Snake River Alliance, Commenter ID No. E4 (cont'd)

Furthermore, INL is in the midst of what the DOE considers a successful cleanup effort. To ship more nuclear waste to INL, particularly in light of the 1995 Settlement Agreement's waste removal requirements, seems irrational. E4-4

By and large, the analyses of the sites are merely cursory and not even sufficient to support narrowing the list of alternatives.

There is a fifth scenario that must be considered. The Snake River Alliance has long advocated that nuclear waste be stored as safely as possible as close to its point of generation as possible. That means that, by and large, nuclear waste stays where it is in hardened on-site storage, and commercial reactors in the east can't willy-nilly send their waste to the West. The Idaho National Laboratory has some GTCC waste that was generated in Idaho. For now, it would stay here in hardened on-site storage (HOSS). HOSS is *not* "no action." E4-5

The draft EIS does not include an adequate discussion of the licensing requirements for any new disposal or long-term storage facility. Nor is it apparent what agency would regulate facilities that handle both commercial and government waste. Those questions must be resolved. E4-6 E4-7

WIPP is the only deep geologic repository on the planet. It was opened with a promise to the people of New Mexico that it would be used *solely* for waste from nuclear weapons production. Commercial waste is specifically prohibited. The federal government can't now tell New Mexicans: "You took the nose, now take the camel." To do so would show every other community asked to host a permanent repository in the future that they might well get more than they bargained for. E4-8

Respectfully submitted,

Beatrice Brailsford
Program director

Hoss

E4-4 DOE is performing environmental restoration activities at INL. The ongoing cleanup effort will continue.

E4-5 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

E4-6 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

E4-7 DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process. DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

E4-8 Disposal of GTCC LLRW and GTCC-like wastes at WIPP or the WIPP Vicinity site is included in the range of reasonable alternatives and is evaluated in this EIS. DOE acknowledges that only defense-generated TRU waste is currently authorized for disposal at the WIPP geologic repository under the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and that legislation would be required to allow disposal of waste other than TRU waste generated by atomic energy defense activities at WIPP and/or for siting a new facility within the land withdrawal area. It would also be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit. In addition, site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads) as well as the proposed packaging for disposal.

However, NEPA does not limit an EIS to proposing and evaluating alternatives that are currently authorized. Furthermore, the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant recognizes that the mission of WIPP may change and provides provisions to modify the agreement. For example, the Agreement states: "The parties to this Agreement recognize that

Snake River Alliance, Commenter ID No. E4 (cont'd)

future developments including changes to applicable laws (e.g., Public Law [P.L.] 96-164) may make it desirable or necessary for one or both parties to seek to modify this Agreement. Either party to this Agreement may request a review of the terms and conditions."

DOE acknowledges the TRU waste disposal limitations for WIPP specified in the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and in the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant. Information on these limitations is provided in this EIS (see Section 4.1.1) and was considered in developing the preferred alternative. Based on the GTCC EIS evaluation, disposal of GTCC LLRW and GTCC-like wastes at WIPP would result in minimal environmental impacts for all resource areas evaluated, including human health and transportation. Both the annual dose and the latent cancer fatality (LCF) risk would be zero because there would be no releases to the accessible environment and therefore no radiation doses and LCFs during the first 10,000 years following closure of the WIPP repository. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require legislative changes and site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads), as well as the proposed packaging for disposal.

Snake River Alliance, Commenter ID No. T20

MR. BROWN: Thanks very much.

Beatrice Brailsford, and she will be followed by Dennis Donnelly.

BEATRICE BRAILSFORD: Thank you. My name is Beatrice Brailsford, I'm with Snake River Alliance, Idaho's nuclear watchdog and advocate for clean energy since 1979.

MR. BROWN: Can you speak a little more into the mic?

BEATRICE BRAILSFORD: Okay. The Alliance -- well, then I can't see my notes.

MR. BROWN: Okay.

BEATRICE BRAILSFORD: There. How is that? The Alliance will be submitting written comments, thank heavens. The Snake River Alliance has long advocated that nuclear waste is to be stored as safely as possible as close as possible to its point of generation. T20-1

T20-1 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

Snake River Alliance, Commenter ID No. T20 (cont'd)

After 9/11, the Alliance, many other organizations that share similar views, re-examined that perspective, and added the notion that the storage as close as possible to its point of generation should be in hardened on-site storage. T20-1 (Cont.)

I would like to state very firmly hardened on-site storage is not no action. You know, the whole notion that "If we don't move waste, we're not doing anything with waste," is not correct.

This study has a number of problems, and I will just note a couple of them. This -- the waste that we're talking about here is not even yet waste. It's still in the middle of the reactor buildings, by and large. It's not a waste stream. It is decades from being a waste stream. So we don't have to decide this evening what to do with it. It will be, what, 60 years before this waste stream is a waste stream.

Another issue with this particular study, all the sites, not surprisingly, are DOE sites, all of the sites that we're looking at for disposal of this waste. They don't necessarily have anything else in common other than that they're Department of Energy sites and they're already contaminated. T20-2

T20-2 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

Snake River Alliance, Commenter ID No. T20 (cont'd)

1 I would say that the DOE has to go back
2 and look more broadly down the road, "What do we need
3 for this kind of waste?" I would like to obviously
4 reiterate the notion that if the Nuclear Regulatory T20-3
5 Commission says this should be in a deep geologic
6 repository, then that is -- that's the starting point
7 for the analysis.
8 But the repository question as discussed
9 in this Draft, is a little odd. First of all, the
10 Department of Energy, the United States Government is T20-4
11 required by law to develop a second repository, other
12 than Yucca Mountain, and certainly other than WIPP.
13 The Waste Isolation Pilot Plant is by
14 law -- and, again, you know, the Department of Energy
15 is a government agency, by law, WIPP cannot accept T20-5
16 commercial waste. And I want to talk about that as
17 someone from Idaho. You know, Idaho sends a fair
18 amount of waste to other places for disposal,
19 noticeably WIPP, but, you know, the Nevada Test Site,
20 EnviroCare -- Energy Solutions, I'm sorry.
21 But we also receive waste for long-term
22 storage, noticeably from the Nuclear Navy. The --
23 there is, you know, the nuclear waste management has
24 a lot of aspects to it. It's, you know, a technical
25 problem. It's an economic problem, for sure. It's a

T20-3 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. In addition to a deep geologic repository, the GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

T20-4 The EIS considered the range of reasonable alternatives for the disposal of the GTCC waste inventory, including disposal in a deep geologic repository. DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

T20-5 Disposal of GTCC LLRW and GTCC-like wastes at WIPP or the WIPP Vicinity site is included in the range of reasonable alternatives and is evaluated in this EIS. DOE acknowledges that only defense-generated TRU waste is currently authorized for disposal at the WIPP geologic repository under the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and that legislation would be required to allow disposal of waste other than TRU waste generated by atomic energy defense activities at WIPP and/or for siting a new facility within the land withdrawal area. It would also be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit. In addition, site-specific NEPA reviews would have to be conducted, including further characterization of the waste (e.g., radionuclide inventory and heat loads) as well as the proposed packaging for disposal.

However, NEPA does not limit an EIS to proposing and evaluating alternatives that are currently authorized. Furthermore, the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant recognizes that the mission of WIPP may change and provides provisions to modify the agreement. For example, the Agreement states: "The parties to this Agreement recognize that future developments including changes to applicable laws (e.g., Public Law [P.L.] 96-164) may make it desirable or necessary for one or both parties to seek to modify this Agreement. Either party to this Agreement may request a review of the terms and conditions."

Snake River Alliance, Commenter ID No. T20 (cont'd)

1 cultural problem. And it's a social -- it raises
2 some social questions. And one of the most important
3 questions it raises is equity.
4 And if Idaho -- you know, the deal has
5 been made that Idaho will accept a certain number of
6 shipments a year of extraordinarily radioactive
7 waste, part of that deal is that Idaho is
8 acknowledged not to be the appropriate place for that
9 waste to stay until the end of time.
10 That's a deal we've made. If we then
11 advocate that it's okay for the DOE to break its deal
12 with the people of New Mexico, what's to stop the DOE
13 from breaking the deal with the people of Idaho?
14 Where do we stand in that equation?
15 As important, you know, on this planet,
16 nobody has really figured out how to establish a deep
17 geological repository for high-level waste. And if
18 we start breaking our promises to the only place on
19 this planet that has accepted the establishment of a
20 deep geologic repository, think how hard the next one
21 is going to be to establish.
22 You know, if folks in Finland, or folks
23 in any place else on the planet say, "Okay, New
24 Mexico said they would take a certain quantity of a
25 certain kind of waste and the United States

T20-6

DOE acknowledges the TRU waste disposal limitations for WIPP specified in the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and in the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant. Information on these limitations is provided in this EIS (see Section 4.1.1) and was considered in developing the preferred alternative. Based on the GTCC EIS evaluation, disposal of GTCC LLRW and GTCC-like wastes at WIPP would result in minimal environmental impacts for all resource areas evaluated, including human health and transportation. Both the annual dose and the latent cancer fatality (LCF) risk would be zero because there would be no releases to the accessible environment and therefore no radiation doses and LCFs during the first 10,000 years following closure of the WIPP repository. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require legislative changes and site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads), as well as the proposed packaging for disposal .

T20-6 See response to T20-2.

Snake River Alliance, Commenter ID No. T20 (cont'd)

1 Government broke their word," that's going to be a
2 problem. And it's certainly going to be a problem
3 here in Idaho if we start seeing the twinkle in the
4 eye of the federal government that it's going to
5 break its promise to us.
6 So I would say that the problem with
7 this Draft is there's no rush. It's like, we're
8 having to make this decision in 2012 to solve a
9 problem that we don't yet really have, and we're
10 looking at it -- a lot of what we're looking at as
11 alternatives are really not alternatives if we accept
12 the notion that the federal government is going to
13 obey the law.
14 So I would suggest that the Department
15 of Energy withdraw this Draft. I'm glad to hear that
16 other members of the public have advocated hardened
17 on-site storage. And I will say that I heard some
18 folks in the Blue Ribbon Commission the other day
19 speaking fairly acceptingly of that notion. Thanks.

T20-7

T20-7 DOE believes this EIS process is appropriate given the current circumstances. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS.

DOE believes that this EIS process is not being rushed. On the basis of an assumed starting date of 2019 for disposal operations, more than half (about 6,700 m^3 [240,000 ft^3] of the total GTCC LLRW and GTCC-like waste inventory of 12,000 m^3 [420,000 ft^3]) is projected to be available for disposal between 2019 and 2030. An additional 2,000 m^3 (71,000 ft^3) would become available for disposal between 2031 and 2035. This information is presented in Figure 3.4.2-1. DOE believes this EIS is timely, especially given the length of time necessary to develop a GTCC waste disposal facility.

DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. DOE plans a tiered decision-making process, in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

South Carolina Department of Health and Environmental Control, Commenter ID No. W2

From: gtcceiswebmaster@anl.gov
Sent: Friday, March 18, 2011 8:25 AM
To: mail_gtcceisarchives; gtcceiswebmaster@anl.gov
Subject: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10002
Attachments: GTCC_March_2011_GTCC10002.doc

Thank you for your comment, Michelle Wilson.

The comment tracking number that has been assigned to your comment is GTCC10002. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: March 18, 2011 08:24:48AM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10002

First Name: Michelle
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Privacy Preference: Don't withhold name or address from public record
Attachment: C:\fakepath\GTCC March 2011.doc

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

South Carolina Department of Health and Environmental Control, Commenter ID No. W2 (cont'd)

COMMENTS FROM THE
SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL
ON THE
DEPARTMENT OF ENERGY
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE DISPOSAL OF
GREATER-THAN-CLASS C (GTCC) LOW-LEVEL RADIOACTIVE WASTE
(LLRW) and GTCC-LIKE WASTE

March 18, 2011

1) The Savannah River Site (SRS) is not an appropriate location for additional radioactive waste burden given its current waste management status. Approximately thirty-seven million gallons of high-level mixed waste are stored in aging tanks with leak sites. A substantial volume of transuranic waste remains in storage at SRS awaiting appropriate disposition. Radioactive contamination remains in many areas slated for future cleanup decisions. Disposal of Greater-Than-Class C (GTCC) and GTCC-like waste is inappropriate at SRS given the current cleanup backlog. Any new disposal activities at SRS would influence future cleanup and closure decisions, given the objective of the State to minimize residuals remaining at SRS for long-term care. W2-1

2) Any new mixed waste disposal activities at SRS would have to meet the requirements for new disposal facilities in R.61-104. Hazardous Waste Management Location Standards in addition to other disposal facility requirements including R.61-79. South Carolina Hazardous Waste Management Regulations. W2-2

W2-1 DOE is performing environmental restoration activities at SRS. The ongoing cleanup effort will continue. If GTCC LLRW or GTCC-like waste were to be disposed at SRS, DOE does not anticipate negative impacts to ongoing cleanup activities at this site.

W2-2 Comment noted. Development of the waste acceptance criteria for the new GTCC disposal facility would be in accordance with the final facility design and site requirements.

Southwest Research and Information Center, Commenter ID No. L6

SOUTHWEST RESEARCH AND INFORMATION CENTER
P.O. Box 4524 Albuquerque, NM 87106 505-262-1862 FAX: 505-262-1864

June 27, 2011

Mr. Arnold M. Edelman, EIS Document Manager
U.S. Department of Energy
GTCC EIS
Cloverleaf Building, EM-43
1000 Independence Ave., S.W.
Washington, D.C. 20585 VIA ELECTRONIC MAIL

RE: Comments on the Draft Environmental Impact Statement for the Disposal of Greater-Than-Class-C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D)

Dear Mr. Edelman:

Southwest Research and Information Center (SRIC), a 40-year-old nonprofit organization with more than 35 years experience in working on nuclear waste issues, submits these comments in response to the Department of Energy (DOE) Draft Environmental Impact Statement for the Disposal of Greater-Than-Class-C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D). These comments are in addition to letters from SRIC during the comment period and oral testimony provided at the Albuquerque hearing on April 27, 2011. DOE must respond to these comments and all of the previous ones.

The GTCC Draft Environmental Impact Statement (DEIS) is fatally flawed legally, as a matter of public policy, and technically. It does not provide an adequate basis for a final EIS. Therefore, the EIS process must stop and start over.

1. The GTCC DEIS is the wrong document. DOE must instead prepare a programmatic EIS (PEIS) for Greater-than-Class C wastes, and issue a supplemental or new PEIS for DOE wastes ("GTTC-like").

DOE has never prepared a PEIS for GTCC wastes, and it must do so as a prerequisite for preparing an EIS to choose specific disposal sites and technologies. DOE does not know what the types and amounts of GTCC waste there will be from existing commercial powerplants, from planned plants, and from other activities. A PEIS including storage and disposal alternatives has not been done and must be done before a draft EIS for disposal is issued. Such a PEIS should address issues that are not included in the DEIS, including: L6-1

- Should DOE sites be used for commercial wastes?
- Could GTCC waste be disposed in a high-level waste/spent nuclear fuel (HLW/SNF) repository?
- What are the options for GTCC waste storage at existing reactor sites for several decades or more

L6-1 DOE does not agree that a programmatic EIS as described in this comment must be prepared before this EIS is completed. DOE tailored the scope of this EIS to ensure the analyses will adequately inform the decisions at issue, including the selection of sites and technologies for the disposal of GTCC and GTCC-like waste. This EIS presents the environmental information needed to adequately inform decision makers regarding many of the questions and points raised in this comment; other questions and points raised remain outside of the scope of this document. DOE plans a tiered decision making process in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

Regarding the types and exact amount of GTCC from existing commercial power plants ultimately requiring disposal, DOE does not agree this is an issue warranting preparation of a PEIS as a prerequisite to this EIS. Nevertheless, considerable attention is given to waste inventories in this EIS, which quantifies and analyzes potential impacts from the range of potential quantities of wastes from commercial power plants as well as from other types of GTCC waste. The EIS is structured to inform potential decisions to employ different technologies and disposal sites from the different types of GTCC and GTCC-like wastes, as is the case under the preferred alternative identified in this Final EIS.

Contrary to points raised in this comment, this EIS also provides substantial attention to inventories and characteristics of GTCC-like wastes and analyzes in detail potential impacts of transportation and disposal options. This EIS also answers the question posed regarding whether GTCC waste could be disposed of in a repository for high-level waste and spent nuclear fuel; the EIS concludes that use of a geologic repository would be a protective and safe method for disposal of the entire inventory of GTCC and GTCC-like wastes evaluated in this EIS (see response to A.2.3 under *Topics of Interest*).

The issues raised in the comment regarding regulatory factors such as NRC licensing do not affect the health and environmental analyses which are appropriately the subject of this EIS, and do not support the proposition that a PEIS is needed. Those matters would be addressed as DOE proceeds to implement future decisions pursuant to this EIS, which is focused on the identification of a suitable location or locations for the safe and secure disposal of these wastes; accordingly, DOE proposes to make a site-specific decision.

The EIS explains why existing commercial sites are not available for inclusion in the scope of this EIS and why analysis of generic commercial sites for future consideration is a valid approach (see Chapter 12). DOE's treatment of this topic is programmatic in nature, consistent with DOE's understanding of the comment. Issues pertaining to storage of GTCC LLRW and GTCC-like waste are outside the scope of this EIS, which is focused on disposal of the waste as stated in DOE's Purpose and Need for Action and in the Proposed Action itself. The Final EIS includes a No Action Alternative, in which long-term storage of GTCC LLRW is analyzed (Chapter 3).

DOE does not agree that the draft GTCC EIS is fatally flawed legally, as a matter of public policy and technically. DOE believes that the draft GTCC EIS provides an adequate basis for the Final GTCC EIS. Refer to specific comment responses in L6 that address each of these areas in more detail.

Southwest Research and Information Center, Commenter ID No. L6 (cont'd)

- What are the options for consolidating GTCC waste storage at commercial site(s)?
- What are the options for commercial sealed sources without a disposal path?
- *Could commercial sealed sources be secured and/or disposed without being co-mingled with* other GTCC wastes?
- Could any of the existing commercial low-level waste (LLW) disposal sites meet technical requirements for storage or disposal of some or all of the GTCC wastes?
- What are the possible disposal options; and is Nuclear Regulatory Commission (NRC) licensing required?
- What changes are needed in NRC regulations for the various disposal options?
- What changes are needed in NRC regulations regarding transportation?
- What changes in NRC regulations are required if a licensed facility (nuclear power plant or *other NRC licensee) sends waste to an unlicensed facility (DOE disposal sites)?*

SRIC and other commentors requested a PEIS during the scoping process. The DEIS states that those comments were considered to be outside the scope of the EIS. The cursory response in the DEIS is: L6-1 (Cont.)

> "This EIS has been scoped to provide adequate environmental information to support the decision-making process to identify an appropriate site(s) and technology(s) to dispose of a limited amount of GTCC LLRW and GTCC-like waste. If appropriate, DOE would conduct further NEPA review, tiered from this EIS, before implementing decisions." at A-12.

That response is totally inadequate and does not even describe the matters that have been raised in support of a PEIS, let alone providing a reasoned basis for not proceeding with the requested PEIS. That response also does not address the many issues that have yet to be answered that should be addressed in a PEIS. Thus, the need for a PEIS remains. Further, what kind of EIS is required also is certainly not outside the scope of an EIS.

Regarding "GTCC-like" waste, DOE issued a **Waste Management Programmatic Environmental Impact Statement** *(DOE/EIS-0200-F) in May 1997.* That PEIS included, or should have included as low-level or transuranic waste, much if not all of the waste that is now called "GTCC-like" waste. See, pages 1-23 to 1-31. Thus, since DOE is now considering alternative technologies and sites for such waste that were not included in the Waste Management PEIS, the required procedure is to supplement that PEIS for those "GTCC-like" wastes. Such a supplement should, among other things, discuss: L6-2

- Whether there should be such a category as "GTCC-like" waste and what are its specific characteristics or whether the waste is included in low-level waste, mixed low-level waste, transuranic waste, or environmental retoration waste;
- Inventory of such waste;
- Detailed description of and options for DOE wastes with no disposal path;
- Alternative storage technologies;
- Alternative DOE sites for storage and disposal;

2

L6-2 DOE is not contemplating a change in its decisions regarding the waste analyzed in the Waste Management Programmatic EIS (WM PEIS). The GTCC and GTCC-like wastes having characteristics that would permit those wastes to meet established Waste Acceptance Criteria are considered for disposal in existing disposal facilities evaluated in the WM PEIS. GTCC LLRW and GTCC-like wastes that may not be qualified for disposal in existing facilities would have to be disposed of in safe and secure facilities suitable for those wastes, and new construction is evaluated in this EIS. For the purposes of analysis, this EIS uses the term "GTCC-like waste" to distinguish DOE wastes having characteristics similar to commercial GTCC waste. Chapter 1 and Appendix B provide detailed information on the definition and inventory of these wastes. As stated above, this EIS includes a No Action Alternative, in which long-term storage is analyzed.

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- Cumulative impacts of storage and disposal, including existing and future missions of each DOE site;
- Transportation options and their impacts;
- Environmental impacts of the various technologies and alternatives;
- Licensing requirements that exist or would be needed for DOE sites to take commercial wastes.

L6-2 (Cont.)

SRIC further suggests that DOE conduct a scoping process for the WM PEIS supplement, including an analysis of whether an entire new EIS process is needed, given that the WM PEIS is 14 years old.

2. The DEIS is legally flawed because it does not consider all reasonable alternatives. Council on Environmental Quality (CEQ) regulations under the National Environmental Policy Act (NEPA) clearly state that alternatives including the proposed action are:

> "the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (§1502.15) and the Environmental Consequences (§1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public. In this section agencies shall:
> (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
> (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
> (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
> (d) Include the alternative of no action.
> (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
> (f) Include appropriate mitigation measures not already included in the proposed action or alternatives." 40 CFR § 1502.14 (emphasis added).

L6-3

The DEIS totally fails to fulfill the requirement to "consider all reasonable alternatives."

A. The DEIS does not consider the only alternative that is consistent with existing law – GTCC waste disposal in a licensed geologic repository under the Nuclear Waste Policy Act (NWPA).

The NWPA, Public Law 97-425, as amended, (42 U.S.C. § 10101 et seq.) requires the federal government to site, construct, and operate "repositories that will provide a reasonable assurance that the public and the environment will be adequately protected from the hazards posed by high-level radioactive waste and such spent nuclear fuel as may be disposed of in a repository." 42 U.S.C. § 10131(b)(1). The NWPA does not preclude disposal in such repositories of GTCC waste.

3

L6-3 As explained in in Section 2.6, DOE determined that Yucca Mountain is not a reasonable alternative for this EIS. DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

The Blue Ribbon Commission (BRC) on America's Nuclear Future, in its final report to DOE on January 26, 2012, provided recommendations, which included the development of one or more permanent deep geologic facilities for the safe disposal of spent nuclear fuel and high-level radioactive waste and the development of one or more consolidated interim storage facilities as part of an integrated, comprehensive plan for managing the back end of the nuclear fuel cycle. In its Strategy for the Management and Disposal of Spent Nuclear Fuel and High Level Radioactive Waste (DOE 2013), developed in response to the BRC Report, the Administration agreed "that the development of geologic disposal capacity is currently the most cost-effective way of permanently disposing of used nuclear fuel and high-level radioactive waste while minimizing the burden on future generations" and proposed to "engage in a consent-based siting process and begin to conduct preliminary site investigations for a geologic repository." The Administration's goal is to have a repository constructed and its operations started by 2048. The Administration will work with Congress using the strategy as an actionable framework for building a national program for the management and disposal of the nation's used nuclear fuel and high-level radioactive waste (DOE 2013).

DOE has identified DOE sites that do have compatible missions and existing infrastructure to support the disposal of GTCC LLRW and GTCC-like wastes. DOE also included an analysis of generic commercial facilities in the event that such a facility could become available in the future. DOE plans a tiered decision-making process, in which DOE would conduct further project-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

As described in the comment, this EIS considers the use of HOSS to be outside the scope of the EIS. This approach would not satisfy the purpose and need to isolate the waste permanently, and accordingly, it would not be a reasonable alternative. DOE recognizes that the longer the waste would remain in storage, the higher the risk it could re-enter the environment over a long term. Further, the No Action Alternative provides a comparatively conservative analysis of the potential health and environmental impacts of long-term storage. See A.2.3 under *Topics of Interest* for a further discussion.

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As amended by Congress in 1987, the NWPA designates Yucca Mountain, NV as currently the only site undergoing development as a repository. However, the NWPA continues to maintain the requirement for repositories, noted above. The NWPA also places a limit of 70,000 metric tons of HLW/SNF in the first repository (42 U.S.C. § 10134(d)), thereby allowing for other future repositories. The NWPA also requires the Secretary of Energy to report to the President and Congress on the need for a second repository. § 161(b). Such a report was issued in December 2008 and, among other things, stated: "Unless Congress raises or eliminates the current statutory capacity limit of 70,000 MTHM in the NWPA, the Nation will need a second repository for SNF and HLW." *The Report to the President and the Congress by the Secretary of Energy on the Need for a Second Repository* (DOE/RW-0595) at 2. Congress has not taken any action to raise or eliminate the capacity limit.

Thus, existing law requires development of Yucca Mountain as the first repository and does not *prohibit GTCC waste disposal in that repository. Thus, consideration of Yucca Mountain for* GTCC disposal is a reasonable alternative.

In its Notice of Intent (NOI), DOE stated that the GTCC EIS "intends to analyze disposal at Yucca Mountain in Nevada." 72 *Federal Register* 40137, c.3. The NOI also included Yucca Mountain as Alternative 3." 72 *Federal Register* 40138, c.2.

However, the DEIS does not include Yucca Mountain as an alternative. The DEIS states that:

> "since publication of the NOI, the Administration has determined that developing a permanent repository for high-level waste and spent nuclear fuel at Yucca Mountain, Nevada, is not a workable option and that the project should be terminated....Therefore, because a repository for high-level waste and spent nuclear fuel at Yucca Mountain has been determined not to be a workable option *and will not be developed, co-disposal at a Yucca Mountain repository is not a* reasonable alternative." at 2-9.

L6-3 (Cont.)

SRIC has long maintained that Yucca Mountain is not a safe repository site for many reasons, including that it is not a technically suitable site and does not meet the requirements of 40 CFR 191. Thus, SRIC would oppose the use of Yucca Mountain for SNF, HLW, GTCC, or "GTCC-like" storage or disposal. However, just as SRIC opposes use of the Waste Isolation Pilot Plant (WIPP) for GTCC disposal, as will be discussed further below, WIPP can be considered a legally reasonable alternative and Yucca Mountain can also be considered a legally reasonable alternative.

Even if DOE does not consider Yucca Mountain as a reasonable alternative, it *must* include a future repository or repositories as reasonable alternative(s). The exclusion of any consideration any SNF/HLW repository as a reasonable alternative for GTCC *disposal is clearly contrary to law. Even if DOE does not take SRIC's recommendation* to undertake one or more PEISs, it cannot issue an Final EIS and must instead issue a new DEIS that includes at least one SNF/HLW repository as a reasonable alternative.

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B. The DEIS does not adequately consider disposal at specific commercial sites as a reasonable alternative.

The DEIS considers that DOE geologic repositories are not the only reasonable alternatives for GTCC waste disposal. The DEIS does not demonstrate that near surface disposal technologies could only occur at DOE sites. Indeed the DEIS includes two "WIPP Vicinity" sites, and four "generic regional commercial disposal sites." Yet the DEIS does not include any of the eight commercial LLW disposal sites as reasonable alternatives. Over the past 50 years, disposal of LLW has occurred at Barnwell, SC; Beatty, NV; Energy Solutions, Clive, UT; US Ecology, Richland, WA; Maxey Flats, KY; Sheffield, IL; and West Valley, NY. In addition, Waste Control Specialists, Andrews, TX may receive LLW in the future.

GTCC waste will be generated and stored at dozens of commercial nuclear power plants and other sites around the country over the next several decades. Yet none of those specific locations are considered reasonable alternatives of GTCC waste disposal in the DEIS.

The DEIS does not specifically analyze whether any of the commercial LLW disposal sites (active and closed) could be used for the technologies that do not require geologic disposal. The DEIS also does not analyze whether at least one of the dozens of commercial generation and storage sites (now and in the future) could be used for the technologies that do not require geologic disposal. That none of those sites has "volunteered" to be considered for GTCC waste disposal does not mean that each one of them is unsuitable.

The "generic" sites included in the DEIS are more appropriate for a PEIS and are certainly not identified sufficiently for the environmental analysis required for the DEIS for disposal alternatives. L6-3 (Cont.)

C. The DEIS does not considered Hardened On Site Storage (HOSS) as a reasonable alternative. Dozens of scoping commentors advocated that HOSS be considered as an alternative. The DEIS states that those comments were considered to be outside the scope of the EIS. On page 1-43 (and very similar language on A-9):

> Comment: Hardened on-site storage (HOSS) should be added to the alternatives evaluated in the EIS. In addition, HOSS should be the preferred alternative.
> Response: HOSS and other waste storage approaches beyond the No Action Alternative are considered to be outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005, DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. In addition, the No Action Alternative evaluates storage of this waste consistent with ongoing practices.

However, the DEIS analysis of the No Action Alternative is that "current practices for storing GTCC LLRW and GTCC like waste would continue." at 3-1. That is not an analysis of HOSS. It is a reasonable alternative to consider HOSS as improved on-site storage. "Principles for Safeguarding Nuclear Waste at Reactors" have been endorsed by SRIC and citizen organizations based in all 50 states. Attachment 1. Those organizations support numerous actions that are

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much different practices than the DEIS "no action" alternative. Those practices are not geologic disposal, but rather would result in SNF (and GTCC waste) being stored as close as possible to existing reactors (active or decommissioned) for decades in more secure storage than has been used for the past 50 years at reactor sites.

The DEIS has not analyzed whether HOSS would provide storage of GTCC waste that is more secure and would have lesser environmental impacts than its "no action" alternative. The DEIS also has not analyzed whether HOSS would provide equivalent and improved environmental protection to GTCC waste compared with the "no action" alternative or the action alternatives. L6-3 (Cont.)

To dismiss HOSS because it is not "disposal" is unreasonable. None of the disposal technologies other than geologic disposal has been demonstrated to meet NRC disposal requirements for GTCC waste. Given that there has never been a U.S. geologic repository for commercial waste, it is certainly reasonable and possible that there will be no disposal site for GTCC waste for decades or centuries. During such an extended period of time with no GTCC disposal, DOE and Congress should consider what the environmental impacts of long-term storage at reactors of the approximately 160,000,000 curies of GTCC waste would be.

3. The DEIS is legally flawed because it does not adequately state a purpose and need. There is no clear statement of purpose and need beyond: "There is currently no disposal capability for GTCC LLRW." at 1-2. However, there is currently no disposal capability for high-level waste. There is no current disposal capability for spent nuclear fuel. Thus, the lack of "disposal capability" is not a sufficient statement of need. NEPA requires the need to be properly defined. Here again, SRIC believes that an adequate statement of need should be developed and addressed through programmatic EISs.

The DEIS seems to indicate that the near-term issue is the protection of disused sealed sources, including storage and disposal of commercial sealed sources, which comprise less than one percent of the activity and volume of GTCC waste. The DEIS makes no showing that current storage methods and locations are inadequate. The DEIS provides no adequate information that current storage methods under the no action alternative or some enhanced no action alternative are not sufficient for the next few decades. If there is a current problem with storage and security of sealed sources, that issue should be specifically addressed. Such an analysis would include, among other things, inventory, current storage capabilities and vulnerabilities, options to improve storage, reasonable storage technologies, reasonable storage locations, need for disposal if secure storage for decades exists. Such an analysis could provide the information and clear choices that decisionmakers and the public need and that NEPA requires. L6-4

Although sealed sources appears to be an overriding concern for DOE, the DEIS does not provide any analysis of many of the existing sealed sources. The DEIS states:

> "Sources recovered by GTRI/OSRP for national security or public health and safety reasons are stored at LANL or off-site contractor facilities pending disposal....To date, all of the sources recovered by GTRI/OSRP have an identified path to disposal and are therefore not included in the GTCC EIS inventory." at. 1-17. L6-5

6

L6-4 DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action is stated in the EIS (Section 1.1). The potential security concerns presented by disused sealed sources are also discussed in Section 1.1 of the EIS.

L6-5 Section 1.4.1.2, Sealed Sources, describes the sealed sources included in the GTCC EIS inventory. To date, all of the sources recovered by GMS/OSRP have an identified path to disposal and are therefore not included in the GTCC EIS inventory. Storage of sources recovered by GMS/OSRP at LANL or off-site contractor facilities is outside the scope of this EIS.

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Thus, the DEIS does not discuss all sealed sources, nor does it describe and analyze those "off-site contractor facilities" and what role they could play regarding the sealed sources that are included in the DEIS. L6-5 (Cont.)

The DEIS Table 1.4.1-2 indicates that 98 percent of the radioactivity in the wastes included in the DEIS are activated metals from decommissioned nuclear power plants. The DEIS, however, never includes readily available information from the Nuclear Regulatory Commission website, (http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html), regarding the actual licensing status of licensed nuclear power plants. That information indicates that of the 104 operating reactors, 66 are licensed to 2030 or beyond; 18 more renewal applications under review; and at least 11 more renewal applications expected. Therefore, at least 85% of existing reactors expect to operate beyond 2030 – which means GTCC activated metals disposal is not available to even begin disposal for years after that. L6-6

The DEIS does not analyze and discuss why when 98 percent of the radioactivity of GTCC waste is not available for disposal for more than two decades into the future that there is a need to make a determination about disposal technologies and sites now for those wastes. There should be an analysis of whether it is premature to make any technology and disposal site decisions so far in advance of when waste is actually available for disposal. In fact, an adequate DEIS would state that apparently the only reasonable alternative for the next few decades is on-site storage of such activated metals.

The DEIS inappropriately conflates different purposes and needs into the DEIS, contrary to NEPA requirements. There is a perceived need to secure sealed sources as soon as possible. There is not a need to make disposal decisions about approximately 98 percent of GTCC wastes. There is no analysis of whether storage, including improved storage through HOSS would make the timeframe for decisions about activated metals from decommissioned nuclear power plants disposal technologies and sites even several more decades into the future. L6-7

Once again, a PEIS would provide the appropriate NEPA document to discuss these issues so that decisionmakers and the public are aware of the purpose and need, including timeframes for decision and action regarding the various GTCC wastes.

4. The DEIS is legally flawed because it does not adequately consider cumulative impacts. CEQ regulations under NEPA and caselaw clearly require consideration of cumulative impacts. CEQ regulations state:

> "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 CFR § 1508.7 L6-8

The Supreme Court has clearly ruled that cumulative impacts must be analyzed in an EIS:

7

L6-6 DOE agrees that most of the activated metals from nuclear power plants will not be generated for decades. DOE did determine that including these activated metals in the preferred alternative (Section 2.10 of this Final EIS) was appropriate.

L6-7 DOE believes this EIS process is appropriate given the current circumstances. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS. DOE believes that this EIS process is not being rushed. On the basis of an assumed starting date of 2019 for disposal operations, more than half (about 6,700 m^3 [240,000 ft^3] of the total GTCC LLRW and GTCC-like waste inventory of 12,000 m^3 [420,000 ft^3]) is projected to be available for disposal between 2019 and 2030. An additional 2,000 m^3 (71,000 ft^3) would become available for disposal between 2031 and 2035. This information is presented in Figure 3.4.2-1. DOE believes this EIS is timely, especially given the length of time necessary to develop a GTCC waste disposal facility.

DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. DOE plans a tiered decision-making process, inwhich DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

As described in the comment, this EIS considers the use of HOSS to be outside the scope of the EIS. This approach would not satisfy the purpose and need to isolate the waste permanently, and accordingly, it would not be a reasonable alternative. DOE recognizes that the longer the waste would remain in storage, the higher the risk it could re-enter the environment over a long term. Further, the No Action Alternative provides a comparatively conservative analysis of the potential health and environmental impacts of long-term storage.

DOE agrees that most of the activated metals from nuclear power plants will not be generated for decades. DOE did determine that including these activated metals in the preferred alternative (Section 2.10 of this Final EIS) was appropriate. However, a path for disposal is included in the preferred alternative described in Section 2.10 of this Final EIS.

L6-8 DOE has considered cumulative impacts of disposal of GTCC LLRW and GTCC-like waste at all of the alternative sites evaluated in this EIS. Past practices are reflected in the Affected Environment sections for each alternative site, while reasonably foreseeable actions are discussed with the respective resource area impact results in all the site Chapters. Worker exposures are also discussed within each of the site chapters and the impact assessment methodologies l approach is discussed in Appendix C.

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> "when several proposals for ...actions that will have a cumulative or synergisic environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considereed together." *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976).

All of the DOE sites considered in the DEIS have other missions with their own environmental impacts. An adequate EIS must consider the impacts of those past, present, and future activities and the impacts of GTCC disposal. The DEIS makes no serious attempt to provide such an analysis, as the cumulative impact discussion does not fully describe and evaluate the existing impacts at each site, let alone the additional cumulative and synergistic impacts of GTCC waste.

Among the needed analyses is consideration of historic and current releases of radioactive and hazardous contaminants into the environment. The DEIS does not detail the current inventories of radioactive and hazardous materials at each DOE site, nor describe and analyze the current and past releases of contaminants. The DEIS does not discuss the additional impacts that GTCC wastes would have, nor does it discuss the impacts that management of existing waste at each site could have on GTCC waste disposal.

Among the needed analyses is consideration of historic and current contamination and illnesses of workers. Because of the actual (and underestimated and underreported) contamination of workers and contractors at DOE sites, Congress enacted the Energy Employees Occupational Injury Compensation Program (EEOICP) of 2000. The EEOICP covers radiation-induced cancers (Part B) and exposures to toxic substances (Part E). More than $7 billion has been paid in compensation and medical expenses for tens of thousands of DOE workers and contractors. http://www.dol.gov/owcp/energy/regs/compliance/weeklystats.htm. Each of the DOE sites being considered in the DEIS has compensated workers. An adequate DEIS would, among other things, include detailed information about the workers and contractors involved with EEOICP, including the specific illnesses, timeframes of the employment and contamination, sources of contamination, and how past and current monitoring data compares with the findings of the dose reconstruction and other claims decisions. The DEIS would analyze how the new and additional exposures to workers handling GTCC waste would contribute to future worker health effects. L6-8 (Cont.)

While contamination and worker exposures at other DOE sites have been reported in the media, SRIC especially believes that a description and analysis of worker exposures and illnesses at WIPP are especially important, given the site's mission to "start clean and stay clean." The large amounts of additional radioactivity in GTCC waste coming to WIPP also could increase worker radiation exposure. Such exposures may already be a problem at WIPP. Under the EEOICP, four WIPP workers have been approved for compensation for work-related illnesses from radiation exposure. http://www.dol.gov/owcp/energy/regs/compliance/statistics/WebPages/WASTE_ISO_PILOT.htm. SRIC has made further inquiries to the Department of Labor and has been informed that all four workers also have been employed at other DOE sites. Thus, while their illnesses are definitively from radiation exposure, how much of the exposure is WIPP-related has not been determined. Nevertheless, worker radiation exposure must be addressed. In addition, there are also six decisions under Part E regarding toxic substances exposure and illness. The cumulative impacts

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of additional radioactive and hazardous chemical exposures has not been discussed and analyzed in the DEIS. L6-8 (Cont.)

5. The DEIS has insufficient policy options because it effectively considers only DOE sites for commercial waste disposal.

The burden of disposal of 160,000,000 curies of commercial wastes should not be limited to DOE sites that have an enormous inventory of waste to manage, some of which DOE estimates will be ongoing for more than 50 years. To create the burdens of additional waste transportation and disposal at DOE sites is inappropriate. An adequate PEIS and EIS must seriously consider specific non-DOE sites that can have similar environmental analysis as DOE sites. Just as communities near DOE sites have received the economic activity – and the environmental burden – of nuclear weapons activities, so too communities near power plants must receive economic activity and the environmental burden of nuclear power. Not even seriously considering sites at or near commercial nuclear power plants for GTCC disposal is not consistent with fairness and good public policy. The generic commercial locations in the DEIS do not provide for comparing the site specific impacts that NEPA and good public policy require. L6-9

6. The DEIS has insufficient policy options regarding regulatory requirements.

The DEIS makes assumptions about regulatory requirements without providing adequate basis. Moreover, such assumptions are not the only reasonable ones. Thus, decisionmakers and the public are not provided with sufficient information and policy options.

The DEIS states:

> "Available information indicates that much of this waste is characteristic hazardous waste as regulated under the Resource Conservation and Recovery Act (RCRA); therefore, this EIS assumes that for the land disposal methods, the generators will treat the waste to render it nonhazardous under federal and state laws and requirements." at 1-12.

That assumption is not the only reasonable one. It is certainly possible that some or all of the waste will not be treated to render it nonhazardous. That such treatment will not occur is clearly a reasonable and realistic option. Further, the DEIS does not discuss the costs for such treatment. The DEIS does not discuss the treatment technologies, including whether there are existing treatment technologies for all of the waste. The DEIS does not discuss why treatment will occur given that there is no legal or regulatory requirement to do so. L6-10

The DEIS states:

> "NRC regulations at 10 CFR 61.55 (a)(2)(iv) require that GTCC LLRW must be disposed of in a geologic repository unless alternative methods of disposal are proposed to the NRC and approved by the Commission." at 1-20.

The DEIS assumes that proposed alternative methods (boreholes, trenches, vaults) will be approved by NRC. However, the DEIS presents no information or evidence to support that assumption.

9

L6-9 See response to L6-1.

L6-10 DOE does not agree that the EIS does not provide an adequate basis for its content regarding regulatory requirements. For example, waste having characteristics that would cause it to be regulated under RCRA would be disposed of only in facilities having the requisite RCRA permit(s), and such waste would be treated to comply with RCRA specifications.

NEPA does not require agencies to include detailed cost analyses in their EISs. DOE would consider costs among other factors, as well as the results of the EIS and public comments, in decision making about disposal facilities to be used, their locations, and the necessary treatment technologies.

Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

The EIS evaluates the range of reasonable alternatives as required under NEPA. Accordingly, the scope is adequate to inform potential decisions and outcomes postulated in this comment, such as the potential disposal of different types of GTCC waste at different sites using different technologies (see response to comment L6-1).

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Once again, the assumption in the DEIS is not the only reasonable one. An adequate DEIS would analyze the option that some or all of the GTCC waste would not be approved for the alternative methods. An adequate DEIS would analyze whether some or all of the GTCC waste could be disposed in commercial LLW disposal sites. An adequate DEIS would analyze each of the waste types and describe what information would be needed for such waste to be licensed under each alternative method. An adequate DEIS would analyze each of the waste forms and describe what information would be needed for the existing waste form to be licensed under each alternative method. An adequate DEIS would analyze each of the waste forms and describe what information would be needed for alternative waste forms to be licensed under each alternative method. An adequate DEIS would analyze each of the existing waste containers and describe what information would be needed for alternative containers to be licensed under each alternative method. L6-10 (Cont.)

7. The DEIS has insufficient policy options because it considers "disposal" as the only policy option.

Some of the radionuclides in GTCC waste – uranium and plutonium-239, for example – have half-lives of tens of thousands of years or more and pose dangers to public health and the environment for thousands of generations. The DEIS does not discuss the fact that those timeframes are longer than human history. Therefore, humanity has no adequate basis to determine the range of information needed by future generations that will be affected by those wastes.

An important issue not discussed in the DEIS is will disposal site(s) attract intrusion by future generations, as, for example, the pyramids of Egypt and Yucatan have attracted recent generations? What are the impacts of human intrusion on the performance of the disposal site? What is the reliability of today's assumptions and calculations about the environmental impacts of such disposal technologies and sites regarding future human intrusion? What methods would be needed to adequately inform future generations about the wastes and dangers of those sites? What are the various methods to communicate with future generations and what is the likelihood that we will communicate our desired message and that the message would be understood? L6-11

An adequate analysis of those uncertainties could inform decisionmakers and the public about whether storage options adequately protect the wastes into the future.

8. The DEIS has insufficient policy options because it does not consider entities other than DOE to management GTCC disposal.

Decisions to be made by Congress about GTCC waste could result in changes in several laws. The DEIS assumes that DOE will be responsible for disposal, based on existing law. That is not the only possible option, as another entity could take over that role, and such other options must be considered in an adequate DEIS. Just as Congress would have to enact laws to implement many of the aspects discussed in the DEIS, it could also change that law that gives the responsibility to DOE. L6-12

10

L6-11 DOE recognizes that some of the radionuclides comprising the GTCC LLRW and GTCC-like waste types have very long half-lives, making disposal a safer long-term strategy for isolating them from humans and the environment than storage.

DOE agrees that use of a geologic repository could be a protective and safe method for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. Thus the GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault).

The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur. The GTCC EIS evaluation also indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L6-12 DOE recognizes that options for organizational configurations and legislative changes into the future are many and varied. DOE's proposed action and preferred alternative are intended to balance near-term progress toward safe and secure disposal of GTCC LLRW and GTCC-like waste with a longer-term outlook on wastes that can be expected to be generated over several decades.

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Indeed, there are two recent reports from government and non-governmental sources that recommend that DOE no longer manage the U.S. waste disposal programs. The DEIS should include options and analyses regarding other management entities.

The Blue Ribbon Commission on America's Nuclear Future Disposal Subcommittee issued its Draft Report on June 1, 2011:
http://www.brc.gov/sites/default/files/documents/draft_disposal_report_06-01-11.pdf.

The Subcommittee's Recommendation #2 is:

> *"A new, single-purpose organization is needed to develop and implement a focused, integrated program for the transportation, storage, and disposal of nuclear waste in the United States.*
>
> "The U.S. Department of Energy (DOE) and its predecessor agencies, subject to annual appropriations and policy direction by Congress, have had primary responsibility for implementing U.S. nuclear waste policy for the last 60 years. Having examined this experience, the Subcommittee concludes that new nstitutional leadership for the nation's nuclear waste program is needed. A new organization offers the best opportunity to establish—from the outset—the track record of consultation, transparency, accountability, and scientific and technical credibility needed to re-establish trust with the public and key stakeholders." at iv.

L6-12 (Cont.)

The MIT Energy Initiative issued a new report on March 31, 2011:
http://web.mit.edu/mitei/research/studies/documents/nuclear-fuel-cycle/The_Nuclear_Fuel_Cycle-all.pdf

Among the report's recommendations:

> "Based on our analysis, we have concluded that the U.S. should create a new organization responsible for the management of long-lived radioactive wastes—independent of the final outcome of the Yucca Mountain Project." at 64.

An adequate analysis of those and other management options should be discussed and analyzed in the DEIS.

9. The DEIS has insufficient policy options regarding commitment of resources.
CEQ regulations under NEPA require consideration of "any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented." 40 CFR § 1502.16. In addition to the NEPA requirements, decisionmakers and the public must understand the commitment of resources required by GTCC waste, especially given present concerns regarding the national debt and deficit spending.

L6-13

The DEIS does not adequately consider the resources required for GTCC wastes, including costs of treatment, packaging, and transportation at each of the sites. The discussion of construction and operating costs in Section 2.9.3.4 is seriously inadequate. The DEIS states: "Costs for facility permits, licenses, transportation, packaging, and post-closure activities are not included

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L6-13 As stated in DOE's response to comment 10, NEPA does not require agencies to include detailed cost analyses in their EISs. DOE would consider costs separately among other factors, as well as the results of the EIS and public comments, in decision making about disposal facilities to be used, their locations, and the necessary treatment technologies.

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in the estimates." at 2-64. That admission of inadequacy does not suffice to comply with NEPA or to provide sufficient total cost estimate information for decisionmakers and the public.

Those construction and operating costs are inadequate as they do not consider the DOE's historic practice of construction and operating costs of its facilities being substantially higher than predicted and construction taking much longer than projected. The DEIS includes no discussion of numerous Government Accountability Office (GAO) reports on those matters. For example, *Department of* Energy *Actions Needed to Develop High-Quality Cost Estimates for Construction and Environmental Cleanup Projects*, (GAO-10-199), January 2010. http://www.gao.gov/new.items/d10199.pdf. L6-13 (Cont.)

The brief discussion in Section 5.1.4.4 of the estimated construction and operating costs of the Borehole, Trench, and Vault facilities also is seriously deficient. While Appendix D contains more detail about the basis of the costs, it also does not include total costs of the alternatives, including treatment, packaging, and transportation. Nor does it include discussion and analysis of historic DOE practices and cost overruns and schedule delays.

10. The DEIS is technically flawed because there are major aspects of all the proposed sites that are not accurately described and analyzed.
All of the DOE alternative sites in the DEIS have substantial technical issues. The full range of information available about the sites, including environmental impacts of past, present, and future activities is not included in the DEIS and its references. The DEIS does not adequately describe the current missions of each of those sites. The DEIS does not adequately describe and analyze the long-term future use of sites and how GTCC operations for decades would affect such future use. The DEIS does not adequately analyze the cumulative impacts of bringing 160,000,000 million curies of commercial wastes to those sites along with the past, present, and future activities at each site. The DEIS does not adequately analyze the cumulative impacts of transportation shipments to or from those DOE sites during the timeframe of operation of GTCC disposal operations. L6-14

A. The discussion of WIPP seriously deficient.
Section 4 contains the analysis of WIPP. A few of the many inadequacies include:

1. The facility's operational history.
The DEIS states:

> "On the basis of current mining experience in the area, it is assumed that the existing mine shafts, shaft stations, and underground haul routes and tunnels would be functional during the period projected for the disposal of GTCC LLRW and GTCC-like waste." at 4-1.

L6-15

There is no technical documentation provided for that assertion. Indeed, the actual operational experience of WIPP is not discussed, and does not support such an assertion. The existing operations have shown that the mine environment is not so stable and that DOE and its contractors have not been able to fully use the existing shafts, haul routes, and disposal rooms. That history includes that much of the facility's capacity has not been used. Panel 1 contains 10,496.65 cubic meters of waste, less than 59 percent of permitted capacity, because of the

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L6-14 In selecting sites for evaluation in this EIS, DOE considered current and projected missions at each candidate site. Only sites with current and projected missions potentially compatible with the requirements for disposal of GTCC and GTCC-like were identified for inclusion within the scope of this EIS.

DOE believes the Final EIS provides transportation and cumulative impacts analyses suitable to serve as a basis of comparison, along with other factors, for identifying a site or sites that would be appropriate for the disposal of GTCC and GTCC-like wastes. These analyses are provided for each site evaluated in the Final EIS, and the analytical methodology is described in Appendix C. Further, DOE considered the data contained in the sites' Annual Environmental Reports, which provide detailed monitoring data such as groundwater analyses, that indicate current trends and conditions resulting from past practices.

