 11e.(2) material; however, it is not possible to predict with precision the exact radionuclide mix of the material that will eventually be disposed. For this reason, the DEIS approach relied on the Vitro experience and modified it as appropriate for the anticipated 11e.(2) byproduct material.

40 CFR Part 192 establishes the applicable radiological standards for process operations, as well as for the period after closure. "Dose limits" apply to the former, while "radon flux rates" apply to the latter. The DEIS appropriately utilizes radon flux rate values to describe potential impacts following closure of the facility.

R3-27. The radiological assessment and analysis in the DEIS was presented to assess potential environmental impacts, not to address compliance with radiological dose regulations. The NRC considers the analyses in the DEIS to be adequate; see also Comments C1-1 and C1-2.

site, it should be held to an equivalent level of analysis and be judged on that basis on its own merits. Therefore, the DEIS' evaluation of this issue appears to be wholly insufficient.

C3-28 It is also likely that at 560 pCi/gm, Radium-226, the designed unit will not comply with the Subpart W 20 pCi/m^2-sec radon emanation standard without concurrent covering or wetting of the tailings. Cover materials would occupy a significant percentage of the volume now allotted for tailings and do not appear to be accounted for in the overall site design. Wetting at a level sufficient to control radon emanation would likely saturate the tailings and cause contaminated seepage to accumulate on the impoundment "liner." Again, there is no cogent plan to control potential seepage releases.

C3-29 11. It is also worth noting that with respect to occupational exposures from radon, DOE made assumptions during closure at the Vitro site that were never validated because the State of Utah failed to measure radon concentrations during closure. (DEIS at 5.18).

R3-28. Compliance with Subpart W is beyond the scope of this environmental evaluation. However, the facility will be required to maintain compliance with all applicable regulations. In regard to long-term seepage, see the response to Comment R3-7b.

R3-29. The comment is noted; validation of DOE assumptions is not essential to the radiological assessment presented in the DEIS.

C3-30 12. The DEIS does not appear to discuss in any great detail how the Envirocare proposal will differ from the Vitro site and whether or not differences in the likely characteristics of the waste are significant in light of the recent revisions to 10 C.F.R. Part 20.[1] For example, the limits for release of thorium

C3-31 in 10 C.F.R. Part 20 have been reduced almost 300 times and would have potential compliance impacts with respect to both worker and environmental exposure.

The relatively high thorium-230 concentration in the tailings and an assumed release rate of 440 tons per year of particulate are further indications that the site may not meet the proposed thorium standard at the site boundary.

[1]It should be noted that EPA regulations for control and stabilized of uranium mill tailings (40 C.F.R. 192.350 et seq.) See also, 10 C.F.R. Part 40, Appendix A, Introduction.

R3-30. Section 5.2.8.2 of the DEIS related and contrasted the characteristics of the 11e.(2) material to those of the Vitro site. As discussed in Sect. 5.2.8.4, the analyses in the DEIS accounted for differences in waste characteristics between the Vitro site and the proposed Envirocare site.

Details of each candidate 11e.(2) material stream can be provided only in a general manner because of the great diversity in make-up and origin of such material. The weighted average radionuclide concentrations for 11e.(2) material were presented in Table 5.3; such concentrations were used in the radiological impact assessment.

Furthermore, Sect. 11e.(2) of the Atomic Energy Act of 1954, as amended, contains a definition of "byproduct material;" both the Vitro tailings and the material to be disposed in the proposed facility are "byproduct material" as defined.

R3-31. Section 5.2.8.4 of the DEIS discussed the issue of compliance with 10 CFR Part 20 in regard to release limits and monitoring activities; the applicant will be required to comply with 10 CFR Part 20 dose criteria at all times to obtain and keep a license.

The radiological assessment for compliance with 10 CFR Part 20 is contained in the Safety Evaluation Report.

LETTERS FROM THE "THORIUM ACTION GROUP"

Seventeen letters were received from members of a "Thorium Action Group" in West Chicago; Warrenville; and Winfield, Illinois. The seventeen letters unanimously urge that favorable consideration be given to the license application for the proposed Envirocare 11e.(2) disposal facility. Because of the similarity of the comments contained in those letters, they are not reproduced verbatim in this appendix, but rather are paraphrased below.

C4-1 *Please license the Envirocare site in Utah.*
Please expedite the license of Envirocare at Clive, Utah.
I urge you to grant the license to Envirocare of Utah as soon as possible.
Please ensure a speedy approval of the Envirocare license.

R4-1. The comments are noted.