L6-15 An extensive description of WIPP is found in Section 4.1.2 of the DEIS. The WIPP operational experience and WIPP vicinity potash mines do support the assertion that existing WIPP mine shafts, shaft stations and underground haulage routes can be maintained during the period projected for GTCC disposal. WIPP mine workings are similar to local potash mines in the area. The oldest local potash mine (Intrepid Potash West Mine) sank its first shaft in 1929 (then called "American Potash"). This shaft is used daily for current potash production, demonstrating the long life of nearby mine workings. If, however, the WIPP access ways become difficult to maintain, new access drifts could be mined, although this is not anticipated.

The assertion that WIPP waste emplacement in Panel 1 is related to the ability to maintain mine workings and ensure safety is incorrect. Panel 1 was the first panel mined and was open much longer than expected prior to waste being emplaced. Due to normal mine creep, three rooms in Panel 1 could not meet the operational design requirements for ventilation space above the waste stacks if additional mining and maintenance were not performed. These rooms were mined and left open longer than was expected because of the timeframe needed to characterize, permit and certify WIPP. After WIPP became operational, the DOE requested (to the EPA) a change to the standard waste emplacement scheme in these rooms to emplace in either one high, two high or three high waste stacks. EPA did not agree to this configuration change and DOE decided to not emplace waste in these three rooms (EPA Docket A-98-49, Category IIB-3, item 19). The decision not to emplace waste in these rooms of Panel 1 was not made because waste could not be emplaced or that the rooms could not be maintained. Secondly, there is no link between waste emplacement efficiencies and the ability to maintain underground mine workings. All other panels have been mined and maintained to the WIPP design specifications. The differences in emplaced waste volumes in each panel is not due to mining, safety, or the ability to maintain haulage routes. Emplacement efficiencies are related to stacking efficiencies, dunnage drums from shipping requirements, the types of containers or overpacks used by the generator sites and certain MgO requirements that take up waste emplacement floor space. The waste volumes referenced in the comment are permitting requirement from the NMED Hazardous Waste Facilities Permit and are not related to any long-term radioactive waste performance requirements. There are no waste emplacement arrangement requirements or panel volume limits in the EPA radioactive waste Certification Application.

The DEIS states in Section 4.1.4.2 that all GTCC waste will be shipped in containers that allow the waste to be emplaced as contact-handled waste. Some containers will be shielded (not the same as WIPP shielded containers - see response to comment L6-16). As such, the curie content of the waste is not relevant to the operational capabilities of the Waste Handling Building. Since GTCC waste is contact-handled waste, the remote-handled waste handling capabilities in the Waste Handling Building would not be needed.

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danger of collapsing ceilings injuring workers and releasing waste into the environment. While Panel 2 has 17,997.67 cubic meters of waste (100 percent of its permitted capacity), subsequent panels also are not filled. Panel 3 was filled with 17,902.06 cubic meters of CH waste (91 percent of permitted capacity), Panel 4 was filled with 14,257.54 cubic meters of CH waste (76 percent of permitted capacity), and while Panel 5 is still receiving CH waste, it will not be completely filled to the 18,750 cubic meter permitted capacity. Thus, cumulatively for panels 1-5, WIPP will empace less than 78,000 cubic meters of contact-handled (CH) transuranic (TRU) waste, or about 85 percent of permitted capacity. For remote-handled (RH) TRU waste, Panels 1-5 contain 462 canisters, or less than 51 percent of the permitted capacity. Disposal statistics are on the WIPP website (http://www.wipp.energy.gov/general/GenerateWippStatusReport.pdf). Permitted capacities are in the WIPP Hazardous Waste Permit, Table 4.1.1 (http://www.nmenv.state.nm.us/wipp/documents/Part4.pdf).

The main WIPP underground haul route (E-140) must be re-mined and stabilized, requiring use of an alternative haul route (W-30) that was not previously planned and permitted. Deterioration of existing underground facilities less than 25 years after they were mined does not support the assertion that they could be used for the next 60+ years, as would be required for GTCC waste. The DEIS does not analyze the reasonable possibility that the existing underground haulage routes could not be used, as an adequate DEIS must do.

2. The Waste Shaft.
The possibility of not being able to use the waste shaft for GTCC wastes is not considered in the DEIS, but must be considered in an adequate document. In addition to stability issues, there has been no documentation that the existing shaft can be safely used for another 60 years in order to accommodate GTCC (or other) wastes. L6-15 (Cont.)

3. The Waste Handling Building.
The 160,000,000 curies of GTCC waste is more than 20 times more radioactivity than all the waste coming to WIPP, and its volume is much less than the amount of CH and RH waste designated for WIPP. That the existing Waste Handling Building could handle that much more highly radioactive waste has not been demonstrated in the DEIS and its references.

4. Safety performance.
The DEIS states:

> "Even though some of the GTCC LLRW and GTCC-like wastes may have radiation dose rates above those for the TRU wastes currently being disposed of at WIPP, the safety envelope established for CH and RH wastes in the documented safety analysis reports (DOE 2006c,d) should be adequate for disposal of this waste at WIPP." at 4-55.

There is no further basis for that totally unsupported assertion. The safety analysis reports mentioned do not include GTCC wastes.

Moreover, the assertion itself is not credible. The 160,000,000 curies of GTCC waste is more than 20 times more radioactivity than all the waste coming to WIPP, and its volume is much less

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than the amount of CH and RH waste designated for WIPP. Thus, a more accurate statement would be that "*much of the GTCC waste will have radiation dose rates many times those of the* TRU wastes currently being disposed at WIPP." L6-15 (Cont.)

5. RH waste containers.
The DEIS states:

> "Consistent with this planned change request, this EIS assumes that all activated metal waste and Other Waste - RH would be packaged in shielded containers that would be emplaced on the floor of the mined panel rooms in a manner similar to that used for the emplacement of CH waste.' at 2-4. L6-16

In fact, shielded containers have not yet been approved by either the Environmental Protection Agency or NMED, both of which have to separately approve in different regulatory processes. Thus, it is as best premature to conclude that they will be used. Even if shielded containers are approved, some RH will continue to be placed in the walls, not on the floor. An adequate DEIS must include analysis of the option that some or all of the activated metals would not be in shielded containers.

6. Surrounding oil and gas resources and pressurized brine reservoirs.
The WIPP Land Withdrawal Area is surrounded by oil and gas resources and hundreds of wells. Active drilling would be underway through much of the WIPP site, except for the provision preventing such leasing and mining in the WIPP Land Withdrawal Act (LWA – Public Law 102-579), Section 3(a)(1). The DEIS must analyze the impacts of mining on the safety performance of the proposed 26 rooms for GTCC waste. Such an analysis is not included in the DEIS. L6-17

A pressurized brine reservoir was found when borehole WIPP-12 was deepened in 1980. The DEIS must analyze the impacts of drilling into a pressurized brine reservoir on GTCC waste disposal.

7. The impacts of mixed radioactive and hazardous waste.
The DEIS states the much of GTCC waste contains hazardous chemical contaminants. Of course, much of the waste coming to WIPP is mixed and all of the waste is handled under the WIPP Hazardous Waste Permit as if it is mixed.

WIPP's operational history shows that volatile organic compounds (VOCs) are a significant problem that was not adequately analyzed in other WIPP-related NEPA documents. Regarding VOCs, WIPP has not accomplished that part of its mission to "start clean, stay clean." The DEIS is seriously deficient because it contains no discussion or analysis of the issue. Since late 2008, carbon tetrachloride has been released in higher than expected levels in the WIPP underground. That situation first became publicly known on July 24, 2009, when, pursuant to the Hazardous Waste Permit, DOE informed the New Mexico Environment Department (NMED) that carbon tetrachloride of 281 parts per billion volume (ppbv) was detected in July 1, 2009 sampling. Since it was issued in 1999, the Permit required notification if levels exceed 165 ppbv. Sampling errors were discovered on October 23, 2009 that resulted in recalculation of the levels so that the July 1 sample was changed to 393.65 ppbv. The recalculation also disclosed that there were "21 additional exceedances for carbon tetrachloride between December 22, 2008 and September 30, L6-18

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L6-16 Text has been included in Section 2.2 to clarify that the shielded container discussed for WIPP remote-handled waste is not the same container intended for GTCC waste. GTCC waste is assumed to be packaged in half activated metal containers (h-AMCs). Per Section 4.1.4.2 (page 4-11) of the DEIS, a yet-to-be designed half activated metal container (that is shielded) is to be used for the higher activity waste. The WIPP shielded container has recently been approved by EPA (with provisions). Although the WIPP shielded container is discussed in the same paragraph, it is not the same container as that proposed for GTCC waste in this EIS.

L6-17 DOE agrees with the commenter that that the WIPP land withdrawal area is surrounded by oil and gas production wells. The oil and gas resources are beneath (about a mile beneath) the horizon of salt used for the repository. In addition, one might predict there are potash reserves in a horizon above the waste. There are two primary ways natural resource attractiveness is considered in demonstrating the safety case for WIPP.

First, the 40 CFR 194 criteria for certification require DOE to set up a system of active and passive institutional controls to preclude post closure human intrusion into or through the repository. The active controls must operate for more than 100 years. The passive controls are intended to communicate the hazards of the site past the active controls period for as long as practicable. Active institutional controls (AIC) include fences and periodic inspections. Passive institutional controls (PICs) are more numerous, and include permanent markers (warning signs, plaques and monuments), awareness triggers (institutional records and archives in multiple locations), and information repositories at the site and at other waste repositories in countries around the world. EPA evaluated the depth and breadth of DOE's proposed system of controls to preclude human intrusion, and determined that it constituted a reasonable effort to minimize the possibility of future releases from human intrusion. Remember that human intrusion is the only pathway for a release from WIPP – total containment is predicted without intrusion.

The second way that nearby natural resource attractiveness is incorporated into the WIPP safety case is that notwithstanding the AIC and PIC measures, human intrusion is assumed to occur in different ways over the regulatory period. The WIPP Performance Assessment (PA) is a probabilistic analysis of the impacts from many different future features events and processes (FEPs). The WIPP PA includes calculations of the amount of radioactive material released during assumed human intrusion (both drilling events and mining events). The probabilistic analysis recognizes the uncertainty in our ability to predict the future. It incorporates all of the FEPS possible and applies probability distributions to the many parameters that must be included in any numeric calculation of risk. Hundreds of parameters, such as the frequency of intrusions, the amount of waste encountered, the size and pressure of an unknown brine reservoir beneath the waste disposal footprint, different drilling practices, etc. are all sampled and the probability of releasing a certain amount of radioactivity is determined over the next 10,000 years. This probability versus amount can then be compared to the release criteria established by EPA in 40 CFR 191. An entirely full WIPP (with the TRU waste inventory allowed by the LWA as amended [P.L. 102-579 as amended by P.L. 104-201]) is shown to comply with the limits by a factor of ten. For the GTCC waste inventory, this same PA system, assuming all the human intrusion as before, demonstrated that WIPP would comply with the disposal standards. Therefore, even with assumed human intrusion (assumed failure of the AIC and PIC measures), WIPP and the additional GTCC inventory, meets the EPA standards.

In summary, natural resource exploration and extraction are considered in WIPP's safety case. While human intrusion is unlikely due to the AIC and PIC measures DOE will implement, the WIPP PA (including the additional GTCC inventory) demonstrates that releases caused by human intrusion would still comply with long-term criteria established by EPA to protect human health in the environment.

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2009."[1] Thus, there were exceedances of carbon tetrachloride for more than six months before DOE and its contractors were even aware that they had occurred.

DOE and its contractors also originally mis-identified the specific wastes that were causing the rising levels. On November 17, 2009, they informed NMED that "[t]he main contribution of carbon tetrachloride appears to be from waste in filled panels (Panels 3 and 4)."[2] By January 14, 2010, DOE had decided that the primary cause of the emissions was waste in Panel 4 and continuing emplacement of some waste streams in Panel 5.[3] Yet, despite repeated requests from SRIC that shipments of such high carbon tetrachloride waste streams be suspended, DOE continued shipments of such wastes. Consequently, the running annual average (RAA) of carbon tetrachloride continued to rise. By late March 2010, DOE and its contractors expressed great concern about the problem because if the RAA exceeded 165 ppbv, the permit required that the then open room be closed, even if it were not filled. On March 29, 2010, they asked NMED to immediately grant a temporary authorization to raise the RAA limit by almost four times to 630 ppbv, which NMED granted on April 1. With the issuance of a renewed Hazardous Waste Permit in December 2010, the allowed RRA for carbon tetrachloride is now 960 ppbv. Nonetheless, additional exceedances of carbon tetrachloride continue being released in closed disposal rooms in Panel 5. Thousands of drums with significant amounts of carbon tetrachloride are still to be shipped to WIPP. L6-18 (Cont.)

But there are at least three important lessons from the carbon tetrachloride situation. First, the fact that VOC monitoring in the underground mine that had been in place for a decade provided erroneous results for months demonstrates a significant operational problem. Second, the fact that a known contaminant (carbon tetrachloride) in a significant amount of waste was not addressed before it became an issue that altered WIPP's operations shows management and operational failures as well as inadequate data in the waste inventory. Third, the necessity of independent regulation was demonstrated, since without the requirements of the Hazardous Waste Permit the problem would not have been detected and without state and public involvement the remedial measures might not have been implemented.

The DEIS must discuss the WIPP experience with hazardous chemicals. The DEIS also must discuss the specific hazardous chemicals, their amounts and concentrations in GTCC waste. The measures needed to prohibit substantial releases of those chemicals at WIPP must be described and analyzed. The monitoring of VOCs in GTCC disposal facilities must be described.

8. The legal requirements are not adequately described and analyzed.
The DEIS states: L6-19

> "Most of the GTCC-like waste consists of TRU waste that may not have been generated from atomic energy defense activities. Disposing of these wastes and GTCC LLRW in WIPP may require a modification of the WIPP LWA to allow

[1] December 4, 2009 Letter from James P. Bearzi (NMED) to David Moody and Farok Sharif, p. 1. http://sric.org/nuclear/docs/NMED12042009.pdf
[2] November 17, 2009 Letter from David Moody and M.F. Sharif to James Bearzi, p. 2. http://sric.org/nuclear/docs/DOE11172009.pdf
[3] January 14, 2010 Letter from David Moody to Don Hancock (SRIC). http://www.sric.org/nuclear/docs/VOC%20CBFO%20response10-0903-1.pdf

The brine trapped in WIPP salt makes up about 1% of the rock volume. The brine comes in two forms, interstitial and included. Interstitial brine is that trapped in between crystal facies (in between fracture boundaries at microscopic scale). Included brine is inside small cavities called inclusions trapped within the crystals themselves. Inclusions are what you see as small cubical cavities with "bubbles" of air inside. Of course there is hydrated water as well, but it is chemically bound within the minerals. Samples of brine collected from locations just inches apart show different chemical and isotopic composition. Therefore the brine never moved from one location to another. The brine was trapped where it was when that ancient tidal flat dried up 250 million years ago!

With the construction of WIPP, a preferential pathway was opened for water to get inside in the future. This is being addressed through the concept of shaft seals. EPA ruled that the WIPP design for shaft seals will ensure no fresh water enters, and that there will be no release from the repository unless there is assumed human intrusion.

The Performance Assessment (PA) run for the DEIS used a modified version of the current WIPP PA. All WIPP intrusion scenarios were used and the additional 26 rooms were included in these scenarios. Drilling and pressurized brine impacts were included in the analysis. The results of the PA that included the GTCC waste inventory did not exceed the current EPA limits for WIPP.

The discussion of the post-closure compliance analysis in Section 4.3.4.3 was revised to include items taken into consideration with the addition of the GTCC inventory to WIPP.

L6-18 Unlike the TRU wastes destined for disposal at WIPP, the GTCC inventory does not include organic solids. Under the laws that regulate exposure to hazardous materials, if waste does not contain specific listed chemicals, it is considered hazardous only if it exhibits one or more of four characteristics; flammability, reactivity, corrosivity or toxicity. At WIPP (and presumably at any other disposal alternative), hazardous wastes that are flammable, reactive or corrosive are (would be) prohibited. This prudent policy is primarily for safety during packaging, transportation and emplacement in a final disposal facility. There are no flammable, reactive or corrosive wastes in the GTCC inventory. The remaining characteristic of toxicity can be manifested through two potential exposure pathways: contamination of drinking water or inhalation of airborne contaminants. The exposure hazard at WIPP described in the comment was from organic solid waste streams being received at WIPP. These waste forms were generated from past plutonium production operations where process residues included organic solvents and were solidified primarily by grouting. These organic solids contain significant concentrations of volatile compounds that are toxic above certain concentrations. Because containers with radioactive contents must be vented to preclude flammable hydrogen gas build-up, the filtered vents also served as a release pathway for volatile gases.

While there are no organic solid waste forms in the GTCC inventory, some of the wastes are managed as mixed (radioactive and hazardous) waste. Therefore, the final disposal of the GTCC waste will be permitted for both hazardous and radioactive waste disposal. It is not within the scope of NEPA to establish the monitoring and action level requirements for hazardous materials imposed by a state regulator. It is the same provisions of such a permit that provide assurance that levels of hazardous constituents will not jeopardize worker health and safety, by imposing monitoring and action level requirements. The monitoring requirements for GTCC waste disposal operations will be established in the hazardous waste facility permit when the preferred alternative is selected and authorized. If at a facility with an existing hazardous waste facility permit, the permit will have to be modified. If at a new facility, a permit will have to be issued by the state regulatory authority.

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receipt of non-defense wastes and non-transuranic (non-TRU) waste. The total estimated inventory of GTCC LLRW and GTCC like waste, added to the DOE defense TRU waste disposed of or scheduled to be disposed of at WIPP, could exceed the WIPP LWA and the Consultation and Cooperative Agreement RH volume and curie limits for WIPP, as discussed above. The LWA and the *regulations at 40 CFR Parts 191 and 194 may also require modification,* depending on the specific characteristics of the GTCC LLRW and GTCC-like wastes (see Chapter 13)." at 2-5.

Essentially nothing in that statement is accurate or even consistent with other information in the DEIS. The inventory information is that GTCC waste is not from atomic energy defense activities. Such waste is clearly prohibited by the WIPP LWA. The amount of GTCC waste would exceed the WIPP capacity set by the LWA. The amount, types, and sources of GTCC waste are clearly contrary to the requirements of the Consultation and Cooperation Agreement, which is not only incorporated into the LWA but is also part of a court decision. The EPA regulations and its WIPP certification clearly allow only defense waste in the quantities provided in the LWA.

In addition to those and other changes in the LWA, significant provisions of the WIPP Hazardous Waste Permit (HWP) do not allow GTCC wastes.

The discussion of legal requirements on page 4-77 is less inaccurate and mentions the HWP and the fact that WIPP is not licensed by the NRC. That provision is in another law – PL 96-164, Section 213(a). Moreover, the DEIS does not analyze whether WIPP that was designed and operated without an NRC license could be licensed for GTCC waste, and what the requirements would be and what regulations would have to change. L6-19. (Cont.)

Thus, the DEIS description and analysis is too inaccurate to adequately inform decisionsmakers and the public.

An adequate DEIS must also describe and analyze two other significant matters. First, WIPP's mission would be dramatically changed by GTCC. WIPP has a specific mission to demonstrate whether the federal government and its contractors, at the cost of billions of dollars: (1) can safely operate WIPP to meet the "start clean, stay clean" standard for up to 175,564 cubic meters (m^3) of transuranic (TRU) waste; (2) can safely transport TRU waste through more than 20 states without serious accidents or release of radioactive or hazardous contaminants; (3) can meet commitments to clean up TRU waste at about 20 Department of Energy (DOE) nuclear weapons sites; and (4) can safely close, decontaminate, and decommission the WIPP site, beginning in about 2030 or earlier. Adding GTCC waste to that mission means that some or all aspects of the mission will not be met.

Second, New Mexicans were promised that WIPP would not be a commercial repository and that it would not be the nation's only repository. Absent that promise, public opposition would have been even greater and government officials might not have supported WIPP. Breaking the promises also would make it more likely that there would be an intensive opposition campaign to GTCC waste at WIPP as occurred with the opposition in Nevada to Yucca Mountain.

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L6-19 DOE acknowledges that only defense-generated TRU waste is currently authorized for disposal at the WIPP geologic repository under the WIPP LWA (P.L. 102-579, amended by P.L. 104-201) and that legislation would be required to allow disposal of waste other than TRU waste generated by atomic energy defense activities at WIPP and/or for siting a new facility within the land withdrawal area. It would also be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit. In addition, follow-on NEPA project-specific review, including further characterization of the waste (e.g., radionuclide inventory and heat loads) as well as the proposed packaging for disposal would have to be conducted.

However, NEPA does not limit an EIS to proposing and evaluating alternatives that are currently authorized. Furthermore, the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant recognizes that the mission of WIPP may change and provides provisions to modify the agreement. For example, the Agreement states: "The parties to this Agreement recognize that future developments including changes to applicable laws (e.g., P.L. 96-164) may make it desirable or necessary for one or both parties to seek to modify this Agreement. Either party to this Agreement may request a review of the terms and conditions."

DOE acknowledges the TRU waste disposal limitations for WIPP specified in the WIPP LWA and in the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant. Information on these limitations is provided in this EIS (see Section 4.1.1) and was considered in developing the preferred alternative. Based on the GTCC EIS evaluation, disposal of GTCC LLRW and GTCC-like wastes at WIPP would result in minimal environmental impacts on all resource areas evaluated, including human health and transportation. Both the annual dose and the latent cancer fatality (LCF) risk would be zero because there would be no releases to the accessible environment and therefore no radiation doses and LCFs during the first 10,000 years following closure of the WIPP repository.

The WIPP has been certified by the EPA as an acceptable facility for the disposal of defense-generated TRU waste. The physical and chemical characteristics of the GTCC LLRW and GTCC-like wastes proposed for disposal in the WIPP repository are comparable to the TRU wastes currently being disposed of in the repository.

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Therefore, while it is appropriate under NEPA to consider WIPP as an alternative, it should not adopted as a disposal option for GTCC wastes. L6-19 (Cont.)

B. The discussion of "WIPP Vicinity" sites is seriously deficient.

1. The specific proposed locations are not identified.
The DEIS states:

> "Both the reference locations are located within T22S, R31E. These reference locations were selected primarily for evaluation purposes for this EIS. The actual location or locations would be identified on the basis of follow-on evaluations if and when it is decided to locate a land disposal facility at the WIPP Vicinity." at 11-1.

In southeastern New Mexico, as with other locations, site-specific analysis is necessary for an adequate NEPA analysis and because conditions can be significantly different from place to place. The WIPP site has been moved twice in its history because the actual conditions were not what was expected. L6-20

The original WIPP site was moved in 1975 when borehole drilling

> "produced unexpected results: rock strata were much higher than expected; beds showed severe distortion, with dips of up to 75 degrees; sections of the upper Castile Formation (the formation below the Salado Formation) were missing, and fractured Castile anhydrite encountered at a depth of 2710 feet contained a pocket of pressurized brine." *WIPP Final Environmental Impact Statement* (DOE/EIS-0026), October 1980, at 2-10.

The waste rooms were relocated in the early 1980s because another pressurized brine reservoir was encountered at WIPP-12, about a mile north of the center of the site. Thus, absent substantial geophysical information that has not been provided, the characteristics of the two reference locations cannot be presumed. Thus, the DEIS does not provide adequate information about either site.

2. Oil and gas resources exist at the two reference locations.
What is known is that oil and natural gas resources exist (in varying amounts) throughout this region of the Delaware Basin. The DEIS does not document that no oil and gas resources are in Section 27. The DEIS states: "There is an oil well on Section 35." at 11-5. What the DEIS does not explain is why that well and the likelihood of others does not disqualify those sites. The DEIS does not analyze the impacts of active drilling throughout the reference locations on the performance of the sites for GTCC waste. L6-21

3. The legal requirements are not adequately described.
The DEIS states: L6-22

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L6-20 As stated, the specific locations that would be used at each potential site for development of a disposal facility for GTCC LLRW and GTCC-like wastes are not known at this time. The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. Once a final decision is made, site-specific NEPA reviews would be conducted as needed.

L6-21 See the response to L6-17.

L6-22 DOE acknowledges the legislative complexity surrounding a modification to the WIPP LWA, but does not believe a more robust discussion of the legislative history of the WIPP LWA is within the scope of this EIS.

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> "Siting a vault, trench, or borehole facility for GTCC waste inside the WIPP LWA boundary (i.e., Section 27) would be subject to the limits of the WIPP LWA (as discussed for WIPP in Section 4.7); therefore, federal legislation to develop such facilities would be required." at 11-35.

The DEIS should discuss the more than a decade of litigation and proposed land withdrawal legislation as the most relevant example of what is required for such federal legislation. In the case of Section 27, such new legislation could be especially complicated, since it would break the fundamental promises to the State of New Mexico and the public that the LWA strictly limits the use of the site for defense TRU waste. L6-22 (Cont.)

The DEIS also states:

> "Siting a vault, trench, or borehole facility on BLM-administered land outside the WIPP LWB (i.e., Section 35) would require a land withdrawal in accordance with DOI regulations at 40 CFR Part 2300, 'Land Withdrawals'." at 11-36.

Once again, the DEIS should discuss the more than a decade of litigation and proposed land withdrawal legislation as the most relevant example of what is required for such federal legislation. In the case of Section 35, GTCC disposal would require permanent withdrawal by an act of Congress, not by DOI withdrawal authority.

C. The discussion of Los Alamos National Laboratory (LANL) is seriously deficient.

1. The specific location is not identified.

The DEIS states:

> "The reference location was selected primarily for evaluation purposes for this EIS. The actual location would be identified on the basis of follow-on evaluations if and when it is decided to locate a land disposal facility at LANL" at 8-1. L6-23

The geological setting at LANL is highly complex and variable. The DEIS does not provide adequate site-specific information.

2. The location of LANL in a seismic fault zone between a rift valley and a dormant volcano is not the place for radioactive waste that is dangerous for tens of thousands of years.

The seismic issues at LANL have affected existing operations at LANL for more than a decade, including reducing activities at facilities such as the Chemistry and Metallurgical Research building. While the DEIS has some discussion of seismic issues at LANL, it does not discuss those actual effects on existing operations. Given that some existing facilities have limited activities because of seismic issues and the proposed Chemistry and Metallurgical Research Replacement-Nuclear Facility is undergoing major design changes as a result of seismic issues, LANL is clearly not a suitable site for GTCC waste disposal. That the DEIS does not discuss that actual history is a serious inadequacy. L6-24

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L6-23 For the purposes of the EIS analysis DOE believes that the level of details provided describing the geological setting at LANL is adequate for the EIS analysis (see Section 8.1.2).

L6-24 Key parameters evaluated in selection of the preferred alternative include seismic factors (seismicity and volcanism). In addition, the seismic characteristics of the LANL site are in Section 8.1.2.1.4.

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3. LANL's mission has never included GTCC disposal, does not include that mission now, and should not have that future mission.

The only apparent reason to consider LANL for GTCC waste disposal is its current involvement with defense TRU was sealed sources that are supposed to be disposed at WIPP. That wastes is not even included in the DEIS inventory, so that waste provides no basis to include LANL as an alternative site. L6-25

Otherwise, LANL's environmental missions relate to cleanup of existing contamination by 2015 under the Consent Order with the State of New Mexico. There is no mission to dispose of wastes subject to independent regulation or NRC licensing.

4. LANL as a GTCC disposal facility is totally contrary to the American Indian Text.

That the DEIS contains the American Indian Text is an appropriate recognition of the importance of the LANL site to the Native peoples who have used the site for generations before LANL was created in 1943. But including the text without acting on its substance and meaning would be another example of environmental racism.

The tribes are committed to cleanup of the contamination and their use of their sacred lands. The tribes believe that natural processes – both from plant life and geologic forces – would result in major releases from GTCC disposal. The tribes believe that air pollution is an existing problem, which the current fire problems further validate. The tribes believe that contamination of their water supplies is an existing problem and that additional waste storage or disposal will increase those environmental impacts. Therefore GTCC disposal is totally inappropriate and unacceptable. L6-26

D. SRIC is not discussing the technical flaws of sites outside of New Mexico, but expects that DOE will fully consider the comments of those who do point out such flaws.

11. The DEIS is technically flawed because it does not discuss the DOE's history of using trenches, vaults, and boreholes for waste storage and disposal.

While the DEIS discusses conceptual designs for trenches, vaults, and boreholes, it does not discuss at all the long DOE history of using such technologies for storage and disposal at various DOE sites.

The DOE sites included in the DEIS have decades of experience of dumping wastes into shallow trenches, boreholes, and vaults. Those practices have resulted in contamination of ground water and soils at all of those locations. L6-27

Some of the problems with such practices at INL were discussed in http://www.ieer.org/reports/poison/pvz.pdf and in http://www.ananuclear.org/Portals/0/documents/Water%20Report/waterreportidaho.pdf.

Some of the problems with such practices at SRS were discussed in http://www.ieer.org/reports/srs/fullrpt.pdf and in http://www.ananuclear.org/Portals/0/documents/Water%20Report/waterreportsavannahriver.pdf.

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L6-25 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP LWA Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

L6-26 Text prepared by potentially affected American Indian tribes is included in this EIS. DOE considered this text for Hanford, INL, LANL, and NNSS; however, DOE also needed to ensure consistency in the EIS analyses between the various sites, so that an even comparison could be made between alternatives as required by NEPA. Because of this, it was not possible to fully utilize all of the information provided by the tribal governments in order to perform specific analyses associated with exposure events unique to a given American Indian tribe (such as greater intakes of fish, game, and plants; the use of sweat lodges; and the use of natural pigment paints for traditional ceremonies). Once a decision is made on a specific site location and method, appropriate site-specific NEPA review would be conducted, including appropriate analysis of exposure events unique to the impacted local American Indian tribes.

However, the information provided, especially related to cultural resource impacts and historical sites, in these narratives was considered in the identification of the preferred alternative presented in this EIS. The information provided in the narratives for Hanford, INL, LANL, and NNSS was very useful, and DOE appreciates the time and effort expended by the various tribes in supporting this EIS process.

L6-27 A discussion of DOE experience related to use of the trench, vault and boreholes are found in Section 2.9.3.2

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Some of the problems with such practices at LANL were discussed in http://www.icer.org/reports/lanl/weaponspureport.pdf and in http://www.ananuclear.org/Portals/0/documents/Water%20Report/waterreportlosalamos.pdf.

Some of the problems with such practices at Hanford were discusssed in http://www.ananuclear.org/Portals/0/documents/Water%20Report/waterreporthanford.pdf.

Some of the problems with such practices at Nevada Test Site were discussed in http://www.ananuclear.org/Portals/0/documents/Water%20Report/waterreporttestsite.pdf and in http://ndep.nv.gov/boff/steward.htm.

DOE also should have consulted some of its own reports, such as *A Report to Congress on Long-Term Stewardship (DOE/EM-0563), January 2001. 2 volumes. Volume 2 contains Site* Summaries, including on each of the sites considered in the DEIS and dozens of others. This DOE report and others are not mentioned or referenced in the DEIS. L6-27 Cont.

These practices and technologies are relevant to the DEIS in several ways. The DEIS should compare and contrast the performance of the past practices with those expected from the conceptual designs. The DEIS should discuss and analyze the past, current, and future efforts necessary to remediate contamination and how those efforts affect and would be effected by GTCC waste. The DEIS should discuss and analyze the regulatory requirements and actions (including litigation, fines, and penalties) for such past practices and how GTCC disposal would be subjected to similar regulation. The DEIS should analyze the level of expertise that DOE has in handling nuclear and hazardous wastes using such technologies at its sites (including those not being considered for GTCC, such as Fernald). The DEIS should discuss and analyze the credibility that its technologies and practices have with other governmental entities, scientific bodies, and the public, based on its long history.

12. The DEIS is technically flawed because it does include analysis of decommissioning of the disposal facilities.

The DEIS states: "The impact analysis for the decommissioning phase has not been included in this EIS but would be conducted at a later time, as appropriate." at 2-2. L6-28

The admitted lack of analysis is another aspect of the DEIS that does not adequately describe the resources required for GTCC disposal, which is an important matter for decisionmakers and the public. The required analysis also would discuss how decommissioning impacts other future use requirements of the sites.

13. The DEIS is technically flawed because there are major inadequacies in the transportation analysis.

The DEIS transportation analysis essentially shows that there are no significant differences among the sites considered. Such an analysis is not credible, and it is not adequate under NEPA. L6-29

The large majority of the radioactivity is in activated metals at decommissioned nuclear power plants, which are in large majority located east of the Mississippi River. Thus, the transportation impacts for sites closer to those power plants would be less than for sites in the West.

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L6-28 The EIS notes that the decommissioning of a GTCC LLRW disposal facility is part of the proposed action, but because the facility would not be closed and decommissioned until far into the future (after 2083), the impact analysis for the decommissioning phase would be conducted at that time. It is not possible at this time to evaluate with any degree of confidence the environmental impacts from decommissioning a facility that has not yet been selected.

The GTCC LLRW disposal facility would be designed to facilitate future decommissioning consistent with applicable law, guidance, and policies. The appropriate site-specific NEPA review will be conducted in the future as part of the decommissioning plan.

L6-29 The primary radiological transportation risk to the public for any alternative is from the low level of radiation emanating from the transport vehicle. As discussed in Section 5.3.9.1, the collective population risk is a measure of the total risk posed to society as a whole. A comparison of the collective population risk provides a meaningful evaluation of the relative risks between disposal locations, as provided in Tables 2.7 5 and 2.7 6. The magnitude of the collective population risk is primarily determined by the number of routes, the length of each route, the number of shipments along each route, the external dose rate of each shipment, and the population density along a given route. The primary differences between alternatives from the standpoint of transportation are the lengths of the routes as determined by the location of the disposal sites (destination of the shipments). Thus, higher collective population risks are associated with alternatives that require transportation over longer distances. All alternatives involve routes that have similar characteristics, with no significant differences for comparison among alternatives, requiring transportation through a range of rural and urban areas. In addition, the routes used in the analysis are considered representative routes (as discussed in Appendix C, Section C.9.4.1.1), because the actual routes used would be determined in the future. For each disposal site, the routes most affected would be the interstate highways that are in closest proximity to the site.

Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers. Thus, in general, there are no significant differences among alternatives with respect to transportation impacts.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across

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Some sites have railroad access, some sites do not. There is no analysis of the costs and right-of-way and other requirements for constructing railroad access into sites. Thus, the transportation analysis must be different for sites that do not have railroad access.

Some sites are in close proximity to interstate highways, some are not. Again, the transportation impacts are different for sites with interstate highway access. In addition, all truck transportation of GTCC waste should be treated as "highway route controlled quantity" (HRCQ) shipments, as defined in 49 CFR 173.403. The DEIS makes no such commitment and does not provide any analysis of the requirements for such a practice. The DEIS states: "[m]any potential shipments evaluated for this EIS, such as shipments of activated metal from commercial reactors, fall under this category." at C-33. Thus, the DEIS seems to imply that DOE would not treat all GTCC shipments as HRCQ.

Since 98 percent of the radioactivity is in activated metals from decommissioned nuclear power plants, there can be no accurate assessment of the population impacts of transportation, since it is not knowable with the populations will be along transportation routes several decades into the future.

The basis for the accident consequence analysis in the DEIS is not fully and adequately presented. Thus, it is not a credible or adequate analysis.

There is no adequate analysis of the economic impacts of transportation accidents. There is no adequate analysis of the costs of cleanup of releases from any transportation accident. There is no adequate analysis of the short-and long-term costs of a transportation accident in a highly populated area. There is not adequate analysis of the short- and long-term costs of a transportation accident in an area with a significant tourism-based economy. L6-29 (Cont.)

While the DEIS considers sealed sources a security risk, there is no analysis of the impacts of sabotage of the transportation of sealed sources. There is no analysis of the transportation security requirements for sealed sources. For example, would armed escorts be necessary? It is not a credible or adequate analysis to state that sealed sources are a security risk when they are not being transported, but that they are not a security risk when they are transported.

Virtually all of the GTCC waste shipments would originate from NRC-licensed facilities. None of the disposal sites included in the DEIS are currently NRC licensed. The DEIS does not describe what the regulatory requirements would be for such shipments, nor how they would be met. Based on experience of WIPP, DOE "self-regulation" is not acceptable. There will be prolonged conflicts with states and tribes along possible transportation routes and demands for additional transportation measures will be made. In the case of WIPP, several years of congressional consideration of the Land Withdrawal Act (Public Law 102-579) was necessary and WIPP-specific transportation requirements were legislated. It then requires years of implementation of those measures before shipments begin. Similar processes should be assumed for GTCC wastes, but the DEIS includes no assessment of such a process.

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all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

The analysis of intentional destructive acts is given in Section 2.7.4.3 of the EIS. This analysis provides a perspective on the risks that the GTCC LLRW and GTCC-like wastes could pose should such an act occur. In general, the risk presented from an intentional destructive act is similar to that from a high-severity transportation accident. The accident consequence assessment (given in Section 5.3.9.3 of the Final EIS) presents the results for transportation accidents that fall into the highest severity category. The severe environment that occurs under such conditions can be considered to be similar to that which could be initially instigated by an act of sabotage. In highly populated areas, where the highest exposures would be anticipated, a rapid response would be expected, minimizing the amount of time available to fully breach a Type B package. Should such shipments be diverted and the radioactive material removed for dispersion, higher exposures could be achieved, and potential impacts could be significant. The economic impact could reach several billions of dollars. The extent of the impacts would depend on the exact location of the release, density of the surrounding population, local meteorology, and emergency response capabilities in the affected area.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur.

Once an alternative is selected in a ROD for this EIS for implementation, site-specific NEPA reviews would be conducted as needed, including an assessment of specific routing and an accident analysis. This process will include planning that involves all affected transportation stakeholders. DOE does not intend to make any decisions regarding specific waste transportation routes in this EIS.

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Planning for transportation routes, inspections, emergency response training, satellite tracking of each shipment, and other aspects started more than a decade before shipments began to WIPP in 1999. The DEIS does not state that similar transportation planning and implementation requirements would occur for GTCC waste shipments. Based on the WIPP experience, the host state and some or all of the states along transportation routes will advocate for such advanced planning and perhaps require additional funding to implement those requirements. L6-29 (Cont.)

Conclusion

SRIC's comments and those of all other persons must be fully considered. If DOE adequately considers those comments, it will withdraw the DEIS and instead proceed with developing a GTCC PEIS. DOE also will supplement or issue at new Waste Management PEIS that covers wastes for which DOE is responsible in a comprehensive way. Developing and implementing an adequate program for GTCC will be a decades long, technically and politically challenging task. That task must be supported by adequate NEPA documents to assist decisionmakers and the public.

Sincerely,

Don Hancock

Don Hancock

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ATTACHMENT 1

March 24, 2010

Principles for Safeguarding Nuclear Waste at Reactors

The following principles are based on the urgent need to protect the public from the threats posed by the current vulnerable storage of commercial irradiated fuel. The United States does not currently have a national policy for the permanent storage of high-level nuclear waste. The Obama administration has determined that the Yucca Mountain site, which has been mired in bad science and mismanagement, is not an option for geologic storage of nuclear waste. Unfortunately, reprocessing proponents have used this opportunity to promote reprocessing as the solution for managing our nuclear waste. Contrary to their claims, however, reprocessing is extremely expensive, highly polluting, and a proliferation threat, and will actually complicate the management of irradiated fuel. Nor will reprocessing obviate the need for, or "save space" in, a geologic repository.

The United States has a unique opportunity to re-evaluate our nuclear waste management plan. We can make wise decisions about safeguarding radioactive waste or go down the risky, costly, and proliferation prone path towards reprocessing.

The undersigned organizations' support for improving the protection of radioactive waste stored at reactor sites is a matter of security and is in no way an indication that we support nuclear power and the generation of more nuclear waste.

➢ **Require a low-density, open-frame layout for fuel pools:** Fuel pools were originally designed for temporary storage of a limited number of irradiated fuel assemblies in a low density, open frame configuration. As the amount of waste generated has increased beyond the designed capacity, the pools have been reorganized so that the concentration of fuel in the pools is nearly the same as that in operating reactor cores. If water is lost from a densely packed pool as the result of an attack or an accident, cooling by ambient air would likely be insufficient to prevent a fire, resulting in the release of large quantities of radioactivity to the environment. A low density, open-frame arrangement within fuel pools could allow enough air circulation to keep the fuel from catching fire. In order to achieve and maintain this arrangement within the pools, irradiated fuel must be transferred from the pools to dry storage within five years of being discharged from the reactor.

➢ **Establish hardened on-site storage (HOSS):** Irradiated fuel must be stored as safely as possible as close to the site of generation as possible. Waste moved from fuel pools must be safeguarded in hardened, on-site storage (HOSS) facilities. Transporting waste to interim away-from-reactor storage should not be done unless the reactor site is unsuitable for a HOSS facility and the move increases the safety and security of the waste. HOSS facilities must not be regarded as a permanent waste solution, and thus should not be constructed deep underground. The waste must be retrievable, and real-time radiation and heat monitoring at the HOSS facility must be implemented for early detection of radiation releases and overheating. The overall objective of HOSS should be that the amount of releases projected in even severe attacks should be low enough that the storage system would be unattractive as a terrorist target. Design criteria that would correspond to the overall objective must include: Resistance to severe attacks, such as a direct hit by high-explosive or deeply penetrating weapons and munitions or a direct hit by a large aircraft loaded with fuel or a small

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aircraft loaded with fuel and/or explosives, without major releases. Placement of individual canisters that makes detection difficult from outside the site boundary.

- **Protect fuel pools:** Irradiated fuel must be kept in pools for several years before it can be stored in a dry facility. The pools must be protected to withstand an attack by air, land, or water from a force at least equal in size and coordination to the 9/11 attacks. The security improvements must be approved by a panel of experts independent of the nuclear industry and the Nuclear Regulatory Commission.

- **Require periodic review of HOSS facilities and fuel pools:** An annual report consisting of the review of each HOSS facility and fuel pool should be prepared with meaningful participation from public stakeholders, regulators, and utility managers at each site. The report must be made publicly available and may include recommendations for actions to be taken.

- **Dedicate funding to local and state governments to independently monitor the sites:** Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.

- **Prohibit reprocessing:** The reprocessing of irradiated fuel has not solved the nuclear waste problem in any country, and actually exacerbates it by creating numerous additional waste streams that must be managed. In addition to being expensive and polluting, reprocessing also increases nuclear weapons proliferation threats.

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National

Leonor Tomero, Center for Arms Control and Non-Proliferation

John Issacs, Council for a Liveable World

Kevin Kamps, Beyond Nuclear

Lynn Thorp, Clean Water Action

Erich Pica, Friends of the Earth

Michele Boyd, Physicians for Social Responsibility

Jim Riccio, Greenpeace

Diane Kreiger, Nuclear Peace Age Foundation

Kevin Martin, Peace Action

Tyson Slocum, Public Citizen

Susan Gordon, Alliance for Nuclear Accountability

Arjun Makhijani, Institute for Energy and Environmental Research

Ken Bossong, SUN Day Campaign

Michael Mariotte, Nuclear Information and Resource Service

Anna Aurilio, Environment America

Winona La Duke, Honor the Earth

Dan Becker, Safe Climate Campaign

Dave Hamilton, Sierra Club

Geoffrey Fettus, Natural Resources Defense Council

Ed Lyman, Union of Concerned Scientists

Susan Shaer, Women's Action for New Directions (WAND)

Alaska

Stacy Fritz, No Nukes North

Alabama

Garry Morgan, Bellefonte Efficiency and Sustainability Team, Alabama Chapter of BREDL

Tom Moss, North Alabama Peace Network

Arkansas

Pat Youngdahl, Arkansas WAND

Arizona

Stephen M. Brittle, Don't Waste Arizona

Jack and Felice Cohen-Joppa, Nuclear Resister

Patricia Birnie, GE Stockholder's Alliance

Russell Lowes, SafeEnergyAnalyst.org

Barbara Warren, Arizona Physicians for Social Responsibility

California

Rochelle Becker, Alliance for Nuclear Responsibility CA

David Hartsough, PEACEWORKERS

Jane Williams, California Communities Against Toxics

Roland Valentine, Desert Citizens Against Pollution

Mary Beth Brangan, Ecological Options Network (EON)

Betty Winholz, SAVE THE PARK

Jacqueline Cabasso, Western States Legal Foundation

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Molly Johnson, Grandmothers for Peace-San Luis Obispo County Chapter

Linda Seeley, Terra Foundation

Jane Swanson, San Luis Obispo Mothers For Peace Action Committee

Marylia Kelley, Tri-Valley CARES

Michael Welch, Redwood Alliance

Enid Schreibman, Center for Safe Energy

Jennifer Olavana Viereck, Healing Ourselves and Mother Earth

Dan Hirsch, Committee to Bridge the Gap

Pamela Meidell, Atomic Mirror

Colorado

Bob Kinsey, Colorado Coalition for the Prevention of Nuclear War

Sharyn Cunningham, Colorado Citizens Against Toxic Waste, Inc.

Judith Mobling, Rocky Mountain Peace and Justice Center

Connecticut

Nancy Burton, Connecticut Coalition Against Millstone

Judi Friedman, People's Action for Clean Energy

Sal Mangiagli, Connecticut Citizens Action Network, Haddam Chapter

Washington, DC

Louis Clark, Government Accountability Project

Delaware

Alan Muller, Green Delaware

Florida

Bob Krasowski, Florida Alliance for A Clean Environment, The Zero Waste Collier County Group

Georgia

Tom Ferguson, Foundation for A Global Community

Bobbie Paul, Georgia WAND

Glenn Carroll, Nuclear Watch South

Bob Darby, Food Not Bombs, Atlanta

Hawaii

Henry Curtis, Life of the Land

Iowa

Maureen McCue, PSR Iowa

Idaho

Beatrice Brailsford, Snake River Alliance

Chuck Broscious, Environmental Defense Institute

Illinois

Dave Kraft, Nuclear Energy Information Service

Carolyn Treadway, No New Nukes

Indiana

Grant Smith, Citizens Action Coalition of Indiana

John Blair, ValleyWatch, Inc.

Kansas

Dave Pack, Kansas City Peaceworks

Anne Suellentrop, Kansas City PSR

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Kentucky

Mary Davis, Earth Island Institute

Louisiana

Nathalie Walker, Advocates for Environmental Human Rights

Massachusetts

Debbie Grinell, C-10 Research and Education Foundation

Deb Katz, Citizens Awareness Network

Mary Lampert, Pilgrim Watch

Maryland

Dagmar Fabian, Crabshell Alliance

Johanna Neumann, Maryland PIRG

Max Obuszewski, Baltimore Nonviolence Center

Lucy Duff, Peace and Justice Coalition-Prince George's County

Maine

William S. Linnell, Cheaper, Safer Power

Bruce Gagnon, Global Network Against Weapons & Nuclear Power in Space

Michigan

Keith Gunter, Citizens Resistance at Fermi Two

Michael Keegan, Coalition for a Nuclear Free Great Lakes

Georgia Donovan, Izaak Walton League-Dwight Lydell Chapter

Terry Miller, Lone Tree Council

Patricia Gillis, Voices for Earth Justice

Alice Hirt, Don't Waste Michigan

Nancy Seubert, IHM Justice, Peace, and Sustainability Office

Lynn Howard Ehrle, International Science Oversight Board-Organic Consumers Association

Kay Cumbow, Citizens for Alternatives to Chemical Contamination

Ronald and Joyce Mason, Swords Into Plowshares Peace Center and Gallery

David Gard, Michigan Environmental Council

Steve Senesi, Kalamazoo Non-Violent Opponents of War

Minnesota

Danene Provencher, West Metro Global Warming Action Group, Inc.

Glady Schmitz, Mankato Area Environmentalists

George Crocker, North American Water Office

Bruce Drew, Prairie Island Coalition

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Missouri

Mark Haim, Missourians for Safe Energy

Kat Logan Smith, Missouri Coalition on the Environment

Mississippi

Louie Miller, Mississippi Sierra Club

Montana

Florence Chessin, Missoula Women for Peace, a branch of Women's International League for Peace and Freedom

North Carolina

Lewis Patrie, Western North Carolina Physicians for Social Responsibility

B.M.T O'Nan, Protect All Children's Environment

Avram Friedman, The Canary Coalition

Jim Warren, North Carolina Waste Awareness and Reduction Network

Janet Marsh, Blue Ridge Environmental Defense League

North Dakota
Kandi L. Mossett, Indigenous Environmental Network

Jodie L. White, The Environmental Awareness Committee, Save Our Sacred Earth Campaign

Nebraska

Buffalo Bruce, Western Nebraska Resources Council

Tim Rinne, Nebraskans for Peace

New Hampshire

Will Hopkins, New Hampshire Peace Action

New Jersey

Paula Gotsch, Grandmothers, Mother and More for Energy Safety

Norm Cohen, Coalition for Peace and Justice-UNPLUG Salem Campaign

New Mexico

Mervyn Tilden, Sovereign Dine' Foundation

Janet Greenwald, Citizens for Alternatives to Radioactive Dumping

Joni Arends, Concerned Citizens for Nuclear Safety

Scott Kovac, Nuclear Watch of New Mexico

Greg Mello, Los Alamos Study Group

Don Hancock, Southwest Research and Information Center

Nevada

Judy Treichel, Nevada Nuclear Waste Taskforce

Jim Haber, Nevada Desert Experience

New York

Joanne Hameister, Coalition on West Valley Nuclear Wastes

Anne Rabe, Center for Health, Environment, and Justice

James Rauch, For a Clean Tonawanda Site (FACTS)

Barbara Warren, Citizen's Environmental Coalition

Phillip Musegaas, Riverkeeper NY

Tim Judson, Central New York Citizens Awareness Network

Ohio

Chris Trepal, Earth Day Coalition

Terry Lodge, Toledo Coalition for Safe Energy

Sharon Cowdrey, Miamisburg Environmental Safety and Health Network

Oklahoma

Marilyn McCulloch, The Carrie Dickerson Foundation

Southwest Research and Information Center, Commenter ID No. L6 (cont'd)

Oregon

Dona Hippert, Oregon Toxics Alliance

Charles K. Johnson, Center for Energy Research

Nina Bell, Northwest Environmental Advocates

Kelly Campbell, Oregon Physicians for Social Responsibility

Gerry Pollet, Heart of America Northwest

Pennsylvania

David Hughes, Citizen Power

Katherine Dodge, Northwest Pennsylvania, Audobon Society

Gene Stilp, Taxpayers and Ratepayers United

Ernest Fuller, Concerned Citizens for SNEC Safety

Patricia Harner, Philadelphia Physicians for Social Responsibility

Dr. Lewis Cuthbert, Alliance for a Clean Environment

Rhode Island

Sheila Dormandy, Clean Water Action Rhode Island

South Carolina

Susan Corbett, South Carolina Sierra Club

Dr. Finian Taylor, Hilton Head for Peace

South Dakota

Deb McIntyre, South Dakota Peace and Justice Center

Charmaine White Face, Defenders of the Black Hills

Tennessee

Donald B. Clark, Network for Economic and Environmental Responsibility, United Church of Christ

Rev. Charles Lord, Caney Fork Headwaters Association

Rev. Douglas B. Hunt, Interfaith Power & Light

Ralph Hutchinson, Oak Ridge Environmental Peace Alliance

Rev. Walter Stark, Cumberland Countians for Peace and Justice

Ann Harris, We the People, Inc.

Texas

Eliza Brown, SEED Coalition

Mavis Belisle, JustPeace

Gary Steard, Interfaith Environmental Alliance

Craig Tounet, Austin Physicians for Social Responsibility

Jill Johnston, Southwest Workers Union

Southwest Research and Information Center, Commenter ID No. L6 (cont'd)

Utah

Margene Bullcreek, Olingo Gusdedah Devla Awareness

Vanessa Pierce, HEAL Utah

Virginia

Scott Sklar, *The Stella Group, Inc.*

Elena Day, People's Alliance for Clean Energy

Vermont

Arnie Gundersen, Fairewinds Associates, Inc.

Clay Turnbull, New England Coalition on Nuclear Pollution

Chris Williams, Vermont Citizens Awareness Network

Margaret Harrington Tamulonis, Women's International League for Peace

Washington

Tom Carpenter, Hanford Challenge

Wisconsin

Charlie Higley, Citizens Utility Board

Bonnie Urfer and John LaForge, Nukewatch Wisconsin

Al Gedicks, Wisconsin Resources Protection Council

Judy Miner, Wisconsin Network for Peace and Justice

West Virginia

Gary Zuckett, West Virginia Citizens Action Group

Wyoming

Mary Woolen, Keep Yellowstone Nuclear Free

30

Southwest Research and Information Center, Commenter ID No. T51

Capital Reporting Company 5

1 comments to add after their initial five minutes, we
2 may have some time near the end in order to allow
3 people to add a few final comments. So, with that by
4 way of introduction, let me call on our first speaker,
5 who is Don Hancock, and he will be followed by Yemane
6 Asmerom.
7 MR. HANCOCK: Good evening. Welcome to
8 Albuquerque for the Department of Energy and other
9 people who are here. I'm Don Hancock from Southwest
10 Research and Information Center in Albuquerque, a 40-
11 year-old organization that has worked on a variety of
12 nuclear issues, including nuclear waste issues during
13 most of that time. We provided scoping comments on
14 this document and so, I'm disappointed in looking at
15 the document that our conclusion must be that this
16 Draft EIS is fatally flawed as a matter of law, as a
17 matter of policy, and as a technical matter.
18 From a legal standpoint, the Draft EIS is the
19 wrong document. It does not consider all the
20 reasonable alternatives, as required by the law, and it
21 cannot be used to consider -- continue on to an
22 adequate final EIS. First, it's the wrong document. T51-1

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T51-1 DOE does not agree that a programmatic EIS as described in this comment must be prepared before this EIS is completed. This EIS has been scoped to provide adequate environmental information to support the decision-making process to identify an appropriate site(s) and technology(s) to dispose of a limited amount of GTCC LLRW and GTCC-like waste. If appropriate, DOE would conduct further NEPA review, tiered from this EIS before implementing decisions. DOE tailored the scope of this EIS to ensure the analyses will adequately inform the decisions at issue, including the selection of sites and technologies for the disposal of GTCC and GTCC-like waste. This EIS presents the environmental information needed to adequately inform decision makers regarding many of the questions and points raised in this comment; other questions and points raised remain outside of the scope of this document, as noted below. DOE plans a tiered decision making process in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

Regarding the types and exact amount of GTCC from existing commercial power plants ultimately requiring disposal, DOE does not agree this is an issue warranting preparation of a PEIS as a prerequisite to this EIS. Nevertheless, considerable attention is given to waste inventories in this EIS, which quantifies and analyzes potential impacts from the range of potential quantities of wastes from commercial power plants as well as from other types of GTCC waste. The EIS is structured to inform potential decisions to employ different technologies and disposal sites from the different types of GTCC and GTCC-like wastes, as is the case under the preferred alternative identified in this Final EIS.

Contrary to points raised in this comment, this EIS also provides substantial attention to inventories and characteristics of GTCC-like wastes and analyzes in detail potential impacts of transportation and disposal options. This EIS also answers the question posed regarding whether GTCC waste could be disposed of in a repository for high-level waste and spent nuclear fuel; the EIS concludes that use of a geologic repository would be a protective and safe method for disposal of the entire inventory of GTCC and GTCC-like wastes evaluated in this EIS (see response to A.2.3 under *Topics of Interest*).

Southwest Research and Information Center, Commenter ID No. T51 (cont'd)

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1 Why is it the wrong document? Because, as we stated in
2 our scoping comments, the Department of Energy first
3 must do a programmatic environmental impact statement
4 to address a variety of issues, some of which are not
5 even considered in this draft document.
6 For example, PEIS, a programmatic
7 environmental impact statement should address questions
8 like, "Should a Department of Energy facility be used
9 for commercial waste?" "Should Greater-Than-Class-C
10 waste be disposed of alternatively in a high-level
11 waste or spent nuclear fuel repository?" "What about
12 the options for on-site storage at existing reactor
13 sites for several decades or more?" "What about
14 consolidating GTCC storage at a few locations?" "What
15 about the range of disposal options even more than are
16 considered in the document?" "What about changes in
17 the Nuclear Regulatory Commission regulations that
18 would be required for various disposal options,
19 especially for the existing sites?" And, you were
20 shown those existing Department of Energy sites, none
21 of which have an NRC licensed disposal facility.
22 Regarding the other kinds of waste that they

T51-1 (Cont.)

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Southwest Research and Information Center, Commenter ID No. T51 (cont'd)

Capital Reporting Company 7

1 want to include, the misnamed GTC-like waste, in 1997,
2 the Department of Energy issued its Waste Management
3 Programmatic Environmental Impact Statement. That's
4 almost 15-years-old. It's time to update that
5 programmatic environmental impact statement to decide
6 what about the Department of Energy waste unrelated to
7 the commercial Greater-Than-Class-C waste. So, that
8 document has to be supplemented to look at the
9 Department of Energy waste before there should be any
10 consideration of consolidating DOE and commercial
11 waste.

T51-1 (Cont.)

12 There's no clear statement of what the need
13 is. You heard Mr. Edelman's presentation saying the
14 need is there's no current -- there is currently no
15 disposal capacity for Greater-Than-Class-C low-level
16 radioactive waste. The same thing, in fact, could be
17 said about there's no disposal -- current disposal
18 capability for spent nuclear fuel. That -- the
19 statement that there isn't current disposal capability
20 is not an adequate statement of need.
21 Again, the National Environmental Policy Act
22 requires that the need, the purpose, be clearly defined

T51-2

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T51-2 DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. The potential security concerns presented by disused sealed sources are also discussed in Section 1.1 of the EIS.

Southwest Research and Information Center, Commenter ID No. T51 (cont'd)

Capital Reporting Company 8

1 and stated so the decision makers and the public can
2 understand what the alternatives really are. Again,
3 this is another reason that we should be having a
4 programmatic environmental impact statement not this
5 one.
6 Secondly, the -- according to the federal
7 regulations, the heart of any legally adequate
8 environmental impact statement is consideration of all
9 reasonable alternatives. This document doesn't do
10 that. The Nuclear Waste Policy Act, for example,
11 federal law, says that there is a legal requirement for
12 the Department of Energy to develop a geologic
13 repository for spent nuclear fuel and high-level waste
14 other than WIPP.
15 In any of the presentation, did you hear
16 anything about that legally required facility even
17 being mentioned in this document? No. It's not. It
18 has to be for all reasonable alternatives to be
19 considered.
20 MR. BROWN: Don, you've got about a minute
21 left on this part of your presentation. Thanks.
22 MR. HANCOCK: The only alternatives, as you

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T51-2 (Cont.)

T51-3

T51-4

T51-3 The Nuclear Waste Policy Act applied to the disposal of spent nuclear fuel and High Level waste, not GTCC. The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

T51-4 DOE solicited technical capability statements from commercial vendors that might be interested in constructing and operating a GTCC LLRW disposal facility. Although several commercial vendors expressed interest, no vendors provided specific information on disposal locations and methods that could have been analyzed in the EIS. Hence, this option was analyzed generically. The analysis provided in this EIS could be used to support a decision for disposing of GTCC LLRW and GTCC-like waste in one or more commercial facilities, if such facilities are identified in the future. Additional NEPA reviews would be conducted, as appropriate.

The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

Southwest Research and Information Center, Commenter ID No. T51 (cont'd)

Capital Reporting Company 9

1 heard, that are really being seriously considered are
2 Department of Energy sites. What about commercial
3 sites for commercial waste? In fact, DOE didn't even
4 follow its own advance notice of intent, which said, T51-4 (Cont.)
5 "They would consider disposal in new or existing DOE or
6 commercial facilities." They certainly didn't do that.
7 The generic facilities they talk about are not
8 adequate.
9 They didn't consider the need for long T51-5
10 Hardened On-site Storage on site. Shockingly, from a
11 policy standpoint, this document says that for the next
12 70 years, the term that it purports to cover, the only
13 geologic repository in the United States will be WIPP.
14 That is wrong policy and wrong law. So, the conclusion
15 that they can't go forward, they've got to stop, go
16 back and start over with a programmatic environmental
17 impact statement and supplementing the waste management
18 PEIS is what they need to do.
19 The PEIS process, the one that they're doing
20 now that we've just heard about should end after our
21 comments. They shouldn't proceed to a final EIS.
22 Instead, DOE needs to start over. And, they should T51-6

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T51-5 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

T51-6 The EIS analysis was used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. The preferred alternative was identified based on consideration of many factors and sought to minimize the overall human health risks posed by the proposed GTCC disposal facility.

Southwest Research and Information Center, Commenter ID No. T51 (cont'd)

Capital Reporting Company 10

1 conclude and determine that neither New Mexico nor
2 other Department of Energy sites should be used for
3 disposal of commercial Greater-Than-Class-C waste.

T51-6 (Cont.)

Southwestern Low-Level Radioactive Waste Commission, Commenter ID No. L281

SOUTHWESTERN LOW-LEVEL RADIOACTIVE WASTE COMMISSION
1731 Howe Avenue #611, Sacramento, California 95825
Voice: (916) 448-2390
Fax: (916) 720-0144
E-mail: swllrwcc@swllrwcc.org
Website: www.swllrwcc.org

COPY

May 6, 2011

receive

MAY 1 ...

TO: Dr. Steven Chu, Secretary
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, DC 20585-0119

SUBJECT: Comment on Draft GTCC EIS

Dear Secretary Chu;

The Southwestern Low-Level Radioactive Waste Commission (Commission), established pursuant to the Southwestern Low-Level Radioactive Waste Disposal Compact Consent Act (P.L. 100-712) and charged with the duty of ensuring that low-level radioactive wastes are safely disposed of and managed within the states of Arizona, California, North Dakota and South Dakota, wishes to comment on the Draft GTCC EIS (Draft EIS). We are writing to you because our Commission believes, that, properly addressed , the inclusion of Class B and C low-level radioactive waste in the Draft EIS has potential to significantly respond to the "most significant challenge" identified in the 2010 Radiation Source Protection and Security Task Force Report (Report) to the President and the U.S. Congress- that being access to disposal for disused radioactive sources.. Augmenting DOE's efforts to develop a GTCC disposal capability with Congressional approval of the B & C waste pathway would go a long way in solving the problem

It is apparent to our Commission that the Draft EIS does not address/include the disposal of commercial Class B and C waste. The Commission would like to strongly suggest that the DOE take what ever steps are necessary to add commercial Class B and C waste. The Commission is well aware that the Low-Level Radioactive Waste Policy Amendments Act of 1985 limits the DOE's responsibility to the disposal of GTCC waste and makes the states responsible for commercial Class B and C waste. But, the law needs to be changed. The GTCC facility should be used for Class B and C wastes also, since if it can safely dispose of GTCC wastes, it can certainly dispose of Class B and Class C wastes safely. Congress, by changing the law, would enable this to happen. The EIS process whereby DOE must obtain Congressional approval of the GTCC EIS before issuing a Record of Decision in selecting a site for a proposed GTCC facility is a noteworthy opportunity to get Congressional focus/action on this critically important issue. L281-1

With the closure of access to the Barnwell, SC, facility on July1, 2008, thirty six States, including our four States, now have no pathway for the disposal of Class B and C waste. All such waste must now be held in storage. The U.S. Nuclear Regulatory Commission (NRC) considers storage less safe than disposal. Storage also has national security implications (see "Report," p.ii). While it is true that the newly licensed WCS facility in Texas will provide access to a disposal pathway for Class B and C waste for Texas and Vermont, there is no guarantee all states will have such access.

Our Commission's position, above, is consistent with other organizations. The Health Physics Society (HPS) first advanced the proposal that the GTCC disposal facility also be used for the disposal of commercial Class B and C waste (September 17, 2007, Letter from HPS to DOE Office of Regulatory Compliance). The American Nuclear Society, in a paper entitled "Disposal of Low-Level Radioactive Waste, Revised February 2009," takes the position of including the disposal of Class B and C waste with GTCC waste Also, the Chairman of the NRC, in the "Report" confirmed that such challenge requires attention at higher levels for solution The GTCC EIS process is one way to get the issue before the U.S. Congress and we appreciate your attention to this matter.

Sincerely,

Aubrey Godwin, Chairman
Southwestern Low-Level Radioactive Waste Commission

L281-1 Disposal of Class B and Class C LLRW is outside the scope of this EIS.

Southwestern Low-Level Radioactive Waste Commission, Commenter ID No. L281 (cont'd)

CC: Dr. Gregory B. Jaczko, Chairman
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

Mr. Arnold Edelman
Greater-Than-Class C Low-Level Radioactive Waste EIS
Office of Technical and Regulatory Support (EM-43)
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, DC 20585-0119

AZ, CA, ND, SD Governors
SWLLRWC Commissioners

Spark of Divinity Mission, Commenter ID No. W47

Abplanalp, Jennifer Marie

From: gtcceiswebmaster@anl.gov
Sent: Friday, May 20, 2011 4:09 AM
To: gtcceiswebmaster@anl.gov
Subject: Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10047

Thank you for your comment, Arnold Troeh, Ph.D..

The comment tracking number that has been assigned to your comment is GTCC10047. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: May 20, 2011 04:08:33AM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10047

First Name: Arnold
Middle Initial: N
Last Name: Troeh, Ph.D.
Organization: The Spark of Divinity Mission
Address: 15214 9th Ave. SW.
City: Seattle
State: WA
Zip: 98166-2102
Country: USA
Email: onlytry@comcast.net
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Please heed Dkhw'Duw'Absh (Duwamish) Chief Si'ahl's (Seattle) wise admonition when he said, "What happens to Mother Earth happens to Mother Earth's children." She is a living being who has sustained untold abuse, due to the pollution of Her sacred air, land, and waters, through predominantly war and industry. We have a vital symbiotic relationship with Her. When I was teaching on the Yakama Indian reservation in white Swan in 1975 the Hanford Complex was leaking radioactive waste according to Russel Jim a Yakama Tribal Council Member into the Columbia River, and we doubt if much has been done if anything to correct this disastrous problem. The Yakama Tribal Council was really upset about it at that time. So how will that be improved by adding all the radio-active waste in the nation to be disposed of at this location. It is a disaster equal to Fukishima ready to happen. W47-1

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

W47-1 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

SRS Community ReUse Organization, Commenter ID No. T9

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19 MR. BROWN: Thank you. Rick McLeod, and then
20 Charles Utley will then follow.
21 MR. RICK MCLEOD: I'm Rick McLeod, the executive
22 director of the SRS Community ReUse Organization. I'd
23 like to read a letter into the record and then at the
24 conclusion leave a copy for your files. Dear Mr.
25 Edelman, our organization, Savannah River Site
26 Community ReUse Organization, does not support the

SRS Community ReUse Organization, Commenter ID No T9 (cont'd)

25

1 selection of Savannah River Site as a potential
2 candidate for the disposal of greater-than-class C or
3 greater-than-class C-like waste under the scope of the
4 Draft Environmental Impact Statement. The SRSCRO was
5 the U.S. Department of Energy's designated community
6 re-use organization. We are charged with developing
7 and implementing a comprehensive strategy to diversify
8 the economy of a five-county region in the Central
9 Savannah River area of Georgia and South Carolina. The
10 SRSCRO is governed by a 22-member board of directors
11 composed of business, government, academic leaders from
12 Georgia from South Carolina. Initially its mission was
13 to develop and implement a regional economic
14 development plan utilizing technology-based facilities
15 at Savannah River Site. Today SRSCRO remains focused
16 on the regions of county by supporting new business
17 ventures that create new jobs in our region. The
18 disposal record class-C waste and greater-than-class
19 C-like waste from offsite is not compatible with local
20 and regional manues (phonetic) plans. The SRSCRO
21 believes since disposal of off-site waste as SRS may
22 ultimately affect future industrial recruitment, job
23 creation and overall the common health of the region.
24 Our community has been supporting missions at SRS for
25 over 50 years, a testament to SRS's outstanding record
26 of safety and performance, compliance and contribution

SRS Community ReUse Organization, Commenter ID No T9 (cont'd)

26

1 to our region and state. While we were confident
2 that--that SRS current handles the disposal of
3 low-level radioactive waste generated onsite and in a
4 technically acceptable and safe manner the disposal of
5 greater-than-class C waste and greater-than-class
6 C-like waste at SRS would violate one of the T9-1
7 community's guiding principles, no waste or excess
8 material should be brought into South Carolina unless
9 an approved and funded pathway exists for its
10 processing the shipment to either a customer or an
11 out-of-state waste disposal facility. It appears to
12 the SRSCRO the disposal in the geologic repository like
13 Yucca Mountain and/or the Waste Isolation Pilot Plant,
14 WIPP, is a more appropriate approach for this type of T9-2
15 waste stream and provides the additional level of
16 safety, security, reliability to deter and eliminate
17 any terrorist access to radioactive sealed sources and
18 such waste. Thank you for allowing us to voice--our
19 voice to be heard and participate in the Draft EIS
20 meeting.

T9-1 The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes, DOE considered all pertinent and important factors including existing regulations, agreements and other requirements in identifying its preferred alternative. The reader is referred to Section 2.9, Factors Considered in the Development of the Preferred Alternative.

T9-2 Based on the GTCC EIS evaluation and WIPP's operating record, DOE believes that the WIPP repository would be a safe location for the disposal of GTCC LLRW and GTCC-like wastes, some of which include long-lived radionuclides. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require modification to existing law. In addition, it would be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit.

The State of New Mexico has indicated a willingness to accept GTCC LLRW and GTCC-like wastes for disposal at WIPP. Twenty-eight New Mexico State Senators signed a proclamation made in the Fiftieth Legislature, First Session, 2011, stating: "Be it resolved that we, the undersigned, support the opportunity for other potential missions in southeast New Mexico to adequately address the disposal of defense high-level waste, commercial high-level waste, Greater Than Class C LLRW and surplus plutonium waste, as well as the interim storage of spent nuclear fuel." In response to the Draft GTCC EIS, Secretary David Martin, Secretary of the New Mexico Environment Department, sent a letter to DOE on June 27, 2011, stating that "the Department encourages DOE to support the WIPP or WIPP Vicinity proposed locations as the preferred alternatives addressed in the Draft EIS. The geologic repository is the favored alternative being more effective for the enduring time frames for this waste type." In addition, the Governor of New Mexico, in a letter to DOE Secretary Steven Chu on September 1, 2011, stated that the State of New Mexico encourages DOE to support the proposed location of WIPP as the preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes.

The Secretary of Energy determined that a permanent repository for high-level waste and spent nuclear fuel at Yucca Mountain, Nevada, is not a workable option and will not be developed. Therefore, DOE concluded that co-disposal at a Yucca Mountain repository is not a reasonable alternative and has eliminated it from evaluation in this EIS, as described in Section 2.6 of the EIS.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

June 24, 2011

Arnold Edelman, EIS Document Manager
Office of Environmental Management
U.S. Department of Energy
Cloverleaf Building, EM-42
1000 Independence Avenue, SW
Washington, DC 20585

Sent via email

Re: Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste

Dear Mr. Edelman:

The Idaho Department of Environmental Quality (DEQ) appreciates the opportunity to review the above titled document and has the following comments in addition to those submitted by Governor Otter at the pubic hearing held in Idaho Falls on May 11, 2011.

In 1995 the State of Idaho entered into an agreement (1995 Agreement) with the Department of Energy (DOE) and the U.S. Navy to ensure Idaho would not be a dumping ground for out-of-state radioactive waste and to provide requirements and a schedule for the removal of existing wastes from Idaho. The Draft EIS, on page 7-74 in Table 7.5.1, correctly notes that under the 1995 Agreement, Transuranic (TRU) waste brought to Idaho must be treated within 6 months of receipt and shipped out within 6 months of treatment. The Agreement does not allow TRU waste to enter Idaho for permanent disposal. As the Draft EIS indicates, GTCC-like waste includes TRU waste that cannot be brought to Idaho unless it is shipped out within one year of receipt. Accordingly, there is little utility in considering INL as a possible site for disposal of GTCC-like waste which includes TRU waste. L2-1

DOE has expended significant resources and effort to successfully implement the intent and requirements of the 1995 Agreement to restrict the importation of radioactive wastes into Idaho and to treat and remove existing wastes. Selecting or even considering INL as a possible disposal location for additional out-of-state radioactive waste undermines that success and the mutual understandings and vision for the INL that Idaho and DOE have reached over the past two decades. Selecting INL for

L2-1 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent. DOE fully supports the provisions of the 1995 agreement. The agreement was taken into considered in the selection of the preferred alternative.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

June 24, 2011
Arnold Edelman, EIS Document Manager
Page 2

disposal of additional waste, while continuing to clean up and remove past waste would reverse the progress that has been made and reignite issues that have long been settled. This is especially so as a great deal of the cleanup and removal of the waste at the INL is complete. L2-1 (Cont.)

DEQ also reiterates that the only disposal method approved by the NRC for GTCC waste is a geological repository – and consideration of other methods is unnecessary and unproductive where that method appears to be responsible and available. The Draft EIS clearly shows the geological repository has low environmental and human health impacts making it a better disposal method than the other alternatives. L2-2

For these reasons and those already expressed by Governor Otter, Idaho is not an appropriate site for the disposal of GTCC and GTCC-like waste.

Specific comments regarding the Draft EIS are attached for your consideration.

Sincerely,

Curt Fransen
Deputy Director

c: David Hensley – Counsel to the Governor
Toni Hardesty – Director, DEQ

Attachment

L2-2 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

ATTACHMENT

Idaho Department of Environmental Quality Comments on *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D)*

Page 2-6, lines 28-35

The key assumption pertaining to the borehole disposal method that an 8 ft diameter borehole can be drilled to a total depth of 130 ft in "unconsolidated to semiconsolidated soils" is not supported in subsequent text. Lines 13-14 (page 7-11) state the first basalt unit appears to occur at a depth of 43 to 57 ft; therefore, up to 87 ft of borehole would have to be drilled in basalt. Lines 26-29 (page 5-5) indicate an alternate drilling method may be employed to drill smaller diameter boreholes in "consolidated materials" (rock) but this alternate drilling method and diameter are not developed for the reference location at the INL. The rationale for not proceeding with assumptions supported by data presented in the report pertaining to the materials (unconsolidated materials versus rock), prescribed borehole depth (130 ft), and diameter (8 ft diameter) is not provided. Such a rationale is needed to support the analysis. L2-3

In addition, that assumption the waste would be placed in unconsolidated soils is not conservative for the reference location on the INL since it appears the waste would be placed into basalt. This is significant because retardation of isotopes is assumed to occur within the unconsolidated materials but not within the basalts above the water table. The modeling is not adequately described to ensure the analysis correctly captures the placement of the waste in the appropriate lithology at the reference location on the INL.

Page 2-16, lines 29-34

The assumption that water infiltration rate will decline to 20% of the background infiltration rate after 500 years following facility closure is neither conservative nor supported by the information presented. The "natural background infiltration rate" should be used post closure of the facility. L2-4

Page 2-17, lines 17-22

The summary incorrectly states that K_d for the basalts was assumed to be zero and the text refers to "the basalt layer that is present in some parts of INL..." Table E-4 of the main report identifies the values used for the variable represented by K_d. The table shows the basalts layers present above the water table were simulated with a K_d value of zero but the values of K_d assigned in the modeling where the basalt layers occur below the water table have specific L2-5

1

L2-3 The specific locations that would be used at each potential site for development of a disposal facility for GTCC LLRW and GTCC-like wastes are not known at this time. The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. In the case of intermediate depth boreholes and enhanced near surface trenches and vaults at INL, the local stratigraphy was accounted for in the modeling calculations. See Table E-3 in Appendix E for the characteristics of the 5 unsaturated zones (layers), which include basalt layers, used in the calculations. However, DOE recognizes that additional project- and site-specific information could be used to inform the implementation of a disposal facility at a given location. This additional information is expected to reduce the uncertainty associated with these types of evaluations to the extent possible. Site-specific information would be evaluated in any site-specific NEPA review that would be conducted based on a ROD for this EIS.

L2-4 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

values ranging from zero (0) to 160 cm^3/g. The multiple basalt layers that occur above the water table are assumed to not retard the movement of the simulated contaminants but the interbeds are assigned the same K_d values as the alluvium. The multiple basalt layers below the water table are assigned specific values for simulating the retardation of the contaminants. The text should be corrected to note the existence of multiple layers of basalt that underlie the INL and the text should be expanded to correctly portray the modeling approach used to simulate contaminant transport using multiple values for K_d as defined for the unsaturated zone and for the saturated zone.

Page 5-5, lines 26-29

The assumption that a "more robust drilling technology" could be employed where consolidated materials are present should have been carried forward into the risk analysis since it is highly likely, based on lines 13-14 (page 7-11) that basalt will be encountered before the total projected depth of 130 ft is reached. The text and analysis should be revised to present a more accurate analysis. L2-5 (Cont.)

Page 5-7, lines 8-9

The assumption that trenches can be excavated to a depth of 36 ft may be optimistic. Test borings are needed to verify the accuracy of this assumption over the area needed for the disposal facility. Such a caveat should be inserted in the text that only one well has been drilled within the boundary of the GTCC reference location and the depth to basalt in that well is not provided. The inference about the depth of the alluvium over the basalt at the reference location is inferred from unidentified wells in the vicinity of the reference location.

Page 5-28, lines 44-46

This section states "Relatively large doses are required to cause acute effects and potential mechanisms for such exposures include direct intrusion into the disposal units or workers being in the immediate vicinity of a large accidental release during operations."

An additional acute exposure pathway should be included for each disposal method considered for the INL reference site. The INL reference site is located in the Snake River Plain, a volcanic province that was created by a series of cataclysmic caldera-forming super-eruptions which started about 15 million years ago. [1] L2-6

Volcanic activity within the province in the form of extrusive lava flows has been estimated to have occurred as recently as 2,250 years ago. Volcanic activity within the Snake River Plain is generally considered dormant rather than extinct. If the hazard analysis period extends out 10,000 years, it should address the possibility and potential impacts of such a flow surfacing at or near the site.

2

DOE believes that 500 years is a realistic time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study. Further detail is provided in Appendix E.

L2-5 See response to L2-3.

L2-6 Site-specific environmental factors such as volcanic activity were evaluated in the EIS as appropriate. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS. A discussion of the risk of volcanic activity is included in Section 7.1.2.1.5 of the EIS. This risk is characterized as being the beyond design basis frequency.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

Page 7-2, Figure 7.1-1

This figure must be replaced. The image is distorted and misrepresents the locations and boundaries for ATR and INTEC. Portions of INTEC are incorrectly shown on both sides of the Big Lost River. One can only assume the reference location for the disposal facility is correctly placed. See the attached image copied from Google Earth that shows the proper locations for ATR and INTEC. L2-7

Page 7-10, Figure 1.2-1

The figure indicates the "Lava Ridge-Hell's Half Acre Volcanic Rift Zone (40,000 years)". If this is intended to state the time since last eruption it should be 5200 years. The last eruption was 3250 BC ± 150 years [a] L2-8

Page 7-11, lines 13-18

The key assumption pertaining to the viability of the borehole and the trenching methods is that the depth of unconsolidated "soils" is thick enough. Stratigraphic data from nearby wells are used to estimate the thickness of the unconsolidated "soils" at 43 to 57 ft which is much shallower than the assumption for a 130 ft total depth for the boreholes. Additional on-site data are needed to support the assumption that trenches can be dug to a depth of 36 ft across the reference location. Also, smaller diameter boreholes would probably be needed if basalt is encountered at these shallow depths and the area needed would increase in size to maintain the projected spacing between boreholes. It is not clear if data from well USGS 326 is included in the assessment of the depth to basalt or if it was left out of the assessment. The assumption pertaining to the depth of unconsolidated "soils" should be modified to match the site specific data that is available. L2-9

Page 7-12, Figure 7.1.2-2

A companion figure should be added that shows the geologic cross section for the reference location at a scale that allow the thickness of the alluvium to be assessed. This figure provides little useful information particularly regarding the reference location which is not shown on the plan view. L2-10

Page 7-15, lines 34-37

This very brief discussion regarding soils should be augmented with the previously mentioned cross section for the reference area at a scale that will portray the thickness of the alluvium. L2-11

3

L2-7 The figure was replaced in the Final EIS.

L2-8 The values in parenthesis appearing in Figure 7.1.2-1 do not represent the time elapsed since the last eruption. They represent the recurrence interval computed by Hackett et al (2002) by dividing the number of volcanic events into the age range of volcanism.

L2-9 See response to L2-3.

L2-10 See response to L2-3.

L2-11 The level of detail presented here is appropriate for the analyses performed. As the long-term modeling analysis uses primarily average DOE site characteristics for many parameters rather than exact measurements at the reference locations, it would not be appropriate to imply more accuracy than is warranted.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

Page 7-17, lines 11-14

These lines state "Other surface water bodies within the INL boundaries include natural wetland-like ponds and several man-made percolation and evaporation ponds...." The locations and approximate sizes of these "natural wetland-like ponds" should be included on a figure that demonstrates the locations relative to the reference location. L2-12

Page 7-18, lines 28-30

The stated thickness of the alluvium at the reference location is "about 9.1 m (30 ft)." This thickness is not consistent with Section 7.1.2.1.3 (page 7-11) where the stated alluvial thickness is reported to be 43 to 57 ft. This inconsistency should be resolved. The conservative thickness should be used for modeling and assessment of the borehole and trenching proposals. L2-13

Page 7-18, lines 30-36

This description of the thicknesses of the layers of the unsaturated zone should be clarified for the reader to describe both the layers of basalt and the layers of sedimentary interbeds that interrupt the sequence of basalt flows. It is these layers of sedimentary interbeds that are assigned values for K_d where retardation will occur slowing the movement of the contaminants from the trenches, boreholes, or vaults. L2-14

Page 7-18, lines 43-44

The stated range of depths to ground water is 200 ft to about 900 ft but lines 23-24 (page 7-18) states the thickness of the unsaturated zone is 400 ft to 800 ft. The thickness of the unsaturated zone and the depth to ground water should be the same in this environment. The correct depth to ground water is 200 ft to about 900 ft and the discussion in lines 23-24 should be edited to match the text on the same page. L2-15

Page 7-19, lines 3-5

The discussion pertaining to perched aquifers should be separated from the discussion about the regional Snake River Plain Aquifer. As presented, the discussion is not complete and the average reader would likely not understand the relevance of perched aquifers that have been found at ATR and other facilities such as INTEC. Multiple perched aquifers have been found at the facilities often separated aerially and vertically from each other. Please expand this discussion regarding the occurrence of perched aquifers and their potential relevance to this proposal for waste disposal. L2-16

4

L2-12 As the locations and approximate sizes of the nearby surface water bodies are not expected to be impacted, do not impact the long-term dose calculations, and might not be near the final location of a potential disposal facility if one were selected for INL, adding additional information would not be relevant to any decisions made based on the EIS analysis.

L2-13 Section 7.1.3.2.1 was re-written for consistency.

L2-14 The characteristics of these layers are further described in Table E-3 in Appendix E.

L2-15 The text has been revised for consistency.

L2-16 Based on INL 2011 (Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site, DOE/EA-1793) there are no permanent perched water zones under the GTCC reference site. Formation of permanent perched water zones is associated with large surface water discharges from industrial facilities. The perched water under the ATR Complex does not underlie the GTCC reference location and therefore perched water zones would not result in a release of contaminants to surface water.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

Page 7-19, lines 34-35

The text incorrectly states "Aquifer recharge occurs mainly through the surface of the ESRP from flow in the channel of the Big Lost River and its diversion area to the south." The Big Lost River is not the main source of recharge to the aquifer. Please correct this text. L2-17

Page 7-23, lines 38-45

The rationale supporting the conversion of 666 mrem to a direct radiation dose to a site worker at 120 mrem is not clear. Please revise the text to more clearly state the method used to develop the direct radiation dose. L2-18

Page 7-51, lines 31-39

The methodology and assumptions used to calculate the peak annual dose under the borehole method is not apparent compared to the other two methods as written. It appears the calculation is based on the travel times for the uranium isotopes that will arrive in the ground water earlier in the borehole method when compared with the other two methods. The text states the risk is driven by the uranium isotopes which will be "slightly higher than the dose resulting from the C-14, Tc-99, and I-129...." Lines 41-43 (same page) refer the reader to Tables 7.2.4-2 and 7.2.4-3 that show the vault and trenches produce higher doses and risk within the 10,000 year time frame. Lines 4-14 (page 7-54) convey the same message regarding the distribution of risk from the three types of disposal. The statements and tables appear to be in conflict. A revision is recommended to more clearly state the arrival times of the noted contaminants and their respective contribution to peak risk which is driven by the later arriving uranium isotopes and not the mobile C-14, Tc-99, and I-129. See the following comment on lines 4-14 (page 7-54) for further discussion regarding the conflicting messages presented between the text and Figures 7.2.4-1 and 7.2.4-2. L2-19

Page 7-54, lines 4-14
Page 7-55, Figures 7.2.4-1 and 7.2.4-2

The predicted radiation doses shown on the figures are not described adequately to explain why the arrival times of the isotopes in ground water are shorter for the borehole disposal method than with the trenches or vaults yet the predicted doses are higher for the trenches and vaults. The discussion needs to describe the modeling assumptions that result in the apparent shorter travel times to the ground water but higher doses with the longer travel times. L2-20

5

L2-17 Text in Section 7.1.3.2.3 was modified to reflect the fact that recharge to the Eastern Snake River Plain aquifer is principally from infiltration of applied irrigation water, infiltration of stream flow from the Big Lost River, and ground-water inflow from adjoining mountain drainage basins.

L2-18 Based on TLD measurements, if someone were present the entire time over the course of one year at the location with the highest site radiation level, they would receive approximately 666 mrem. Of that 666 mrem, approximately 122 mrem was from natural background radiation for the area. Thus, the dose from site activities would be about 666 – 122 = 544 mrem. If someone, such as a worker, were exposed at that location for 2000 hours per year, rather than the entire 8,766 hours in one year, they would receive a dose of about 544 x 2,000/8,766 = 120 mrem (rounded to 2 significant figures). The text was modified for clarity.

L2-19 The methodology and assumptions used to calculate the peak doses are the same for the three different disposal methods considered. There is no conflict between the text and the figures. However, to facilitate a better understanding of the results, the text was revised so that the two figures are referenced and explained first before the discussions moves on to cover the information presented in the tables.

L2-20 Additional discussion of the modeling assumptions and their influence on the dose results was added to Section 7.2.4.2. The travel times for radionuclides to reach the groundwater table are shorter for the borehole disposal method than for the trench and vault disposal methods because the bottom of the boreholes will be located closer to the groundwater table than the bottoms of the trenches and vaults. The peak doses for the borehole method were estimated to be smaller than those for the vault and trench methods because the footprint of a borehole disposal facility would be larger than that of a vault or trench disposal facility. As a result, the distance that the majority of the contamination needs to travel, after arriving at the groundwater table, to reach an offsite well located at 100 m from the edge of the disposal facility, would be greater for the borehole method than that for the vault or trench method (although the leading edge of the contamination for the borehole method would arrive first). The larger disposal area and also the greater distance for a majority of the contamination would result in greater dilution in the groundwater concentrations, and consequently, would yield smaller peak doses.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

Page 7-67, lines 41-43

This section states that a radiological release from the GTCC reference location could have an impact on the Advanced Test Reactor (ATR) facility, since the ATR is considered historically significant. There is no mention of the potential impact to the Engineering Breeder Reactor I (EBR-I) facility, a National Historic Landmark, which is located approximately four miles to the SSW (generally down gradient) of the proposed GTCC reference location. Please consider adding the potential for impact to the EBR-I site to this section. L2-21

Page E-30, Appendix E, Table E-3

Please provide a rationale in a footnote for using a density for "sandy clay/clay" in Unsaturated Zone 1 when the alluvium is described as "coarse-grain unit consisting of predominently sand and gravel." L2-22

Page E-30, Appendix E, Table E-3

The contaminated zone dry bulk density is a soil parameter and is the ratio of the mass of the solid phase of the soil (i.e., dried soil) to its total volume. [3] The typical value used for INL is 1.5. The values for bulk density used elsewhere in appendix E should be reviewed and adjusted to reflect sand, clay, gravel, "fractured Basalt" (instead of basalt) per the discussion in Draft GTCC EIS sections 7.1.3.2 and its sub-sections. L2-23

Page E-30, Appendix E, Table E-3

The b-parameter used in the model for the contaminated zone is 5.3 which is a default value in RESRAD corresponding to silty loam. "The soil-specific b parameter is an empirical fitting parameter and, therefore, must be determined experimentally. For each type of soil, the best estimate of b can be obtained by adjusting the best-fit values of each soil to an experimentally determined curve of relative permeability versus saturation, according to the power function model" [6] L2-24

$$R_s = (I_r / K_{sat})\,(1 / 2b+3)$$

Where Rs is the saturation ratio (dimensionless), and b is the fitting parameter, called the soil-specific exponential parameter, I_r the downward water infiltration rate and K_{sat} the saturated hydraulic conductivity.

When the b parameter cannot be experimentally determined the values in the following table should be used.

L2-21 The ATR Complex is approximately 0.75 miles from the reference location and the EBR-1 site is located approximately 4 miles to the south-southwest of the reference location. The ATR and EBR-I sites are over 400 feet above the aquifer and would not be impacted by contaminated groundwater under any conceivable scenario. There are no surface water sources extending between the GTCC reference location and the ATR or the EBR-I sites. Therefore, radionuclides would not have the possibility of contaminating surface water and then the buildings during operations or post-closure. Therefore, the only exposure source would be from a potential accident via airborne releases from the facility. Based on a credible accident scenario during operation of a potential disposal facility and the prevailing wind direction, air deposition of radionuclides from an accident at the reference location would have little potential to impact the EBR-1 reactor building.

L2-22 The density of alluvium was judged to be between those of sandy and clayey soils. Because the measured value for alluvium was not available, the value for sandy clay soil was used. On the other hand, the range of bulk density for different types of soil is small which, in conjunction with the fact that soil bulk density is not a very sensitive parameter, i.e. its influence on the modeling result is small, the use of the density for sandy slay was determined to be acceptable.

L2-23 The way RESRAD-OFFSITE was used for groundwater modeling in the EIS deviates from the typical use of the code. The radionuclide release rates from the contaminated zone were pre-calculated and input to the code rather than were calculated by the code using the input parameters of the contaminated zone. Therefore, the soil bulk density of the contaminated zone was not used in the dose modeling. Regarding the soil densities for the unsaturated zones and saturated zone, the input values had been reviewed by INL site representatives before being used in the dose modeling.

L2-24 In the EIS modeling, the contaminated zone consists of the waste materials, the waste containers, and the back fill soils. Therefore, the homogeneously contaminated soil assumption associated with a typical contaminated zone for RESRAD-OFFSITE modeling is not applicable. In the EIS modeling, the release rates of radionuclides from the contaminated zone were pre-calculated and input to the code, so the calculation involving a homogeneous contaminated zone was bypassed. Because of this, the input soil-b parameter was not used in the RESRAD-OFFSITE dose calculations and the RESRAD-OFFSITE default value was listed in the table.

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)

Representative Values of Soil-Specific Exponential b Parameter

Texture	Soil-Specific Exponential Parameter, b
Sand	4.05
Loamy sand	4.38
Sandy loam	4.90
Silty loam	5.30
Loam	5.39
Sandy clay loam	7.12
Silty clay loam	7.75
Clay loam	8.52
Sandy clay	10.40
Silty clay	10.40
Clay	11.40

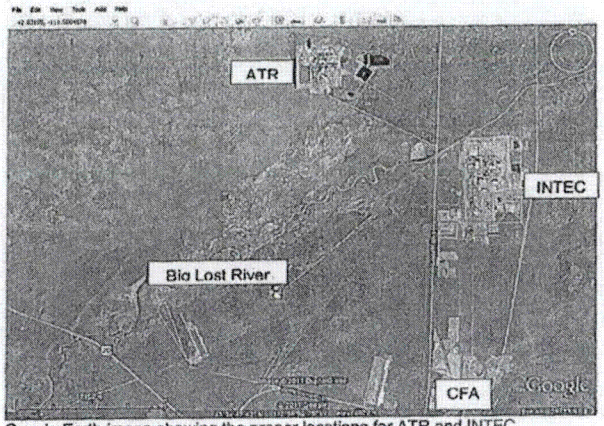
Source: Clapp and Hornberger (1978).

In this case a value ranging from 4.05 to 4.9 should be used instead of the RESRAD default value.

Notes

1. NPS (1991). *Craters of the Moon: National Park Handbook (139).* Washington D.C.: National Park Service Division of Publications. ISBN 0-912627-44-1.
2. Kuntz, et al., "Radiocarbon Studies of Latest Pleistocene and Holocene Lava Flows of the Snake River Plain, Idaho: Data, Lessons, Interpretations," *Quaternary Research*, February 1986, p. 163.
3. ANL (1993). DATA COLLECTION HANDBOOK TO SUPPORT MODELING IMPACTS OF RADIOACTIVE MATERIAL IN SOIL , Chapter 2, section 2.12
4. ANL (1993). DATA COLLECTION HANDBOOK TO SUPPORT MODELING IMPACTS OF RADIOACTIVE MATERIAL IN SOIL , Chapter 13

State of Idaho, Department of Environmental Quality, Commenter ID No. L2 (cont'd)



Google Earth image showing the proper locations for ATR and INTEC.

8

State of Idaho, Governor's Office, Commenter ID No. T18

So with that, by introduction, let me call our first speaker from the Governor's office, Mike Webster, and he will be followed by Stevan Piet.

MIKE WEBSTER: I think you already introduced me, didn't you?

MR. BROWN: I did.

MIKE WEBSTER: That's not on the record.

MR. BROWN: You can confirm identification.

State of Idaho, Governor's Office, Commenter ID No. T18 (cont'd)

MIKE WEBSTER: Okay. I'm Mike Webster from -- representing the Governor of the great State of Idaho. And his letter reads:

"Dr. Steven Chu, Secretary, U.S. Department of Energy. Regards: Greater-Than-Class C Waste Disposal Draft Environmental Impact Statement. Dear Secretary Chu, as Governor, I write to express my objection to the U.S. Department of Energy's proposal to dispose of Greater-Than-Class C waste or GTCC-like waste generated outside of Idaho in our great state.

The Idaho National Laboratory is a preeminent nuclear energy research and engineering facility and a valuable asset to the nation and Idaho. I firmly believe the INL will be a leader in our nation's nuclear renaissance. Proposing the INL as a disposal site for GTCC waste is inconsistent with my vision for the Site and incompatible with its mission to ensure the nation's energies, security with safe, competitive, and sustainable energy systems, and unique national and homeland security capabilities. Idaho embraces this vision for the future of INL and is not willing to risk that future by turning INL into a disposal facility for the off-site waste. T18-1

T18-1 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

State of Idaho, Governor's Office, Commenter ID No. T18 (cont'd)

1 The potential selection of the INL for
2 the GTCC waste is contradictory to the DOE's cleanup
3 progress in Idaho. As you know, the INL has been
4 used in the past to store or dispose of radioactive
5 waste that was generated outside of Idaho. Some of
6 that historic waste is similar to the GTCC or
7 GTCC-like waste under consideration in the Draft EIS.
8 The State and DOE resolved years of
9 conflict regarding the historic waste by agreeing to T18-2
10 a retrieval and a removal program that had been
11 successfully implemented by DOE. Selecting INL now
12 would be inconsistent with the intent and
13 understandings of the 1995 Settlement Agreement.
14 In the face of our agreements and the
15 great progress DOE has made, it makes no sense to
16 change directions by selecting INL for further
17 disposal of additional out-of-state radioactive
18 waste.
19 The Nuclear Regulatory Commission
20 regards deep geological disposal of GTCC as the most T18-3
21 appropriate method. Such repository currently exists
22 in other states and should be selected as the
23 disposable site for this material.
24 Even if alternatives to deep geological T18-4
25 disposal, such as trenches, deep bore holes, or

T18-2 DOE is performing environmental restoration activities at INL. The ongoing cleanup effort will continue. DOE fully supports the 1995 Settlement Agreement. In selection of the preferred alternative, exiting agreements were taken into consideration.

T18-3 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

T18-4 In site evaluation and the selection of the preferred alternative, factors such as geology (basalt) and groundwater (sole source aquifers) were taken into consideration.

State of Idaho, Governor's Office, Commenter ID No. T18 (cont'd)

1 vaults are deemed acceptable, the INL is located on
2 top of the Snake River Plain Aquifer, the largest
3 fractured basalt aquifer in the country, estimated to
4 have a volume the size of Lake Erie. It is a
5 federally designated sole source aquifer for more
6 than 200,000 people. As such, the INL is not a
7 suitable disposal site when other safer and more
8 appropriate locations are available.

T18-4 (Cont.)

9 I understand the DOE must consider a
10 range of alternatives in this decision-making
11 process; however, the INL is not a viable option for
12 the aforementioned reasons.
13 In Idaho, we are working towards a new
14 tomorrow when it comes to nuclear energy. We want to
15 close the chapter as an off-site disposal facility
16 and continue as a leader in the nuclear renaissance.
17 Additional written comments will be
18 provided by the State, through the Department of
19 Environmental Quality during the public comment
20 period.
21 Please do not hesitate to contact my
22 office at (208)334-2100; or Toni Hardesty, Director
23 of DEQ at (208)373-0502.
24 As always-Idaho, Esto Perpetua, C.L.
25 "Butch" Otter, Governor of Idaho.

State of Idaho, Governor's Office, Commenter ID No. T18 (cont'd)

1 Thank you.
2 MR. BROWN: Thanks very much.
3 Stevan Piet.
4 MIKE WEBSTER: I give this to whom?
5 MR. BROWN: The court reporter. Thank you.
6

State of Idaho, Governor's Office, Commenter ID No. L298

C. L. "BUTCH" OTTER
GOVERNOR

May 11, 2011

Dr. Steven Chu
Secretary
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

VIA U.S. MAIL & HAND DELIVERY

RE: Greater-Than-Class C Waste Disposal Draft Environmental Impact Statement

Dear Secretary Chu,

As Governor I write to express my objection to the U.S. Department of Energy's (DOE) proposal to dispose of Greater-Than-Class C waste (GTCC) or GTCC-like waste generated outside of Idaho in our great state.

The Idaho National Laboratory (INL) is a pre-eminent nuclear energy research and engineering facility and a valuable asset to the nation and to Idaho. I firmly believe the INL will be a leader in our nation's nuclear renaissance. Proposing the INL as a disposal site for GTCC waste is inconsistent with my vision for the site and incompatible with its mission to "[e]nsure the nation's energy security with safe, competitive, and sustainable energy systems and unique national and homeland security capabilities." Idaho embraces this vision for the future of INL and is not willing to risk that future by turning INL into a disposal facility for off-site waste. L298-1

The potential selection of the INL as a disposal site for GTCC waste is contradictory to the DOE's cleanup progress in Idaho. As you know, the INL has been used in the past to store or dispose of radioactive waste that was generated outside of Idaho. Some of that historic waste is similar to the GTCC or GTCC-like waste under consideration in the draft EIS. The State and DOE resolved years of conflict regarding the historic waste by agreeing to a retrieval and removal program plan that is being successfully implemented by DOE. Selecting INL now would be inconsistent with the intent and understandings of the 1995 Settlement Agreement. In the face of our agreements and the great progress DOE has made, it makes no sense to change direction by selecting INL for further disposal of additional out of state radioactive waste. L298-2

The Nuclear Regulatory Commission requires deep geological disposal for GTCC as the most appropriate method. Such a repository currently exists in other states and should be selected as the disposal site for this material. Even if alternatives to deep geological disposal such as trenches, deep bore holes or vaults L298-3 L298-4

STATE CAPITOL • BOISE, IDAHO 83720 • (208) 334-2100

L298-1 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

L298-2 DOE is performing environmental restoration activities at INL. The ongoing cleanup effort will continue. DOE fully supports the 1995 Settlement Agreement. In selection of the preferred alternative, exiting agreements were taken into consideration.

L298-3 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L298-4 In site evaluation and the selection of the preferred alternative, factors such as geology (basalt) and ground water (sole source aquifers) were taken into consideration.

State of Idaho, Governor's Office, Commenter ID No. L298 (cont'd)

basalt aquifer in the country estimated to have a volume the size of Lake Erie. It is a federally designated "sole source" aquifer for more than 200,000 people. As such, the INL is not a suitable disposal site when other safer and more appropriate locations are available. L298-4 (Cont.)

I understand the DOE must consider a range of alternatives in this decision-making process; however the INL is not a viable option for the aforementioned reasons. In Idaho we are working towards a new tomorrow when it comes to nuclear energy. We want to close the chapter as an off-site disposal facility and continue as a leader in the nuclear renaissance.

Additional written comments will be provided by the State, through the Department of Environmental Quality (DEQ) during the public comment period. Please do not hesitate to contact my office at (208) 334-2100 or Toni Hardesty, Director of DEQ at (208) 373-0502.

As Always-Idaho, "Esto Perpetua"

C. L. "Butch" Otter
Governor of Idaho

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45

From: gtcceiswebmaster@anl.gov
Sent: Thursday, June 23, 2011 4:45 PM
To: mail_gtcceisarchives; gtcceiswebmaster@anl.gov; gtcceis@anl.gov
Subject: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10381
Attachments: State_of_Nevada_Comments_-_Draft_GTCC_Waste_EIS_GTCC10381.pdf

Thank you for your comment, Joseph Strolin.

The comment tracking number that has been assigned to your comment is GTCC10381. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 23, 2011 04:44:25PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10381

First Name: Joseph
Middle Initial: C
Last Name: Strolin
Organization: State of Nevada
Address: Agency for Nuclear Projects
Address 2: Office of the Governor
Address 3: 1761 E. College Parkway, Ste. 118
City: Carson City
State: NV
Zip: 89706
Country: USA
Email: jstrolin@nuc.state.nv.us
Privacy Preference: Don't withhold name or address from public record
Attachment: C:\Documents and Settings\loe\Desktop\GTCC Draft EIS 2-2011\State of Nevada Comments - Draft GTCC Waste EIS.pdf

Comment Submitted:
Attached are the State of Nevada's comments on DOE's Draft EIS for Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste.

Sincerely,

Joseph C. Strolin
Acting Executive Director
Nevada Agency for Nuclear Projects
Office of the Governor
1761 E. College Parkway, Suite 118
Carson City, Nevada 89706
775-687-3744

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State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

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State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

From: Joe Strolin <jstrolin@nuc.state.nv.us>
Sent: Thursday, June 23, 2011 4:40 PM
To: gtcceis@anl.gov
Subject: State of Nevada Comments on DOE's Draft EIS for Disposal of GTCC Waste
Attachments: State of Nevada Comments - Draft GTCC Waste EIS.pdf

Attached please find the State of Nevada's comments on DOE Draft EIS for Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste. The comments are submitted in response to the notice of availability in the Federal Register of February 25, 2011.

I would appreciate it if you would acknowledge receipt of these comments by replying to this email or by calling my office at 775-687-3744.

Sincerely,

Joseph C. Strolin, Acting Executive Director
Nevada Agency for Nuclear Projects
Office of the Governor
1761 E. College Parkway, Suite 118
Carson City, Nevada 89706
775-687-3744

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State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

BRIAN SANDOVAL
Governor

STATE OF NEVADA

JOSEPH C. STROLIN
Acting Executive Director

OFFICE OF THE GOVERNOR
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1761 E. College Parkway, Suite 118
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E-mail: nwpo@nuc.state.nv.us

June 23, 2011

Mr. Arnold M. Edelman, EIS Document Manager
U.S. Department of Energy, GTCC EIS
Cloverleaf Building, EM-43
1000 Independence Avenue, SW
Washington, DC 20585

RE: State of Nevada Comments on DOE's Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D)

Dear Mr. Edelman:

Enclosed please find the State of Nevada's comments on DOE's Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste.

If you have questions regarding these comments or would like additional information, please let me know.

Sincerely,

Joseph C. Strolin
Acting Executive Director

JCS/js
Enclosure
cc Marta Adams, Senior Deputy Attorney General
Nevada State Clearinghouse

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

STATE OF NEVADA COMMENTS
ON DOE'S DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE DISPOSAL OF GREATER-THAN-CLASS C (GTCC) LOW-LEVEL
RADIOACTIVE WASTE AND GTCC-LIKE WASTE (DOE/EIS-0375-D)[1]

Submitted by
The Nevada Agency for Nuclear Projects
Office of the Governor
June 23, 2011

1.0 General Comments

1.1 The Nevada Nuclear Security Site (NNSS) as a Potential Disposal Location

In comments on the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the disposal of Greater-Than-Class C waste in 2007, the State of Nevada voiced serious reservations about the appropriateness of the Nevada Test Site (since renamed NNSS) as a location for disposal of GTCC waste[2]. In those comments, the State pointed to continuing issues associated with allowable new activities at NNSS, given the site's statutory designation as a "weapons testing site." Those concerns still have not been resolved. In addition, while NNSS has been a site for the disposal of low-level and mixed hazardous and low-level radioactive waste, the nature and characteristics of GTCC wastes and the longer-lived radionuclides they contain pose added and unacceptable long-term risks, given the geophysical conditions at NNSS. E45-1

Many of the same conditions that made Yucca Mountain an unsuitable site for long-term geologic isolation of radioactive wastes are also present at the NNSS (i.e., active seismic area; fast groundwater pathways; potential for renewed volcanism; highly corrosive subsurface environment; etc.). In addition, there are serious issues involving the potential for cumulative impacts to the environment from past weapons testing activities (and resulting contamination) and from current and future low-level and mixed-low-level waste disposal activities.

NNSS also poses serious problems with regard to the transportation of GTCC waste and GTCC-like waste from generator and storage sites to any disposal facility that might be located at NNSS. As discussed below, of all the potential disposal locations evaluated in the DEIS, NNSS is by far the most problematic from a transportation standpoint. The fact that transportation factors were not used to discriminate between potential alternative disposal locations, and only overly general cumulative radiation dose calculations were used to compare one site to another with respect to transportation impacts, are major shortcomings of the DEIS.

[1] The *Draft Environmental Impact Statement for Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* is referred to in these comments as the "DEIS".
[2] Unless otherwise specified, the term "GTCC waste" as used in these comments refers to both GTCC low-level radioactive waste (as defined in the DEIS) and "GTCC-Like" waste.

E45-1 The NNSS was originally created through the issuance of four administrative Public Land Orders by the Secretary of the Interior. Public Land Order 805, dated February 12, 1952, reserved lands for the use of the U.S. Atomic Energy Commission (AEC), DOE's predecessor, as a weapons testing site. Subsequent administrative land withdrawals through 1965 reserved the withdrawn lands for use of the AEC in connection with the NNSS. The 1961 Public Land Order specifically mentioned that it reserved the lands for use of the AEC "in connection with the Nevada Test Site for test facilities, roads, utilities, and safety distances." The Military Lands Withdrawal Act of 1999 withdrew the northwestern area of the NNSS (Pahute Mesa) for exclusive use of DOE. This area had previously been utilized by DOE and its predecessors under a Memorandum of Understanding with the U.S. Air Force.

The U.S. Department of the Interior (DOI) is vested with oversight responsibility to review existing land withdrawals under the Federal Land Policy and Management Act. The DOI suggested in its comments on the 1996 NTS EIS (which included proposals for commercial reuse of the site) that substantial changes in land use at the NTS may require a new land withdrawal. As part of the April 1997 Settlement Agreement resolving State of Nevada litigation regarding radioactive waste disposal at the NTS (State of Nevada v. Peña, U.S. District Court, District of Nevada, 1997), DOE committed to initiate "consultation with the United States Department of the Interior ('DOI') concerning the status of the existing land withdrawals for NTS with regard to low-level waste storage/disposal activities." The consultation process was initiated by DOE with DOI shortly thereafter and was concluded in November 2009, with NNSS's acceptance of custody and control of the approximately 740 acres constituting the NNSS Area 5 Radioactive Waste Management Complex. This facility is part of NNSS's continuing environmental management mission as a disposal facility for low-level waste (LLW) and mixed low-level waste (MLLW). All radioactive waste management at the NNSS is conducted in accordance with applicable federal, state and local regulations.

Site-specific environmental factors such as geophysical conditions were evaluated in the EIS. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

The State's comments on the 2007 NOI indicated that NNSS was an unacceptable location for disposal of GTCC waste and GTCC-like waste. There is nothing in this DEIS that would alter that assessment. E45-2

1.2 The need for NRC Regulation of any GTCC Waste Disposal Activities

The DEIS acknowledges that most of the GTCC waste to be disposed of will be commercial waste generated by current and future Nuclear Regulatory Commission (NRC) licensees, and that, by law, a GTCC waste facility must be regulated/licensed by the NRC. Inclusion of DOE's GTCC-like wastes currently managed under DOE Orders and stored at DOE facilities that operate under DOE Orders requires that these be brought into the NRC regulatory regime. The DEIS does not directly address this issue and, in fact, does not even commit to the NRC licensing and regulation of any disposal facility established pursuant to the Final EIS. NRC licensing is not a simple process, as evidenced by the high-level waste program where the decision was made to co-mingle commercial and defense waste. Major issues and additional regulatory authority matters arise with respect to all of the DOE sites that are under consideration for a GTCC waste facility. The DEIS failed to describe how a NRC-regulated facility can co-exist with a DOE self-regulated facility or an EPA/state-regulated facility such as WIPP, and how the public can be assured that NRC regulatory authority has primacy at the GTCC facility. E45-3

Issues of NRC regulation also arise with regard to the transportation of GTCC waste, including the requirement for use of NRC certified shipping containers, requirements involving shipments notifications, NRC transportation safeguards regulations, and others. E45-4

1.3 Seriously Deficient Transportation Analysis

The analysis of transportation impacts associated with shipments of GTCC waste and GTCC-like waste in the DEIS is seriously deficient. Most importantly, transportation system characteristics and the effects of waste shipments along specific routes (rail and highway) through specific communities, using specific modes of transport are not used as criteria in evaluating whether identified alternative disposal locations are viable or appropriate. Nor are transportation factors such as these used to compare alternative disposal sites and discriminate among the various sites. Because of the substantial nature of the shipping campaign required for the disposal of GTCC waste, transportation considerations should be a major factor in identifying alternative disposal sites. If that had been done, sites like NNSS, where transportation access is limited and extremely problematic, would have been eliminated from consideration. E45-5

Transportation of GTCC waste to any disposal facility located at NNSS would involve unacceptable impacts for the State of Nevada in general and the heavily populated Las Vegas metropolitan area in particular. Since there is no rail access to NNSS, and the cost for constructing such access would be in the neighborhood of $3 billion (according to DOE's own estimates that were done for the Yucca Mountain project), it is entirely unrealistic to assume that GTCC waste would be shipped via rail to the site. Consequently, all of the waste would have to be moved to the site by truck, requiring 12,600 shipments. Many of these shipments, according to the DEIS, would be "Highway Route-Controlled Quantity" (HRCQ) shipments. By law, HRCQ shipments must use the interstate highway system and would, of necessity, pass through

2

E45-2 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

E45-3 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

E45-4 DOT and the NRC have primary responsibility for federal regulations governing commercial radioactive materials transportation. Non-DOE shipments of GTCC LLRW from commercial sites would be transported by commercial carriers and would be regulated by DOT and the NRC. In addition, DOE shipments by commercial carriers of GTCC LLRW from commercial sites or of GTCC-like waste from DOE sites would be regulated by DOT and NRC.

DOE has broad authority under the AEA to regulate all aspects of activities involving radioactive materials that are undertaken by DOE or undertaken on its behalf, including the transportation of radioactive wastes. However, in most cases that do not involve national security, DOE does not exercise its authority to regulate DOE shipments and instead utilizes commercial carriers that undertake shipments of DOE materials under the same terms and conditions as those used for commercial shipments. These shipments are subject to regulation by DOT and the NRC. As a matter of policy, however, even in the limited circumstances where DOE exercises its AEA authority for shipments, DOE requirements mandate that all DOE shipments be undertaken in accordance with the requirements and standards that apply to comparable commercial shipments, unless there is a determination that national security or another critical interest requires different action.

E45-5 Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

the most heavily populated portions of Las Vegas and Clark County. Such a shipping campaign would put Las Vegas' tourism-dependent economy at substantial risk in the event of an accident or terrorist attack against a shipment while in transit.

Transportation impacts associated with the disposal of GTCC waste generally, and with respect to NNSS in particular, do not appear to have been adequately addressed in the DEIS. The draft document uses an overly general approach to radiological impact assessment for GTCC waste shipments and ignores the importance of non-radiological factors in defining the true scope and nature of impacts associated with such transportation. Important non-radiological impacts are not used to discriminate among potential disposal locations. Additional issues that should have been covered in the DEIS include, but are not necessarily limited to, differential analyses of impacts associated with various modes of shipment (highway, rail, barge); routing issues and impacts, including the identification of specific preferred and alternative routes from generator/storage sites to proposed disposal locations and the unique characteristics along those routes; property value effects; and risk perception impacts (and their attendant economic consequences) associated with prospective GTCC shipments. E45-5 (Cont.)

1.4 Lessons from the Failed Federal High-Level Radioactive Waste Program

In going forward with the identification of disposal sites for GTCC waste, DOE should be cognizant of the important lessons to be learned from the failed attempt to site a facility for disposal of high-level radioactive waste and spent nuclear fuel at Yucca Mountain. Such lessons have special relevance with regard to any proposal for siting a GTCC waste disposal facility in general and at NNSS in particular. Any criteria for selecting a disposal location from among various alternatives should reflect the two most important lessons to be gleaned from the failed Yucca Mountain program: (1) that any siting decision must have an impeccable scientific and technical foundation that is fully transparent; and (2) that no facility can or should be forced on an unwilling state.

The scientific and technical justification for any facility means not only that its design and operation be of the highest quality, but also that the geotechnical characteristics of the site can be shown to meet health and safety criteria that, themselves, are sound, scientifically based and objective. The fact that a facility for GTCC waste disposal will be a new, never-before-attempted project (similar to a HLW repository or the WIPP TRU waste facility) makes it imperative that it have the voluntary support of the host state. In this regard, it is not sufficient to garner support from small rural communities that can be readily enticed with promises of economic benefits. Local support alone will not be sufficient to ensure success in a siting program for a facility of this type. E45-6

The final EIS should contain (and clearly explain and justify) the specific criteria that will be used to ultimately select a site or sites for GTCC waste disposal. That criteria should include the scientific and technical factors by which sites and the facility-site interface will be evaluated and a requirement that prospective host state approval must be obtained before any siting decision can be finalized.

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normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

E45-6 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

1.5 Definitional Issues

Strictly speaking, most GTCC waste covered by the DEIS is not low-level radioactive waste as that term is widely understood (and reacted to). While GTCC waste may be lower activity waste than spent fuel or high-level waste, its "orphan" situation (i.e., waste that doesn't fit the definition of either LLW or HLW and for which there is no defined disposal path) reflects the difficulty inherent in attempting to define away the problem by appending the term "low-level radioactive waste" to its designation. Originally (and as contained in current regulation), GTCC waste was supposed to be disposed of in a high-level waste repository because GTCC waste contains longer-lived radioactive elements requiring longer-term isolation that would be unacceptable for LLW disposal facilities. The DEIS acknowledges that so-called "GTCC-Like waste" analyzed in the document is similar to non-defense generated TRU waste. The fact that GTCC waste is longer-lived and has a higher activity than LLW cannot be simply defined away by calling it LLW. In the past, GTCC waste was not considered LLW, and it is questionable whether that designation should be used at all. Simply calling the waste "GTCC" and acknowledging its unique characteristics and standing in the waste continuum would be more honest and encourage the more rigorous scrutiny disposal of such material deserves. E45-7

2.0 Specific Comments – DEIS Summary and Chapters 1 - 13

2.1 Summary, page S-3: GTCC-like waste

The DEIS states that, "Although GTCC-like waste is not subject to the requirements in the LLRWPAA [Low Level Radioactive Waste Policy Amendments Act], DOE also intends to determine a path to disposal that is similarly protective of public health and safety." The DEIS presents no reason why GTCC-like waste should be treated differently that commercial GTCC waste. Disposal of GTCC-like waste should be protective of public health and safety in the *same way* as GTCC waste that is governed by the LLRWPAA and regulated by NRC. DOE indicates in this same paragraph that it does not intend to create a new classification for GTCC-like waste, but that is exactly what the DEIS proposes. DOE should make the commitment that disposal of all GTCC waste will be subject to NRC regulation and that all facilities for GTCC waste disposal will be licensed by the NRC. E45-8

2.2 Summary, page S-13: Resource Conservation and Recovery Act (RCRA)

The DEIS assumes that GTCC waste will be treated to render it "nonhazardous" under RCRA. However, the DEIS does not address whether this is even feasible. A more reasonable and realistic approach would be to assume that much of the waste will be mixed hazardous and GTCC, regulated under RCRA as well as other applicable laws and regulations. E45-9

2.3 Summary, Table S-3, page S-45: Bounding Analysis of Transportation Impacts

Bounding is a legitimate way to establish the upper and lower boundaries of a possible impact. However, in this case, the extremely simplistic nature of the bounding analysis does not convey the extent of the impacts. The NNSS is not accessible by rail line, a fact mentioned by E45-10

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Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

E45-7 Greater-than-Class C (GTCC) low-level radioactive waste (LLRW) is defined by the U.S. Nuclear Regulatory Commission (NRC) as LLRW that has radionuclide concentrations exceeding the limits for Class C LLRW established in Title 10, Part 61, of the Code of Federal Regulations (10 CFR Part 61),

DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.)

DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process.

DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

E45-8 DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process. DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

E45-9 DOE agrees that some GTCC LLRW and GTCC-like wastes may be characterized as mixed waste (waste containing hazardous chemical constituents in addition to radionuclides). However, currently available waste characterization information is limited, and these wastes only constitute approximately 4% by volume of the Group 1 wastes. Additional information

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the GTCC DEIS. Therefore, the section of the DEIS that refers to rail impacts is not valid. The possibility exists that there could be intermodal transportation from two sites nearby, but the numbers of truck shipments to the NNSS will be identical in either the rail or truck scenario. For the NNSS transportation analysis, there is no lower bound possible. There is no bounding analysis. It should be reported this way in the DEIS, and an intermodal alternative, if desired, should be studied. It is important to point out that intermodal operations can substantially change the risks of a transportation program. If DOE is interested in shipping these materials via intermodal, it should assess the risks and inform the affected parties (notably California - Inyo County and San Bernardino County).

Furthermore, the analysis of transportation impacts completely ignores the significant transportation differences among potential disposal sites. The analysis focuses solely on the overly generalized RADTRAN evaluation of radiological impacts as the sole discriminator when major considerations like availability of rail access, proximity to the national rail and interstate highway system, availability of alternate routes, non-radiological impacts to population centers, etc., should have been assessed and used to determine which of the alternative disposal locations would be preferable. The way it appears in the DEIS, there are no substantial differences in transportation impacts among the various possible sites. This is emphatically not the case. In any comprehensive transportation analysis, NNSS would rank at the bottom of potential candidates due to the extremely poor transportation access, lack of rail access, and routes to the facility that impact the state's major population centers and economic sectors. E45-10 (Cont.)

2.4 Summary, page 49: Cumulative Impacts

The DEIS concludes that "for Alternatives 3 to 5 at the federal sites, the estimated impacts from the GTCC proposed action are not expected to contribute substantially to cumulative impacts for the various resource areas evaluated, with the likely exception of potential human health impacts in the long term." However, with regard to NNSS, this conclusion appears to ignore the fact that thousands of GTCC waste shipments will be added to the thousands of LLW and MLLW shipments on the state's highways due to ongoing LLW and MLLW disposal activities at NNSS. There is no analysis of the cumulative impacts associated with ongoing transportation activities at NNSS and the added impacts from proposed GTCC waste disposal shipments. E45-11

2.5 Summary, page 54: Developing a Preferred Alternative

The DEIS notes that existing NRC regulations require GTCC waste to be disposed of in a geologic repository unless alternative proposals are approved by the NRC. The DEIS assumes that alternative methods proposed by DOE (i.e., borehole disposal, trenches, vaults) will be approved by NRC. However, there is no evidence presented in the DEIS to support this assumption. E45-12

2.6 Chapter 1, page 1-9: GTCC-like Waste Definition

The text box at the top of the page states that "much of the GTCC-like waste meets the DOE definition of TRU waste." If that is the case, the DEIS needs to explain why GTCC-like E45-13

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would be obtained prior to any disposal, however, and the mixed waste would be rendered nonhazardous before being submitted for disposal. In addition, potential health impacts from hazardous chemicals are expected to be small when compared to radiological risks presented in the EIS (due to the higher volume and activity from the radioactive component of the GTCC LLRW and GTCC-like waste inventory). Any mixed waste in the GTCC EIS inventory would be managed in accordance with federal and state laws and requirements.

E45-10 Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and

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waste is not disposed of as TRU waste. If DOE can define away the problem by classifying this waste as LLW, why instead cannot the waste be defined as TRU waste and disposed of at WIPP? E45-13 (Cont.)

2.7 Chapter 1, page 1-35: NNSS

The U.S. Air Force, Nellis Air Force Base notes that the potential disposal area at NNSS identified in the DEIS is near a major Nellis training area (R-4806W) that ground parties use for training. The DEIS failed to assess the impacts of overflights or the impacts to the Nellis mission should overflights be prohibited. [Note – this comment was made by Deborah Stockdale, Chief, Asset Management Flight, Nellis Air Force Base and submitted to the Nevada State Clearinghouse.] E45-14

2.8 Chapter 1, Lines 24 to 45, page 1-3: Two-Tiered System of Transportation Impacts.

The DEIS confronts two different assessment problems. The first, classified as Group 1, consists of existing GTCC sources whose characteristics, risks, and disposal responsibility are well understood. Group 1 is ready for disposal now and is not subject to a great deal of uncertainty. Group 2 materials, on the other hand, consist primarily of GTCC wastes from West Valley, New York. The future of this waste is uncertain pending Congressional action. The disposition of Group 2 materials cannot be assessed as easily and the size of the future waste stream cannot be known very readily.

The DEIS assessed the uncertainty for Group 2 materials to the degree possible given its current knowledge. However, this assessment muddles the conclusions of the DEIS and makes the DEIS seem more authoritative than it actually is. A different and possibly better approach would have been to assess the impacts of Group 1 materials to the degree possible and then describe the problems facing the disposition of Group 2. The DEIS may have been strengthened or at least become clearer, by discussing the need for congressional leadership in resolving problems with Group 2 materials. E45-15

2.9 Chapter 1, Lines 24 to 41, page 1-8: Sealed Sources

The DEIS makes it clear that there are thousands of disused sealed sources all over the country, there are new sources being generated and moved around every year, and all of these sources will have to be managed in the coming decades. The decrease in sealed sources the DEIS indicates past 2030 is due to changes in technology, which seems speculative. The problem is the ongoing creation and management of these wastes and their dispersion throughout the country. While in use, they cannot be centralized.

Centralizing and managing the current inventory of sealed sources is a critical problem. The transportation impact assessment portion should study feasible transportation alternatives for each of the sites for existing inventories of sealed sources, present alternatives for those, and then develop a set of actions for the remaining sealed sources-it won't be much in terms of volume, but it will be important in terms of security and handling.

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comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

E45-11 DOE believes that the analyses presented in the EIS are sufficient to compare the potential cumulative impacts of GTCC LLRW and GTCC-like waste disposal for the sites that were evaluated. While up to 12,600 truck shipments were assessed for transport of the GTCC LLRW and GTCC-like wastes to a proposed disposal facility, these shipments would be spread out over a 60 year time period, with the result that only about one to two shipments a day might be expected at the facility in addition to current traffic. Additional cumulative impact analyses would be conducted in site-specific NEPA reviews, if needed, for the alternative selected in a ROD. Such follow-on analyses would be based on additional site-specific information.

E45-12 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

E45-13 There is no current disposal path for GTCC-like waste, much of which meets the definition of DOE TRU waste but was not generated by atomic energy defense activities.

E45-14 Construction and operation of a disposal facility for GTCC LLRW and GTCC-like wastes will be conducted in accordance with current procedures and agreements in existence at the respective sites. Any changes to these procedures and agreements will be developed in coordination among the agencies participating in the current agreement.

E45-15 The GTCC LLRW and GTCC-like waste inventory evaluated in the EIS is based on the best available information on the stored and projected GTCC LLRW and GTCC-like wastes from ongoing and planned activities. The estimated 12,000 m^3 of GTCC LLRW and GTCC-like wastes is a relatively small volume of waste when compared to other wastes disposed of by DOE. For example, this volume of GTCC LLRW and GTCC-like wastes is only about 20% of the 59,000 m^3 of LLRW disposed of at one site (NNSS) in one year (fiscal year 2010). Inclusion of the Group 2 West Valley waste provides a disposal pathway for that waste should it be needed. The current locations of all sealed sources are not known at this time. Follow-on

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The problem of public safety discussed in the 2010 Radiation Source Protection and Security Task Force Report centers on the security of sealed sources. The current system of managing sealed sources seems adequate and addresses the public safety needs. The current program argues for the no action alternative. It does not appear to be an urgent requirement. E45-16

2.10 Chapter 2, page 2.9: Alternative Considered but not Evaluated in Detail

The DEIS notes that "reference locations" were limited to federal sites and that no specific locations were analyzed for commercial disposal locations. It appears that the entire assessment contained in the DEIS is focused on locating disposal facilities at federal sites, with a "generic" commercial location almost an afterthought. Since most of the GTCC waste is, in fact, commercial waste regulated and licensed by the NRC, it would seem more appropriate for the DEIS is be founded on the assumption that any disposal facility for such waste should be a commercial facility operating under NRC regulation. The fact that no commercial LLW disposal site is currently available for GTCC waste does not mean that one (or more) could not be available in the future if the DEIS concluded that this was the preferred option. After all, none of the federal sites are currently available for GTCC waste disposal, but that didn't hinder the DEIS from including alternate federal sites in the analysis. E45-17

2.11 *Chapter 2, pages 2-21 to 2-22: Transportation*

As noted, the transportation analysis in the DEIS is fundamentally flawed. The overly general assessment of radiological impacts completely ignores the significant diversity in transportation-related factors among alternative disposal locations. In addition, there is no indication that, even in assessing radiological health impacts, the DEIS considered important differentiating characteristics – such as the lack of rail access to NNSS; the added impacts to workers and the public from intermodal operations (the only way to evaluate rail shipments to NNSS) caused by the need to handle waste twice and the incorporation of truck/highway impacts once the waste is removed from trains; and other such factors. E45-18

2.12 Chapter 4, pages 4-66 to 4-67: WIPP Transportation Overview

The DEIS states: "The transportation of GTCC LLRW and GTCC-like waste necessary for the disposal of all such waste at WIPP was evaluated." The evaluation appears to have ignored the past 20 years of cooperative planning by DOE and the Western Governors' Association (and other State Regional Groups) for the ongoing shipments of transuranic waste to WIPP. This is a serious omission that should be rectified in the Final EIS. There are many similarities between the current WIPP transuranic waste transportation program and the GTCC transportation program that DOE would be required to develop and implement under the proposed action in this DEIS. E45-19

Beginning in the 1980s, the Western Governors' Association (WGA) adopted and reconsidered at three-year intervals, a series of resolutions on waste management generally, and spent nuclear fuel (SNF) and high-level radioactive waste (HLW) transportation in particular. These resolutions were specifically addressed to DOE and emphasized the need for a comprehensive transportation plan that did not take safety for granted.

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NEPA activities will be required to look at more specific transportation impacts once management of the sealed sources is better defined.

E45-16 The No Action Alternative is evaluated in Chapter 3 of the EIS, and under this alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5. As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in sufficient detail in the EIS as required by NEPA. Comparatively high potential radiation doses and cancer risks could occur should this alternative be selected. While a more detailed analysis could reduce the uncertainties associated with estimating these doses and risks, the conclusion of comparatively high impacts would not change for this alternative.

Impacts from accidents or theft/intrusion were not performed for the No Action Alternative because of the large number of potential locations, and in many cases (sealed sources), the current locations of the waste are not known. In general, these impacts would be comparable to those in the accident consequence analyses conducted for facilities and transportation but possibly occur at a higher frequency because of a lower overall level of security.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

E45-17 The Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA, P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Under NEPA, DOE must evaluate the range of reasonable alternatives for a GTCC LLRW disposal facility. DOE sites represent reasonable alternatives for a GTCC LLRW disposal facility.

E45-18 Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

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In this DEIS, DOE should have explicitly examined and endorsed the detailed recommendations of the Western Governors' Association for any future large-scale shipments of radioactive waste to disposal facilities. While these WGA recommendations were primarily addressed to SNF and HLW, they apply equally to the nationwide, multi-decade, GTCC waste disposal program evaluated in this DEIS. In order to develop a safe and effective waste disposal system, WGA recommended that "the federal government must expand its focus beyond siting, and develop, in coordination with states and tribes, a logical and timely transportation program." This requires policy commitments from DOE and other federal agencies to:

- Fix the shipping origins and destination points as early as possible;
- Ensure the availability of rail and truck shipping casks;
- Conduct full scale testing of casks for transport of spent nuclear fuel and HLW;
- Prepare a comprehensive transportation plan that includes the analysis of all needed transport safety activities in a single document;
- Develop responsible criteria for selecting shipping routes;
- Develop a sound methodology for evaluating optional mixes of routes and transportation modes; and
- Conduct a thorough review of the risks of terrorism and sabotage against spent fuel and HLW shipments and work with state governments to assume that adequate safeguards are in place prior to shipments occurring."[3]

E45-19 (Cont.)

The WGA policy resolution also calls on DOE or any other operator of a repository or storage facility to consider specific elements of the WIPP transportation program, including: (1) a safety and public information program similar to that developed with Western states; (2) the WIPP Transportation Safety Program Implementation Guide; (3) the WIPP example of working through its regional cooperative-agreement groups to propose a set of shipping routes to affected states and tribes for their review and comment, resulting in the identification of a set of primary and secondary routes; (4) a tracking system, such as TRANSCOM, capable of notifying the vehicle operator, DOE, states and tribes of current location, potential bad weather and road conditions, and occurrence of incidents; and (5) the responsibility of the generators of spent nuclear fuel and HLW and the federal government, not the states and tribes, to pay for all costs associated with assuring safe transportation, including emergency response, shipment escorts and inspections, and route evaluations. Transportation of GTCC waste should likewise be conducted using such a program.

2.13 Chapter 5, pages 5-18 to 5-91: Assessment Approach and Assumptions (Section 5.2)

The analysis of impacts throughout the DEIS ignores the potential for impacts related to risk, risk perception and the stigmatizing potential of a program and facilities involving large amounts of material identifies as "nuclear" and "radiological". These "special" impacts have the potential to generate significant economic and social consequences such as losses in property values, decreases in tourism and tourism-related revenues, suppression of economic development

E45-20

[3] *Western Governors' Association Policy Resolution 08-6*, Transportation of Spent Nuclear Fuel and High-Level Radioactive Waste (2008).

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The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

Once an alternative is selected in a ROD for this EIS for implementation, site-specific NEPA reviews would be conducted as needed, including an assessment of specific routing and an accident analysis, including dedicated trains and the potential for multiple railcar accidents if applicable. This process will include planning that involves transportation stakeholders.

E45-19 In the case of WIPP, all routes used in the analysis were in conformance with current WIPP routing guidelines. At this time, any detailed analysis of the specific routes themselves that any shipment could take would not be practical. As discussed in Section C.9.4.1.1, representative shipment routes, including the WIPP routes, were used for the analysis because routes would be selected in the future at the time of shipment based on current road or track conditions. Once the potential disposal site is selected, follow-on analysis would be required, including follow-on NEPA documentation. At that time, depending on the type of shipment, specific preferred and alternative routes could be designated based on public and local, state, and tribal concerns.

Once an alternative is selected in a ROD for this EIS for implementation, DOE will begin the process of developing a transportation plan for the designated disposal facility or facilities. Planning will involve transportation stakeholders such as the WGA and will consider current policies and practices in place for other wastes.

E45-20 The estimated costs associated with the construction and operation of GTCC waste disposal facilities at each of the sites – including costs for direct and indirect labor, equipment, materials, services, and subcontracts – are included in the assessment of each waste management alternative in the EIS. The cost estimates for the land disposal methods are based on a conceptual design of the disposal facility and could increase with actual implementation. Costs shown for WIPP are based on actual costs experienced to date and reflect construction and operation costs of an operating geologic repository. The economic analysis in the EIS addresses the potential economic impacts, including potential impacts resulting from in migration of workers or their families during the construction period, and any consequent impacts on housing, public finances, public service employment, and traffic.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

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due to perceived risks, radiological-related accidents, terrorism/sabotage, etc. While such impacts are not required (by statute or regulation) to be addressed in an EIS, the fact that the GTCC DEIS involves a proposed course of action that spans many decades, impacts potentially wide areas and populations, and deals with waste that the public perceives as highly dangerous *more than justifies going the extra mile and evaluating the potential for such "special" impacts in* discriminating among possible disposal locations.[4] E45-20 (Cont.)

2.14 Chapter 9, page 9-52, Lines 10: Absence of Rail Access to NNSS

NNSS *not only lacks direct rail access, it is unlikely that NNSS* would ever have direct rail access. The 2008 DOE Supplemental EIS for Yucca Mountain estimated that construction of the Caliente rail alignment to the now cancelled repository site would have cost $2.7 billion or more. Based on that analysis, construction of a rail line to the proposed GTCC disposal area at NNSS would likely cost more than 5-10 times the estimated total cost ($250-520 million) to construct and operate a disposal facility at NNSS. (GTCC DEIS, page 2-65) The absence of direct rail access to NNSS means that the number of truck shipments in Nevada would not be reduced by intermodal transfer at any receiving location in or near Nevada. Under any intermodal scenario, there would still be 12,600 truck shipments to NNSS. E45-21

2.15 Chapter 9, page 9-52, Lines 10-11: Intermodal Access to NNSS via Las Vegas

DOE erroneously suggests that NNSS could receive intermodal shipments of GTCC via Las Vegas, asserting that "the closest access to commercial rail service is in Las Vegas." DOE should drop this sentence in the Final EIS, unless DOE can identify a specific location in Las Vegas where rail shipments of GTCC could be received and transferred to trucks for shipment to NNSS. Moreover, intermodal transfer in Las Vegas would still require 12,600 truck shipments to NNSS. E45-22

2.16 Chapter 9, page 9-52, Lines 11-13: Truck shipments through the "Spaghetti Bowl"

The DEIS suggests that, absent being "discouraged" (presumably by the State of Nevada and Clark County), DOE could legally ship LLRW through Las Vegas using the I-15 and US 95 interchange (the "Spaghetti Bowl"). DOE should clarify its position on the legality and advisability of shipping GTCC waste through Las Vegas using the I-15 and US 95 interchange. The policy of avoiding metro Las Vegas and the Spaghetti Bowl for LLW and MLLW shipments to the NNSS is part of an agreement between the State of Nevada and DOE at the secretarial level related to the designation of NNSS (then NTS) as a regional LLW disposal facility in the Record of Decision to the Waste Management Programmatic EIS. Under that agreement, DOE E45-23

[4] Extensive research into the nuclear-related special impacts of a major federal program has been carried out by the State of Nevada in studies that spanned more than a decade. Information on these impacts can be found in the report: A Mountain of Trouble, A Nation at Risk – Report on Impacts of the Proposed Yucca Mountain High-Level Nuclear Waste Program (http://www.state.nv.us/nucwaste/yucca/impactreport.pdf).

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E45-21 For the purposes of NEPA, the 100% rail transportation analysis was conducted for all sites, including the NNSS, as a reasonable alternative to 100% truck transportation. It is recognized that construction of a rail spur to the NNSS would be required for the 100% rail alternative (e.g., see Section 9.2.9). If a rail spur were not constructed, additional risk would be incurred for intermodal truck shipments for sites without direct rail access as discussed in the EIS.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

While the risks associated with 100% rail shipments would be lower than those associated with 100% truck shipments overall, there would still be approximately 12,600 truck shipments in Nevada to NNSS as pointed out in the comment should an intermodal option be considered.

Once an alternative is selected in a ROD for this EIS for implementation, site-specific NEPA reviews would be conducted as needed, including an assessment of specific routing and an accident analysis, including dedicated trains and the potential for multiple railcar accidents if applicable. This process will include planning that involves transportation stakeholders.

E45-22 DOE does not suggest that NNSS would receive intermodal shipments of GTCC via Las Vegas. As noted on in the text immediately following the quote given in the comment, the text discusses that shipments through Las Vegas have been discouraged and that intermodal shipments would likely pass through either Barstow or Caliente, not Las Vegas.

E45-23 As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

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agreed to use shipping routes for LLW and MLLW that avoided Metro Las Vegas, the I-15/US 95 interchange, and Hoover Dam (which, at the time, could still be used for such shipments). E45-23 (Cont.)

2.17 Chapter 9, page 9-52, Lines 13-14: Intermodal facility at "Caliente, New Mexico"

There is no intermodal facility at Caliente, New Mexico. Indeed, there is no Caliente, New Mexico, although there is a small unincorporated community named Ojo Calient in Taos County, New Mexico. The DEIS apparently meant to refer to Caliente, Nevada. Caliente, Nevada is clearly identified as the intended location in the reference (DOE 1999) cited in the DEIS (see comment 2.18).

2.18 Chapter 9, page 9-52, Lines 13-16: Intermodal facility at Caliente, Nevada

E45-24

The DEIS should clearly state that there is, at present, no intermodal facility at Caliente, Nevada, which could be used for GTCC shipments to NNSS. To our knowledge, there are no plans for construction of an intermodal facility at Caliente, Nevada, which could be used for GTCC shipments to NNSS. DOE should drop this reference to intermodal facilities in the Final EIS unless DOE is proposing to construct and operate such a facility at Caliente, Nevada. Moreover, intermodal transfer at Caliente would still require 12,600 truck shipments to NNSS. In addition, it is the position of the State of Nevada that any intermodal transfer facility would be a defacto waste storage facility for commercial, NRC-licensed material and, as such, would require a license from the NRC.

2.19 Chapter 9, page 9-52, Lines 18-20: Route from Caliente to NNSS

The DEIS identifies SR 375, US 6, and US 95 as a potential route from Caliente to NNSS "to avoid Las Vegas." If GTCC waste shipments are considered to be HRCQ shipments, DOE would not be able to use this route under U.S. Department of Transportation regulations governing HRCQ shipments. Such GTCC waste shipments from Caliente would be required to use US 93, I-15, and US 95 through Las Vegas, resulting in significant impacts to the Las Vegas/Clark County area.

If DOE believes it can legally use SR 375, US 6, and US 95, for GTCC waste shipments, the Final EIS must evaluate the unique local conditions along the "necessarily longer" route from Caliente to NNSS that could increase the frequency, severity, and consequences of transportation accidents. There are numerous locations along this route where steep grades, sharp curves, critical side slopes, and sheer drop-offs, especially near the summits of mountain passes, could subject shipments to extreme accident impact forces and make emergency response, vehicle and package recovery, and post-accident remediation extremely difficult. Such conditions occur near Oak Springs Summit on US 93 west of Caliente, Hancock Summit on SR 375, Warm Springs Summit on US 6, and numerous locations on US 95 between Tonopah and Mercury. The Final EIS should also examine the impacts of GTCC shipments along this route on the communities of Tonopah, Goldfield, and Beatty. In these communities, schools, public buildings, residences, hotels and other commercial establishments are located in close proximity to the potential GTCC shipment route, often within 25 to 250 feet of the US 95 road shoulder, and in some instances less than 20 feet from the side of the road on which loaded GTCC packages would travel south to E45-25

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E45-24 The EIS has been corrected to refer to Caliente, NV. Regarding an intermodal facility at Caliente, NV, the EIS states that such a facility was recommended in the past. However, that facility was not built.

E45-25 See response to E45-23.

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NNSS. There are also environmentally sensitive areas along both potential Caliente to NNSS routes, including the Key Pittman Wildlife Area, Crystal Spring, Ash Springs, and the Pahranagat National Wildlife Refuge. E45-25 (Cont.)

2.20 Chapter 9, page 9-62: Water Resources (NNSS)

The statement that, "... the potential for mobilization of contaminants to the groundwater [underlying NNSS] from all these sources is negligible because of the arid climate, the extensive depth to groundwater ... and the proven behavior of liquid and vapor fluxes in the vadose zone ... ." *is not supported by findings from the failed Yucca Mountain project, where the bomb pulse* isotope Chlorine 36 was found hundreds of feet below the surface, indicating that the water infiltration travel time from the surface had to have been in the neighborhood of 50 years, since Chlorine 36 was deposited following bomb tests conducted in the Pacific Ocean in the 1950s. Likewise, radioactive tritium has been found at depth under the NNSS and, more recently, tritium from bomb tests at Paiute Mesa has been detected off site at the western edge of the NNSS boundary. The potential for migration of radionuclides from GTCC waste disposal activities at NNSS is a significant issue and concern, and the conclusion reached in the DEIS is contradicted by findings from other projects and groundwater monitoring efforts. E45-26

2.21 Chapter 9, pages 9-65 to 9-66: Post-Closure (NNSS)

The DEIS conclusion that radionuclides are not expected to reach the groundwater table within 100,000 years is unsupported (see comment 2.20).

2.22 Chapter 9, pages 9-68 to 9-70: Socioeconomics (NNSS)

The socioeconomic impact assessment for NNSS contained in the DEIS is seriously incomplete. No effort is made to assess the economic impacts associated with GTCC waste transportation to the site (potentially impacting Nevada's major population areas and economic sectors). Likewise, no attempt was made to assess impacts to property values along shipping routes, impacts to tourism, impacts to economic development from negative perceptions of risk and/or accidents involving GTCC waste, etc. Assessing only the negligible employment effects and relatively minor impacts of project expenditures on area communities misses entirely the potential significant economic and other impacts inherent in a project of this type. E45-27

2.23 Chapter 9, page 9-72, lines 26-42: Collective Population Risk

The method of risk analysis used in the DEIS fails to assess the actual impacts that the shipments would have at specific locations along specific routes in Nevada. The DEIS assessment method fails to examine unique local conditions, especially the proximity of buildings to roads and railroads, and actual observed travel speeds and stop times at specific locations along the potential routes in Nevada identified in the DEIS. The aggregate impacts reported in the DEIS tables on pages 9-73 to 9-76 conceal the actual radiological exposures that would likely result from truck shipments at specific locations, such as the intersection of US 6 and US 95 in Tonopah (where truck stop times of 2-5 minutes could be expected), or on US 95 in Goldfield, where trucks may travel at speeds as low as 5 miles per hour around a curve where E45-28

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E45-26 The GTCC DEIS evaluates three facility options sited in Area 5 on the NSSS: an intermediate-depth borehole disposal facility, an enhanced near-surface trench disposal facility, and an above-ground vault disposal facility. All three disposal facility options involve near-surface disposal in or on thick unsaturated alluvium deposits. The groundwater transport cases cited by the reviewer, Yucca Mountain and Pahute Mesa, involve contaminant sources in fractured rock. The hydrologic and geologic characteristics of Yucca Mountain and Pahute Mesa are entirely different than that Area 5 which is an alluvium-filled valley. No groundwater recharge occurs in alluvium-filled valleys whereas on the higher elevation mesas there is a potential for recharge because of the prevailing higher precipitation rates and higher infiltration rates due to the hydraulic properties of thin alluvium overlaying fractured rock. Consequently, a potential downward pathway for radionuclide transport from the sources located in fractured rock toward the groundwater may exist on the mesas of the NNSS. Whereas in Area 5, there is no groundwater pathway and all radionuclide transport pathways are upward toward the ground surface, including upward liquid and vapor flux, plant uptake, and burrowing animal activity. Therefore, radionuclide migration from sources at Yucca Mountain and Pahute Mesa is not analogous to transport at a GTCC disposal facility in unsaturated alluvium at Area 5.

Extensive site characterization studies have been conducted on the valley-fill alluvium at the NNSS Area 5 Radioactive Waste Management Site that support a conclusion of a negligible potential for transport of contaminants to groundwater. Deep boreholes indicate that thick unsaturated alluvial sediments, more than 200 m thick, are present in Area 5 (Shott et al. 1998). Multiple lines of evidence support a conclusion that percolation of rainwater below the plant root zone, or upper 2 m of alluvium, ceased 10,000 to 15,000 years ago as the climate shifted from cooler and wetter late Pleistocene conditions to the warmer, dryer Holocene conditions (Tyler et al. 1996, Shott et al. 1998, Wolfsberg and Stauffer 2003). Specific evidence supporting negligible deep percolation includes the following:

- Chloride mass-balance studies indicate that percolating rainfall has not reached the uppermost aquifer in the last 20,000 to 120,000 years (Tyler et al. 1996). The large accumulation of stable chloride at the base of the plant root zone indicates that percolation below 2 m ceased 10,000 to 15,000 years ago (Walvoord et al. 2002, Scanlon et al. 2003).
- Age dating of water in the uppermost aquifer using 14C indicates ages from 10,000 to 14,500 years (Tyler et al. 1996). These dates are consistent with recharging ending in the late Pleistocene. Recharge in the Pleistocene was not necessarily spatially uniform and may not have occurred through the alluvial sediments (Tyler et al. 1996).
- Since 1945, atmospheric nuclear testing has increased the 36Cl/35Cl ratio in the atmosphere. Enriched 36Cl/35Cl ratios are not found below a depth of 2 m in Area 5 alluvium, indicating that rainfall has not percolated below this depth since the start of nuclear testing (Tyler et al. 1996).
- Water flow in near-surface Area 5 alluvium is upward due to high evapotranspiration at the surface driven by the arid climate and xerophytic plants. Water potential gradients measured in Area 5 alluvium indicate upward water flow in the upper 35 m of alluvium (Shott et al. 1998). Modeling simulations suggest that the unsaturated alluvium profile has been drying very slowly since the late Pleistocene (Wolfsberg and Stauffer 2003).
- Profiles of heavy isotopes of hydrogen (2H) and oxygen (18O) in soil pore water indicate enrichment in near-surface alluvium and depletion at depth relative to standard mean ocean water. The substantial near-surface enrichment in heavy isotopes indicates persistent evaporative conditions in the shallow vadose zone (Wolfberg and Stauffer 2003). The depletion in deeper vadose zone pore water indicates the presence of water that infiltrated during a past colder climate (Wolfberg and Stauffer 2003).

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residences are located less than 20 feet from the road shoulder. The Final EIS should consider collective population risk from routine transportation in specific communities along specific routes in Nevada, by considering actual building types and locations, travel speeds and stop times, and actual populations, not only residents, but also children in schools and non-residents in hotels and commercial establishments. The Final EIS should also consider the perceived risk impacts that could result from routine shipments, especially impacts on property values, business location decisions, and tourism along the potential routes in Nevada identified in the DEIS.

2.24 Chapter 9, page 9-77, lines 3-14: Highest Exposed Individuals

The method of risk analysis used in the DEIS fails to assess the actual individual exposures that could result from shipments at specific locations along specific routes in Nevada. The DEIS assessment method uses the RISKIND model default values for individual exposures provided in Table C-6. Actual conditions along potential Nevada shipment routes identified in the DEIS are considerably different and would result in significantly different exposure events and exposures. For example, a location near a pedestrian crosswalk in a school zone, along US 95 in Goldfield, could receive a 30-second exposure at a distance less than 4 meters, from each passing truck. The Final EIS should reexamine the maximum individual exposures from routine transportation, using individual exposure scenarios based on actual conditions at specific locations along specific routes in Nevada. E45-28 (Cont.)

2.25 Chapter 9, page 9-77, lines 19-25: Accident Consequence Assessment

The DEIS does not provide sufficient information about how the accident consequence assessments were conducted, to allow reviewers to determine the validity of the accident dose risk values presented in the tables on pages 9-73 to 9-76. The discussion in Appendix C, pages C-29 to C-47, does not provide sufficient information about how the accident consequence assessments were conducted, to allow reviewers to determine the validity of the potential accident radiological consequences to populations reported in Table 5.3.9-3, nor to determine the validity of the potential accident radiological consequences to the highest-exposed individuals reported in Table 5.3.9-4. The Final EIS must explain in detail how the analyses were conducted for each type of waste (sealed sources – CII, activated metals – RII, other waste – CII, and other waste – RII) and each mode (rail and truck). E45-29

2.26 Chapter 9, page 9-77, lines 19-25: Failure to Evaluate Accident Economic Impacts

The DEIS did not evaluate cleanup costs and other economic impacts, as part of the accident consequence assessments conducted to develop the accident dose risk values presented in the tables on pages 9-73 to 9-76, and the potential accident radiological consequences reported in Tables 5.3.9-3 and 5.3.9-4. Accidents during transport of sealed sources, severe enough to result in a population dose of 4,400 – 15,000 person-rem in an urban area as reported on page 5-86, would release significant amounts of radioactive material, requiring extensive cleanup, remediation, and compensation. Based on analyses of radioactive materials transportation accidents involving similar population doses in urban areas, Nevada believes that severe accidents involving sealed sources could result in adverse economic impacts totaling hundreds of millions of dollars or more. Accidents involving certain other GTCC waste types could also E45-30

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Similar conclusions have been reached by multiple investigators for other arid alluvium-filled valleys in the desert southwest (Prudic 1994, Andraski 1997, Walvoord et al. 2002, Scanlon et al. 2003). These findings support the statement of negligible potential for contaminant transport from a GTCC disposal facility in Area 5 on the NNSS to the groundwater.

Andraski, B.J., 1997. Soil-Water Movement under Natural-Site and Waste-Site Conditions: A Multiple-Year Field Study in the Mojave Desert, Nevada. *Water Resources Research* 33: 1901–1916.

Prudic, D.E., 1994. *Estimates of Percolation Rates and Ages of Water in Unsaturated Sediments at Two Mojave Desert Sites, California-Nevada.* Denver, CO: U.S. Geological Survey, Water-Resources Investigations Report 94-4160.

Scanlon, B.R. K. Keese, R.C. Reedy, J. Simunek, and B.J. Andraski, 2003. Variations in Flow and Transport in Thick Desert Vadose Zones in Response to Paleoclimatic Forcing (0-90 kyr): Field Measurements, Modeling, and Uncertainties. *Water Resources Research* 39: 1179–1197.

Shott, G.J., L.E. Barker, S.E. Rawlinson, M.J. Sully, and B.A. Moore, 1998. *Performance Assessment for the Area 5 Radioactive Waste Management Site at the Nevada Test Site, Nye County, Nevada, Rev. 2.1.* Las Vegas, NV: Bechtel Nevada, DOE/NV/11718--176.

Walvoord, M.A., F.M. Phillips, S.W. Tyler, and P.C. Hartsough, 2003. Deep Arid System Hydrodynamics 2. Application to Paleohydrologic Reconstruction Using Vadose Zone Profiles from the Northern Mojave Desert. *Water Resources Research* 38: 1291–1303.

Wolfsberg, A, and P. Stauffer, 2003. *Vadose Zone Fluid and Solute Flux: Advection and Diffusion at the Are 5 Radioactive Waste Management Site.* Los Alamos, NM: Los Alamos National Laboratory, LA-UR-03-4819.

E45-27 The estimated costs associated with the construction and operation of GTCC waste disposal facilities at each of the sites – including costs for direct and indirect labor, equipment, materials, services, and subcontracts – are included in the assessment of each waste management alternative in the EIS. The cost estimates for the land disposal methods are based on a conceptual design of the disposal facility and could increase with actual implementation. Costs shown for WIPP are based on actual costs experienced to date and reflect construction and operation costs of an operating geologic repository. The economic analysis in the EIS addresses the potential economic impacts, including potential impacts resulting from in migration of workers or their families during the construction period, and any consequent impacts on housing, public finances, public service employment, and traffic.

Costs for institutional controls out to a 10,000 year time frame were not evaluated because the institutional control period was assumed to be for the first 100 years after facility closure. Follow-on site-specific NEPA reviews would take a closer look the implementation and costs of institutional controls.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

E45-28 The primary radiological transportation risk to the public for any alternative is from the low level of radiation emanating from the transport vehicle. As discussed in Section 5.3.9.1, the collective population risk is a measure of the total risk posed to society as a whole. A comparison of the collective population risk provides a meaningful evaluation of the relative

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release significant amounts of radioactive materials, according to Table 5.3.9.5, and result in adverse economic impacts. The Final EIS must explain in detail the specific source terms released, the extent of contaminated areas requiring cleanup, and the total economic impacts, for each of the severe accident scenarios listed in Table 5.3.9-3 (sealed sources – CH, activated metals – RH, other waste – CH, and other waste – RH, for rail and truck). The Final EIS should also consider the perceived risk impacts that could result from severe accidents involving GTCC shipments, especially impacts on property values, business location decisions, and tourism, along the potential routes in Nevada identified in the DEIS. The Final EIS should also evaluate adverse economic impacts in Nevada resulting from accidents in which no radioactive materials are released. E45-30 (Cont.)

2.27 Chapter 9, page 9-77, lines 19-25: Failure to Evaluate Acts of Sabotage

The DEIS fails to evaluate the impacts of potential acts of sabotage against shipments of GTCC materials. This failure is particularly serious regarding shipments of sealed sources. Throughout the DEIS, the secure storage and disposal of sealed sources are recognized as a matter of national security concern. Based on analyses of other radioactive materials sabotage events, Nevada believes a successful attack on a sealed source shipment could result in a release of radioactive materials hundreds of times greater that the release resulting from the maximum foreseeable transportation accident. Such an attack in an urban area could result in significant adverse health effects and economic impacts. Certain other shipments, such as contact handled GTCC wastes ("Other Waste –CH"), which contain substantial quantities of dispersible alpha-emitting radionuclides, might also be equally vulnerable to acts of sabotage that could result in significant adverse impacts, especially in urban areas. The Final EIS should evaluate the consequences of successful acts of sabotage against GTCC waste shipments. E45-31

2.28 Chapter 9, page 9-81: Summary of Potential Environmental Consequences and Human Health Impacts – Transportation (NNSS)

The summary concludes that "[t]ransporting all waste [to NNSS] by rail would require 5,010 railcar shipments involving 21 million km (13 million mi) of travel." Since there is no rail access to NNSS and no plans to construct such access, it is uncertain how such a conclusion can be supported or on what information such an analysis is based. If the DEIS assumes shipping waste by rail to some intermodal facility, the calculation as to the number of shipments would have to include the truck shipments required to move the waste from the intermodal facility to NNSS. There is no indication that this is factored into the assessment and is a major reason why NNSS is a less-than-ideal site for a GTCC waste disposal facility. E45-32

2.29 Chapter 9, page 9-87: Cumulative Impacts (NNSS)

The DEIS concludes that "...the incremental potential impacts from the GTCC proposed action are not expected to contribute substantially to cumulative impacts on the various resource areas evaluated for NNSS." Such a conclusion does not consider the potentially significant cumulative impacts from the simultaneous operations of a large scale LLW and MLLW disposal program at NNSS with the operations of the proposed GTCC waste disposal project. Thousands of LLW and MLLW shipments would be made annually into the NNSS at the same time E45-33

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risks between disposal locations, as provided in Tables 2.7 5 and 2.7 6. The magnitude of the collective population risk is primarily determined by the number of routes, the length of each route, the number of shipments along each route, the external dose rate of each shipment, and the population density along a given route. The primary differences between alternatives from the standpoint of transportation are the lengths of the routes as determined by the location of the disposal sites (destination of the shipments). Thus, higher collective population risks are associated with alternatives that require transportation over longer distances. All alternatives involve routes that have similar characteristics, with no significant differences for comparison among alternatives, requiring transportation through a range of rural and urban areas. In addition, the routes used in the analysis are considered representative routes (as discussed in Appendix C, Section C.9.4.1.1, because the actual routes used would be determined in the future. For each disposal site, the routes most affected would be the interstate highways that are in closest proximity to the site.

Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative (i.e., they overestimate the calculated dose), the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives will have some deviation in terms of vehicle speed and receptor distance among others. The overall effect of these types of uncertainties as discussed in Section C.9.5 may cause some deviation in an absolute calculation of risk, but the uniform application of the risk models and input parameters minimizes the relative risks between alternatives.

All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in Section C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

E45-29 Details of the facility accident analysis can be found in Sections 5.3.4.2.1 and C.4.2. All information necessary to duplicate the transportation accident consequence assessment was available in Section 5.3.9.3 of the Draft EIS, with the exception of the source terms used for the contact-handled and remote-handled Other Waste. These latter source terms have been added to Appendix B, Section B.7 of the Final EIS. The accident risk analysis (see Section C.9.3.1) is separate from the accident consequence analysis (see Section C.9.3.3). All relevant data for the accident risk analysis, with the exception of the shipment source terms and route information, are provided in Section C.9.3. Approximately 1,200 routes were considered in this analysis, so it was not considered practical to include this information in the EIS. Such information is readily available by using the TRAGIS routing model, as referenced in Appendix C. Shipment-specific source terms were determined by dividing the origin source inventory by the number of shipments from that site. Site inventories were published in Sandia (2007, 2008), as referenced in Appendix B, which also contains the per-shipment packaging assumptions for each waste type. The shipment-specific source terms were omitted from the EIS for brevity and because of the low estimated impacts.

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thousands of GTCC waste shipment would be occurring. Nowhere are impacts to NNSS operations from these activities evaluated. Nor are impacts to communities along LLW, MLLW and GTCC waste shipping routes – many of which would be affected by all these shipments simultaneously – evaluated. E45-33 (Cont.)

2.30 Chapter 9, page 9-88: Settlement Agreement and Consent Orders for NNSS

The DEIS concludes that no settlement agreement or consent orders would be affected by proposed GTCC waste disposal alternatives for NNSS. This is not entirely accurate. There continue to be unresolved land use issues associated with NNSS that are not adequately addressed in the draft EIS. As Nevada has noted in numerous comments and communications over the years, the original 1952 administrative land withdrawal for the Nevada Test Site (Public Land Order 805) specified its use as a "weapons testing site." In 1994, the State of Nevada filed a complaint in the U.S. District Court in Las Vegas, alleging that the land withdrawals for NTS do not include waste disposal from offsite sources as an intended use of the land. A settlement agreement signed in April 1997 committed DOE to initiate "consultation with the United States Department of the Interior concerning the status of existing land withdrawals for the NTS with regard to low-level waste storage/disposal activities." Although DOE has indicated that consultations with the Department of Interior have concluded, the State has continuing concerns about off-site waste disposition, particularly with respect to GTCC and other waste streams, which are subject to NRC regulation. These matters are not addressed in the DEIS. E45-34

2.31 Chapter 13, page 13-18, lines 14-21: DOE Self-regulation of Transportation

More than 75 percent of the GTCC shipments evaluated in this DEIS would originate at NRC-licensed facilities, or originate from NRC-licensed activities, yet it is not clear to what extent these shipments would comply with NRC regulations, nor the extent (if any) to which the shipments would be subject to NRC inspections and/or NRC enforcement actions. The Final EIS must clarify how DOE self-regulation of shipments under the Atomic Energy Act would actually operate on a day-to-day basis. The Final EIS should explain how DOE compliance with NRC and DOT regulations would be enforced. Stakeholders are concerned that DOE may exempt itself from DOT and/or NRC requirements and standards "where there is a determination that national security or another critical interest requires different action." A particular concern is that Federal budget restrictions might influence the degree to which DOE actually achieves "a level of protection that meets or exceeds the level of protection associated with comparable commercial shipments." E45-35

3.0 Specific Comments – Appendices

3.1 Appendix C: Transportation Analysis (and Volume 2, Chapter 9.1.9, Lines 10-20)

The DEIS contains a less rigorous assessment of transportation impacts than it does for other impacts. This is consistent with other DOE EISs, which do not devote adequate attention to important transportation issues. E45-36

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E45-30 While cleanup costs could be significant for a severe accident, it is impossible to estimate the economic impacts from a potential radioactive transportation accident without knowing the exact location of such an accident, which is why a generic accident consequence assessment was performed as provided in Section 5.3.9.3. Without knowing the specific details about such items as the affected land use (e.g., agricultural, commercial, retail, residential, etc.), infrastructure (e.g., utilities, transportation), and population levels, any estimate would be speculative. Also, all alternatives would present similar impacts so such an analysis would not provide information that would discriminate between alternatives.

E45-31 The analysis of intentional destructive acts is given in Section 2.7.4.3 of the EIS. This analysis provides a perspective on the risks that the GTCC LLRW and GTCC-like wastes could pose should such an act occur. In general, the risk presented from an intentional destructive act is similar to that from a high-severity transportation accident. The accident consequence assessment (given in Section 5.3.9.3 of the Final EIS) presents the results for transportation accidents that fall into the highest severity category. The severe environment that occurs under such conditions can be considered to be similar to that which could be initially instigated by an act of sabotage. In highly populated areas, where the highest exposures would be anticipated, a rapid response would be expected, minimizing the amount of time available to fully breach a Type B package. Should such shipments be diverted and the radioactive material removed for dispersion, higher exposures could be achieved, and potential impacts could be significant. The economic impact could reach several billions of dollars. The extent of the impacts would depend on the exact location of the release, density of the surrounding population, local meteorology, and emergency response capabilities in the affected area. In addition, the final transportation routes will not be selected until a ROD for the EIS is issued and follow-up site-specific NEPA review is conducted as needed.

E45-32 All shipping options to NNSS were considered, including the use of intermodal facilities if rail transport were used. However, shipment of waste to NNSS would likely be via truck transport.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

E45-33 DOE believes that the analyses presented in the EIS are sufficient to compare the potential cumulative impacts of GTCC LLRW and GTCC-like waste disposal for the sites that were evaluated. In particular, existing concentrations of various radionuclides in contaminated soil and groundwater at the candidate sites were taken into consideration in the selection of the preferred alternative. Also, while up to 12,600 truck shipments were assessed for transport of the GTCC LLRW and GTCC-like wastes to a proposed disposal facility, these shipments would be spread out over a 60 year time period, with the result that only about one to two shipments a day might be expected at the facility in addition to current traffic. Additional cumulative impact analyses would be conducted in site-specific NEPA reviews, if needed, for the alternative selected in a ROD. Such follow-on analyses would be based on additional site-specific information.

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There are three transportation alternatives to move GTCC waste. The first is to use exclusively legal-weight truck. The DEIS does not specify, but it is possible to assume that it refers to legal-weight truck, i.e., trucks with a weight below 80,000 pounds. Most of these materials are separable into packages that would enable shipments to fall below the 80,000 pound limit. However, there may also be shipments that could exceed the 80,000 pound limit or may not be divisible in a way that makes it possible to use a legal-weight truck. Examples of these types of materials are: unusual and large reactor parts such as the reactor core shroud, unique defense materials, or prepackaged accumulations of sealed sources where the removal of the sealed sources from the waste package would create a greater burden than shipping via legal-weight truck. Since much of the GTCC waste would be HRCQ shipments, all legal weight and overweight shipments would, of necessity, be routed through Metro Las Vegas and the Spaghetti Bowl (the default route under U.S. DOT regulations).

The second alternative is intermodal shipments. The draft GTCC DEIS does not describe an intermodal shipping scenario in detail. It mentions that two intermodal sites have been studied and identifies them as Barstow, California and Caliente, Nevada (not New Mexico). The DEIS then fails to perform an assessment of intermodal shipping and handling. It indicates that intermodal transportation from either Barstow, California or Caliente, Nevada is possible. However, the DEIS does not indicate which intermodal transportation site was considered. The risks of intermodal shipping and handling are substantially different from direct shipments. The risks at the specific sites and the risks along the routes should be evaluated.

This is particularly true for the extremely rural routes that will be traversed by these shipments. For example, intermodal shipments arriving in Barstow, California will almost certainly travel along California Highway 127 to reach the NNSS. This route is interrupted by seasonal flooding, used by recreational travelers and would require careful study in order to be used for a major shipping campaign. This has a substantial bearing on the risks associated with the shipments. These risks should be considered in the DEIS. The Latent Cancer Fatality numbers and deaths related to accidents contained in the DEIS cannot be properly understood without reference to intermodal handling risks, if indeed that is an option being considered. E45-36 (Cont.)

The DEIS does not specify which routes the Department of Energy would consider shipping these materials on (i.e., from whatever intermodal facility is postulated to NNSS). The DEIS provides RADTRAN and RISKIND assessments of the routes, but it does not provide maps of the specific routes. There is no detailed description of the selected routes or the risk characteristics along the routes. As with direct truck shipments, the DEIS does not consider that highway routes within Nevada for intermodal shipments of much of the GTCC waste will be severely limited because they would be considered HRCQ shipments. Nor does the DEIS consider the implications of having such HRCQ shipments routed through Metro Las Vegas and the Spaghetti Bowl (which is the default route that must be used under US DOT routing regulations).

The third shipping option is rail. It is not clear what the DEIS means by rail transportation as it relates to the NNSS. There is currently no rail access to the NNSS. Based on work done for the now-defunct Yucca Mountain project, it will require construction of a 319 mile long rail spur. Such construction would last more than 10 years and cost in excess of $3

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E45-34 The NNSS was originally created through the issuance of four administrative Public Land Orders by the Secretary of the Interior. Public Land Order 805, dated February 12, 1952, reserved lands for the use of the U.S. Atomic Energy Commission (AEC), DOE's predecessor, as a weapons testing site. Subsequent administrative land withdrawals through 1965 reserved the withdrawn lands for use of the AEC in connection with the NNSS. The 1961 Public Land Order specifically mentioned that it reserved the lands for use of the AEC "in connection with the Nevada Test Site for test facilities, roads, utilities, and safety distances." The Military Lands Withdrawal Act of 1999 withdrew the northwestern area of the NNSS (Pahute Mesa) for exclusive use of DOE. This area had previously been utilized by DOE and its predecessors under a Memorandum of Understanding with the U.S. Air Force.

The U.S. Department of the Interior (DOI) is vested with oversight responsibility to review existing land withdrawals under the Federal Land Policy and Management Act. The DOI suggested in its comments on the 1996 NTS EIS (which included proposals for commercial reuse of the site) that substantial changes in land use at the NTS may require a new land withdrawal. As part of the April 1997 Settlement Agreement resolving State of Nevada litigation regarding radioactive waste disposal at the NTS (State of Nevada v. Peña, U.S. District Court, District of Nevada, 1997), DOE committed to initiate "consultation with the United States Department of the Interior ('DOI') concerning the status of the existing land withdrawals for NTS with regard to low-level waste storage/disposal activities." The consultation process was initiated by DOE with DOI shortly thereafter and was concluded in November 2009, with NNSS's acceptance of custody and control of the approximately 740 acres constituting the NNSS Area 5 Radioactive Waste Management Complex. This facility is part of NNSS's continuing environmental management mission as a disposal facility for low-level waste (LLW) and mixed low-level waste (MLLW). All radioactive waste management at the NNSS is conducted in accordance with applicable federal, state and local regulations.

E45-35 DOT and the NRC have primary responsibility for federal regulations governing commercial radioactive materials transportation. Non-DOE shipments of GTCC LLRW from commercial sites would be transported by commercial carriers and would be regulated by DOT and the NRC. In addition, DOE shipments by commercial carriers of GTCC LLRW from commercial sites or of GTCC-like waste from DOE sites would be regulated by DOT and NRC.

DOE has broad authority under the AEA to regulate all aspects of activities involving radioactive materials that are undertaken by DOE or undertaken on its behalf, including the transportation of radioactive wastes. However, in most cases that do not involve national security, DOE does not exercise its authority to regulate DOE shipments and instead utilizes commercial carriers that undertake shipments of DOE materials under the same terms and conditions as those used for commercial shipments. These shipments are subject to regulation by DOT and the NRC. As a matter of policy, however, even in the limited circumstances where DOE exercises its AEA authority for shipments, DOE requirements mandate that all DOE shipments be undertaken in accordance with the requirements and standards that apply to comparable commercial shipments, unless there is a determination that national security or another critical interest requires different action.

E45-36 The primary radiological transportation risk to the public for any alternative is from the low level of radiation emanating from the transport vehicle. As discussed in Section 5.3.9.1, the collective population risk is a measure of the total risk posed to society as a whole. A comparison of the collective population risk provides a meaningful evaluation of the relative risks between disposal locations, as provided in Tables 2.7 5 and 2.7 6. The magnitude of the collective population risk is primarily determined by the number of routes, the length of each route, the number of shipments along each route, the external dose rate of each shipment, and the population density along a given route. The primary differences between alternatives from the standpoint of transportation are the lengths of the routes as determined by the location of the disposal sites (destination of the shipments). Thus, higher collective population risks are

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billion. Since there is no rail access to NNSS, it is unclear what the DEIS is referring to in the assessment of rail shipments to NNSS. The DEIS should specify how the rail transportation scenario was developed. A rail shipping campaign to a location that has no rail access is unrealistic and should not be used in a bounding assessment.

3.2 Appendix C, pages C-25 to C-26: Transportation Risk Analysis

The methods used to evaluate collective population risk, maximum individual exposures, and accident consequences in the DEIS are too generalized to be of any value in comparative impact assessment of the disposal options and the disposal sites under consideration. The Final EIS should reexamine collective population risk from routine transportation in specific communities along specific routes, by considering actual building types and locations, travel speeds and stop times, and actual populations

The Final EIS should reexamine the maximum individual exposures from routine transportation, using individual exposure scenarios based on actual conditions at specific locations along specific routes. Appendix C, pages C-29 to C-47, does not provide sufficient information about how the accident consequence assessments were conducted, to allow reviewers to determine the validity of the potential accident radiological consequences to populations reported in Table 5.3.9-3, nor to determine the validity of the potential accident radiological consequences to the highest-exposed individuals reported in Table 5.3.9-4. The Final EIS must explain in detail how the analyses were conducted for each type of waste (sealed sources – CH, activated metals – RH, other waste – CH, and other waste – RH) and each mode (rail and truck). E45-36 (Cont.)

The DEIS fails to evaluate cleanup costs and other economic impacts as part of the accident consequence assessments. The Final EIS must explain in detail the specific source terms released, the extent of contaminated areas requiring cleanup, and the total economic impacts, for each of the severe accident scenarios listed in Table 5.3.9-3.

The DEIS fails to evaluate the impacts of potential acts of sabotage against shipments of GTCC materials. The Final EIS should evaluate the consequences of successful acts of sabotage against GTCC waste shipments.

3.3 Appendix C, page C-33, Lines 5-18: Route Selection for Truck Shipments of GTCC

All truck shipments of GTCC should be treated as "highway route controlled quantity" (HRCQ) of radioactive materials shipments, as defined in 49 CFR 173.403, for purposes of highway route selection. The DEIS is unclear in this regard. The DEIS states, "[m]any potential shipments..., such as shipments of activated metal from commercial reactors, fall under this category." The DEIS seems to imply that DOE would not treat all GTCC shipments as HRCQ. Treating some, but not all, GTCC shipments as HRCQ, could result in use of multiple highway routes to each disposal location. This would complicate the process of comparative evaluation of impacts, required under NEPA, and invite unnecessary confusion and controversy. Failure to treat all GTCC shipments as HRCQ for purposes of highway route selection would likely undermine public acceptance on safety and security grounds, especially for shipments through

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associated with alternatives that require transportation over longer distances. All alternatives involve routes that have similar characteristics, with no significant differences for comparison among alternatives, requiring transportation through a range of rural and urban areas. In addition, the routes used in the analysis are considered representative routes (as discussed in Appendix C, Section C.9.4.1.1, because the actual routes used would be determined in the future. For each disposal site, the routes most affected would be the interstate highways that are in closest proximity to the site.

Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

There are no definitive studies related to the effects of radioactive waste shipments on local tourism and property values. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on tourism and property values.

As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur. In the case of rail transport, the text was revised to include a reference to the routing regulations in 49CFR172.820(c) regarding the transportation of an HRCQ of material by rail which requires the rail carrier to perform a security and safety risk analysis for any proposed routes.

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highly populated areas. However, for NNSS, the use of the HRCQ default route would violate a long-standing agreement between the State of Nevada and DOE requiring shipments of LLW to avoid Metro Las Vegas and the I-15/US 95 interchange.

3.4 Appendix C, page C-33, Lines 30-32: Route Selection for Rail Shipments of GTCC

DOE should reexamine the statement that "DOT has no railroad routing regulations specific to the transportation of radioactive materials. Routes are generally fixed by the location of rail lines, and urban areas cannot be readily bypassed." Rail shipments of activated metals, sealed sources, remote handled wastes, and perhaps all of the GTCC materials evaluated in the DEIS, may be subject to the routing regulations recently adopted by the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Department of Homeland Security's Transportation Security Administration (TSA).

In 2008, regulations [49 CFR Parts 172 &1580] were jointly promulgated by TSA and PHMSA that would restrict rail shipments of certain hazardous materials, including radioactive materials, through highly populated areas. The new regulations were intended to prevent "catastrophic release or explosion in proximity to densely populated areas, including urban areas and events or venues with large numbers of people in attendance. Also of major concern is the release or explosion of rail cars in close proximity to iconic buildings, landmarks, or environmentally significant areas." Of particular concern, "if terrorists perpetrated an attack against a rail car transporting certain radioactive materials, they could endanger a significant number of people as well as disrupt the supply chain as a result of contamination." E45-36 (Cont.)

While these rules clearly apply to rail shipments of spent nuclear fuel and high-level radioactive waste, they would likely also apply to rail shipments of activated metals, sealed sources, and other types of GTCC evaluated in the DEIS, especially if such shipments were deemed to be HRCQ shipments. DOE should specifically evaluate the routing implications of the TSA rule, which designates 46 high threat urban areas (HTUAs) in 28 states and the District of Columbia. These regulations [49 CFR Part 1580, Appendix A] subject shipments through these HTUAs to new chain of custody and control and other procedures, such as designation of rail security coordinators and monitoring plans [49 CFR Part 1580, Appendix B]. DOE should also specifically evaluate the implications of the PHMSA regulations for shipments through areas not designated HTUAs, but which exhibit conditions of concern identified in the PHMSA routing regulations, which are designed to protect highly populated areas and iconic locations, through the application of 27 routing risk analysis factors [49 CFR Part 172, Appendix D].

3.5 Appendix C, page C-33, Lines 38-40: Timing of Route Selection for Shipments

DOE must its reconsider its position on the timing of route selection and the role of affected states and tribes. The DEIS states: "At the time of shipment, the route would be selected on the bases [sic] of current road or railroad track conditions, including repairs and traffic conditions." Based on experience with the WIPP transuranic waste shipments, DOE should plan *to identify preferred and alternative route options at least 5-7 years in advance of shipments, in* consultation with the affected states and tribes.

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DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

3.6 Appendix C, page C-33, Lines 42-45: TRAGIS highway route updates

It is our understanding that the highway data network in TRAGIS has not been recently updated and does not, for example, include the Tillman Bridge over the Colorado River on US Highway 93, which could significantly affect routes in Arizona, California, and Nevada.

3.7 Appendix C, page C-34, Lines 6-7: Use of HRCQ option for modeling highway routes

Use of the HRCQ option to select routes for modeling is inappropriate unless DOE has committed to actually use HRCQ routes for all truck shipments. Otherwise, use of HRCQ routes in risk analysis may systematically underestimate the actual transportation risks, especially regarding routes through highly populated areas.

3.8 Appendix C, page C-34, Lines 18-23: Use of "shortest-route" algorithm for rail shipments

E45-36 (Cont.)

Using the standard assumptions in the model for selection of rail routes, i.e., the "shortest-route" algorithm, does not reflect the impact of the 2008 TSA and PHMSA rail routing regulations cited previously for shipments of certain radioactive materials, which likely apply to some or all of the GTCC materials evaluated in the DEIS.

3.9 Appendix D, page D-2, Lines 8 to 47: General Planning Issues

The DEIS does not include a comprehensive transportation plan. However, the DEIS can recognize the critical importance of a comprehensive transportation plan to stakeholders. DOE has neglected transportation planning in the past. DOE should, however, make a commitment to a process that will result in a systematic approach to transportation planning that will: (1) incorporate stakeholder concerns; (2) effectively manage safety and security issues; and (3) deliver a safe and comprehensive transportation system. The GTCC DEIS fails to acknowledge the size and possible complexity of the transportation program that will be required and the transportation Appendix is only a boilerplate discussion of transportation risk assessment.

3.10 Appendix D, page D-2, Lines 8 to 47: Containers

The DEIS does not make it clear what container would be adopted for sealed sources. Appendix D describes assumptions about the containers, their size and description. It indicates which waste will be placed in which container, but it does not make it clear which container will be used for sealed sources. This is important because these sources are irregularly shaped, in various states of decay, and will require very special kinds of packages. The DEIS also does not address the issue of NRC certification for containers for sealed sources and other types of GTCC waste.

E45-37

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E45-37 The specific waste forms and packages used to dispose of GTCC LLRW and GTCC-like wastes would be determined in the future as part of the waste acceptance criteria and packaging requirements developed. See the discussion in Section B.5 and C.9.4.2 of the EIS for more information on packaging requirements. All GTCC LLRW and GTCC-like wastes would be packaged and transported in accordance with all applicable federal and state requirements.

State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

ATTACHMENT

NELLIS AIR FORCE BASE COMMENT

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State of Nevada Agency for Nuclear Projects, Commenter ID No. E45 (cont'd)

DEPARTMENT OF THE AIR FORCE
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MAY 17 2011

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Department of Administration
209 East Musser Street, Room 200
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Mesdames, Gentlemen,

Thank you for including Nellis Air Force Base (AFB) in the Draft Environmental Impact Statement process for a Facility for Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste at the Nevada National Security Site (formerly known as the Nevada Test Site). Nellis AFB has reviewed the Department of Energy (DOE) Draft Environmental Impact Statement (DEIS), Nevada SAI #E2011-109, and offers the following comment:

> The disposal area is near R-4806W and there are ground parties that use that area for training. How will they be affected? Will overflight of aircraft be allowed for the disposal site?

E45-38

Nellis AFB appreciates the DOE's efforts to address these issues. Should the DOE have any questions or require further assistance, my Action officer for this issue is Mr. Tod Oppenborn, (702) 652-9366.

Sincerely,

Deborah Stockdale

DEBORAH STOCKDALE
Chief, Asset Management Flight

Honor the Warfighter

E45-38 This comment was also submitted by the Department of the Air Force separately (see comment response L307-1) and referenced earlier in this comment document (see E45-14).

State of Nevada Agency for Nuclear Projects, Commenter ID No. T38

MR. BROWN: Okay. Fine.

So Phil Klevorick, I guess, will follow. You'll follow Steve then.

Steve, proceed.

PUBLIC COMMENTS

MR. FRISHMAN: Thanks. I'm Steve Frishman. I'm representing the Nevada Agency for Nuclear Projects. And I'm giving this statement on behalf of Joe Strolin, the Acting Executive Director of the agency. He has provided a written statement, and I've taken the liberty of reducing it to a five-minute statement, but I'll provide his whole statement, for the record.

State of Nevada Agency for Nuclear Projects, Commenter ID No. T38 (cont'd)

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1 (Reading) The State of Nevada Agency
2 for Nuclear Projects is in the process
3 of reviewing the Department of Energy's
4 Draft Environmental Impact Statement.
5 In addition to these brief preliminary
6 comments, the State will provide more
7 extensive written comments prior to the
8 June 27 deadline.
9 In comments on DOE's Notice of Intent to
10 prepare the EIS for Greater-than-Class C in 2007,
11 Nevada opposed, on both scientific and legal grounds,
12 the use of either the proposed high-level nuclear waste
13 repository --
14 (Reporter request.)
15 MR. BROWN: I'll be liberal on the five
16 minutes, Steve. Go ahead on.
17 MR. FRISHAM: That's the first time I've ever
18 outrun the court reporter.
19 MR. BROWN: Yeah.
20 MR. FRISHAM: In comments on DOE's Notice of
21 Intent to prepare the EIS for Greater-than-Class C in
22 2007, Nevada opposed, on both scientific and legal
23 grounds, the use of either the proposed high-level
24 radioactive waste repository at Yucca Mountain or the
25 Nevada Test Site for Greater-than-Class C disposal.

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The fact that this Draft EIS explicitly excludes Yucca Mountain as an option is an appropriate acknowledgment of the reality that Yucca Mountain will never be built.

The Draft EIS fails to recognize the problems associated with the requirement that any facility chosen for disposal of Greater-than-Class C waste disposal must be licensed and regulated by the U.S. Nuclear Regulatory Commission.

While the Draft acknowledges that most of the Greater-than-Class C waste requiring disposal would be commercial waste from NRC-licensed generators, neither Nevada Test Site, nor any of the specific locations identified for potential Greater-than-Class C waste disposal, has an NRC-licensed facility. Inclusion of DOE's Greater-than-Class C-Like waste, currently managed under DOE orders and stored at DOE facilities, requires that these wastes be brought into NRC regulatory regime. T38-1

This raises considerable waste characterization and security issues. It is by no means clear how or if an NRC-regulated facility can coexist with a DOE self-regulated facility like Nevada Test Site, or in the case of the WIPP facility in New Mexico, an EPA and state-regulated facility, and how the public can be assured that the NRC's regulatory T38-2

T38-1 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

T38-2 DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process. DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

State of Nevada Agency for Nuclear Projects, Commenter ID No. T38 (cont'd)

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1 authority will have primacy at a Greater-than-Class C T38-2 (Cont.)
2 site.
3 There continues to be unresolved land-use
4 issues associated with the Nevada Test Site that are
5 not adequately addressed in the Draft EIS. The
6 original 1952 administrative land withdrawal for the
7 Nevada Test Site specified its use as a, quote,
8 "weapons testing site."
9 In 1994, the State of Nevada filed a
10 Complaint in the U.S. District Court in Las Vegas,
11 alleging that the land withdrawals for the Nevada Test
12 Site do not include waste disposal for offsite sources
13 as an intended use of the land.
14 A Settlement Agreement signed in April 1997 T38-3
15 committed DOE to initiate, quote, "consultation with
16 the United States Department of the Interior concerning
17 the status of existing land withdrawals for the NTS
18 with regard to low-level waste disposal and storage."
19 Although DOE has indicated that consultations
20 with the Department of the Interior have concluded, the
21 State has continuing unresolved land withdrawal static
22 concerns about the use of the site for offsite-
23 generated waste disposal, including Greater-than-Class
24 C and Greater-than-Class-C-Like wastes.
25 Transportation impacts associated with the T38-4

T38-3 The NNSS was originally created through the issuance of four administrative Public Land Orders by the Secretary of the Interior. Public Land Order 805, dated February 12, 1952, reserved lands for the use of the U.S. Atomic Energy Commission (AEC), DOE's predecessor, as a weapons testing site. Subsequent administrative land withdrawals through 1965 reserved the withdrawn lands for use of the AEC in connection with the NNSS. The 1961 Public Land Order specifically mentioned that it reserved the lands for use of the AEC "in connection with the Nevada Test Site for test facilities, roads, utilities, and safety distances." The Military Lands Withdrawal Act of 1999 withdrew the northwestern area of the NNSS (Pahute Mesa) for exclusive use of DOE. This area had previously been utilized by DOE and its predecessors under a Memorandum of Understanding with the U.S. Air Force.

The U.S. Department of the Interior (DOI) is vested with oversight responsibility to review existing land withdrawals under the Federal Land Policy and Management Act. The DOI suggested in its comments on the 1996 NTS EIS (which included proposals for commercial reuse of the site) that substantial changes in land use at the NTS may require a new land withdrawal. As part of the April 1997 Settlement Agreement resolving State of Nevada litigation regarding radioactive waste disposal at the NTS (State of Nevada v. Peña, U.S. District Court, District of Nevada, 1997), DOE committed to initiate "consultation with the United States Department of the Interior ('DOI') concerning the status of the existing land withdrawals for NTS with regard to low-level waste storage/disposal activities." The consultation process was initiated by DOE with DOI shortly thereafter and was concluded in November 2009, with NNSS's acceptance of custody and control of the approximately 740 acres constituting the NNSS Area 5 Radioactive Waste Management Complex. This facility is part of NNSS's continuing environmental management mission as a disposal facility for low-level waste (LLW) and mixed low-level waste (MLLW). All radioactive waste management at the NNSS is conducted in accordance with applicable federal, state and local regulations.

T38-4 As stated in Section C.9.4.1.1 of the EIS on route selection, many of the GTCC LLRW and GTCC-like wastes considered in the EIS would meet the definition of a highway route HRCQ (49 CFR 173.403). However, as noted in the discussion, states and Native American tribes have the opportunity to designate "preferred routes" to replace or supplement the interstate highway system. For those wastes not specifically designated as HRCQ, the selection of a route is left to the carrier, but in the case of GTCC LLRW and GTCC-like wastes, additional consultation with transportation stakeholders would occur. For disposal at NNSS, the total number of shipments is estimated to be about 12,600 shipments as stated in Section 9.2.9.1. With an average of only one to two shipments per day over the potential 60 year lifetime of a proposed disposal facility in the case of GTCC LLRW and GTCC-like waste shipments, it is unlikely that there would be any significant impact on any local road traffic or current NNSS operations.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

Once an alternative is selected in a ROD for this EIS, implementation will include, as needed and appropriate, NEPA reviews and other analysis (e.g., transportation).

State of Nevada Agency for Nuclear Projects, Commenter ID No. T38 (cont'd)

11

1 disposal of the Greater-than-Class C waste, generally
2 and with respect to Nevada Test Site in particular,
3 have not been adequately addressed in the Draft EIS.
4 Since there is no rail access to NTS, it's entirely
5 unrealistic to assume that Greater-than-Class C waste
6 could be shipped via rail to the site. Consequently,
7 all the waste, over 30,000 potential shipments, would
8 have to be moved to the site by truck. T38-4 (Cont.)
9 Many of these shipments, according to the
10 Draft, would be required to use the interstate highway
11 system, thus pass through the most heavily populated
12 portions of Las Vegas and Clark County. Such a shipping
13 campaign would put Las Vegas' tourism-dependent economy
14 at substantial risk in the event of an accident or
15 terrorist attack against a shipment while in transit.
16 Initial review of this draft document reveals
17 nothing that alters the State's view that disposal of
18 Greater-than-Class C at NTS, regardless of the T38-5
19 alternative method employed, is unacceptable.
20 (Whereupon Exhibit No. 1 was marked for
21 identification.)

T38-5 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

State of New Mexico, Governor's Office, Commenter ID No. L304

State of New Mexico

Susana Martinez
Governor

September 1, 2011

Secretary Steven Chu
U.S. Department of Energy
Forrestal Building
1000 Independence Ave. SW
Washington, DC 20585
Via fax: 202-586-4403 and U.S. Mail

Re: Science Will Lead New Mexico's Role in Radioactive Waste Management

Dear Dr. Chu:

This letter presents the position of the State of New Mexico regarding the present and future management of radioactive waste in our State and in the Nation. Several recommendations are presented for your consideration.

New Mexico's National Laboratories and the Waste Isolation Pilot Plant

As I am certain you are aware, the Waste Isolation Pilot Plant (WIPP), near Carlsbad, NM, is the only operating facility in the U.S. that permanently disposes defense-related transuranic (TRU) waste. The facility was built for the purpose of isolating waste contaminated with long-lived, mostly alpha-emitting radionuclides left from the research and production of nuclear weapons. These TRU wastes include clothing, tools, rags, solidified sludge, soil and other trash derived from laboratory and manufacturing operations. WIPP was successfully sited, constructed and operated, with State oversight throughout the process. The WIPP facility operates with a total of 728 employees.

Current operations focus on disposing of defense legacy wastes from Los Alamos National Laboratory (LANL) and from other DOE facilities. New Mexico insists removal of these defense legacy wastes from LANL must remain the highest priority to DOE at WIPP. The urgency has become ever more evident as the largest fire in New Mexico's history encroached upon nuclear waste materials stored above ground, approximately 11 years after a previous fire burned significant portions of LANL property. This work is also a necessary precursor for completing the cleanup of all legacy wastes at LANL.

State Capitol • Room 400 • Santa Fe, New Mexico 87501 • 505-476-2200 • fax: 505-476-2226

State of New Mexico, Governor's Office, Commenter ID No. L304 (cont'd)

Dr. Alfredo Armendariz
September 1, 2011
Page 2

Decreases in FY11 operating budgets for WIPP and LANL have decreased the pace of the legacy TRU waste cleanup work at LANL and caused fewer shipments of waste to the WIPP site. These decreases in both funding and shipments have resulted in WIPP implementing a voluntary separation of 51 employees in May 2011. A further reduction of 49 employees may be implemented if the same level of funding is maintained for FY12.

WIPP, with the support of the two New Mexico national laboratories, has safely and efficiently disposed of radioactive waste for the past 12 years. These actions should serve as a model for the President's Blue Ribbon Commission (BRC) on how to site and open future repositories for the permanent disposal of radioactive wastes.

Blue Ribbon Commission Recommendations

The Blue Ribbon Commission on America's Nuclear Future (BRC) came to New Mexico in January 2011 to learn how and why the Federal Government's WIPP facility was successfully sited, constructed and operated. I am delighted to see elements of the WIPP success story liberally spread throughout the Commission's draft report recommendations. When the Blue Ribbon Commission visited Carlsbad early this year, I told them that New Mexico was willing to have a dialogue on other nuclear waste projects within its border as long as the science provided clear and overwhelming assurance of safety and reliability, as it did for WIPP.

The Commission's draft recommendations include "prompt efforts to develop a new permanent geologic disposal facility." As recognized in the other BRC recommendations, New Mexico also believes that any such development must be informed by science and broad local community outreach and support.

Required Future Research

In early June of this year, a management proposal for "Salt Disposal Investigations," describing a field-scale, coupled process heater-test at WIPP, was forwarded from the Department's Carlsbad Field Office to DOE leadership in Washington. This peer reviewed research document proposes an integrated scope of scientific and engineering activities, both in the laboratory and performed underground. The proposed six-year test program could provide key information on thermal, mechanical, and hydrologic responses of salt to elevated thermal conditions. Only comprehensive tests of such maturity can provide the scientifically rigorous proof-of-principle field demonstration for disposal of heat-generating nuclear waste which New Mexico will demand in order to continue the dialogue on other nuclear waste projects within its borders.

The proposed test would be staged in that area of WIPP designated and currently used for non-WIPP related scientific experiments. I recognize that performing the tests at WIPP could be met with skepticism that they only open the door for WIPP expansion and disposal of higher level waste there. That is not New Mexico's intent or goal. Thermal testing of waste disposal in salt must be conducted to guide future options for higher level waste disposal whether in New Mexico, or salt beds elsewhere.

State of New Mexico, Governor's Office, Commenter ID No. L304 (cont'd)

Dr. Alfredo Armendariz
September 1, 2011
Page 3

Consistent with this position, in recent correspondence to the DOE by my Cabinet Secretary for the Environment, New Mexico encourages the DOE to support the proposed location of WIPP as the preferred alternative in the Draft EIS for the disposal of Greater Than Class C (GTCC) Low-Level Radioactive Waste and GTCC-like wastes. L304-1

I urge you to provide additional funding for the thermal testing in salt that could lead to a permanent disposal solution for heat-generating nuclear waste in the United States. New Mexico offers the ideal test facilities to demonstrate the scientific and engineering feasibility of emplacing and disposing high level and thermally active nuclear waste in salt formations. A definitive study on the suitability of salt as a disposal medium will move the country forward in its quest to protect human health and the environment over the long term, and if proven feasible, will reduce the potential for a catastrophic event at sites where such material is temporarily stored.

Recommendations
Mr. Secretary, I request that you provide sufficient funding to accelerate the disposal of defense legacy waste from LANL at WIPP in support of completing the LANL cleanup. Again, cleaning up the defense legacy wastes at Los Alamos will be, and must remain, a highest priority to both the State of New Mexico and DOE. In addition, I request that you facilitate discussions with applicable DOE decision makers in Nuclear Energy, Environmental Management and the Office of Science to finalize DOE's proposal for thermal testing of salt, and commit funding at the beginning of fiscal year 2012 for planning and test initiation.

New Mexico continues to recognize the important role that the DOE plays in our state. I look forward to working with you in the pursuit of our mutual goals.

Sincerely,

Susana Martinez
Governor

SM/ts

cc: Dave Martin, Secretary, New Mexico Environment Department

Senator Jeff Bingaman

Senator Tom Udall

Senator Dianne Feinstein

L304-1 Based on the GTCC EIS evaluation and WIPP's operating record, DOE believes that the WIPP repository would be a safe location for the disposal of GTCC LLRW and GTCC-like wastes, some of which include long-lived radionuclides. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require modification to existing law. In addition, it would be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit.

State of New Mexico, Governor's Office, Commenter ID No. L304 (cont'd)

Dr. Alfredo Armendariz
September 1, 2011
Page 4

U.S. Congressman Steve Pearce

U.S. Congressman James Clyburn

U.S. Congressman Fred Upton

U.S. Congressman John Shimkus

Daniel B. Poneman, Deputy Secretary of Energy
U.S. Department of Energy

Mr. Thomas D'Agostino, Assistant Secretary, National Nuclear Security Administration
U.S. Department of Energy

Dr. Ines Triay, Assistant Secretary, Environmental Management
U.S. Department of Energy

Dr. Pete Lyons, Assistant Secretary, Nuclear Energy
U.S. Department of Energy

Dr. William F. Brinkman, Director, DOE Office of Science

Vernon D. Asbill, N.M. State Senator

Cathrynn N. Brown, N.M. State Representative

Carlsbad Mayor Dale Janway

State of South Carolina, Governor's Nuclear Advisory Council, Commenter ID No. W298

From:	gtcceiswebmaster@anl.gov
Sent:	Friday, June 17, 2011 12:38 PM
To:	mail_gtcceisarchives; gtcceiswebmaster@anl.gov; gtcceis@anl.gov
Subject:	Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10298
Attachments:	SC_GNAC_-_GTCC_EIS_Letter_6-15-2011_GTCC10298.pdf

Thank you for your comment, Ben Rusche.

The comment tracking number that has been assigned to your comment is GTCC10298. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 17, 2011 12:38:10PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10298

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Privacy Preference: Don't withhold name or address from public record
Attachment: C:\fakepath\SC GNAC - GTCC EIS Letter 6-15-2011.pdf

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

State of South Carolina, Governor's Nuclear Advisory Council, Commenter ID No. W298 (cont'd)

STATE OF SOUTH CAROLINA
Governor's Nuclear Advisory Council
1200 Senate Street, 408 Wade Hampton Building
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BEN RUSCHE, CHAIRMAN
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CAROLYN HUDSON
DAVID PETERSON
VINCENT VAN BRUNT

June 15, 2011

Mr. Arnold Edelman
Document Manager
Office of Regulatory Compliance (EM-43)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0119

Dear Mr. Edelman:

This letter from the South Carolina Governor's Nuclear Advisory Council provides comments on the Draft Environmental Impact Statement for the Disposal of Greater Than Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D). This Council was formed by statute to advise the Governor on issues relating to nuclear materials and activities in South Carolina.

The subject draft environmental impact statement listed the Savannah River Site (SRS) as a possible alternative for storage of this waste. We strongly disagree with this alternative for the following reasons:

1. It would add to the long-term human health impacts (doses) within 10,000 years which is already much higher than the majority of other alternate locations.

2. The volume of radioactive material at SRS for the foreseeable future needs to be reduced, not added to. And finally,

3. We are opposed to bringing radioactive waste to SRS for disposal because DOE has not demonstrated the ability to execute plans for disposition and disposal of the radioactive materials currently there.

W298-1

Sincerely,

Ben C Rusche

Ben Rusche, Chair
Governor's Nuclear Advisory Council

Cc: Governor Haley
Members of Council
Dr. Dave Moody, DOE-SR Site Manager

W298-1 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

State of Washington, Department of Ecology, Commenter ID No. W429

From: gtcceiswebmaster@anl.gov
Sent: Friday, June 24, 2011 11:15 AM
To: gtcceiswebmaster@anl.gov
Subject: Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10429

Thank you for your comment, John Price.

The comment tracking number that has been assigned to your comment is GTCC10429. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 24, 2011 11:14:50AM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10429

First Name: John
Middle Initial: B
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Country: USA
Email: John.Price@ecy.wa.gov
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
American Indian text on top of page 6-69 appears to have typographical omission. It says "The 50-year management time horizon of the CLUP does create permanent land use designations." W429-1
Add the word "not" to read:
"The 50-year management time horizon of the CLUP does not create permanent land use designations."

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

W429-1 Text was revised as suggested.

State of Washington, Department of Ecology, Commenter ID No. W545

From: gtcceiswebmaster@anl.gov
Sent: Monday, June 27, 2011 4:23 PM
To: mail_gtcceisarchives; gtcceiswebmaster@anl.gov; gtcceis@anl.gov
Subject: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10545
Attachments: 11-NWP-64_Comments_on_GTCC_EIC_6-24-11_GTCC10545.pdf

Thank you for your comment, Jane Hedges.

The comment tracking number that has been assigned to your comment is GTCC10545. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 27, 2011 04:23:15PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10545

First Name: Jane
Middle Initial: A
Last Name: Hedges
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Privacy Preference: Don't withhold name or address from public record
Attachment: Z:\11-NWP-64 Comments on GTCC EIC 6-24-11.pdf

Comment Submitted:
Please see the comments on the letter attached.

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

State of Washington, Department of Ecology, Commenter ID No. W545 (cont'd)

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received JUL - 5 2011

June 27, 2011 11-NWP-064

Arnold Edelman, Document Manager
Greater-Than-Class C Low-Level Radioactive Waste EIS
Office of Technical and Regulatory Support (EM-43)
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, DC 20585-0119

Re: Washington State Department of Ecology (Ecology) Comments on Draft Greater-Than-Class C Low Level Radioactive Waste Environmental Impact Statement (GTCC EIS)

References: See page 3

Dear Mr. Edelman,

As the Washington and Oregon directors said in their letter (Reference 1), the State of Washington remains opposed to any United States Department of Energy (USDOE) plans to dispose of the Greater-than-Class C (GTCC) waste at Hanford. The following comments identify major logic flaws that invalidate the Hanford alternatives in the GTCC EIS.

1. **GTCC disposal at Hanford does not have the "mission compatibility" used to select candidate disposal sites.** The GTCC EIS page 1-25 states that "The DOE sites evaluated for the land disposal methods were identified on the basis of mission compatibility (i.e., only DOE sites that currently have radioactive waste disposal as part of their ongoing mission were considered)." This statement is contradicted by legal commitments for the Hanford Site:
   A. As the USDOE announced in the *Federal Register* Volume 74, page 67190 (74 FR 9719), the Hanford Site will not receive waste from off-site until the Waste Treatment and Immobilization Plant (WTP) begins operation. Per the provisions in the United States District Court Consent Decree No. 08-50850-FVS, Appendix A, Milestone A-1, the WTP must achieve initial operations by 12/31/2022. Offsite waste may not come to Hanford before 2023. Therefore, disposal of radioactive waste that originates from off the Hanford site is not part of the ongoing mission for Hanford.
   B. The Presidential Memorandum dated June 9, 2000 directs the Secretary of Energy to "protect these important values [that are the same in Central Hanford as in the Hanford Reach National Monument] where practical." An ongoing mission to dispose of long-lived radioactive waste is incongruous with protection of the values of a National Monument. Because of the Presidential Memorandum, radioactive waste disposal cannot be part of the ongoing mission of Hanford.
   C. As noted by Oregon in its comments on this GTCC EIS (reference 4), the proposed disposal of GTCC at Hanford conflicts with (is not compatible with) the Hanford cleanup mission. Therefore, disposal of offsite radioactive waste is not part of the ongoing mission for Hanford.

W545-1

W545-1 For purposes of the NEPA analysis, Hanford was included. NEPA does not restrict the analysis based on current requirements, legislation or agreements. However, in the selection and implementation of the preferred alternative, these factors were taken into consideration.

The generation or storage of GTCC waste at a specific site was not a consideration in the selection of the site for analysis. A key factor was the existence at or near the reference location (e.g., access roads, utilities, waste storage buildings, etc.) of an existing infrastructure that would support a disposal facility.

The timeline for receipt of GTCC LLRW and GTCC-like waste is not fixed and was assumed in the GTCC EIS to provide a basis for evaluation. As discussed in Section 3.4.2 of the EIS, the actual start date for operations is uncertain at this time. As such, the receipt of waste at the facility is dependent upon, among other things, the alternative or alternatives selected, additional NEPA review as needed, characterization studies, and other actions necessary to initiate and complete construction of a GTCC LLRW and GTCC-like waste disposal facility. Thus, the timeline for the receipt of GTCC LLRW and GTCC-like waste at the disposal facility does not exclude any alternative considered and will be adapted to the alternative(s) selected for implementation.

State of Washington, Department of Ecology, Commenter ID No. W545 (cont'd)

Mr. Arnold Edelman
June 27, 2011
Page 2

Washington does acknowledge the ongoing near-surface disposal of Navy reactor compartments at Hanford. However, the latter disposal was specifically excepted by the moratorium agreed to by USDOE United States District Court Consent Decree No. 08-50850-FVS. We also note the latter disposal has no practical alternative in the near-term.

2. **The GTCC EIS fails to identify a key difference between Hanford and other USDOE sites, that Hanford does not currently store nor generate GTCC or GTCC-like waste.** Table S-2 in the GTCC EIS summary lists some of the candidate disposal sites as current storage or generator *locations for GTCC or GTCC-like waste. Hanford is not listed in Table S-2. Proposing to dispose* GTCC at Hanford would introduce a new waste category to the Hanford site, which is a key difference from some other candidate sites. The proposal to introduce GTCC waste to the Hanford site is inconsistent with the waste categories already stored at the Hanford site.

3. **The GTCC EIS timeline for receipt of GTCC waste can't be supported at the Hanford Site.** Figure S-6 in the GTCC EIS summary assumed receipt of GTCC waste for disposal in the timeframe from 2019 to 2025. As stated in a preceding comment, the Hanford Site will not receive off-site waste until at least 2022. At that time, several time-consuming elements would be required before off-site waste could potentially be disposed at Hanford: W545-1 (Cont.)
   - Ecology presumes USDOE would designate some or all GTCC and GTCC-like waste as mixed low-level/hazardous waste, and that USDOE would apply for a state dangerous waste *management permit. Ecology would not consider such an application until the 2022* commitment date, and would take some time (e.g., 2 to 3 years) to review and approve such a permit. This permit would have to be in place prior to start of construction of a mixed waste disposal facility.
   - Also, prior to issuing a Draft permit for a disposal facility a new, current National Environmental Policy Act (NEPA) EIS would be required in order for the state to complete its own State Environmental Policy Act (SEPA) commitments.
   - Public meetings and/or public hearings would be required for both USDOE and the State.
   - The GTCC EIS states that construction is assumed to require 820 days (3.4 years).

   Based on the timing and duration of these elements, receipt of waste could not possibly occur before 2027 or 2028, which is inconsistent with the timeline presented in the GTCC EIS.

4. **Borehole disposal at Hanford is contradicted both within the GTCC EIS, and by Hanford history.**
   A. The State disagrees with USDOE's contention that the depth to groundwater means that only facilities in Nuclear Regulatory Commission (NRC) Region 4 are suitable for burial of wastes because the depth to groundwater is too shallow in the other regions. While depth to groundwater in Central Hanford is 250 to 300 feet below ground surface, the conceptual design of the Intermediate-Depth boreholes would reduce that by 130 feet, to 120 to 170 feet below ground surface. Thus, there is no difference between Intermediate-Depth borehole disposal at Hanford and near-surface disposal in other NRC regions. W545-2
   B. Hanford's vadose zone and dry climate may seem like a protective situation however, when waste does migrate, it does so at a greater concentration and is not easily diluted in the groundwater.

W545-2 Depth to groundwater is only one of many factors considered in assessing the suitability of a site for a GTCC disposal facility. Past operational experience with these types of disposal facilities at DOE sites has shown that when properly implemented, they can provide isolation of radioactive waste from the environment for extended time periods. Past problems that have arisen with each option provide additional information to improve the design and performance of future land disposal facilities. Issues related to performance over time would be analyzed in a project-specific analysis to address technical concerns.

State of Washington, Department of Ecology, Commenter ID No. W545 (cont'd)

Mr. Arnold Edelman
June 27, 2011
Page 3

C. The GTCC EIS analyzes intermediate-depth borehole disposal at Hanford as a reference location. Borehole disposal is also analyzed for a hypothetical commercial facility, but only within NRC Region IV "because the depth to groundwater at the other three regions is considered too shallow." The implication is that depth to groundwater at Hanford is adequate for borehole disposal. This is contradicted by impacts from historic waste disposal at Hanford. Hanford's shallow waste disposal cribs were designed for maximum waste retardation and failed. The massive plumes of groundwater contamination at Hanford demonstrate the fatally flawed logic of the GTCC EIS assumption that depth to groundwater makes Hanford a suitable site. W545-2 (Cont.)

5. **Hanford's current risk burden cannot support additional offsite waste disposal.**

A. The State and the public has already noted that offsite waste disposal, as proposed in the Draft Tank Closure & Waste Management EIS, results in significant adverse impacts to the groundwater under the Hanford Site. The State requested that USDOE eliminate disposal of offsite waste at Hanford (Reference 5). W545-3

B. The State is disturbed that USDOE has limited its decisions in the GTCC EIS to the selection of disposal methods and disposal sites without providing in-depth analyses of the impacts. The State urges USDOE to add detailed analyses for each Site to the GTCC EIS. W545-4

As the Washington and Oregon Directors stated in Reference 1, we do not support any plans that include the addition of more waste to the Hanford Site and increase cleanup. We stand with the State of Oregon in opposition to any further consideration of Hanford as the disposal site for GTCC and GTCC-like waste.

If you have any questions about our comments, please contact John B. Price of my staff on 509-372-7921.

Sincerely,

Jane A. Hedges
Program Manager
Nuclear Waste Program

jbp/dbm

Reference 1: Letter, Ted Sturdevant, Director, Washington State Department of Ecology and Bob Repine, Acting Director, Oregon Department of Energy, dated May 17, 2011

Reference 2: Letter, Jane A. Hedges, Program Manager, Nuclear Waste Program to Ms. Mary Beth Burandt, dated April 30, 2010

Reference 3: Memorandum by President William J. Clinton, Subject: Memorandum on the Hanford Reach National Monument, June 9, 2000, Weekly Compilation of Presidential Documents, pages Page 1324-1325

Reference 4: Letter, Ken Niles, Oregon Nuclear Safety Division Administrator, dated June 22, 2011

Reference 5: Letter, Jane A. Hedges, Program Manager, to Mary Beth Burandt, US DOE, dated April 30, 2010

cc: See next page

W545-3 The Hanford Site is analyzed as a candidate location for a new GTCC waste disposal facility in the GTCC EIS. DOE is performing environmental restoration activities at the Hanford Site, and the ongoing cleanup efforts at the Hanford Site will continue.

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

Chapter 6 in the Final TC&WM EIS cumulative impacts analysis addresses the impacts from past, present and reasonably foreseeable actions in and around the Hanford site.

W545-4 The analysis presented in the GTTC EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. As appropriate additional NEPA review would be done as well as public participation as appropriate, before implementation.

State of Washington, Department of Ecology, Commenter ID No. W545 (cont'd)

Mr. Arnold Edelman
June 27, 2011
Page 4

cc: Dennis Faulk, EPA
Matt McCormick, USDOE
Scott Samuelson, USDOE
Stuart Harris, CTUIR
Gabe Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
Ted Sturdevant, Ecology
Keith Phillips, OFM
Mark Rupp, OFM
Max Power, Oregon Hanford Cleanup Board
Administrative Record:
Environmental Portal
USDOE-ORP Correspondence Control
USDOE-RL Correspondence Control

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. L285

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

May 17, 2011

Mr. Arnold Edelman, Document Manager
Office of Technical and Regulatory Support (EM-43)
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585-0119

Re: Draft Environmental Impact Statement (EIS) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste (LLRW) and GTCC-Like Waste (DOE/EIS-0375D, Draft EIS)

Dear Mr. Edelman:

We are very disappointed that the draft EIS for the Disposal of GTCC and GTCC-like Waste continues to list Hanford as a viable location for the disposal of these highly radioactive wastes. We believed that a thorough analysis would clearly demonstrate that this additional burden of waste would create unacceptable environmental consequences. Rather than focus on analyzing the most appropriate site for disposal of these wastes, the EIS appears to try to preserve every potential option and alternative – to the detriment of the entire process. L285-1

The states of Washington and Oregon adamantly oppose use of Hanford for disposal of GTCC wastes. Both of our states have been deeply engaged in, and supportive of, cleanup of radioactive and chemically hazardous wastes at Hanford for over 20 years. Adding more waste to the subsurface – especially waste that is highly radioactive and long-lived – is incompatible with the cleanup effort that has come at such a high price and that we all support.

Since Hanford cleanup began in 1989, the federal government has spent more than 30 billion taxpayer dollars to try to clean up the extensive environmental injury caused by 45 years of plutonium production. The United States Department of Energy (USDOE) will be cleaning up the existing contamination at Hanford for many decades to come, at a cost of tens of billions of additional dollars. The problems USDOE faces at Hanford are so daunting that no precise estimate is possible. L285-2

L285-1 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

L285-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. L285 (cont'd)

Mr. Arnold Edelman
May 17, 2011
Page 2

Even when the work is complete to the best of our collective ability, extensive contamination [illegible] OE's own analysis in the draft Hanford Tank Closure and Waste Management EIS shows persistent contamination of Hanford groundwater for thousands of years due to waste now in the subsurface. L285-2 (Cont.)

It is inconceivable to us that USDOE would spend billions of dollars to try to clean up the environmental damage at Hanford, yet ignore that work by proposing to dispose of additional highly radioactive wastes on the site.

Protection of the Columbia River is a core value of the states of Washington and Oregon and the people of the Pacific Northwest. The consideration of Hanford as a disposal site for GTCC wastes is contrary to that value. We strongly urge USDOE to remove Hanford from the list of possible sites for disposal of this waste. L285-3

Sincerely,

Ted Sturdevant
Director
Washington State Department of Ecology

Bob Repine
Acting Director
Oregon Department of Energy

cc: Dennis Faulk, EPA
Matthew McCormick, USDOE
Scott Samuelson, USDOE
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
Ron Skinnarland, Ecology
Oregon Congressional Delegation
Washington Congressional Delegation

cc electronic:
Keith Phillips, Washington Governor's Policy Office
Mark Rupp, Washington Governor's DC Office

L285-3 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. T13

Capital Reporting Company 6

MR. SKINNARLAND: Yes. I want to thank you all for coming tonight. I'm Ron Skinnarland. I work for the Washington State Department of Ecology, here in the Richland office. And the State of Washington is concerned that there be a safe place to put Greater-Than-Class C waste.

I have a letter I'd like to read tonight. It's a joint letter from the head of the Department of Ecology and the head of the Oregon Department of Environmental Quality and I think summarizes our concerns about the potential impact of bringing off-site waste to Hanford for disposal.

So, basically, the letter is addressed to Mr. Edelman, and it's about the Greater-Than-Class C EIS. It starts -- I'll just read it.

"We are very disappointed that the Draft EIS for the disposal of Greater-than-Class C Waste and Greater-Than-Class-C-Like Waste continues to list Hanford as a viable location for the disposal of these highly radioactive wastes. We believe that a thorough analysis would clearly demonstrate that this additional burden of waste would

T13-1

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T13-1 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. T13 (cont'd)

Capital Reporting Company 7

1 create unacceptable environmental
2 consequences.
3 "Rather than focusing on analyzing the
4 most appropriate site for disposal of these
5 wastes, the EIS appears to try to preserve
6 every potential option and alternative, to
7 the detriment of the overall process.
8 "The states of Washington and Oregon
9 adamantly oppose use of Hanford for
10 disposal of Greater-Than-Class C Waste.
11 Both of our states are deeply engaged in,
12 and supportive of, cleanup of radioactive
13 and chemically hazardous wastes at Hanford
14 for over 20 years. Adding more waste to
15 the subsurface, especially waste that is
16 highly radioactive and long-lived, is
17 incompatible with the cleanup effort that
18 has come at such a high price and that we
19 all support.
20 "Since the Hanford cleanup began in
21 1989, the federal government has spent more
22 than 30 billion taxpayer dollars to try to
23 clean up the extensive environmental injury
24 caused by 45 years of plutonium production.
25 The United States Department of Energy will

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T13-1 (Cont.)

T13-2

T13-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue. If GTCC LLRW or GTCC-like waste were to be disposed at Hanford, DOE does not anticipate negative impacts to ongoing cleanup activities at this site.

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. T13 (cont'd)

Capital Reporting Company 8

be cleaning up the existing contamination at Hanford for many decades to come, at a cost of tens of billions of additional dollars.

"The problems US DOE faces at Hanford are so daunting that no precise estimate is currently available.

"Even when the work is complete to the best of our collective ability, extensive contamination will remain. The Department of Energy's own analysis in the Draft Hanford Tank Closure and Waste Management Environmental Impact Statement shows persistent contamination of Hanford groundwater for thousands of years due to waste now in the subsurface.

"So it is inconceivable to us that the Department of Energy would spend billions of dollars to try to clean up the environmental damage at Hanford, yet ignore that work by proposing to dispose of additional highly radioactive wastes on the site.

"Protection of the Columbia River is a core value of the states of Washington and

T13-2 (Cont.)

T13-3

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T13-3 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

State of Washington, Department of Ecology, and Oregon Department of Energy, Commenter ID No. T13 (cont'd)

Capital Reporting Company 9

1 Oregon and the people of the Pacific
2 Northwest. The consideration of Hanford as
3 a disposal site for Greater-Than-Class C
4 Waste is contrary to that value, and we
5 strongly urge that the Department of Energy
6 remove Hanford from the list of possible
7 waste sites for disposal of this waste."
8 And the letter is signed Ted Sturdevant, Director
9 of the Washington Department of Ecology, and Bob Repine,
10 the Acting Director of Oregon Department of Energy. I
11 have a copy of that.

T13-3 (Cont.)

Sun Rays Mechanical Contractors, Inc., Commenter ID No. L306

DRAFT ENVIRONMENTAL IMPACT STATEMENT for the DISPOSAL OF GREATER THAN-CLASS C (GTCC) LOW-LEVEL RADIOACTIVE WASTE AND GTCC-LIKE WASTE (DOE/EIS-0375-D)
U.S. Department of Energy

WRITTEN COMMENT FORM
Must be received on or before June 27, 2011

received JUN - 6 2011

Mr. X Mrs. ___ Ms. ___ Mr. & Mrs. ___ Dr. ___

Name: James Bruvold, PE

Title: Consulting Engineer

Organization: Sun Rays Mechanical Contractors, Inc

Address: 2120 CR 335

City: Pagosa Springs State: Colorado Zip Code: 81147

Phone: 970-264-5570 E-Mail Address: jbruvold@efn.org

Comment: Apparently there are abandoned uranium mines in New Mexico that could serve as repositories for portions of this waste. As my business partner Mark Ray testified at Public Hearing in Pasco, WA "put the stuff you don't know what to do with back were you found it."
That seems like a good idea to me. L306-1

Please use other side if more space is needed.

WITHHOLDING OF PERSONAL INFORMATION: Information you provide on this form may be published as part of the public record for this project, including publication on the Internet. Individual respondents may request confidentiality by checking one of the two boxes below. The DOE will honor such requests to the extent allowed by law. All submission from organizations and businesses, or from individuals identifying themselves as representatives or officials of organizations or businesses, will be available to the public in their entirety.

☐ Withhold my name and address from the public record.
☐ Withhold only my address from the public record

Comment forms may be mailed to:
Mr. Arnold Edelman
Document Manager
Office of Regulatory Compliance (EM-43)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0119

Comment form may be faxed to:
(301) 903-4303

or sent by electronic mail to:
gtcceis@anl.gov

L306-1 The EIS considered the range of reasonable alternatives for disposal of the inventory of GTCC LLRW and GTCC-like wastes identified for inclusion in these analyses. Regarding the use of mined cavities, DOE does not believe it is reasonable to dispose of GTCC LLRW and GTCC like waste in a new mined cavity (other than the existing WIPP facility) because of the potential cost and time it would take to develop such an alternative in comparison to the relatively small amount of waste. With regard to existing mines, no specific mine has been identified as having the proper characteristics for disposal of GTCC LLRW and GTCC-like wastes.

Sun Rays Mechanical Contractors, Inc., Commenter ID No. T17

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12 MR. BROWN: Jim Bruvold is our speaker now.
13 MR. BRUVOLD: Good evening. My name is James
14 Bruvold. I'm a consulting engineer with Sun Rays
15 Mechanical Contractors.
16 I live in Eugene, Oregon, and I've been attending
17 these meetings for the past year or so, and I've got a
18 pretty good idea of the problems that people are
19 considering here. I think I have a solution that I would
20 like to present.
21 I've been talking to some of the people at the
22 Department of Energy here about it. It's so simple, it's
23 almost stupid. There are fungus that grow on the soil
24 that are actually able to sequester and hold radioactive
25 elements in their bodies, and they use that disintegration

T17-1

T17-1 Remediation for contamination at Hanford is not within the scope of the EIS.

Sun Rays Mechanical Contractors, Inc., Commenter ID No. T17 (cont'd)

Capital Reporting Company 23

energy as a life source.

If we were to feed this fungus and culture it in place, perhaps we could find a way of sequestering the leaking waste tanks at the Central Plateau as 110 square miles of contaminated surface area; and the fungus, if they had all the elements they need to survive, they may be able to thrive for hundreds or maybe thousands of years. This may be a long-term solution. T17-1 (Cont.)

So I'm preparing a proposal that I will submit, but I thought I would come here tonight and make a presentation and meet some of the people here, and see what we can do.

Mark, would you like to say a few words? I know I was going to get you up here. This is my business partner, Mark Ray. And as this gentleman was saying, that, you know, probably the best place to put it is in a deep hole in the ground that already exists.

And where did the uranium come from?

MR. RAY: Okay. I worked on the uranium mines in New Mexico. I was on the uranium mines in New Mexico, in the development.

There are two holes in New Mexico. One is at Grants, New Mexico, where most of the uranium came from in the first place. It is 3400 feet down. It does have a water problem, but it is a hole already there. T17-2

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T17-2 The EIS considered the range of reasonable alternatives for disposal of the inventory of GTCC LLRW and GTCC-like wastes identified for inclusion in these analyses. Regarding the use of mined cavities, DOE does not believe it is reasonable to dispose of GTCC LLRW and GTCC like waste in a new mined cavity (other than the existing WIPP facility) because of the potential cost and time it would take to develop such an alternative in comparison to the relatively small amount of waste. With regard to existing mines, no specific mine has been identified as having the proper characteristics for disposal of GTCC LLRW and GTCC-like wastes.

Sun Rays Mechanical Contractors, Inc., Commenter ID No. T17 (cont'd)

Capital Reporting Company 24

There is another hole at Crown Point, New Mexico, on the Navajo Reservation, that is 3400 feet that we drilled in 1980 and abandoned it. It's gone. It's there. Conoco -- Phillips-Conoco drilled the hole for a new mine site.

I never believed -- I have never been back there, but I don't believe they ever developed this mine site. All they did is drill a 3200-foot hole, 25 feet in diameter, and capped it. It's still there. It's the best place to put it. That's my only thing about it. T17-2 (Cont.)

If you are looking at a waste site, I agree with that woman right there, Yucca Mountain was made for it. They turned it down for who knows -- politicianal reasons. It's in Nevada.

But there are places to put this stuff, and the highly radioactive material needs to be buried deep. 3400 foot is where this stuff all came from. And at that depth, the material and the rock is now already at -- 3 percent is the material content of the uranium in that hole at 3400 feet. That's the vein of the -- that's where they mined it all. So that's basically what I wanted to put in.

Thank you.

Tewa Women United, Commenter ID No. T105

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10 --
11 MR. BROWN: Okay. Kathleen Sanchez is next
12 and David Bacon will follow.
13 MS. SANCHEZ: (Speaking foreign language.)
14 This is an art piece at the Environmental Health and
15 Justice People, our environmental group at Tewa Women
16 United made, and it says you can't bury the truth, and
17 I think it's a very visual way that we have of showing
18 our trust in our Creator that truth can't be buried.
19 You have to speak the truth. You have to live truth,
20 and by being that, you're not able to be cocooned into
21 not doing anything about what's harming your people.
22 And I'm also up here representing, well, Tewa

Tewa Women United, Commenter ID No. T105 (cont'd)

1 Women United, our women's organization, and our mission
2 is to stop violence against -- all forms of violence
3 against Native women and Mother Earth and to promote
4 peace. We're a 501(c)(3), a women's organization, a
5 women's organization that took up the task of
6 educating, protecting our young mothers and our
7 families from what is seen as the monster or the
8 monster on the hill, and that it's consuming our
9 children.
10 And statistics went out saying that San
11 Idelfonso where I'm from -- that's right where Los
12 Alamos has flopped into our sacred lands -- is now --
13 has an increase of deaths and decrease in births. So
14 something is happening to our ability to promote our
15 way of being and to be present here, and the lab only
16 came up being here less than 65 years, and yet we're
17 already dying because of their business.
18 And talking about the draft EIS, being born
19 here in San Idelfonso, we got to see the beginnings of
20 the Manhattan Project and all through its lifetime what
21 they considered doing, environmental impact statements,
22 and knowing that the people that had worked on draft

Tewa Women United, Commenter ID No. T105 (cont'd)

Capital Reporting Company 94

1 environmental impact statements or impact statements,
2 being told they cannot talk to the people, that their
3 findings are supposed to be based on papers that were
4 already published or that were in -- that were allowed
5 to be there, so meaning that they're not true EIS
6 statements, and things have happened.
7 And so the draft that we are looking at now is
8 based upon a draft or EIS statements that were false
9 and don't cover present truths. So there are some
10 hidings that are happening about the truth.
11 And sad to say, but the United States has been
12 the last country in 2007 to recognize indigenous
13 peoples as human beings. So up until 2007, we were
14 natural resources, just like our Mother Earth's
15 elements that they use to create the war weapons. And
16 so they disregarded us as disposable people and now
17 signs of that are showing up.
18 And as women and mothers, we know that a lot
19 of the disposal sites, Area G, the plume is spreading
20 and our children are getting sick. Mother Earth is
21 getting sick. The waters are getting contaminated.
22 Our aquifers whose ability to give life started

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Tewa Women United, Commenter ID No. T105 (cont'd)

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1 millions of years ago, billions of years ago. Yet
2 within that short business of producing weapons, war
3 weaponry and the affiliated chain of that industry is
4 sickening our way of life, our life in general, our
5 life all around on everybody.
6 And Mother Earth, whom we regard as our mother
7 for promoting all life, is sick, sick and dying, and
8 we're also sick and dying because of the nuclear
9 contamination using a natural resources, considered
10 resource, I guess, but a life giver for us in a
11 negative way. So the culture of violence uses our
12 energy, the energy to give life to create a burden on
13 us so that in our dying they can reach out and use the
14 same technology to say they're healing us, which is
15 going round and round, catching your tail in a crazy,
16 crazy way.
17 I don't know. How many minutes?
18 MR. BROWN: You're just about out of time. So
19 if you have one point to make.
20 MS. SANCHEZ: Oh. So I guess what Clarissa
21 asked us to do was think up solutions for energies and T105-1
22 how we're going to use it in a positive way instead of

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T105-1 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

Tewa Women United, Commenter ID No. T105 (cont'd)

Capital Reporting Company 96

1 a negative way, and so using radioactivity that is
2 natural in an unhealthy way is sickening, and we're
3 dying from it. So let's stop that madness now.
4 So "gooda" (phonetic).

T105-1 (Cont.)

Toiyabe Chapter, Sierra Club, Commenter ID No. T42

24

MS. FELDMAN: Sure. I'm sorry it wasn't clear when I signed in.

MR. BROWN: Sure.

MS. FELDMAN: My last name is Feldman, F, as in Frank, E-L-D-M-A-N.

MR. BROWN: Okay. Great. And Shila Z. will be following you.

Thanks. Go ahead.

MS. FELDMAN: I represent the Toiyabe Chapter of the Sierra Club.

The Toiyabe Chapter of the Sierra Club has over 5,000 members in Nevada and Eastern California. We are all deeply concerned about how nuclear waste is managed, and we want to make these following points. First, the EIS process seems to be premature. The majority of the Greater-than-Class C waste will not exist for at least another 20 years. Planning ahead is good, but this seems to be an extreme. T42-1

Also, it would be prudent to first receive the recommendations of the Blue Ribbon Commission, as Judy just mentioned, and evaluate them as possible alternatives. The Commission has not yet announced when to expect the recommendations. Their first

T42-1 The scope of this EIS is adequate to inform decision-making for the disposal of GTCC LLRW and GTCC-like waste. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS.

DOE believes that this EIS process is not premature and is in compliance with NEPA. On the basis of an assumed starting date of 2019 for disposal operations, more than half (about 6,700 m^3 [240,000 ft^3] of the total GTCC LLRW and GTCC-like waste inventory of 12,000 m^3 [420,000 ft^3]) is projected to be available for disposal between 2019 and 2030. An additional 2,000 m^3 (71,000 ft^3) would become available for disposal between 2031 and 2035. This information is presented in Figure 3.4.2-1. DOE believes this EIS is timely, especially given the length of time necessary to develop a GTCC waste disposal facility.

Toiyabe Chapter, Sierra Club, Commenter ID No. T42 (cont'd)

25

1 report, but not their final report, is required to be
2 published in the next month, June of
3 2011.
4 Second, DOE should consider Hardened On-Site
5 Storage option, a HOSS option. HOSS is similar to one
6 of the disposal concepts, vaults, that DOE is
7 considering. Except HOSS is for safe and risk-free
8 storage, not final and irretrievable disposal.
9 Materials could be accessed from a HOSS system in
10 managed ways at later times.
11 HOSS could also be used to store spent T42-2
12 nuclear fuel, a kind of high-level nuclear waste, as
13 well as Greater-than-Class C waste, at the reactor site
14 where it's generated.
15 HOSS also minimizes transportation risks to
16 move nuclear waste from multiple generation sites that
17 are mostly east of the Mississippi to select few
18 disposal sites that are all west of the Mississippi.
19 We'd also like to mention that there's no
20 rail to the Nevada National Security Site, and routing
21 would need to go through Las Vegas. We consider that a T42-3
22 huge risk and not adequately represented by the
23 information as presented in the Draft EIS.
24 Last, we'd like to mention that the best
25 solution for nuclear waste management is not to create T42-4

T42-2 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

T42-3 DOE agrees that there is no direct rail access to NNSS.

DOE/NNSA analyzed various radioactive waste shipping routes through and around metropolitan Las Vegas, Nevada, in the Draft NNSS SWEIS. DOE/NNSA continued discussions with the State of Nevada on routing options throughout the preparation of the Final NNSS SWEIS. After taking into consideration the comments and concerns expressed by State, county, and local government officials and the public in general during the review and comment period for the Draft NNSS SWEIS, DOE/NNSA decided to maintain the current highway routing restrictions for shipments of low-level radioactive waste (LLW) and mixed-low level radioactive waste (MLLW), as described in the Waste Acceptance Criteria (WAC) for the site. DOE/NNSA explained this decision in the Final NNSS SWEIS. The unchanged WAC restrictions are to avoid (1) crossing the Colorado River near Hoover Dam and (2) the greater metropolitan Las Vegas interstate system. DOE/NNSA is not considering, nor is it making, changes to the NNSS WAC with regard to routing.

T42-4 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109 58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

Toiyabe Chapter, Sierra Club, Commenter ID No. T42 (cont'd)

26

1 it. The Draft EIS needs to evaluate an alternative
2 where no new reactors are built. In that scenario,
3 most of the Greater-than-Class C waste would be
4 eliminated and not created.
5 Thank you.

T42-4 (Cont.)

Tri-Valley CAREs, Commenter ID No. L91

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Peace Justice Environment since 1983

received

June 27, 2011

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Tri-Valley CAREs' Comments on the EIS on Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste

Tri-Valley CAREs submits these comments on the Draft Environmental Impact Statement (DEIS) on the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D). As explained herein, the DEIS fails to provide an accurate, complete or legally adequate analysis as is required by the National Environmental Policy Act (NEPA). L91-1

Tri-Valley CAREs was founded in 1983 in Livermore, California by concerned neighbors living around the Lawrence Livermore National Laboratory. Tri-Valley CAREs monitors nuclear weapons and environmental clean-up activities throughout the US nuclear weapons complex on behalf of its 5,600 members. Tri-Valley CAREs has worked for decades with its partners in the Alliance for Nuclear Accountability to develop and promote a rational U.S. policy for the most safe and secure nuclear waste management. We seek options that will have the least impact on the world's communities with the legacy of deadly contamination from the nuclear age. Tri-Valley CAREs also seeks to eliminate waste, fraud and abuse from the oversight and management of facilities that make up the nuclear weapons complex.

The purpose of NEPA is to ensure that every federal agency prepare a full Environmental Impact Statement (EIS) for major federal actions significantly affecting the quality of the human

L91-1 The scope of this EIS is adequate to inform decision-making for the disposal of GTCC LLRW and GTCC-like waste. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS.

DOE believes that this EIS process is in compliance with NEPA. All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements.

DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. DOE plans a tiered decision-making process, in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

Tri-Valley CAREs, Commenter ID No. L91 (cont'd)

Jun 27 11 07:10p Tri-Valley CAREs 925-443-1077 p.3

environment.[1] An EIS must provide a "full and fair discussion of significant environmental impacts and shall inform the decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment."[2]

As described below, the DEIS fails to provide an adequate purpose and need statement, fails to include an adequate analysis of reasonable alternatives, and improperly segments the proposed action from other connected actions. For these reasons, the DEIS must be significantly revised and recirculated for public review and comment.

I. The Purpose and Need Statement Omits Critical Reasons for the Proposed Action

An EIS must explain the underlying purpose and need to which the lead agency is responding in proposing the alternatives including the proposed action. 40 CFR § 1502.13. A federal agency may describe the purpose and need in any way that meets the statutory authority. L91-2

The DEIS ignores the legal requirement to study a deep geologic disposal site. Yucca Mountain was never a scientifically sound disposal site and now the Obama Administration has taken it off the table. There is a legal requirement to develop a deep geological disposal facility for placement of nuclear waste in the long term. The Department of Energy should study whether a realistic deep geological disposal site is feasible. Let us be clear however, Tri-Valley CAREs is only advocating that deep geologic disposal be studied in compliance with federal law. Tri-Valley CAREs is not advocating that DOE rush to put these wastes in the ground. As described below, Tri-Valley CAREs is advocating for a combination of waste minimization and Hardened On Site Storage as the only ethically and scientifically defensible proposal that has been developed to date. L91-3 L91-4

Moreover, the Waste Isolation Pilot Project (WIPP) must not be considered for GTCC waste disposal. The only repository alternative considered in the DEIS is WIPP, even though federal and New Mexico laws clearly prohibit commercial waste, including GTCC. By law, WIPP's mission is limited to 175,564 cubic meters of transuranic waste from nuclear weapons. That's less than 5,000,000 curies of *radioactivity. GTCC waste would contain 30 times more radioactivity than planned for WIPP and would* eliminate the ban on commercial waste. The DOE should revise the DEIS to describe the need for the proposed action that includes options other than the WIPP. L91-5

II. The EIS Fails to Include an Adequate Analysis of Reasonable Alternatives

The twin functions of the Environmental Impact Statement (EIS) are to "require that agencies take a 'hard look' at environmental consequences, and provide for broad dissemination of relevant environmental information." See Robertson v. Methow Valley, 490 US 332, 350 (1989). The discussion of alternatives is the legally required heart of any EIS. 40 CFR § 1502.14. The legally adequate EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." 40 CFR § 1502.14(a). L91-6

a. Hardened On Site Storage is a Reasonable Alternative That Must be Rigorously Explored and Objectively Evaluated in a Revised EIS

[1] 42 U.S.C. 4332; 40 CFR 1501.
[2] 40 CFR 1502.1.

L91-2 In accordance with the LLRWPAA (P.L. 99-240), the federal government (DOE) is responsible for the disposal of GTCC LLRW. DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes.

L91-3 The EIS considered the range of reasonable alternatives for the disposal of the GTCC waste inventory, including disposal in a deep geologic repository. DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

L91-4 DOE advocates waste minimization measures when available and practical and would expect that appropriate measures would be taken prior to actual disposal. However, the use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

L91-5 Disposal of GTCC LLRW and GTCC-like wastes at WIPP or the WIPP Vicinity site is included in the range of reasonable alternatives and is evaluated in this EIS. DOE acknowledges that only defense-generated TRU waste is currently authorized for disposal at the WIPP geologic repository under the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and that legislation would be required to allow disposal of waste other than TRU waste generated by atomic energy defense activities at WIPP and/or for siting a new facility within the land withdrawal area. It would also be necessary to revise the *Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant*, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit. In addition, site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads) as well as the proposed packaging for disposal. However, NEPA does not limit an EIS to proposing and evaluating alternatives that are currently authorized. Furthermore, the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant recognizes that the mission of WIPP may change and provides provisions to modify the agreement. For example, the Agreement states: "The parties to this Agreement recognize that future developments including changes to applicable laws (e.g., Public Law [P.L.] 96-164) may make it desirable or necessary for one or both parties to seek to modify this Agreement. Either party to this Agreement may request a review of the terms and conditions."

Tri-Valley CAREs, Commenter ID No. L91 (cont'd)

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The DEIS rejects "Hardened On-Site Storage" (HOSS) in which GTCC waste and irradiated spent fuel would remain at commercial nuclear power plants in long-term storage so that they can be monitored and are protected from aircraft crashes or terrorist attacks. HOSS involves securing the waste in a reinforced concrete cylinder near the site where it was produced. This avoids many harms, including expensive and dangerous waste transportation.

DOE's reason for rejecting HOSS is that it is "not a permanent disposal facility." This is not a credible reason for rejecting this alternative because it fails to acknowledge that no one has developed a "permanent" method for storing this waste to date. All containment designs have shown that the radioactive waste would leak at some time in the future. Keeping the waste in HOSS is a safe form of storage and would reduce the risk of accidents or a terrorist attack while scientists work to develop safe and secure methods of permanent disposal. HOSS is more protective of human health and the environment than any of DOE's current dumping practices and the alternatives presented in the DEIS. HOSS is a reasonable alternative that must be rigorously explored and objectively evaluated in a revised EIS. In addition to HOSS for already-generated waste, part of a future solution, of course, must be drastically minimizing the generation of those wastes. L91-7

b. The DEIS Must Be Revised to Include a Geologic Disposal Alternative Pursuant to the Nuclear Waste Policy Act of 1982

The DEIS also does not include consideration of any geologic disposal facility, except WIPP, even though for almost thirty years federal law (Nuclear Waste Policy Act of 1982) has required development of one or more other repositories. 42 U.S.C. § 10101. The Nuclear Regulatory Commission has determined that spent nuclear fuel can stay at commercial reactors for up to 100 years. So GTCC could also remain at those sites for at least that time period. L91-8

c. The Alternatives in the DEIS Are Not Reasonable and Violate State Laws

The DEIS focuses on storing GTCC at existing Department of Energy sites. Most of these properties are currently undergoing multi-million or multi-billion dollar clean-up projects and some of them have legal agreements with host states not to accept new waste. L91-9

Moreover, the legal requirement for another repository still exists, yet the alternative of putting the GTCC waste into that repository is not even mentioned. The GTCC EIS disregards the Nuclear Waste Policy Act, which requires DOE to site and operate at least one geologic repository other than WIPP. Since 1987, the only place considered has been Yucca Mountain, Nev. As mentioned, that flawed site has been terminated by the Obama administration, and appropriately has been dropped from consideration in the GTCC EIS. Yet, the alternatives evaluated in the DEIS are unreasonable and at least in part illegal. These alternatives should be rejected and a new DEIS must be circulated that provides a reasonable range of alternatives. L91-10

DOE should not proceed with a final GTCC EIS, but instead should develop a new DEIS that includes HOSS facilities as the best solution for GTCC wastes for decades to come and outlines a credible plan to study geologic disposal site(s) to dispose of GTCC waste. L91-11 Further, stopping the generation of new GTCC wastes is a reasonable and feasible alternative that can change the calculus regarding what to do with these wastes. This also must be fully explored in a new EIS. L91-12

III. The DEIS Improperly Segments the Proposed Action from Other Connected Actions

DOE should develop a national waste management strategy for different waste types. Such a strategy is needed to integrate the management of these wastes as opposed to the apparent piecemeal L91-13

DOE acknowledges the TRU waste disposal limitations for WIPP specified in the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and in the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant. Information on these limitations is provided in this EIS (see Section 4.1.1) and was considered in developing the preferred alternative. Based on the GTCC EIS evaluation, disposal of GTCC LLRW and GTCC-like wastes at WIPP would result in minimal environmental impacts for all resource areas evaluated, including human health and transportation. Both the annual dose and the latent cancer fatality (LCF) risk would be zero because there would be no releases to the accessible environment and therefore no radiation doses and LCFs during the first 10,000 years following closure of the WIPP repository. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require legislative changes and site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads), as well as the proposed packaging for disposal.

L91-6 See response to L91-1.

L91-7 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

L91-8 Development of a geologic repository for disposal of spent nuclear fuel and high-level waste is outside the scope of this EIS.

L91-9 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further site-specific NEPA review as appropriate and be in accordance with applicable laws, regulations and agreements, and would involve local stakeholder involvement the DOE sites. The ongoing cleanup effort will continue.

L91-10 See response to L91-3.

Tri-Valley CAREs, Commenter ID No. L91 (cont'd)

Jun 27 11 07:11p Tri-Valley CAREs 925-443-1077 p.5

approach that is currently being used by the Department. Such a strategy, moreover, should be assessed through programmatic and site-specific NEPA processes. This is particularly important when considering the disposal of long-lived radioactive wastes which are not suitable for shallow land burial.

Connected actions are those actions that are "closely related" and "should be discussed" in the same NEPA document. Under NEPA, actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; cannot or will not proceed unless other actions are taken previously or simultaneously. In Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1215 (9th Cir.1998), the Ninth Circuit held that five potential logging projects in the same watershed were cumulative and had to be evaluated in a single EIS, where they were reasonably foreseeable and "developed as part of a comprehensive forest recovery strategy." Similarly, in Thomas v. Peterson, 753 F.2d 754, 758 (9th Cir.1985), the court held that a logging project and a road to facilitate the logging had to be considered in a single EIS because "the timber sales could not proceed without the road, and the road would not be built but for the contemplated timber sales." The various nuclear waste disposal projects are interrelated and interdependent and will not proceed in a vacuum. These programs are improperly segmented in violation of NEPA. L91-13 (Cont.)

V. Conclusion

Due to the significant revisions that are required to correct the legal deficiencies in the NEPA analysis, the DEIS must be revised and recirculated for public review and comment. We thank you for considering these comments and look forward to the further NEPA review and analysis that is clearly warranted before these major federal actions can proceed.

Sincerely,

/s/
Loulena Miles,
Attorney and Board Member, Tri-Valley CAREs

and

/s/
Marylia Kelley
Executive Director
Tri-Valley CAREs

L91-11 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

The action alternatives evaluated in the GTCC EIS did not include interim storage of GTCC LLRW and GTCC-like wastes until a geologic repository for spent nuclear fuel and high-level radioactive waste becomes available because such interim storage is outside the scope of the GTCC EIS. The purpose of the GTCC EIS is to evaluate the range of reasonable alternatives for the safe and secure disposal of GTCC LLRW and GTCC-like wastes. The No Action Alternative evaluates continued storage of GTCC LLRW and GTCC-like wastes consistent with ongoing practices.

L91-12 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109 58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

L91-13 DOE disagrees that its waste management strategies are "piecemeal" and that its waste disposal projects are improperly segmented. DOE's Programmatic Waste Management Environmental Impact Statement (WM PEIS, DOE-0200, May 1997), addressed its complex-wide waste management activities across the nation for five waste types: LLW, MLLW, HLW, TRU Waste, and Non-Wastewater Hazardous Waste. The WM PEIS did not consider commercial GTCC, however it recognized that DOE is responsible for such waste under the LLRWPA, and as such DOE would be developing strategies for such waste. The actions evaluated in the WM PEIS did not "trigger" actions related to GTCC waste, nor do the disposal alternatives evaluated in this Final GTCC waste "trigger" actions considered in the WM PEIS. DOE is not contemplating a change in its disposal decisions under the WM PEIS. DOE does intend to make site-specific disposal decisions under this Final GTCC EIS. In the absence of available commercial facilities for GTCC waste disposal as explained in Section S.2.6.8 of the EIS summary, DOE evaluated DOE sites suitable to host such disposal facilities, and these sites were all considered in the WM PEIS.

Tri-Valley CAREs, Commenter ID No. W555

From:	gtcceiswebmaster@anl.gov
Sent:	Monday, June 27, 2011 7:55 PM
To:	gtcceiswebmaster@anl.gov
Subject:	Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10555

Thank you for your comment, Marylia Kelley.

The comment tracking number that has been assigned to your comment is GTCC10555. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 27, 2011 07:54:40PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10555

First Name: Marylia
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June 27, 2011
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Tri-Valley CAREs submits these comments on the Draft Environmental Impact Statement (DEIS) on the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D). As explained herein, the DEIS fails to provide an accurate, complete or legally adequate analysis as is required by the National Environmental Policy Act (NEPA). W555-1

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1

W555-1 The scope of this EIS is adequate to inform decision-making for the disposal of GTCC LLRW and GTCC-like waste. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS.

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DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. DOE plans a tiered decision-making process, in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

Tri-Valley CAREs, Commenter ID No. W555 (cont'd)

with its partners in the Alliance for Nuclear Accountability to develop and promote a rational U.S. policy for the most safe and secure nuclear waste management. We seek options that will have the least impact on the world's communities with the legacy of deadly contamination from the nuclear age. Tri-Valley CAREs also seeks to eliminate waste, fraud and abuse from the oversight and management of facilities that make up the nuclear weapons complex.

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Moreover, the Waste Isolation Pilot Project (WIPP) must not be considered for GTCC waste disposal. The only repository alternative considered in the DEIS is WIPP, even though federal and New Mexico laws clearly prohibit commercial waste, including GTCC. By law, WIPP's mission is limited to 175,564 cubic meters of transuranic waste from nuclear weapons. That's less than 5,000,000 curies of radioactivity. GTCC waste would contain 30 times more radioactivity than planned for WIPP and would eliminate the ban on commercial waste. The DOE should revise the DEIS to describe the need for the proposed action that includes options other than the WIPP. W555-5

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a. Hardened On Site Storage is a Reasonable Alternative That Must be Rigorously Explored and Objectively Evaluated in a Revised EIS

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2

W555-2 DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes.

W555-3 The EIS considered the range of reasonable alternatives for the disposal of the GTCC waste inventory, including disposal in a deep geologic repository. The Secretary of Energy determined that a permanent repository for high-level waste and spent nuclear fuel at Yucca Mountain, Nevada, is not a workable option and will not be developed. Therefore, DOE concluded that co-disposal at a Yucca Mountain repository is not a reasonable alternative and has eliminated it from evaluation in this EIS, as described in Section 2.6 of the EIS.

DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

DOE recognizes that disposal of GTCC LLRW and GTCC-like wastes in the WIPP geologic repository would require modification to existing law. In addition, it may be necessary to revise the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with the EPA, and the WIPP Hazardous Waste Facility Permit.

W555-4 DOE advocates waste minimization measures when available and practical and would expect that appropriate measures would be taken prior to actual disposal. However, the use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

W555-5 Disposal of GTCC LLRW and GTCC-like wastes at WIPP or the WIPP Vicinity site is included in the range of reasonable alternatives and is evaluated in this EIS. DOE acknowledges that only defense-generated TRU waste is currently authorized for disposal at the WIPP geologic repository under the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and that legislation would be required to allow disposal of waste other than TRU waste generated by atomic energy defense activities at WIPP and/or for siting a new facility within the land withdrawal area. However, NEPA does not limit an EIS to proposing and evaluating alternatives that are currently authorized. Also, the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant recognizes that the mission of WIPP may change and provides provisions to modify the agreement. For example, the Agreement states: "The parties to this Agreement recognize that future developments including changes to applicable laws (e.g., Public Law [P.L.] 96-164) may make it desirable or necessary for one or both parties to seek to modify this Agreement. Either party to this Agreement may request a review of the terms and conditions."

Tri-Valley CAREs, Commenter ID No. W555 (cont'd)

DOE's reason for rejecting HOSS is that it is "not a permanent disposal facility." This is not a credible reason for rejecting this alternative because it fails to acknowledge that no one has developed a "permanent" method for storing this waste to date. All containment designs have shown that the radioactive waste would leak at some time in the future. Keeping the waste in HOSS is a safe form of storage and would reduce the risk of accidents or a terrorist attack while scientists work to develop safe and secure methods of permanent disposal. HOSS is more protective of human health and the environment than any of DOE's current dumping practices and the alternatives presented in the DEIS. HOSS is a reasonable alternative that must be rigorously explored and objectively evaluated in a revised EIS. In addition to HOSS for already-generated waste, part of a future solution, of course, must be drastically minimizing the generation of those wastes. W555-7 (Cont.)

b. The DEIS Must Be Revised to Include a Geologic Disposal Alternative Pursuant to the Nuclear Waste Policy Act of 1982

The DEIS also does not include consideration of any geologic disposal facility, except WIPP, even though for almost thirty years federal law (Nuclear Waste Policy Act of 1982) has required development of one or more other repositories. 42 U.S.C. § 10101. The Nuclear Regulatory Commission has determined that spent nuclear fuel can stay at commercial reactors for up to 100 years. So GTCC could also remain at those sites for at least that time period. W555-8

c. The Alternatives in the DEIS Are Not Reasonable and Violate State Laws

The DEIS focuses on storing GTCC at existing Department of Energy sites. Most of these properties are currently undergoing multi-million or multi-billion dollar clean-up projects and some of them have legal agreements with host states not to accept new waste. W555-9

Moreover, the legal requirement for another repository still exists, yet the alternative of putting the GTCC waste into that repository is not even mentioned. The GTCC EIS disregards the Nuclear Waste Policy Act, which requires DOE to site and operate at least one geologic repository other than WIPP. Since 1987, the only place considered has been Yucca Mountain, Nev. As mentioned, that flawed site has been terminated by the Obama administration, and appropriately has been dropped from consideration in the GTCC EIS. Yet, the alternatives evaluated in the DEIS are unreasonable and at least in part illegal. These alternatives should be rejected and a new DEIS must be circulated that provides a reasonable range of alternatives. W555-10

DOE should not proceed with a final GTCC EIS, but instead should develop a new DEIS that includes HOSS facilities as the best solution for GTCC wastes for decades to come and outlines a credible plan to study geologic disposal site(s) to dispose of GTCC waste. Further, stopping the generation of new GTCC wastes is a reasonable and feasible alternative that can change the calculus regarding what to do with these wastes. This also must be fully explored in a new EIS. W555-11 W555-12

III. The DEIS Improperly Segments the Proposed Action from Other Connected Actions

DOE should develop a national waste management strategy for different waste types. Such a strategy is needed to integrate the management of these wastes as opposed to the apparent piecemeal approach that is currently being used by the Department. Such a strategy, moreover, should be assessed through programmatic and site-specific NEPA processes. This is particularly important when considering the disposal of long-lived radioactive wastes which are not suitable for shallow land burial.

Connected actions are those actions that are "closely related" and "should be discussed" in the same NEPA document. Under NEPA, actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; cannot or will not proceed unless other actions are taken previously or simultaneously. In Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1215 (9th Cir.1998), the Ninth Circuit held that five potential logging projects in the same watershed were cumulative and had to be evaluated in a single EIS, where they were reasonably foreseeable and "developed as part of a comprehensive forest recovery strategy." Similarly, in Thomas W555-13

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DOE acknowledges the TRU waste disposal limitations for WIPP specified in the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) and in the Agreement for Consultation and Cooperation between Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant. Information on these limitations is provided in this EIS (see Section 4.1.1) and was considered in developing the preferred alternative. Based on the GTCC EIS evaluation, disposal of GTCC LLRW and GTCC-like wastes at WIPP would result in minimal environmental impacts for all resource areas evaluated, including human health and transportation. Both the annual dose and the latent cancer fatality (LCF) risk would be zero because there would be no releases to the accessible environment and therefore no radiation doses and LCFs during the first 10,000 years following closure of the WIPP repository. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require legislative changes and site-specific NEPA reviews would be conducted as needed, including further characterization of the waste (e.g., radionuclide inventory and heat loads), as well as the proposed packaging for disposal.

W555-6 See response to W555-1.

W555-7 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

W555-8 The Nuclear Waste Policy Act of 1982 applies to the disposal of spent fuel and high level waste, not GTCC LLRW. The action alternatives evaluated in the GTCC EIS did not include interim storage of GTCC LLRW and GTCC-like wastes until a geologic repository for spent nuclear fuel and high-level radioactive waste becomes available because such interim storage is outside the scope of the GTCC EIS. The purpose of the GTCC EIS is to evaluate the range of reasonable alternatives for the safe and secure disposal of GTCC LLRW and GTCC-like wastes. The No Action Alternative evaluates continued storage of GTCC LLRW and GTCC-like wastes consistent with ongoing practices.

W555-9 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further site-specific NEPA review as appropriate and be in accordance with applicable laws, regulations and agreements, and would involve local stakeholder involvement the DOE sites. The ongoing cleanup effort will continue.

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v. Peterson, 753 F.2d 754, 758 (9th Cir.1985), the court held that a logging project and a road to facilitate the logging had to be considered in a single EIS because "the timber sales could not proceed without the road, and the road would not be built but for the contemplated timber sales." The various nuclear waste disposal projects are interrelated and interdependent and will not proceed in a vacuum. These programs are improperly segmented in violation of NEPA. W555-13 (Cont.)

V. Conclusion

Due to the significant revisions that are required to correct the legal deficiencies in the NEPA analysis, the DEIS must be revised and recirculated for public review and comment. We thank you for considering these comments and look forward to the further NEPA review and analysis that is clearly warranted before these major federal actions can proceed.

Sincerely,

/s/
Loulena Miles,
Attorney and Board Member, Tri-Valley CAREs

and

/s/
Marylia Kelley
Executive Director
Tri-Valley CAREs

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

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W555-10 See response to W555-3.

W555-11 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

The action alternatives evaluated in the GTCC EIS did not include interim storage of GTCC LLRW and GTCC-like wastes until a geologic repository for spent nuclear fuel and high-level radioactive waste becomes available because such interim storage is outside the scope of the GTCC EIS. The purpose of the GTCC EIS is to evaluate the range of reasonable alternatives for the safe and secure disposal of GTCC LLRW and GTCC-like wastes. The No Action Alternative evaluates continued storage of GTCC LLRW and GTCC-like wastes consistent with ongoing practices.

W555-12 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

W555-13 DOE disagrees that its waste management strategies are "piecemeal" and that its waste disposal projects are improperly segmented. DOE's Programmatic Waste Management Environmental Impact Statement (WM PEIS, DOE-0200, May 1997), addressed its complex-wide waste management activities across the nation for five waste types: LLW, MLLW, HLW, TRU Waste, and Non-Wastewater Hazardous Waste. The WM PEIS did not consider commercial GTCC, however it recognized that DOE is responsible for such waste under the LLRWPA, and as such DOE would be developing strategies for such waste. The actions evaluated in the WM PEIS did not "trigger" actions related to GTCC waste, nor do the disposal alternatives evaluated in this Final GTCC waste "trigger" actions considered in the WM PEIS. DOE is not contemplating a change in its disposal decisions under the WM PEIS. DOE does intend to make site-specific disposal decisions under this Final GTCC EIS. In the absence of available commercial facilities for GTCC waste disposal as explained in Section S.2.6.8 of the EIS summary, DOE evaluated DOE sites suitable to host such disposal facilities, and these sites were all considered in the WM PEIS.

U.S. Environmental Protection Agency, Commenter ID No. L94

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 27 2011

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Arnold Edelman, EIS Document Manager
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Washington, DC 20585-0119

Dear Mr. Edelman:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, the Environmental Protection Agency (EPA) has reviewed the Department of Energy's Draft Environmental Impact Statement (EIS) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste (LLRW) and GTCC-Like Waste (CEQ 20110048). Our general comments are highlighted below with detailed comments enclosed for your consideration.

GTCC LLRW is radioactive waste that is generated by the Nuclear Regulatory Commission (NRC) or Agreement States licensees containing radionuclide concentrations in excess of the limits for Class C LLRW as identified in NRC regulations 10 CFR 61.55. For the purposes of this EIS, GTCC-like waste is DOE owned or generated LLRW and non-defense-generated transuranic radioactive waste that have characteristics similar to those of GTCC LLRW and for which there may not be a path for disposal. The Low-Level Radioactive Waste Policy Act of 1985 (amending the original 1980 Act) assigned the responsibility for the disposal of GTCC LLRW to the Federal Government; the Energy Policy Act of 2005 further assigned this responsibility to the Department of Energy (DOE).

DOE is proposing to construct and operate a new facility or facilities, or use an existing facility for the disposal of GTCC LLRW and DOE GTCC-like waste. The draft EIS analyzes impacts that would be associated with the construction, operation, and long-term management of a facility for the disposal of this waste. One disposal alternative considered is a geologic repository which was evaluated at the Waste Isolation Pilot Plant (WIPP), in New Mexico. The other alternative methods evaluated include an intermediate-depth borehole, an enhanced near-surface trench, and an above-grade vault. Each of these disposal methods were evaluated at the following locations: Hanford Site, Washington; Idaho National Laboratory (INL) Site, Idaho; Nevada National Security Site (NNSS), Nevada; and the Savannah River Site, South Carolina. The conceptual designs described in the draft EIS incorporate a number of engineering enhancements beyond those typically used in designs of LLRW disposal facilities. In addition, post-closure performance calculations were performed for long time frames (10,000 years or

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longer to determine peak annual doses) commensurate with the need to protect the general public for up to 10,000 years.

The draft EIS does not identify a preferred alternative. Instead, a preferred alternative will be determined after consultation with Congress, consistent with Section 631 of the Energy Policy Act of 2005 and then identified in the final EIS. The draft EIS acknowledges that once the site has been identified, a follow-on site-specific NEPA evaluation and documentation will be needed to ensure proper land use planning, assure protection of local ecological and cultural resources, and account for local variations by hydrology and geology to minimize potential waste migration. L94-1

EPA has worked closely with DOE as a cooperating agency and most of our concerns have been addressed through this process. However some clarification regarding the technical bases for the assumption of parameter values leading to faster transport of radionuclides in the subsurface and their relation to current disposal practices is recommended. For example, it may be useful to provide additional discussion of the performance history of the options so that the strengths and weaknesses and the expected degree of reliability for each alternative can be more readily assessed. Regarding the borehole disposal alternative, it may also be useful to discuss how site-specific impacts on the stability of the geologic formation from the installation of 930 boreholes to a maximum depth of 1,000 feet will be assessed. Depth and spacing of boreholes may need to be adjusted, as well as additional measures implemented to enhance stability. Flow of water through the deeper formations will also need to be evaluated. L94-2

In addition, the draft EIS has identified existing agreements (pages 1-31, 6-111, and 7-74) concerning the Hanford and INL sites. According to these agreements no, or limited amounts of, waste will be disposed of at these sites. More specifically:

- EPA has concerns with the potential selection of the Hanford site. The proposed site for the GTCC disposal facility at Hanford is close to the "200 Area." According to DOE's recent analyses in the Tank Closure and Waste Management EIS, this area has very high radionuclide and chemical contamination levels in the vadose zone, which can potentially lead to groundwater contamination well above drinking water standards. The primary contaminants of concern include Technetium-99 (Tc-99) and Iodine 129 (I-129), which are highly soluble in water. Disposal of additional waste near the 200 Area could exacerbate that contamination, especially in the event that the GTCC waste facility cover and engineered barriers fail in the longer term, allowing leaching to take place and radionuclide and chemical contamination to spread to surrounding soils and eventually to groundwater and the Columbia River. Current cleanup goals for the area include limiting additional contaminant releases to surface soils and the vadose zone and development of effective technologies to remove or immobilize the appropriate amount of existing contamination. Thus, the proposed disposal of GTCC waste does not appear to be consistent with the ongoing cleanup effort, given the amount of radionuclides already present in the area. As the draft EIS indicates, one means of mitigating that existing contamination impact would be for DOE to limit disposal of off-site waste streams to Hanford, at least waste containing Tc-99 and I-129 (p. 6-111). If this site is selected, L94-3

L94-1 A preferred alternative is not required to be included in a Draft EIS. The Council on Environmental Quality regulations in 40 CFR 1502.14(e) specify that the section on alternatives in an EIS shall identify the agency's preferred alternative or alternatives, if one or more exists, in the Draft EIS and identify such alternative(s) in the Final EIS unless another law prohibits the expression of such a preference; that is, a preferred alternative shall be identified in the Draft EIS if one exists. If no preferred alternative has been identified at the Draft EIS stage, a preferred alternative need not be included. By the time the Final EIS is filed, 40 CFR 1502.14(e) presumes the existence of a preferred alternative and requires its identification in the Final EIS unless another law prohibits the expression of such a preference.

DOE did not have a preferred alternative at the time of issuance of the Draft EIS because of the complex nature of the proposed action and the potential implications for disposal of GTCC LLRW and GTCC-like wastes. For public comment, the Draft EIS presented considerations for developing a preferred alternative in the Summary (in Section S.6) and in Section 2.9. As required by 40 CFR 1502.14(e), the Final EIS contains a preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes (see Section 2.10). In developing the preferred alternative, DOE took into consideration public comments on the Draft EIS, public EIS scoping comments, and other factors identified in Sections S.6 and 2.9 of the EIS.

L94-2 The fate and transport of radionuclides in the subsurface is dependent on a number of factors many of which exhibit a wide range of values for the sites evaluated in this EIS. The evaluation in the GTCC EIS made use of site-specific fate and transport values provided by each site and therefore, the evaluation results should distinguish each site relative to potential fate and transport of the nuclides in the GTCC LLRW and GTCC-like waste inventory. However, the designs were intended to allow comparisons among sites and as such, the same input values were assumed for all the sites to evaluate performance of the land disposal facilities over a 10,000 year period. These assumptions address aspects such as longevity of the engineered barriers (disposal facility covers, liners) and effectiveness of grouting materials placed to solidify the waste keeping them in place. Appendix E of this EIS presents a detailed discussion of the evaluation and assumptions.

The conceptual nature of these configurations takes into account the characteristics of all of the disposal sites for which they were considered, but their designs (e.g., depth and spacing of boreholes) could be altered or enhanced, as necessary, to provide an optimal solution at a specific location. Note that the depth of boreholes evaluated was 130 ft (40 m), not 1,000 ft, which would make a significant difference in terms of stability relative to borehole spacing. As discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. At any potential site identified in a ROD, DOE would conduct additional studies to confirm the most suitable location of the facility, most optimal technology, and other factors which would involve site-specific NEPA as appropriate.

L94-3 DOE has considered cumulative impacts at the Hanford Site in this GTCC EIS. The disposal of GTCC LLRW and GTCC-like waste at the Hanford Site could result in environmental impacts that may warrant mitigation for Tc-99 and I-129 through limiting receipt of these waste streams (see Table 6.2.4.2 and Figure 6.2.4.1 in this EIS).

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

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contamination impact would be for DOE to limit disposal of off-site waste streams to Hanford, at least waste containing Tc-99 and I-129 (p. 6-111). If this site is selected, EPA recommends that the final EIS include information addressing groundwater contamination remedial activities that would meet Washington State Model Toxics Control Act (MTCA), EPA, and tribal standards for drinking and surface water quality. L94-3 (Cont.)

- EPA also has significant concerns with the potential selection of the INL site. At the INL site, the proposed GTCC facility would be near the existing Advanced Test Reactor Complex and the Big Lost River, and would also be located over the Snake River Plain Aquifer. This aquifer is the sole source of drinking water for nearly 200,000 people in southeast and south central Idaho (p. 7-18). Past waste disposal practices at INL have created plumes of radiochemical contamination within the aquifer. We are also concerned with the transport characteristics of this site. As presented, the assumptions of parameter values lead to a faster transport of radionuclides in the subsurface. As a result, they far exceed the values of the other alternatives. For this reason, as noted in the detailed comments attached, the technical bases that were assumed in the analysis of this site and their relation to current disposal practices should be clarified in the final EIS. L94-4

Based on the above information and issues associated with the disposal alternatives presented, we have rated the action alternatives as Environmental Concerns/Insufficient Information (EC-2), (see enclosed "Summary of EPA Rating System"). The "EC" rating is based on the potential for adverse impacts to surface water and groundwater resources. The "2" rating is based on the need to present information to fully assess the environmental impacts from the proposed action.

We appreciate the opportunity to review and comment on this document. If you have any further questions you may contact me at (202) 564-5400. You may also call my staff point of contact, Marthea Rountree. She can be reached at (202) 564-7141.

Sincerely,

Susan E. Bromm

Susan E. Bromm
Director
Office of Federal Activities

Enclosures (2): Detailed Comments
Summary of EPA Rating System

L94-4 The INL site analysis, as was the case for the other DOE sites, used site-specific information provided by technical staff to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. As provided in Appendix E, fate and transport parameters utilized in the estimations were based on site-specific (information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. However, DOE recognizes that additional project- and site-specific information would be necessary to inform the implementation of a disposal facility at a given location at INL.

U.S. Environmental Protection Agency, Commenter ID No. L94 (cont'd)

Environmental Protection Agency
Draft Environmental Impact Statement
Detailed Comments
Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste ((DOE/EIS-0375-D)

General

Because construction of the waste disposal facility would disturb more than one acre (up to 110 acres), the project will require a National Pollutant Discharge Elimination System permit for construction activities. For this reason, DOE should consider use of Low Impact Development (LID) techniques during construction activities to reduce stormwater impacts, including contaminated runoff and sediments that would discharge to local streams. L94-5

Chapter 1 – Introduction

Waste Inventory:

In estimating the inventory of waste, the draft EIS does not appear to address the potential application of the "waste incidental to reprocessing" (WIR) process at West Valley. The WIR process allows DOE to re-consider whether waste previously considered to be high-level waste can be re-categorized as low-level waste or transuranic waste (TRU). The draft EIS takes an appropriately conservative approach by assuming that any waste exhumed from the NRC- and State-licensed Disposal Areas (NDA/SDA) at the West Valley site will be GTCC or "GTCC-like" waste. However, it should treat the potential application of the WIR process at West Valley in a manner consistent with the *Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (West Valley EIS, DOE/EIS-0226).

Table 3-20 of the West Valley EIS estimates that application of the WIR process could result in generation of an additional 160 cubic meters of low-level waste and 150 cubic meters of TRU waste from current site activities (not including implementation of alternatives in the EIS). Table 4-47 estimates that, if the Sitewide Removal Alternative is selected as the Phase 2 decommissioning alternative, an additional 210 cubic meters of low-level waste and 280 cubic meters of TRU waste could be generated. Thus, application of the WIR process could result in generation of an additional 370 cubic meters of low-level waste and 330 cubic meters of TRU waste. The combined volume of 700 cubic meters represents approximately 6% of the waste volume considered in the draft EIS. Volumes of high-level waste would be reduced by corresponding amounts. L94-6

The West Valley site is unusual in the sense that waste resulting from the reprocessing activities could be considered either DOE-origin or commercial-origin, and DOE-origin waste may not be attributable to defense activities. If the assumption is that any WIR

L94-5 Once a ROD is issued, the design of a new facility or the use of an existing facility will address specific regulatory requirements, (e.g., need for an NPDES permit) and will also incorporate sustainable design and use of low impact development techniques during construction to reduce impacts (Refer to Section 1.3).

L94-6 GTCC EIS includes an estimate of potential GTCC LLRW and GTCC-like wastes at the West Valley Site including WIR. This information was provided by the DOE West Valley Site Office as referenced in the *Supplement to Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste Inventory Reports ANL/EVS/R-10/1, Oct. 2010* (as shown in the data call reference, Bohan, C., 2008a, *GTCC Data Call — Updated Table and Report,* email with attachments). Consistent with the *Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (DOE/EIS-0226), the GTCC EIS assumes TRU waste resulting from a future WIR determination is included in the GTCC EIS inventory as that waste is assumed to be non-defense in origin for the purposes of the GTCC EIS analysis. LLW resulting from a future WIR determination is not included in the GTCC EIS inventory because there would be an existing disposal path. As indicated in Table B-3 in Appendix B of the GTCC EIS, the estimated volume of West Valley waste analyzed in the GTCC EIS is less than those presented in the Final EIS for the West Valley Site because the GTCC EIS assumes volume reduction prior to disposal.

Characterization information for the GTCC LLRW and GTCC-like wastes currently in storage at the West Valley Site is sufficient for the analysis conducted for the GTCC EIS. The inventory of GTCC LLRW for the West Valley Site that may be generated in the future could increase or decrease from the amount assumed in the GTCC EIS, based on the decisions made regarding the disposition of portions of the site, updated characterization information (including the WIR process), and compliance with applicable regulatory requirements.

U.S. Environmental Protection Agency, Commenter ID No. L94 (cont'd)

waste would be non-GTCC low-level waste or defense-origin TRU, in which case it can be accepted at the WIPP, this should be clearly stated. The final EIS should explain how the WIR process is taken into account in deriving waste estimates for the West Valley site. L94-6 (Cont.)

Disposal Alternatives:

It may be useful to provide additional discussion of the performance history of the options so that the reader can more readily assess the strength and weakness of each option and what degree of reliability may be expected. As indicated on page 1-23, the vault design is similar to one employed at SRS. However, there is no information for the reader to judge whether it has performed as desired. How do the "enhanced" trench designs compare to those in use at other sites, and in particular to those known to have failed? L94-7

Regarding the borehole disposal alternative, it may also be useful to discuss how site-specific impacts on the stability of the geologic formation from the installation of 930 boreholes to a maximum depth of 1000 feet will be assessed. Depth and spacing of boreholes may need to be adjusted, as well as additional measures implemented to enhance stability. Flow of water through the deeper formations will also need to be evaluated.

Chapter 3 – No Action Alternative

West Valley Site:

In evaluating the No Action Alternative, the draft EIS does not appear to address the implications of GTCC and TRU waste remaining at the West Valley site as a result of selection of the Sitewide Close-in-Place Alternative for Phase 2 of site decommissioning. The West Valley EIS estimates that the Sitewide Removal Alternative will generate 4,200 cubic meters of GTCC low-level waste and 1,000 cubic meters of TRU waste (Section 2.4.1.5). However, Phase 1 of the Phased Decisionmaking Alternative is estimated to generate only 710 cubic meters of TRU waste and no GTCC waste (Section 2.4.3.6). This implies that 4,200 cubic meters of GTCC low-level waste and 290 cubic meters of TRU waste will remain at the site if the Sitewide Removal Alternative is not selected for Phase 2 (the Sitewide Close-in-Place Alternative is estimated to generate negligible volumes of GTCC and TRU waste). Further, low-level waste in excess of 1 million cubic meters will also remain on site, some of which could be DOE-origin "GTCC-like" low-level waste. L94-8

The draft EIS estimates that exhumation of the NDA and SDA at West Valley will generate 4,300 cubic meters of GTCC low-level waste and GTCC-like waste (page 1-46). This appears to account for all of the GTCC low-level waste that could remain at the site, as only 31 cubic meters is estimated to be GTCC-like waste (page 1-19). Page 1-19 further states that, of the approximately 2,200 cubic meters of GTCC-like waste originating at West Valley, about 44% is in Group 2 (yet to be generated). It appears

L94-7 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2, each concept has its roots in practice at DOE sites. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail.

The conceptual nature of these configurations takes into account the characteristics of all of the disposal sites for which they were considered, but their designs (e.g., width, depth, cover depth, reinforced containment) could be altered or enhanced, as necessary, to provide an optimal solution at a specific location. As an example, the cover depth could be adjusted to ensure that roots from vegetation would not compromise the top of the engineered barrier. In addition, the dimensions of the generic land disposal units (e.g., trench - width and depth, borehole – diameter and depth, vault – width, depth, and height) were selected based on similar existing facilities, existing equipment and methods for construction, and optimized (maximized waste volume disposed of for a given disposal unit volume; simple waste handling procedures to minimize exposure) for the types of waste packages considered. All designs could also accommodate different disposal packages (existing and proposed) with minor variations in their dimensions, but the EIS analyses would remain relevant for each option considered.

For example, if borehole disposal at NNSS became a preferred alternative, any capacity in the existing boreholes would have been considered in follow-up studies. For an above-grade vault with a 5 m cover, long-term impacts from the above-grade vault as determined by modeling for the EIS would be expected to be similar to those for a vault set lower with respect to grade, including with the top of the vault at or below grade, except in the case where the bottom of the waste confinement was closer to the groundwater table. For any disposal option, the bottom of any disposal unit would not be located at or below the water table to exclude the chance of groundwater migration into the disposal unit. Actual implementation of a disposal option at a specific location at a given site may have to be modified (i.e., the depth of a trench or a borehole may need to be reduced to avoid groundwater issues).

Past operational experience with these types of disposal facilities at DOE sites has shown that when properly implemented, they can provide isolation of radioactive waste from the environment for extended time periods. Past problems that have arisen with each option provide additional information to improve the design and performance of future land disposal facilities. Issues related to performance over time would be analyzed in a project-specific analysis to address technical and long-term concerns.

Note that the depth of boreholes evaluated was 130 ft (40 m), not 1,000 ft, which would make a significant difference in terms of stability relative to borehole spacing.

L94-8 The detailed implications of GTCC and TRU waste remaining at the West Valley site as a result of selection of the Sitewide Close in Place Alternative will be addressed under the Phase 2 site decommissioning study. Also, the impacts of storing TRU waste at West Valley are discussed in detail in the *Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (DOE/EIS-0226). Analysis done for the GTCC EIS indicate that the impacts of the No-Action alternative for NRC Region I (i.e., high dose estimates) is a direct reflection of the assumption that waste would reaming at West Valley (Refer to Section 3.5). Any further consideration of possible future actions at West Valley and the uncertainties associated with its waste inventory would be speculative at this time. Even though it is beyond the scope of this GTCC EIS, the comment is noted.

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then that all of the GTCC-like waste from decommissioning at West Valley will be TRU waste, which will not be generated by exhumation of the NDA and SDA.

Applicable regulations for disposal of GTCC low-level and TRU waste assume a greater degree of isolation than is provided by conventional near-surface disposal facilities like the NDA and SDA (10 CFR Part 61 and 40 CFR Part 191, respectively), as have the alternatives analyzed in the draft EIS. Recognizing that the decision on final decommissioning of the NDA and SDA will not be made before the final EIS is issued, the final EIS should address the long-term implications of leaving waste on site, with reference to the West Valley EIS as appropriate. The final EIS should also identify where and in what form TRU materials would remain at the West Valley site. L94-8 (Cont.)

Chapter 4 – WIPP.

Regulatory Structure:

Section 4.7 indicates that statutory changes would be necessary to allow disposal of waste other than defense-origin TRU waste at WIPP. It also recognizes the potential involvement of both EPA and NRC as regulatory authorities for underground disposal operations. This situation is further complicated by the fact that the waste considered in the draft EIS is itself covered under multiple regulations. The discussion on page 4-11 contrasts the requirements of 10 CFR Part 61 and 40 CFR Part 191 in pointing out that magnesium oxide (MgO) is placed on defense-origin TRU waste to satisfy the assurance requirements of 40 CFR Part 191, with the implication that this would not be necessary for GTCC disposal. However, non-defense TRU would still be subject to 40 CFR Part 191 and its assurance requirements. The final EIS should discuss how DOE views this overlap in regulation and how it proposes the overlap be addressed should disposal at WIPP be the preferred alternative. L94-9

Transportation:

Transportation impacts at WIPP need to be clarified and reconciled with Table 5.3.9-3, which shows radiological impacts to the public from severe transportation accidents. Because all remote-handled (RH) waste shipped to WIPP is assumed to be packaged in shielded containers to allow disposal as contact-handled (CH) waste, and fewer shielded containers can be included in any one shipment, there are more shipments overall than assumed for the other land disposal sites. It is clear that the larger number of shipments results in a proportionately greater number of miles travelled and therefore a greater number of accidents. It is also clear that shipping RH waste in shielded containers reduces the external exposure to those living or working along the transportation route, compared to the shipments of RH waste to the other land disposal sites. L94-10

However, impacts to the public should be similar for shipments of CH waste to WIPP or the other land disposal sites. In fact, page 4-72 (addressing impacts of transportation to WIPP) refers the reader to Section 5.3.9 for "transportation impacts for CH shipments." Page 5-85 notes that, for severe accidents, "estimated population doses and associated latent cancer fatalities (LCFs) were higher for the sealed sources and Other Waste-CH

L94-9 DOE acknowledges that the WIPP LWA as amended (P.L. 102-579 as amended by P.L. 104-201) limits disposal at WIPP to defense generated TRU waste. The use of WIPP was included as an alternative in the EIS because the use of this repository for GTCC LLRW and GTCC-like wastes is a reasonable approach. To protect public health and the environment, DOE intends to dispose of GTCC-like waste on the basis of its radiological and physical characteristics. It is recognized that WIPP cannot be used for the GTCC LLRW and GTCC-like waste inventory addressed in the EIS under current law. However, GTCC LLRW and GTCC-like wastes having characteristics similar to those of the defense-generated TRU wastes that are currently being disposed of at WIPP would be expected to be managed in a manner that is generally comparable to that used for defense-generated TRU wastes, to comply with 10 CFR Part 61 to ensure the health and safety of the general public for the long term.

Although WIPP is not currently authorized to dispose of GTCC LLRW and GTCC-like wastes, NEPA does not preclude DOE from considering WIPP as a reasonable alternative for disposing of GTCC LLRW and GTCC-like wastes. The need for legislative modifications to enable WIPP to be used for the disposal of GTCC LLRW and GTCC-like wastes is identified and discussed in the EIS.

L94-10 Direct comparison of the accident risks in Tables 4.3.9-1/4.3.9-2 with the accident consequences in Table 5.3.9.3-3 is not meaningful because the accident risks in Tables 4.3.9-1/4.3.9-2 include factors related to the distance traveled, accident probabilities, release fractions, and weather conditions as discussed in Appendix C, Sections C.9.3.1 and C.9.4.3.

Text has been added to Section 5.3.9.3 to clarify that the accident consequence impacts presented in Tables 5.3.9-3 and 5.3.9-4 correspond to shipments bound for near-surface disposal facilities and that impacts for similar shipments going to WIPP (activated metal shipments and remote-handled Other Waste packaged as contact-handled shipments) would be approximately a factor of three smaller because the packages assumed for the WIPP shipments have approximately one-third the capacity of those assumed for the near-surface disposal facility shipments.

Dose rates for rail shipments are approximately double those for truck shipments when using the same type of shipping containers as discussed further in Section C.9.4.4 and shown in Table C-9. However, AMCs would be shipped in Type B casks such as the 3-60B truck cask or the NAC UMS rail cask (see Table B-9 and discussion in Section B.1.5.2). The NAC UMS rail cask is approximately twice the size of the 3-60B truck cask. As identified in Table B-10, only one AMC could be accommodated in a truck cask and about four in a rail cask. Thus, while the rail cask may contain more AMCs, the dose rate could be approximately double that for the truck cask because of the relative sizes of the truck and rail casks, the loading configuration within the rail cask and the heavier shielding. A similar argument can be made for shipment of the h-SAMCs.

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than for the activated metals and Other Waste-RH because they had higher amounts of alpha-emitting radionuclides, which are more of an inhalation (internal) hazard." Tables B-11 and B-12 indicate that the same number of shipments and same type of packaging are projected for the sealed source and Other Waste-CH categories, regardless of their destination. This suggests that the projected impacts of a similarly severe accident should also be comparable, if not identical.

Comparison of the "accident" column in Tables 4.3.9-1 and 4.3.9-2, which show population risks from transportation to WIPP by truck and rail, respectively, with Table 5.3.9-3 does not show consistency in either projected dose or risk for the CH waste categories. Table 5.3.9-3 shows that projected LCFs for sealed sources are generally higher than 1, with collective doses generally above 1,000 person-rem. The "accident" figures in Tables are all well below 0.1.

Several points should be clarified for the final EIS, including the meaning of the "accident" column in Tables 4.3.9-1 and 4.3.9-2 and the applicability of Table 5.3.9-3 to transportation to WIPP. Further, the statements on page 4-67 and 5-83 that "[d]ose rates for rail shipments are approximately double those for truck shipments because rail shipments are assumed to have twice the number of waste packages as corresponding truck shipments" is incorrect, particularly as it applies to shipments to WIPP. As shown in Table B-10, activated metal canisters (AMCs) and half-shielded activated metal canisters (h-SAMCs) have ratios of rail:truck of 4:1 and 3:1, respectively. These waste packages make up a significant proportion of the overall transportation. As a result, as shown in Tables B-11 and B-12, the rail:truck ratio for the other land disposal sites is about 2.5:1, while the ratio for shipments to WIPP is nearly 3:1 (because h-SAMCs are used for other types of RH waste as well as activated metals). L94-10 (Cont.)

Waste Generation Period:

On page 4-1, line 26, it is assumed that the underground facilities will remain functional during the period projected for disposal of GTCC waste. This needs further explanation. The projected period ranges between the years 2019 and 2083 and it would be helpful to know the basis and details of the assumptions made for functionality. The properties of salt, creep rate, and the rate of deterioration should be included. It would also be helpful to mention what precautionary measures would be undertaken to maintain functionality if WIPP is selected as the site for GTCC disposal. The influence of creep closure is visible in the drift areas which have been open more than 30 years. This is a function of age of the structure and requires secondary or tertiary support to remain operational. L94-11

For completeness and better understanding of the operation procedure (which influences the EIS) the following topics should be considered in section 4.1.3.

- Mining method – the Room and Pillar type of mining method is used in WIPP underground. This has the advantage of safety and keeping the excavations open for longer period. The lower mining ratio is an important issue to consider for stability.

L94-11 As discussed in Section 4.1.4.1, a conceptual location within WIPP was analyzed as a potential alternative. The exact locations and orientations of these rooms would be determined on the basis of mining engineering, safety, and other factors should this alternative be selected. Therefore, a detailed discussion of the mining method and mining ratio and its effects are not required in this EIS and are not significant factors in the EIS impacts analyses. In addition, the proposed change for panels 9 and 10 has not been approved by the EPA or the NMED and should not be included in the EIS. The current certified baseline is what is described in the EIS.

The DOE has always maintained that borehole plugs, panel closures and shaft seals are engineered barriers that meet the definition of 40 CFR 194.44. This position is stated in the CCA Section 3.3. It is the EPA who determined that panel closure shaft seals and borehole plugs are not engineered barriers in their compliance determination for 40 CFR 194. EPA stated in CARD 44, "For compliance with this requirement [40 CFR 194.44], EPA did not evaluate panel seals, shaft seals or borehole plugs. EPA considered these items to be features of the disposal system design and evaluated them in that context." The text in the EIS is correct as written.

The DRZ is discussed in Section 4.1.3. The clay seams and marker beds are assumed to be fractured within the DRZ such that they have the same properties as the DRZ in the PA grid above and below the excavations (but not MB138). The properties of the DRZ are assumed to be homogeneous. The DRZ is considered differently for the panel closures and in a different way again for the shaft seals. The impact of the clay seams and the anhydrite fracture model on the DRZ was not discussed because it was considered beyond the scope of the EIS.

The October 2014 EPA Final Rule on the DOE proposed panel closure redesign was documented in the federal register notice (Volume 79, No. 195, Wednesday October 8, 2014) and based on the EPA technical review of the proposed panel closure redesign, EPA concluded that WIPP would continue to comply with the long term (i.e., 10,000 year compliance time frame after final facility closure) radioactive release standards. However, the primary purpose of a panel closure design is to meet the NMED, WIPP Hazardous Waste Facility Permit closure requirements for the operational period (prior to final facility closure). A panel closure is designed to provide assurance in terms of Resource Conservation Recovery Act (40 CFR 264.110 Subpart G – Closure and Post Closure), that the limit for the migration of hazardous constituents, volatile organic compounds (VOCs), during the operational time frame will be met at the point of compliance, which is the WIPP Land Withdrawal boundary. NMED will have to determine, through a well-defined regulatory review process (i.e., 40 CFR 270.42), the adequacy of a panel closure redesign to meet the primary panel closure design criteria which is to prevent the migration of hazardous VOCs in the air pathway in concentrations above health-based levels beyond the WIPP Land Withdrawal boundary during the operational time frame. NMED will first need to approve the adequacy of the panel closure redesign prior to implementation.

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- Reference to the dimension of the excavations and shape of the opening should be provided. This is a factor for safety and can influence environmental and human impacts.
- In addition, a very brief mention about the nature of the support system can be added here for consideration of safety.
- The proposed changes regarding the Panels 9 and 10 need to be mentioned here and the statements on line 15-17 should be clarified. L94-11 (Cont.)
- In the WIPP certification, MgO is the only design feature actually claimed by DOE as an engineered barrier; while the other engineered features described in lines 34-44 could potentially act as engineered barriers, they are not identified as such by DOE.
- A mention about the extent and influence of the existing fractures and clay layers in the disturbed rock zone (DRZ) would be helpful.

Geology and Soils:

In Section 4.2.2, Geology is limited to stratigraphy and physiography. A thorough investigation of geological and hydrological issues is required in selection of a potential site for disposal. Although stratigraphy is an important aspect of geology, suitability of a site primarily depends upon the lithologic characteristics, which include strength of the materials and other physical characteristics. A brief mention of these (shear strength, etc.) should be included in the final EIS. L94-12

In describing the Salado Formation on page 4-22, the final EIS should include the non-homogeneities which are important issues for waste disposal. The anhydrite layers – Master beds should be mentioned. The weak clay zones for shearing are a factor for stability.

Chapter 5 – Elements Common to Alternatives 3, 4, and 5

Page 5-29 of the draft EIS indicates that EPA's Federal Guidance Reports 11 and 12 contain dose conversion factors based on International Commission on Radiological Protection (ICRP) Publications 26 and 30. The draft EIS also states that dose conversion factors (DCFs) developed by ICRP in Publication 72 were used for the current analyses. The final EIS should highlight that EPA has included DCFs based on ICRP 72 in its CD supplement to Federal Guidance Report No. 13, *Cancer Risk Coefficients for Environmental Exposure to Radionuclides*, which can be found at http://www.epa.gov/radiation/federal/techdocs.html. L94-13

Chapter 7 – INL

Transport Characteristics:

Although Table E-4 indicates that the selection of distribution coefficient (K_d) values at INL was based on site-specific recommendations, some attention should be given to how this conservative assumption compares to the disposal practices at the Radioactive Waste Management Complex (RWMC). Near-surface disposal is being performed at the L94-14

L94-12 The analysis of lithologic characteristics is an activity that would normally be performed after site selection. In the case of an operating facility such as WIPP, this type of characterization is available in its Compliance Certification Application (http://www.wipp.energy.gov/library/CRA/BaselineTool/Documents/CRA%20-%202004/Chapters/Chapter%202.pdf).

Text has been added to section 4.2.2.1.3 related to the Salado Formation.

L94-13 Text was added to Section 5.2.4.3 to reflect the availability of the dose conversion factors based on ICRP 72.

L94-14 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2, each concept has its roots in practice at DOE sites. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail. The INL site analysis, as was the case for the other DOE sites, used site-specific information provided by technical staff to the extent it was available, and conservative assumptions were used to fill any remaining data gaps.

If INL were identified as a host site in a ROD for GTCC disposal, a thorough investigation of current practices at the RWMC would be used to customize the disposal technology to a specified location on the site. Such an investigation would involve site-specific NEPA as appropriate.

U.S. Environmental Protection Agency, Commenter ID No. L94 (cont'd)

RWMC. The final EIS should address the similarity of technology used at the RWMC to the borehole, trench, and vault technologies evaluated in the EIS, and should also compare the K_d assumption to the values used to authorize disposal at the RWMC. The draft EIS indicates that tritium and strontium plumes are present in the area of the reference location, but attributes these to past practices of disposal of liquids. This comparison will help the reader evaluate whether the magnitude of the projected doses are reflective of INL as a whole, or the reference location in particular. L94-14 (Cont.)

Projected Peak Doses:

Some explanation should be provided as to why the projected doses from C-14, Tc-99, and I-129 should be significantly lower for the borehole technology as compared to the trench and vault. The draft EIS notes that these radionuclides will reach the designated receptor sooner because the disposal facility is constructed deeper, and therefore is closer to the ground water. However, this does not necessarily explain why in Figure 7.2.4-1 the peaks for the trench and vault technologies are steep and sharp, while the peak for the borehole technology is shorter and more spread over time. This pattern is also noted at other sites (e.g., Figure 8.2.4-1 for LANL). A possible explanation is that the depth and diameter of the borehole only allows a slower release of radionuclides from the upper portion of the borehole, whereas both the trench and vault are more amenable to an overall flushing of radionuclides once failure and infiltration occur. This would suggest that the borehole peak would be more spread over time, as radionuclides gradually make their way into the ground water. The final EIS should address this finding. L94-15

L94-15 Additional discussion of the modeling assumptions and their influence on the dose results was added to Section 7.2.4.2. The travel times for radionuclides to reach the groundwater table are shorter for the borehole disposal method than for the trench and vault disposal methods because the bottom of the boreholes will be located closer to the groundwater table than the bottoms of the trenches and vaults. The peak doses for the borehole method were estimated to be smaller than those for the vault and trench methods because the footprint of a borehole disposal facility would be larger than that of a vault or trench disposal facility. As a result, the distance that the majority of the contamination needs to travel, after arriving at the groundwater table, to reach an offsite well located at 100 m from the edge of the disposal facility, would be greater for the borehole method than that for the vault or trench method (although the leading edge of the contamination for the borehole method would arrive first). The larger disposal area and also the greater distance for a majority of the contamination would result in greater dilution in the groundwater concentrations, and consequently, would yield smaller peak doses.

U.S. Environmental Protection Agency, Commenter ID No. L94 (cont'd)

SUMMARY OF EPA RATING SYSTEM

Rating the Environmental Impact of the Action

- **LO (Lack of Objections)** The review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposed action.

- **EC (Environmental Concerns)** The review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact.

- **EO (Environmental Objections)** The review has identified significant environmental impacts that should be avoided in order to adequately protect the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The basis for environmental objections can include situations:

  1. *Where an action might violate or be inconsistent with achievement or maintenance of a national environmental standard;*
  2. *Where the Federal agency violates its own substantive environmental requirements that relate to EPA's areas of jurisdiction or expertise;*
  3. *Where there is a violation of an EPA policy declaration;*
  4. *Where there are no applicable standards or where applicable standards will not be violated but there is potential for significant environmental degradation that could be corrected by project modification or other feasible alternatives; or*
  5. *Where proceeding with the proposed action would set a precedent for future actions that collectively could result in significant environmental impacts.*

- **EU (Environmentally Unsatisfactory)** The review has identified adverse environmental impacts that are of sufficient magnitude that EPA believes the proposed action must not proceed as proposed. The basis for an environmentally unsatisfactory determination consists of identification of environmentally objectionable impacts as defined above and one or more of the following conditions:

  1. *The potential violation of or inconsistency with a national environmental standard is substantive, and/or will occur on a long-term basis;*
  2. *There are no applicable standards but the severity, duration, or geographical scope of the impacts associated with the proposed action warrant special attention; or*
  3. *The potential environmental impacts resulting from the proposed action are of national importance because of the threat to national environmental resources or to environmental policies.*

Adequacy of the Impact Statement

- **Category 1 (Adequate)** The draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

- **Category 2 (Insufficient Information)** The draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the proposal. The identified additional information, data, analyses, or discussion should be included in the final EIS.

- **Category 3 (Inadequate)** The draft EIS does not adequately assess the potentially significant environmental impacts of the proposal, or the reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. This rating indicates EPA's belief that the draft EIS does not meet the purpose of NEPA and/or the Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS.

U.S. Nuclear Regulatory Commission, Commenter ID No. L8

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 11, 2011

Mr. Arnold Edelman, EIS Document Manager
U.S. Department of Energy
GTCC EIS
Cloverleaf Building, EM-43
1000 Independence Ave, SW
Washington, DC 20585

SUBJECT: COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE DISPOSAL OF GREATER-THAN-CLASS C (GTCC) LOW-LEVEL RADIOACTIVE WASTE AND GTCC-LIKE WASTE

On February 25, 2011, the U.S. Department of Energy (DOE) published a notice in the *Federal Register* (76 FR 10574) announcing the availability of the "Draft Environmental Impact Statement (DEIS) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste" for public review and comment. As a commenting agency, the U.S. Nuclear Regulatory Commission (NRC) offers the enclosed remarks for consideration by DOE. At a later date, the NRC will also submit its perspective on the four topics identified in the February 16, 2011 letter from Ms. Christine Gelles to Mr. Larry W. Camper.

In the interim, NRC staff will remain available to answer any questions related to the Commission's regulations, guidance, and other regulatory concerns. The NRC appreciates the opportunity to provide comments on the DEIS. Should you have any questions, please contact Janelle Jessie, my staff representative, at (301) 415-6775.

Sincerely,

Andrew Persinko

Andrew Persinko, Deputy Director
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

U.S. Nuclear Regulatory Commission, Commenter ID No. L8 (cont'd)

U.S. Nuclear Regulatory Commission—General Comments on the Draft Environmental Impact Statement for the Disposal of Greater Than Class C (GTCC) Low Level Radioactive Waste and GTCC-Like Waste

The U.S. Nuclear Regulatory Commission (NRC) is cognizant of its potential role as the licensing authority for the U.S. Department of Energy's (DOE) greater-than-class C (GTCC) low-level radioactive waste (LLW) disposal facility. For this reason, the NRC has elected to participate as a commenting agency for DOE's Draft Environmental Impact Statement (DEIS) for the disposal of GTCC and GTCC-like LLW. Recognizing this role, the NRC identified several general issues as well as a number of section-specific issues in the DEIS. Some comments relate to the adequacy of technical information which NRC may need to make a licensing decision while others address the need for additional information or further clarification. Most of these comments are offered as examples and this document should not be considered an exhaustive list of information needed to support a license application and its review.

NRC Non-Section-Specific Comments

1) The document contains a large number of assumptions for which no basis is provided. This compromises the rigor of the impact analyses. Going forward, a thorough basis should be provided for all assumptions and conclusions. L8-1

2) The GTCC DEIS discusses disposal of both GTCC waste generated by NRC licensees and "GTCC-like" waste generated by DOE. Section 3(b)(2) of the Low Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) requires that all Section (3)(b)(1)(D) waste that results from NRC licensed activities be disposed of in a facility licensed by the NRC. This section does not grant NRC the authority to license and regulate disposal of DOE generated or owned GTCC-like waste. If DOE decides to operate a facility that disposes of both DOE and commercially generated waste, NRC would license the portion of the facility that handles commercially generated waste. However, the specific issues associated with licensing a combined facility will depend on the preferred alternative selected by DOE. L8-2

3) DOE should consider including an evaluation of the most likely combination of the alternatives, as well as their impacts, in the Final Environmental Impact Statement documenting selection of an alternative. L8-3

4) A discussion of impacts from "Intentional Destructive Acts" should be included for all of the alternatives. If this discussion is not added, DOE should explain why this discussion is not necessary for the alternatives where the discussion is omitted. L8-4

5) In the DEIS, accidents are discussed for each of the proposed alternatives with the exception of the "No Action" Alternative. A discussion of accidents for the "No Action" Alternative should be included or a justification for why it's not needed should be provided. L8-5

6) A detailed description and evaluation of the potential environmental impacts should be presented for each affected resource. L8-6

Enclosure

L8-1 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

DOE believes that 500 years is a reasonable time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

L8-2 DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process. DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. DOE acknowledges that the LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for

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7) A brief discussion of mitigation for the long-term impacts of the "No Action" Alternative should be provided. L8-7

8) A discussion of both: (1) impacts of an alternative on climate change; and (2) impacts of climate change on an alternative should be provided for all of the alternatives, including the "No Action" Alternative. Additionally, this evaluation should use the same parameters for each alternative. If the same parameters are not used, a basis for that decision should be provided. L8-8

9) For each alternative, a brief description of transportation routes and modes for conveying construction materials to the facility should be included. L8-9

NRC Section-Specific Comments

1) DOE DEIS:
Section 1.4.2.3.1, Page 1-23: *"Wastes would be contained in packages designed to retain their integrity for an extended time period, and these wastes would be carefully emplaced into the trenches."*

Section 5.1.4.3, Page 5-18: *"For wastes like activated metals and sealed sources, which mostly contain radionuclides with shorter half-lives, the EIS does not assume grouting would be required because of the waste form."*

NRC Comment:
Waste container and packaging are an important part of disposal, but little information is presented. Table 5.1-3 on pages 5-3 to 5-4 lists the container type, but additional information should be included in the assessments of the alternatives including composition of the container materials, container thickness, and the potential physical and chemical processes that could affect contaminant release. Since the release rate at the source term is usually a significant component of any assessment, specific information should be included on the contents of the containers, in addition to the waste. "Other Waste" will be embedded in mortar, but it is not clear that the activated metals and sealed sources will be embedded in a sandy backfill or mortar, or if waste will be the only material within the containers. L8-10

2) DOE DEIS:
Section 1.4.2.3.2, Page 1-23: The above-grade vault design is "*...similar to a belowground vault option for LLRW disposal (Denson et al. 1987) that was previously investigated by the U.S. Army Corps of Engineers (USACE). A similar concrete vault structure is currently in use for the below-grade disposal of higher-activity LLRW at SRS (MMES et al. 1994)...*"

NRC Comment:
A brief rationale should be given for excluding the below-ground vault design. L8-11

GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

L8-3 DOE evaluated each of the proposed sites and methods individually including the entire inventory of GTCC LLRW and GTCC-like waste. This approach bounded the analysis by presenting the maximum environmental consequences of the proposed action. The potential environmental consequences of the preferred alternative are also presented in the Final EIS (Section 2.10). The preferred alternative includes a combination of waste types and methods.

L8-4 The analysis of intentional destructive acts is given in Section 2.7.4.3 of the EIS. This analysis provides a perspective on the risks that the GTCC LLRW and GTCC-like wastes could pose should such an act occur. In general, the risk presented from an intentional destructive act is similar to that from a high-severity transportation accident. The accident consequence assessment (given in Section 5.3.9.3 of the Final EIS) presents the results for transportation accidents that fall into the highest severity category. The severe environment that occurs under such conditions can be considered to be similar to that which could be initially instigated by an act of sabotage. In highly populated areas, where the highest exposures would be anticipated, a rapid response would be expected, minimizing the amount of time available to fully breach a Type B package. Should such shipments be diverted and the radioactive material removed for dispersion, higher exposures could be achieved, and potential impacts could be significant. The economic impact could reach several billions of dollars. The extent of the impacts would depend on the exact location of the release, density of the surrounding population, local meteorology, and emergency response capabilities in the affected area. In addition, the final transportation routes will not be selected until a ROD for the EIS is issued and follow-up site-specific NEPA review is conducted as needed.

L8-5 Impacts from accidents or theft/intrusion were not performed for the No Action Alternative because, as stated in Chapter 3 of the GTCC EIS, GTCC LLRW was assumed to be managed consistent with the existing NRC licenses. In general, these impacts would be comparable to those in the accident consequence analyses conducted for facilities and transportation but possibly occur at a higher frequency because of a lower overall level of security.

L8-6 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated. Reasonably foreseeable future scenarios at the sites evaluated may be different from the hypothetical resident farmer scenario considered in the GTCC EIS. Follow-on site-specific NEPA review would be conducted by using additional site-specific information, if available. This information could include sensitive subpopulations and specific pathways of exposure for American Indians. In a similar fashion, additional cumulative impacts analyses would be conducted by using additional site-specific information when the location selected for a GTCC LLRW and GTCC-like waste disposal facility was determined. All environmental resources areas discussed in Chapter 2 and listed in Figure 2-1 were included in the evaluation.

L8-7 The No Action Alternative is evaluated in detail in the EIS as required by NEPA (Chapter 3). A mitigation plan is not required under the No Action Alternative. The long-term storage of GTCC LLRW is subject to NRC and Agreement state requirements.

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3) **DOE DEIS:**
Section 1.5.2, Page 1-44: *"Data on the GTCC LLRW that might be generated by the concentration and consolidation of Class B and Class C LLRW are difficult to ascertain at this time because of the speculative nature of these events. The uncertainty that would be introduced in the EIS process by including this potential volume is not warranted."* L8-12

NRC Comment:
It would be helpful to include additional details supporting the determination that a discussion of the concentration of Class B and C LLRW is not warranted.

4) **DOE DEIS:**
Section 1.8, Pg 1-48 (Tribal Consultation): In the DEIS, only 14 American Indian tribal governments for four of the sites being analyzed were consulted.

NRC Comment:
Consultations with American Indian tribal governments were limited in that they were not conducted for SRS, WIPP vicinity, or the other generic regional locations. Justification should be provided in the DEIS as to why consultations were only conducted for the four sites: Hanford, INL, LANL, and NNGS. L8-13

5) **DOE DEIS:**
Section 2.0, Page 2-2: *"The impact analysis for the decommissioning phase has not been included in this EIS but would be conducted at a later time, as appropriate."*

NRC Comment:
A comparison of decommissioning impacts would be useful in selecting an alternative. For example, an additional 4,300 m^3 (150,000 ft^3) of GTCC LLRW and GTCC-like wastes could be generated by the exhumation of the Nuclear Decommissioning Authority and State-Licensed Disposal Area at the site as part of future decommissioning activities. Exhumation would be an action within the scope of Alternatives 2, 3, 4, and 5, and as such, should be part of the assessment and included in the impact discussions for these alternatives. This would apply to all "Other Waste" that requires exhumation and transportation to a potential GTCC facility. The "No Action" Alternative would not require such an assessment. L8-14

6) **DOE DEIS:**
Section 2.6, Page 2-9: *"[T]he NOI for the GTCC EIS also identified the Oak Ridge Reservation (ORR) as a site to be evaluated for potential disposal of GTCC waste by using a land disposal method because of its ongoing waste disposal mission. However, disposal of radioactive waste at the ORR is currently limited to only CERCLA wastes. Through further reviews conducted by the Low-Level Waste Disposal Facility Federal Review Group, DOE determined that the site is not appropriate for disposal of LLRW containing high concentrations of long-lived radionuclides (such as those found in GTCC waste), especially those with high mobility in the subsurface environment. For this reason, DOE concluded that the Oak Ridge Reservation is not a reasonable disposal site alternative and has eliminated it from detailed evaluation in this EIS."* L8-15

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L8-8 The GTCC EIS analyzed the CO_2 emissions of the action alternatives in Chapters 4 and 5 and found them to be negligible for both construction and operations. As such, a separate, similar analysis of the No Action Alternative would not provide a significantly improved understanding. The impacts of climate change were considered in the evaluation of the resource areas evaluated, and the same parameters (e.g., precipitation, geology, seismic, etc.) were used for each alternative for the long-term modeling. DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

L8-9 A discussion of the transportation aspects of the proposed action are included in Chapter 5.2.9 of the GTCC EIS. The transportation mode used for conveying construction materials to the facility is anticipated to be by truck. Due to the nature of the facility, the types and quantities of materials are small. Follow-on analysis will be conducted once a final decision is made and a site and method is selected for implementation.

L8-10 Information on waste forms and waste packages and containers is provided in the EIS to allow for a comparative analysis of alternatives for transportation and waste disposal. Treatment of the wastes prior to disposal is outside the scope of the EIS. Such treatment is assumed to be addressed prior to receipt of the waste at the GTCC LLRW and GTCC-like waste disposal facility. DOE agrees that it is important to immobilize long-lived radionuclides such as Tc-99 and I-129 prior to disposal. Solidification techniques (e.g., use of grout) are expected to immobilize certain wastes in the GTCC LLRW and GTCC-like waste inventory. If needed, the actual stabilization methods used will depend, in part, on the waste stream, packaging, and final disposal facility design. DOE considers the assumptions used for waste form stability (see Appendix B) to be reasonable for purposes of the comparative analysis provided in the EIS.

The waste characteristics and physical form would have to meet the disposal facility waste acceptance criteria. It is expected that these waste acceptance criteria would identify requirements (such as allowable concentrations) for individual radionuclides, including Tc-99 and I-129. The specific waste forms and packages used to dispose of GTCC LLRW and GTCC-like wastes would be determined in the future as part of the waste acceptance criteria and packaging requirements developed. See the discussion in Section B.5 and C.9.4.2 of the EIS for more information on packaging requirements. All GTCC LLRW and GTCC-like wastes would be packaged and transported in accordance with all applicable federal and state requirements, and waste disposal activities would be conducted in accordance with appropriate requirements.

L8-11 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2, each concept has its roots in practice at DOE sites. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail.

The conceptual nature of these configurations takes into account the characteristics of all of the disposal sites for which they were considered, but their designs (e.g., width, depth, cover depth, reinforced containment) could be altered or enhanced, as necessary, to provide an optimal

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NRC Comment: The FEIS should state specifically what technical basis makes the ORR site inappropriate for disposal of GTCC waste, especially for those wastes with highly mobile isotopes in the subsurface environment. L8-15 (Cont.)

7) DOE EIS:
Section 2.7.4.2, Page 2-17: *"The key input parameters that influenced the long-term human health results are the precipitation rates and the soil distribution coefficients (K_ds) assumed in the calculations."* L8-16

NRC Comment:
The K_ds should be included as a parameter in the sensitivity analyses.

8) DOE EIS
Section 2.7.12, Page 2-23: *"DOE did not evaluate the cumulative impacts of the no action alternative, since such an evaluation would involve making speculative assumptions about environmental conditions and future activities at the many locations where the GTCC LLRW and GTCC-like waste could be stored."*

NRC Comment:
Because of its generic nature, the DEIS contains numerous assumptions that could be described as speculative but the DEIS came to conclusions on impacts for alternatives other than the no-action alternative. Therefore, it is unclear why, the DEIS could not also make reasonable (non-speculative) assumptions on future environmental conditions and activities in order to evaluate the no-action alternative. L8-17

9) DOE EIS:
Section 2.8.4, Page 2-58: *"Because the soil distribution coefficients are used to calculate the radionuclide release rates for sealed sources, it is assumed that the radionuclides would be released to the surrounding soil immediately upon contact with water. This approach is assumed to be conservative, and it adds a large uncertainty to the results presented in this EIS."*

NRC Comment:
A conceptual model of contaminant fate and transport should be presented for each alternative. Assumptions could then be compared to the conceptual model, and large uncertainties would not need to be added to the results. For example, reduced water infiltration rate for only the waste disposal area is assumed to be conservative within the DEIS because with a higher water infiltration rate outside the waste disposal area, the transport time needed for radionuclides to reach the underlying groundwater table after they have been released from the waste disposal area would be shortened. However, a conceptual model may point out that the engineered cover casts a large water shadow so that the higher water infiltration rate outside of the waste disposal area flows past the area of concern and is not significant. L8-18

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solution at a specific location. As an example, the cover depth could be adjusted to ensure that roots from vegetation would not compromise the top of the engineered barrier. In addition, the dimensions of the generic land disposal units (e.g., trench - width and depth, borehole – diameter and depth, vault – width, depth, and height) were selected based on similar existing facilities, existing equipment and methods for construction, and optimized (maximized waste volume disposed of for a given disposal unit volume; simple waste handling procedures to minimize exposure) for the types of waste packages considered. All designs could also accommodate different disposal packages (existing and proposed) with minor variations in their dimensions, but the EIS analyses would remain relevant for each option considered.

For an above-grade vault with a 5 m cover as an example, long-term impacts from the above-grade vault as determined by modeling for the EIS would be expected to be similar to those for a vault set lower with respect to grade, including with the top of the vault at or below grade, except in the case where the bottom of the waste confinement was closer to the groundwater table.

L8-12 Class B and C wastes are not GTCC LLRW and are out of scope for this EIS. The possible concentration of these wastes to form additional GTCC LLRW is too speculative at this time as stated in the text and is not required for consideration under NEPA.

L8-13 DOE solicited input from various sources to identify American Indian tribes that would be interested in engaging in tribal consultation with DOE on the proposed action discussed in the GTCC EIS. This engagement began in 2007 at the October State and Tribal Government Working Group meeting in Snowbird, Utah. As a follow-up to that meeting, DOE, in 2008, sent out letters to tribal government officials communicating DOE's interest in consulting with tribal nations on the GTCC EIS. However, no tribal group came forward, and DOE was not able to identify any interested tribal group affiliated with WIPP or the Savannah River Site. The approach used to engage American Indian tribes is further described in the EIS under Section 1.8 on tribal consultation for the GTCC EIS.

L8-14 The EIS notes that the decommissioning of a GTCC waste disposal facility is part of the proposed action, but because the facility would not be closed and decommissioned until far into the future (after 2083), the impact analysis for the decommissioning phase would be conducted at that time. It is not possible at this time to evaluate with any degree of confidence the environmental impacts from decommissioning a facility that has not yet been selected.

The GTCC waste disposal facility would be designed to facilitate future decommissioning consistent with applicable law, guidance, and policies. The appropriate site-specific NEPA review will be conducted in the future as part of the decommissioning plan.

The impacts of decommissioning of the existing disposal sites at West Valley are not within the scope of this EIS. This GTCC EIS addresses the potential environmental impacts associated with the proposed development, operation, and long-term management of a disposal facility or facilities for GTCC low-level radioactive waste (LLRW) and DOE GTCC-like waste.

L8-15 Based on further reviews conducted by the DOE Low-Level Waste Disposal Facility Federal Review Group, DOE determined that the site is not appropriate for disposal of LLRW containing high concentrations of long-lived radionuclides (such as those found in GTCC waste), especially those with high mobility in the subsurface environment. For this reason, DOE concluded that the Oak Ridge Reservation is not a reasonable disposal site alternative and has eliminated it from detailed evaluation in this EIS.

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10) DOE DEIS:
Section 2.9.2, Page 2-61: *"Use of boreholes or a geologic repository might require more waste handling to make the physical size of the waste manageable than use of trenches or vaults. The need for treatment could result in greater worker doses."*

DOE DEIS, Appendix B, Page B-7, Table B-3, Footnote d: *"Because of the assumed volume reduction, the volumes presented in this GTCC EIS are less than those presented in the Final EIS for the West Valley Site (DOE 2010a)."*

NRC Comment:
This is an incomplete evaluation of worker dose. Waste handling by workers for the borehole and geologic repository alternative should be evaluated or at least discussed in the worker impact sections. If there is additional volume reduction as stated on page B-7 that involves worker handling, the process of this reduction should be described and discussed, and the impact to workers included in the assessment. L8-19

11) DOE DEIS:
Section 2.9.3, Page 2-64: *"If post-closure care is not maintained, vaults could pose a greater potential for radiological exposures to the public (Rao et al. 1992; Kozak et al. 1993). Consequently, maintenance of institutional controls is considered particularly important for this technology to achieve post-closure safety. Long term post-closure care requirements for the trench, borehole, and deep geologic methods should be less than those for an above-grade vault (USACE Waterways Experiment Station 1984)."*

NRC Comment:
10 CFR 61.59 states that a NRC licensed disposal facility may not rely upon institutional controls for longer than 100 years. The level of information presented regarding this design option does not appear to support this alternative under the regulation. To support any future decision, DOE needs to provide additional information that supports the satisfactory behavior of above-ground vaults beyond the institutional control period. In addition, availability of suitable borrow areas needed to build above-grade vaults was not addressed. L8-20

12) DOE DEIS:
Section 3.5.1.2, Page 3-20: *"For the long-term evaluation of the No Action Alternative in this EIS, the following assumptions apply: (1) maintenance activities of these storage facilities would not be conducted after the active institutional control period (i.e., after 100 years), (2) the storage containers would start to degrade to the extent that potential radionuclide releases could occur, (3) these radionuclides would then reach the groundwater and move down gradient off-site, and (4) a hypothetical individual would use and consume this contaminated groundwater in the future. These assumptions were made to allow for an assessment of the potential human health impacts in the future; they do not imply that such a situation is reasonable or likely to occur."* L8-21

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L8-16 The stability of one of the waste forms (i.e., the grout material for Other Waste) was evaluated in the sensitivity analysis by varying the effective retardation period of the release of radionuclides. There are many parameters that could affect the modeling results that could be addressed in a sensitivity analysis. However, the essential effects of many of these parameters are the same (i.e., affecting when and how much water would enter the waste containers and contact the waste materials). In the GTCC EIS, both the influence of the water infiltration rate and the influence of when water would enter the waste containers on the dose results were addressed.

Modeling results can be very sensitive to some factors, such as the Kd for a given radionuclide. Kd values were provided by the sites for the GTCC EIS analyses. More extensive and detailed sensitivity analysis may need to be conducted during the implementation phase for a GTCC LLRW and GTCC-like waste disposal facility, based on more specific information on the engineering designs of the disposal facilities and their influence on the integrity of waste packages, waste containers, barrier materials, and the surrounding native soil (e.g., location-specific Kd values); however, the analysis provided in the EIS is sufficient to inform site and technology selection decisions.

L8-17 The No Action Alternative is evaluated in Chapter 3 of the EIS, and under this alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5. As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

L8-18 The same conceptual model was applied to all of the land-based disposal methods. Details of the model can be found in Section E.2 of the EIS.

L8-19 Operations such as the packaging and loading of shipments fall under the responsibility of the shipping organization and would be covered by the respective organization's operating procedures, safety measures, and NEPA activities, as appropriate. Also, packaging and loading of the GTCC LLRW and GTCC-like wastes at each generator location would be the same for all alternative disposal sites, with the exception of remote-handled waste at WIPP.

L8-20 The EIS assumes that the disposal facility may not rely upon institutional controls for longer than 100 years. Detailed facility designs for the selected disposal method alternative will be developed as part of the project specific analysis.

The availability of soils/borrow areas is dependent in part on the amount of material needed. If the vault design had been selected for use, additional details regarding the available borrow areas would have been identified based on a site-specific design that could require more or less material as identified for the conceptual designs presented in the EIS.

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Section 5.2.4.2 Alternatives 3, 4, and 5 (pg. 5-26): *"The human health impacts associated with the waste handling, transportation, and disposal of GTCC LLRW and GTCC-like wastes are analyzed for all aspects associated with managing these wastes, from the point of generation, to the transportation of wastes to the disposal site, to the placement of wastes in the disposal facility, and to the long-term management of the closed facility. That is, this evaluation includes an assessment of potential environmental impacts for both the operational phase and post-closure phase of actions at the disposal sites."*

Section 5.2.4.3 Alternatives 3, 4, and 5 (pg. 5-26): *"Following completion of the useful life of the disposal facility, it would be decommissioned in accordance with applicable requirements at the time. A long-term monitoring and maintenance period would follow site decommissioning to ensure that the disposal facility was adequately containing the disposed wastes."* L8-21 (Cont.)

NRC Comment:
In determining the long-term impacts of the "No Action" Alternative, the DEIS assumes that there are no institutional controls. It is not clear that the same assumption is used for the other alternatives. Please clarify whether no institutional controls for long term impacts are assumed for all of the alternatives and if they are not, please provide a justification.

13) DOE DEIS:
Section 3.5, Page 3-10: *"Under the No Action Alternative, it is assumed that the current facility operations at the storage and generator sites would continue for the short term and result in minimal impacts on most resource areas (e.g., air quality, geology, water resources, ecological resources, socioeconomics, land use, transportation, and cultural resources)."* L8-22

NRC Comment:
A basis for the assumption that the "No Action" Alternative would have minimal impacts on the stated resource areas should be provided. Specific information regarding those impacts should be available since these facilities are currently operating.

14) DOE DEIS:
Section 3.5, Page 3-11: *"For purposes of analysis of the long-term impacts, wastes from the GTCC inventory that are assumed to be generated within a given NRC region are assumed to be stored at a single facility in that region, and this storage facility is assumed to have a footprint of 300 x 300 m (1,000 x 1,000 ft). It is recognized that these simplifying assumptions do not represent the current situation, and GTCC wastes are currently stored throughout the region at a number of locations. However, this approach is assumed to be reasonable for estimating the potential radiation doses and LCF risks to address the long-term impacts associated with the No Action Alternative."* L8-23

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L8-21 The EIS states in Section 3.1 for the No Action Alternative that the EIS "assumed that the stored waste would be actively managed for 100 years after all the waste was generated and placed in storage." For the other alternatives, the discussion on the application of institutional controls is found in Section 5.6 of the EIS. For the GTCC waste disposal facility or facilities, it is expected that both active and passive institutional controls would be implemented and relied on to allow the facility to perform adequately with respect to protection from inadvertent human intruders.

L8-22 The No Action Alternative is evaluated in Chapter 3 of the EIS, and under this alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5. As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in sufficient detail in the EIS as required by NEPA. Comparatively high potential radiation doses and cancer risks could occur should this alternative be selected. While a more detailed analysis could reduce the uncertainties associated with estimating these doses and risks, the conclusion of comparatively high impacts would not change for this alternative.

Impacts from accidents or theft/intrusion were not performed for the No Action Alternative because of the large number of potential locations, and in many cases (sealed sources), the current locations of the waste are not known. In general, these impacts would be comparable to those in the accident consequence analyses conducted for facilities and transportation but possibly occur at a higher frequency because of a lower overall level of security.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

L8-23 The 300 x 300 m footprint assumption was based on the volume of waste of one NRC Region to be stored, including area for storage of the waste itself and an attendant facility. For comparison purposes, it is less than half the area assumed for the proposed vault disposal facility (420 x 610 m) for the entire waste inventory as discussed in Section D.4.3.

The single site assumption was based on a composite of different sites obtained using a similar approach as used previously in the No Action alternative evaluation for Yucca Mountain.

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NRC Comment:
A basis for the estimated footprint should be provided. Also, additional details are necessary to demonstrate why this "single site" assumption is reasonable. L8-23 (Cont.)

15) DOE DEIS:
Section 4.3.4.3, Page 4-60: *"The post-closure impacts of disposing of the GTCC LLRW and GTCC-like wastes were evaluated in the EIS in the same manner as was done for TRU wastes (i.e., by developing complementary cumulative distribution functions (CCDFs) based on performance assessments) (Sandia 2009a,b; 2010a). The post-closure impacts are limited to the potential radiation doses from the release of radionuclides from waste packages at WIPP and from their subsequent migration to groundwater."* L8-24

NRC Comment:
The analyses performed by Sandia Laboratories for Alternative 2 (disposal at WIPP, page 4-61) should be integrated into the FEIS. The uncertainty produced by using a different computer code and possibly a different analysis methodology should also be discussed (i.e. page E-30).

16) DOE DEIS:
Section 5.2, Pages 5-18 to 5-19: *"The generic commercial disposal locations are not evaluated for the environmental resource areas discussed in this section because each of the four regions encompasses a very large area for which a meaningful evaluation of the resource area is not possible. However, human health impacts for the long term are estimated by using region-specific input parameters. This estimate was done in order to provide information that could be used to distinguish the four regions from one another."*

NRC Comment:
The assessments for the generic commercial regional (I–IV) sites and the "No Action" Alternative are too generic to support an informed decision on an approach for disposing of GTCC wastes. Comparison of results with other sites using site-specific data is unrealistic. For instance, an effective site evaluation would require important parameters such as the depth to groundwater and the unsaturated zone thickness. However, in the DEIS these depths were averaged over areas too large to be of any real value. Results are very dependent on characteristics of the specific sites. The resulting impact analyses are therefore too generic to allow for a useful comparison. L8-25

17) DOE DEIS:
Section 5.3.1.2, Page 5-47: *"In addition, this Section 5.3.1.2 provides a qualitative assessment of the potential effects of global climate change on the proposed land disposal (borehole, trench, and vault) facilities for the long term, as discussed below."*

NRC Comment:
Climate change could affect the results included in the assessments. Currently, the prognoses of future climate states and changes are uncertain. It is precarious to rely on one document (Karl et al, 2009) to characterize future climate conditions in different regions of the United States. A more comprehensive assessment should include L8-26

7

L8-24 The modeling approaches used in the EIS to address the WIPP repository and the land disposal alternatives were selected to best accommodate the unique differences of these two types of facilities. That is, the same modeling approach as that used previously to support the disposal of defense-generated TRU wastes at WIPP was also used for the GTCC LLRW and GTCC-like wastes (i.e., the development of complementary cumulative distribution functions based on performance assessments). This approach was used in the EIS, given the similarity of the GTCC LLRW and GTCC-like wastes to the defense-generated TRU wastes already being safely disposed of in this repository.

In contrast, the land-based disposal concepts were well-suited to be assessed by using the RESRAD-OFFSITE computer code. This computer code is quite flexible and has algorithms for addressing radionuclide decay and ingrowth during transit, which is a very important consideration for the long-lived radionuclides in the GTCC LLRW and GTCC-like wastes, some of which are in very long decay series. This flexibility allowed for its use at all sites (other than WIPP), facilitating comparisons between the three land-based disposal methods at the various sites.

There is no need to integrate the modeling effort at WIPP with the RESRAD-OFFSITE analyses in the EIS. The modeling approaches used for these two sets of analyses address the unique circumstances of WIPP (a deep geologic repository) with the land-based disposal concepts. DOE believes that the analyses in the EIS are sufficient to inform decision-making and allow for the identification of a preferred alternative.

Section 4.3.4.3 of the EIS has been revised to update the Sandia analysis and to provide a more complete description of the scenarios considered in the analysis.

L8-25 In the absence of specific commercial sites, DOE evaluated generic commercial facilities in the EIS to allow DOE to make a determination regarding disposal of GTCC LLRW and GTCC-like waste in such a facility. Should one or more commercial facilities be identified at a later time, DOE may conduct further NEPA reviews, as appropriate. See Section 12.1 of the EIS for the approach used in analyzing the generic sites.

L8-26 DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

A limited sensitivity analysis was conducted to obtain an idea of the uncertainties involved in the long-term post-closure human health estimates as described in Appendix E, Section E.6. The sensitivity analysis did include an analysis of the infiltration rate.

U.S. Nuclear Regulatory Commission, Commenter ID No. L8 (cont'd)

sensitivity analyses with varying climate-sensitive parameters (e.g., infiltration rates, erosion rates, water table fluctuations, etc). L8-26 (Cont.)

18) DOE DEIS:
Section 5.5, Page 5-93: *"The inadvertent human intruder scenario is not evaluated quantitatively for Alternatives 3 to 5 because the NRC had already incorporated the inadvertent human intruder protection concept in its classification system of LLW as Class A, B, C, or GTCC. The NRC had already determined that for waste classified as GTCC, conventional near-surface land disposal is generally not protective of an inadvertent human intruder."* L8-27

NRC Comment:
10 CFR 61.42 states that the disposal facility must ensure the protection of inadvertent intruders. A quantitative evaluation as part of the licensing process would normally be required to demonstrate that this performance objective is being met and should be included in the FEIS.

10) DOE DEIS:
Chapters 6-11: Most of the federal sites considered in the DEIS are relatively large areas or regions. Because site factors can vary significantly, potential environmental impacts can also vary significantly.

NRC Comment:
Both the precision of the reference location being described as well as the site-characteristics need to be improved.

In addition, the NRC has the following specific concerns about the "reference sites" associated with the alternatives selected by DOE for analysis in the DEIS: L8-28

i. *Nevada National Security Site:* The reference location is near a dry lake bed. 10 CFR 61.50(a)(5) states that, "The disposal site must be generally well drained and free of areas of flooding or frequent ponding." If the precipitation rate increases in the future, this area might experience more flooding.

ii. *Idaho National Laboratory:* The reference location appears to lie within the Big Lost River Flood Plain. 10 CFR 61.50(a)(5) states that, "Waste disposal shall not take place in a 100-year flood plain, coastal high-hazard area or wetland".

iii. *Hanford Site:* The reference location appears to be an area where the Ringold Formation is absent, yet the parameter values cited in Table E-5 on pages E-36 through E-39 included the Ringold formation.

iv. *Savannah River Site:* The reference location description is inconsistent throughout Chapter 10. The reference location shown in Fig. 10.1-1 and Fig. 10.1.2-2 is positioned to the northeast of the locations shown in the figures presented later in the chapter.

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L8-27 DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder, especially for the wastes disposed of in an enhanced near surface trench. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC waste trench disposal facility because of (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Further evaluations would be conducted in site-specific NEPA reviews in the future as warranted.

Potential inadvertent human intrusion into WIPP is addressed in the documentation supporting its current operations. Inclusion of GTCC LLRW and GTCC-like wastes with the wastes already planned for disposal in this repository would not be expected to change the results associated with this hypothetical intrusion event.

The FEIS is not intended to be used as part of the licensing process. A quantitative evaluation would be developed and included in any formal licensing request.

L8-28 The reference location is considered to have characteristics representative of the actual location that could be used for waste disposal purposes. Once a decision is made on specific site and method, a project specific analysis will be conducted. As stated in section 1.4.3 these evaluations are intended to serve as a starting point for each of the sites being considered. If a site or sites were selected for possible implementation of a land disposal method or methods, a follow-on site-specific NEPA evaluation and documentation, as appropriate, along with further optimization by a selection study, would be conducted to identify the location or locations within a given site that would be considered the best ones to accommodate the land disposal method(s).

As for the locations selected at the DOE sites –

i) The GTCC reference location at the NNSS is located within Area 5 (Section 9.1). The reference location was selected primarily for evaluation purposes for this EIS. The actual location would be identified on the basis of follow on evaluations if and when it is decided to locate a land disposal facility at NNSS and would be in compliance with applicable federal, state, and DOE requirements.

ii) The GTCC reference location at INL is not located within the 100-yr floodplain as shown in Section 7.2.3.1.

iii) As discussed in Section 6.1.2.1.3, the Ringold formation is absent under the north and northeast parts of the 200 East Area at the Hanford Site. However, the GTCC reference location is south of the 200 East Area, and as discussed "Sediments include the upper Miocene to Pliocene Ringold Formation".

iv) The reference location at the Savannah River Site in Figure 10.1.2-2 was adjusted to be consistent with Figure 10.1-1 and the other figures in the chapter.

U.S. Nuclear Regulatory Commission, Commenter ID No. L8 (cont'd)

20) DOE DEIS:
Section 4.3.1.2.1 (Page 4-52): In the DEIS, it was assumed that "only the two noisiest pieces of equipment would operate simultaneously in order to estimate noise levels."

NRC Comment:
The noise impacts analysis methodology presented are not complete. The referenced assumption is not presented as a part of the noise impacts analysis methodology *described in Appendix C. Throughout Appendix C, the methodologies presented should* be complete for each resource area including methodologies for analyzing noise impacts. L8-29

21) DOE DEIS:
Section E.1, Page E-3: DOE selected RESRAD-OFFSITE for use in this DEIS because of its ability to address radioactive decay and in growth of progeny radionuclide(s)

NRC Comment:
In the DEIS, it was not demonstrated that this is a significant process affecting the results. The potential disadvantages of RESRAD-OFFSITE include: no source term discretization for different designs and no container failure-release rate simulation. Diffusion, colloidal transport (corrosion products), and chemical forms were not modeled. The advantages and disadvantages of RESRAD-OFFSITE and other suitable codes should be addressed in the FEIS. Subsequently, the rationale for choosing a particular numerical code should be documented. L8-30

22) DOE DEIS:
Section E.2.2, Page E-10: *"For purposes of analysis in this EIS, it is assumed that the engineered barriers would begin to degrade and fail 500 years after the closure of the disposal facility. This assumption is considered to be conservative (i.e., yield greater impacts) since the integrity of the engineered barriers is expected to last longer than 500 years. Many of the radionuclides in the GTCC LLRW and GTCC-like wastes have very long half-lives, so this 500-year time period would not result in an appreciable reduction in the total hazard associated with these wastes as a result of radioactive decay."*

NRC Comment:
No infiltration for 500 years is a very significant technical assumption and is non-conservative. The infiltration rate is one of the most important parameter inputs and affects the impact analyses in a significant way. Although the expectations are that the engineered barrier will last for a very long time, an effective performance rate of 100 percent over a 500 year period has not yet been demonstrated. Relatively little information is provided on the covers to be used for the borehole and trench alternatives, and how they are expected to maintain their high rate of performance over the long-term. In addition, many of the radionuclides in the GTCC wastes have shorter half-lives so that a complete immobilization of 500 years could make a difference. Because the numerical simulation runs used to support the DEIS are deterministic, this assumption should be well-documented and include a sound technical basis. L8-31

L8-29 An adequate description of the methodologies for the resource areas considered in the EIS are presented in Section 5.2 and Appendix C. However, a more comprehensive description of the methodology used to evaluate noise impacts has been added to Appendix C.

L8-30 The modeling with the RESRAD-OFFSITE code utilized a specific feature of the code. That is, the leach rates of radionuclides were calculated separately and entered as input values to the code for subsequent transport modeling through the unsaturated zones and the groundwater aquifer. In the process of calculating leach rates to input into the RESRAD-OFFSITE code, the influence of the waste forms was considered. For activated metals, a constant release fraction was assumed, reflecting that the imbedded radionuclides in the metal would not dissolve in water until the metal was corroded. For Other Wastes, the release rates were calculated by considering the retardation provided by grouting; therefore, measured Kd values of radionuclides in cementitious materials as available in published literature were used for the release calculations. For sealed sources, because the waste forms can vary greatly, the release rates were calculated by assuming the waste forms would behave like soils and would not provide extra protection against leaching. The consideration for releases from activated metals was similar to a dissolution mechanism. The consideration for releases from sealed sources was similar to a surface rinse mechanism. The consideration for releases from Other Waste was similar to a surface rinse mechanism, but with non-zero Kds for the waste form.

The integrity of waste packages, waste containers, and barrier materials over time was not specifically modeled in the RESRAD-OFFSITE code. Their performance over time depends on the engineering designs of the disposal facility. Compared with the analysis time frame that extends to 10,000 (or possibly up to 100,000) years into the future, the integrity periods of the waste packages, waste containers, and barrier materials are relatively short. Therefore, in the GTCC EIS, the integrity periods are evaluated as one single parameter, which is assumed to be 500 years in the analysis. To study the influence of this assumption, a sensitivity analysis was conducted. This approach provides a perspective on performance for the long term.

The RESRAD-OFFSITE code, like all codes, has limitations. This code was selected for the GTCC EIS analysis because of its manageable number of input parameters, its comprehensive transport analysis for radionuclides in the unsaturated zones and saturated zone, and its flexibility in accepting radionuclide release rates calculated outside the RESRAD-OFFSITE framework. Furthermore, the RESRAD-OFFSITE code has been benchmarked with other computer codes. The results obtained from the code are considered to be technically sound estimates.

L8-31 DOE believes that 500 years is a realistic time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

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23) DOE DEIS:
Section E.2.2, Page E-11: *"It is assumed that the water infiltration rate into the top of waste disposal facility would be zero for the first 500 years following closure, and then it would be 20% of the natural rate. This approach is meant to account for the reduction in the integrity of the cover and other engineering barriers as they begin to degrade and fail. This value was used for all future times extending to 10,000 years and longer (to obtain peak annual doses)."*

NRC Comment:
Excluding 80 percent of the assumed infiltration from 500 years until 10,000 years after closure is a very significant and non-conservative assumption. Although the expectations are that the engineered barrier will last for a very long time, an effective performance rate of 80 percent over a 9500 year period has not yet been demonstrated. The infiltration rate is one of the most important parameter inputs and affects the impact analyses in a significant way. Because the numerical simulation runs used to support the DEIS are deterministic this assumption should be well-documented and include a sound technical basis. L8-31 (Cont.)

24) DOE DEIS:
Section E.2.3, Page E-11: *"The radionuclide release fraction for activated metals was taken to be 1.19 x 10^{-5}/yr in this analysis. This value is assumed to be reasonable for stainless-steel waste forms for the purpose of this comparative analysis on the basis of rates observed in corrosion experiments on stainless-steel coupons conducted at INL (INL 2006; Aaller Fitton et al. 2004). However, if the environmental conditions surrounding a specific waste were not controlled and were more conductive to causing corrosion, or if the metal making up a specific waste was more conducive to corrosion, the release fractions could be higher than those used here."*

NRC Comment:
Important input values, such as waste form release fractions, should be supported by a strong technical basis and included as performance measures in the sensitivity analyses.

25) DOE DEIS:
Section E.2.3, Page E-12: *"The solidification provided by mixing the Other Waste with a stabilizing agent would also reduce the leaching of radionuclides. However, the reduction in leaching might not last over a long period of time, when the nature of the stabilizing agent would change in the environment or the integrity of the stabilizing agent would deteriorate. In this analysis, the effectiveness of solidification in terms of leaching reduction is assumed to last for 500 years following facility closure; after that, the retention of radionuclides by the stabilizing agent is assumed to be the same as that of the surrounding backfill soils."* L8-32

Section E.2.3, Page E-13: *"Note that these values are based on specific assumptions regarding the type of cement used and would need to be reconsidered on the basis of the actual cements that could be used in a specific situation. Maintaining local reducing conditions can be an important consideration in designing the final system for specific wastes containing significant amounts of nickel, technetium, and uranium isotopes."*

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L8-32 DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. DOE agrees that it is important to immobilize long-lived radionuclides such as Tc-99 and I-129 prior to disposal. Solidification techniques (e.g., use of grout) are expected to immobilize certain wastes in the GTCC LLRW and GTCC-like waste inventory. If needed, the actual stabilization methods used will depend, in part, on the waste stream, packaging, and final disposal facility design. DOE considers the assumptions used for waste form stability (i.e., activated metal corrosion and grout performance, see Appendix B) to be reasonable for purposes of the comparative analysis provided in the EIS.

U.S. Nuclear Regulatory Commission, Commenter ID No. L8 (cont'd)

NRC Comment:
The DEIS's assumption of 500 year effectiveness of "Other Waste" solidification in terms of leaching is a very significant and non-conservative assumption. Although the expectations are that the cementitious material will remain with minimum cracks and virtually intact for a very long time, an effective performance rate of 100 percent over a 500 year period has not yet been demonstrated. Considering that the numerical simulation runs are deterministic this assumption should have a well-documented and sound technical basis. L8-32 (Cont.)

26) DOE DEIS:
Section E.6, Page E-20. Three variables were used to perform sensitivity analysis: increased infiltration rates after 500 years, longer periods of grout effectiveness, and greater distances to the receptor. No analyses were performed on infiltration occurring before 500 years on grout degrading before 500 years. The distance to the receptor is set by regulation and not an ideal parameter to use for sensitivity analyses. Although the draft EIS states that precipitation rates and soil distribution coefficients (K_ds) are key input parameters, K_ds are not included in the sensitivity analyses. L8-33

NRC Comment:
The draft EIS does not demonstrate what the most significant parameters are nor does it provide insights on how contaminants move through the man-made and natural systems. Furthermore, sensitivity analyses should provide insight into how the disposal system works in concert with the environment and should identify those input parameters that are the major contributors to the variation or uncertainty in the calculated dose.

27) DOE DEIS:
Appendix E, Tables on RESRAD-OFFSITE input parameter values, Page E-30: *"Chose a small value [erosion rate] so that the buried waste would remain covered within the time frame considered (i.e., would yield more conservative groundwater results because there would be no losses through surface runoff and erosion). "(page E-43)* L8-34

NRC Comment:
This low erosion rate assumption lacks a technical basis and assumes that the engineered cover remains intact for a longer period of time. This assumption also excludes the possibility of waste being exposed at the surface by geomorphic processes.

28) DOE DEIS:
Appendix E, Table E-10: The evaluation of the WIPP vicinity site appears to use less conservative parameters than other site locations.

NRC Comment:
i. Similar distribution coefficients are used for all sites except WIPP vicinity site (see Table E-14). For example, while most sites have a zero K_d value for Iodine, the WIPP vicinity has 1; while most sites have a zero K_d value for Technetium, the WIPP vicinity has 0.1. L8-35

11

L8-33 The stability of one of the waste forms (i.e., the grout material for Other Waste) was evaluated in the sensitivity analysis by varying the effective retardation period of the release of radionuclides. There are many parameters that could affect the modeling results that could be addressed in a sensitivity analysis. However, the essential effects of many of these parameters are the same (i.e., affecting when and how much water would enter the waste containers and contact the waste materials). In the GTCC EIS, both the influence of the water infiltration rate and the influence of when water would enter the waste containers on the dose results were addressed.

Modeling results can be very sensitive to some factors, such as the Kd for a given radionuclide. Care was taken to use average site values for such input parameters for comparison among alternatives. More extensive and detailed sensitivity analysis may need to be conducted during the implementation phase for a GTCC LLRW and GTCC-like waste disposal facility, based on more specific information on the engineering designs of the disposal facilities and their influence on the integrity of waste packages, waste containers, barrier materials, and the surrounding native soil (e.g., location-specific Kd values); however, the analysis provided in the EIS is sufficient to inform site and technology selection decisions.

L8-34 DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process and was applied across all alternatives. Some of the input values may change in the future and could result in higher impacts. Follow-on site-specific evaluations would also be performed based on a final decision for disposal of GTCC LLRW and GTCC-like waste.

L8-35 i) The Kd values selected for the WIPP Vicinity are generic values for sandy soils which, along with siltstones, are the primary components of the Dewey Lake Formation in which the groundwater aquifer of concern is located. In general, the generic Kd values for siltstones are greater than those for sandy soils. Therefore, the use of Kd values for sandy soils should be conservative because it would yield higher groundwater concentrations and subsequently, higher radiation doses.

ii) The water in the Dewey Lake Formation is a perched aquifer not considered fit for human consumption (see Section 4.2.3.2.2) although it is considered suitable for livestock consumption. Thus, the analysis using RESRAD-OFFSITE used a water source considered to be consistent with what would be used for human consumption.

iii) While the NRC Lea County EIS did not consider impacts from the WIPP site, the GTCC EIS does. Therefore, cumulative impacts are expected to be small from combined operations of the proposed GTCC disposal facility and the enrichment plant at the Lea County site.

U.S. Nuclear Regulatory Commission, Commenter ID No. L8 (cont'd)

ii. Additional inconsistency exists in the unsaturated zone thickness. Page 4-29, lines 30-32, state that, "The saturated zone, which makes up the middle portion of the Dewey Lake, occurs at depths of about 50 to 60 m (164 to 262 ft)," while RESRAD-OFFSITE input value uses a depth of 153 m (Table E-13, page E-55).

iii. Section 11.4 on page 11-35 incorrectly applies concluding results of the 2005 NRC Lea County EIS to the cumulative impacts for the WIPP Vicinity site. The Lea County site was much further away and did not consider impacts from the WIPP site.

L8-35 (Cont.)

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U.S. Senator Jeff Merkley's Office, Commenter ID No. T122

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5 MR. BROWN: Thank you.
6 Marc Siegel is next, with Senator Merkley's
7 office, and Ken Niles will follow Marc.
8 MR. SIEGEL: Thank you. I'm Marc Siegel with
9 the office of U.S. Senator Jeff Merkley. I would
10 like to take this opportunity to say a few words on
11 behalf of Oregon Senator Jeff Merkley.
12 Tonight is an important opportunity for the
13 Pacific Northwest and Oregonians to let their voices
14 be heard about the future of Hanford. The people of
15 the Pacific Northwest have had the opportunity over
16 the years to witness the complications of politics
17 and bureaucracy in dealing with nuclear waste and the
18 problems that are created when waste is poorly
19 handled.
20 This region will be dealing with the reality of
21 Hanford's nuclear waste legacy for many decades as we
22 work to protect our communities and our environment.
23 And that future shouldn't include transporting more
24 dangerous waste through our communities for permanent T122-1
25 storage at Hanford. The current timeline for T122-2

T122-1 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

T122-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

U.S. Senator Jeff Merkley's Office, Commenter ID No. T122 (cont'd)

Capital Reporting Company 10

1 cleaning up the existing contamination at Hanford is
2 decades away, and we can't afford to start talk about
3 bringing more waste into the region. T122-2 (Cont.)
4 Senator Merkley recognizes that there aren't
5 many good options that exist today for storing
6 nuclear waste, but given the history of waste storage
7 at Hanford and the contamination it has caused, he
8 does not believe Hanford is an appropriate location
9 for additional permanent waste storage. The T122-3
10 environmental health of the Pacific Northwest and the
11 Columbia River are closely linked to Hanford nuclear
12 site, and this region looks forward to a toxic-free
13 Hanford site.
14 Again, on behalf of Senator Merkley, thank you
15 for letting me say a few words about this issue.

T122-3 See response to T122-1.

U.S. Senator Ron Wyden's Office, Commenter ID No. L300

U.S. Senator Ron Wyden

For Immediate Release:
May 19, 2011

Contact: Tom Towslee (503) 326-7525

Wyden Statement at Public Hearing on Hanford Cleanup

Portland OR – Senator Ron Wyden (D-Ore.) issued the following statement (through staff) at today's public hearing in Portland on the U.S. Department of Energy's draft environmental impact statement for cleaning up storage tanks and managing waste at the Hanford Nuclear Reservation:

"The U.S. Department of Energy is once again coming to Oregon to solicit public comment on yet another version of its misguided effort to solve the nuclear waste problem by bringing more hazardous material to Hanford. I have opposed using the Hanford Nuclear Reservation as a dumping ground for the nation's nuclear waste every time the Department of Energy brings it up. I oppose it again today. The stated goal of DOE is to clean up Hanford, yet it continues to propose adding more waste and wasting more money on studies to bring in more hazardous waste. L300-1

"DOE has been working on Hanford cleanup for more than 20 years, and at best, they probably have another 35 years to go. I think it's time to point out the obvious -- Hanford cannot be cleaned up by adding more waste. Hanford, with its 40 miles of unlined trenches, sits along 50 miles of the Columbia River, which is the lifeline of the Pacific Northwest economy. That is a formula for disaster. Bringing more radioactive waste from across the country to Hanford is only going to increase the odds of that disaster or, at worst, make it inevitable. L300-2

"It is not just the disposal of waste at Hanford that puts the public at risk. It's also transporting it on public highways. When a semi truck loaded with radioactive waste jackknifed on I-84 near La Grande in December 2008, it brought into sharp focus the serious questions about whether the Department of Energy can adequately protect the environment and the safety of other travelers and communities. The proposal to bring Greater Than Class C waste (GTCC), which could add more than 12,000 more truckloads of radioactive waste on its way to Hanford will only add to that risk. L300-3

"As those of us living downstream from Hanford know only too well, the United States faces a daunting challenge of figuring out what to do with nuclear waste from nuclear weapons and from our existing generation of nuclear power plants. But as we also know, bringing more waste to Hanford, at a time when DOE is missing almost every major milestone in cleaning up that site, does not inspire confidence. I have said many times, "Hanford should not be turned into a 'national sacrifice zone.' I am not satisfied with the progress to date, I am absolutely opposed to bringing more waste to Hanford, and I am not supportive of adding more truckloads of waste going thru the Columbia River Gorge to take it there." L300-4

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L300-1 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

However, regardless of where the GTCC waste disposal facility is ultimately located, a relatively small amount of GTCC LLRW and GTCC-like wastes may be transported through the Columbia River Gorge on their way to the disposal facility. The waste would be generated within the states of Oregon and Washington and would include actinide sealed sources and Cs-137 irradiators from local medical institutions, research facilities, universities, and other NRC and Agreement State licensees.

DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

L300-2 Refer to the L300-1 response regarding a discussion on ongoing cleanup activities at the Hanford site.

L300-3 Refer to the L300-1 response regarding a discussion on the importation of wastes from other DOE sites.

If DOE decides to implement its preferred alternative for the TC&WM EIS, GTCC LLRW and GTCC-like wastes would not be shipped through the Columbia River Gorge for disposal at the Hanford Site until the waste treatment plant is operational. However, regardless of where the GTCC waste disposal facility is ultimately located, a relatively small amount of GTCC LLRW and GTCC-like wastes may be transported through the Columbia River Gorge on their way to the disposal facility. The waste would be generated within the states of Oregon and Washington and would include actinide sealed sources and Cs-137 irradiators from local medical institutions, research facilities, universities, and other NRC and Agreement State licensees.

The transportation of radioactive waste will meet or exceed DOT and NRC regulatory requirements that promote the protection of human health and the environment. These regulations include requirements for radioactive materials packaging, marking, labeling, placarding, shipping papers, and highway routing. The waste shipments would be on preferred routes, which are interstate highways or alternative routes designated by a state routing agency in accordance with DOT regulations (49 CFR Part 397, Subpart D). The GTCC LLRW and GTCC-like wastes would be shipped in approved waste packages and transportation casks. The robust nature of these casks limits the potential release of radioactive and chemically hazardous material under the severest of accident conditions. It is unlikely that the transportation of GTCC LLRW and GTCC-like wastes to any of the alternative sites evaluated in the EIS would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents.

The EIS evaluated the transportation impacts from the shipments that would be required to dispose of all of the GTCC LLRW and GTCC-like wastes at the various disposal sites. The EIS addressed the collective population risks during routine conditions and accidents, the radiological risks to the highest exposed individuals during routine conditions, and the consequences to individuals and populations as a result of transportation accidents, including those that could release radioactive or hazardous chemical materials. About 12,600 shipments would be required to transport all of the GTCC LLRW and GTCC-like wastes to the Hanford Site for disposal. This would result in about 50 million km (30 million mi) of highway travel, with no expected LCFs. One fatality directly related to an accident might occur (see Section 6.2.9.1).

L300-4 See response to L300-3.

UU Ministry for Earth, Commenter ID No. W493

From: gtcceiswebmaster@anl.gov
Sent: Sunday, June 26, 2011 12:18 PM
To: gtcceiswebmaster@anl.gov
Subject: Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10493

Thank you for your comment, Sabrina Harle.

The comment tracking number that has been assigned to your comment is GTCC10493. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 26, 2011 12:18:14PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10493

First Name: Sabrina
Middle Initial: L
Last Name: Harle
Organization: UU Ministry for Earth
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City: Portland
State: OR
Zip: 97205-1705
Country: USA
Email: sabbylou@gmail.com
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Please do not allow any more waste to be dumped at Hanford. We cannot afford to have such deadly poison on our Oregon roads, leaking into our ground water supply, contaminating the Columbia River Gorge or the risk to the thousands of drivers in Oregon, should an accident occur. W493-1

It's time to CLEAN UP Hanford, not add to the waste dumped there. Real clean up efforts can only start when we stop producing such waste, and start finding safer ways of disposing the waste we do have... In DEEP underground tanks, fit for such nastiness. bringing in truckloads from elsewhere is not keeping our state safe. W493-2 W493-3 W493-4 W493-5

I implore you, pleas do NOT allow this to happen.

Thank you.

Very seriously concerned,

Sabrina Louise

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

W493-1 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

However, regardless of where the GTCC waste disposal facility is ultimately located, a relatively small amount of GTCC LLRW and GTCC-like wastes may be transported through the Columbia River Gorge on their way to the disposal facility. The waste would be generated within the states of Oregon and Washington and would include actinide sealed sources and Cs-137 irradiators from local medical institutions, research facilities, universities, and other NRC and Agreement State licensees.

The transportation of radioactive waste will meet or exceed DOT and NRC regulatory requirements that promote the protection of human health and the environment. These regulations include requirements for radioactive materials packaging, marking, labeling, placarding, shipping papers, and highway routing. The waste shipments would be on preferred routes, which are interstate highways or alternative routes designated by a state routing agency in accordance with DOT regulations (49 CFR Part 397, Subpart D). The GTCC LLRW and GTCC-like wastes would be shipped in approved waste packages and transportation casks. The robust nature of these casks limits the potential release of radioactive and chemically hazardous material under the severest of accident conditions. It is unlikely that the transportation of GTCC LLRW and GTCC-like wastes to any of the alternative sites evaluated in the EIS would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents.

The EIS evaluated the transportation impacts from the shipments that would be required to dispose of all of the GTCC LLRW and GTCC-like wastes at the various disposal sites. The EIS addressed the collective population risks during routine conditions and accidents, the radiological risks to the highest exposed individuals during routine conditions, and the consequences to individuals and populations as a result of transportation accidents, including those that could release radioactive or hazardous chemical materials. About 12,600 shipments would be required to transport all of the GTCC LLRW and GTCC-like wastes to the Hanford Site for disposal. This would result in about 50 million km (30 million mi) of highway travel, with no expected LCFs. One fatality directly related to an accident might occur (see Section 6.2.9.1).

DOE's standard operating procedure for transportation of radioactive waste is developed and continually revised to ensure that the utmost protection of public health and the environment is achieved and that the risk of a traffic accident is minimized. For example, DOE has established a comprehensive emergency management program (Transportation Emergency Preparedness Program or TEPP) that provides detailed, hazard specific planning and preparedness measures to minimize the health impacts from accidents involving loss of control over radioactive material or toxic chemicals. DOE's TEPP was established to ensure that its contractors and state, tribal, and local emergency responders are prepared to respond promptly, efficiently, and effectively to accidents involving DOE shipments of radioactive materials.

If an accident that involved a release of radioactive material to the environment occurred, it would be remediated promptly in accordance with these procedures. These measures would help DOE minimize and mitigate any impacts on the environment.

W493-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

UU Ministry for Earth, Commenter ID No. W493 (cont'd)

W493-3 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

W493-4 The EIS considered the range of reasonable alternatives for disposal of the inventory of GTCC LLRW and GTCC-like wastes identified for inclusion in these analyses. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

W493-5 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

Valley Interfaith Project, Commenter ID No. W267

From: gtcceiswebmaster@anl.gov
Sent: Thursday, June 16, 2011 3:06 PM
To: gtcceiswebmaster@anl.gov
Subject: Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10267

Thank you for your comment, Patricia Orlinski.

The comment tracking number that has been assigned to your comment is GTCC10267. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 16, 2011 03:05:29PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10267

First Name: Patricia
Last Name: Orlinski
Organization: Valley Interfaith Project
Address: 10511 W. Kingswood Circle
Address 2: na
City: Sun City
State: AZ
Zip: 85351-2246
Country: USA
Email: blkerpat@mindspring.com
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Please remove the Hanford Nuclear Reservation from the U.S. Department of Energy's list of candidate sites for a permanent nuclear waste dump site to store radioactive materials coming from across the United States. Hanford is the wrong place to transport and dispose of more highly dangerous radioactive material. W267-1

Hanford is already the most contaminated site in the Western Hemisphere and the Department of Energy is already engaged in one of the largest and most complex cleanup projects in U.S. history at Hanford. The number one priority should be to stop waste from leaking into the Columbia River and clean up the existing waste at Hanford. No new nuclear waste should be stored at Hanford. W267-2

Even more than this, we must discontinue the use of nuclear power. There are other choices that are not as hazardous to all living things. Certainly bringing waste from nuclear sites anywhere near a waterway like the Columbia River is reckless and irresponsible. W267-3

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

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W267-1 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

W267-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

W267-3 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

Valley Interfaith Project, Commenter ID No. W418

From:	gtcceiswebmaster@anl.gov
Sent:	Friday, June 24, 2011 12:10 AM
To:	gtcceiswebmaster@anl.gov
Subject:	Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10418

Thank you for your comment, Patricia Orlinski.

The comment tracking number that has been assigned to your comment is GTCC10418. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 24, 2011 12:10:21AM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10418

First Name: Patricia
Last Name: Orlinski
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Address 2: na
Address 3: 10511 W. Kingswood Circle
City: Sun City
State: AZ
Zip: 85351-2246
Country: USA
Email: bikerpat@mindspring.com
Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Nuclear waste is the greatest problem related to the use of nuclear power. There is no way to eliminate the waste created by nuclear fusion. No one wants to have the waste in their "back yard," yet the waste is there from 100 nuclear plants, and will continue to have waste from these plants. We must stop using poison generating forms of electric power. We have other choices and of energy that do not leave these toxic elements behind. W418-1

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

W418-1 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

Washington State, Department of Health, Commenter ID No. T12

Capital Reporting Company 5

MR. MURPHY: Thank you. Sean Murphy, Washington State Department of Health.

Short message to the DOE. We hope you guys work hard on this. There's licensees in the State of Washington that are the caretakers of this material, and it's just sitting there waiting for something to happen to it. So please continue your good work on the EIS and select something. Thanks. T12-1

T12-1 Comment noted.

Waste Control Specialists, LLC, Commenter ID No. E41

From:	Jeff Skov <jskov@VALHI.NET>
Sent:	Monday, June 27, 2011 3:27 PM
To:	gtcceis@anl.gov
Cc:	Scott Kirk
Subject:	WCS Comments on DOE's DEIS for Disposal of GTCC LLRW and GTCC-Like Waste
Attachments:	WCS_GTCC_Comment_Ltr_06_24_11_FINAL.pdf

Waste Control Specialists LLC (WCS) is pleased to submit the attached comments on the U.S. Department of Energy's (DOE's) Draft Environmental Impact Statement (DEIS) for the disposal of Greater-Than-Class C (GTCC) low-level radioactive waste and GTCC-like waste as requested in the Department's Federal Register Notice of February 25, 2011, 76 Fed. Reg. 10574.

A hard-copy is being sent via registered mail this afternoon.

Please contact me if you have questions or desire additional information.

Jeffrey M. Skov
Vice President, Licensing and Regulatory Affairs
Waste Control Specialists LLC
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Waste Control Specialists, LLC, Commenter ID No. E41 (cont'd)

received
JUN 27 2011

WASTE CONTROL SPECIALISTS LLC

June 27, 2011

Mr. Arnold M. Edelman
EIS Document Manager
U.S. Department of Energy
GTCC EIS, Cloverleaf Building, EM-43
1000 Independence Avenue, SW
Washington, DC 20585

References: (1) Texas Radioactive Material License No. R04100, Amendment 07

(2) Federal Register, U.S. Department of Energy, *Notice of Availability of the Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste, and Notice of Public Hearings*, Vol. 76, No. 38, pp. 10574-10577, February 25, 2011

(3) Federal Register, U.S. Nuclear Regulatory Commission, *Public Workshop to Discuss Low-Level Radioactive Waste Management*, Vol. 76, No. 39, pp. 10810-10811, February 28, 2011

(4) Federal Register, U.S. Nuclear Regulatory Commission, *Notice of Public Meeting and Request for Comments on the Potential Revision of the Branch Technical Position on Concentration Averaging and Encapsulation*, Vol. 76, No. 17, pp. 4739-4741, January 26, 2011

Subject: **Comments from Waste Control Specialists LLC Regarding the U.S. Department of Energy's Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste**

Dear Mr. Edelman:

In accordance with Reference 2, Waste Control Specialists LLC (WCS) is pleased to provide comments on the subject Draft Environmental Impact Statement (DEIS), which provides an analysis of options and alternatives for disposing of Greater-Than-Class C (GTCC) and GTCC-like Low-Level Radioactive Waste (LLW). As discussed in the

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Waste Control Specialists, LLC, Commenter ID No. E41 (cont'd)

Arnold M. Edelman
June 27, 2011
Page 2 of 5

DEIS, WCS is currently storing certain GTCC waste at our licensed and secure facility located in Andrews County, Texas. In addition, WCS is currently constructing an enhanced near-surface shallow land disposal facility that is licensed to dispose of Class A, B, and C LLW. Once operational, this facility will be authorized to serve the disposal needs of generators in the Texas Compact (Texas and Vermont, including non-regional waste approved for importation) and the U.S. Department of Energy (DOE).

ALTERNATIVES CONSIDERED

DOE is proposing to construct and operate a new facility or facilities, or use an existing facility or facilities, for the disposal of GTCC LLW and DOE GTCC-like waste. The disposal methods that were evaluated to assess the long-term adequacy of such a facility include burial in a geologic repository, an intermediate-depth borehole facility, an enhanced near-surface trench, and an above-grade vault. The locations for disposal include seven facilities owned by DOE, as well as generic commercial sites in four regions of the U.S. DOE also analyzed a "No Action Alternative" as part of this DEIS.

DOE did not specify a preferred alternative, but identified factors that would be considered to select a preferred alternative or alternatives for inclusion in the Final EIS. The factors listed include the waste type characteristics, such as the radionuclide inventory and waste form stability, disposal method considerations (including protection of an inadvertent intruder), and disposal location considerations.

DISCUSSION

WCS will only comment on two of the alternatives presented in the DEIS: Alternative 1, the No Action Alternative, and Alternative 4, Enhanced Near-Surface Trench disposal.

Alternative 1: WCS believes that the "No Action Alternative" of continuing to store GTCC and GTCC-like LLW across the U.S. is not a long-term solution. These types of radioactive wastes will continue to pose not only a radiological risk to public safety and the environment, but also to national security. WCS believes that the best long-term solution is permanent disposal of this waste in the geologic repository located at the Waste Isolation Pilot Plant located near Carlsbad, New Mexico (Alternative 2), an intermediate borehole facility (Alternative 3), or an enhanced near-surface disposal facility (Alternative 4), or a combination thereof. E41-1

Alternative 4: WCS has licensed (see Reference 1) and is currently constructing the nation's first disposal facility[1] developed under the Low-Level Radioactive Waste Policy Act of 1980, as amended in 1985. The characteristics of the site's geology and climate, a state-of-the-art engineering design, and stringent regulatory requirements will ensure that public health and the environment will be protected for tens of thousands of years. E41-2

[1] WCS is also the only facility authorized to dispose of Class A, B, and C LLW mixed with hazardous waste regulated under the Resource Conservation and Recovery Act in the U.S.

E41-1 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS.

The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

E41-2 Site characteristics similar to those found at WCS (e.g., soil, geology, precipitation) were considered in the EIS analyses. The major considerations for developing a preferred alternative are presented in Section 2.9.

Waste Control Specialists, LLC, Commenter ID No. E41 (cont'd)

Arnold M. Edelman
June 27, 2011
Page 3 of 5

Under Alternative 4 (Enhanced Near-Surface Trench), DOE analyzed the performance of disposal of GTCC LLW and DOE GTCC-like waste in a near-surface trench located in the U.S. Nuclear Regulatory Commission's (NRC's) Regions 2 and 4. The design of the disposal facility analyzed included trenches approximately 3-m (10-ft) wide, 11-m (36-ft) deep, and 100-m (33-ft) long. The GTCC waste disposal placement was estimated to be 5 to 10 m (15 to 30 ft) below grade surface. Use of a reinforced concrete layer was included as an engineered barrier that would be placed on top of the waste and backfill would be added to raise the trench elevation to grade. The reinforced concrete layer would serve as shielding to reduce the levels of radiation during facility operations and to deter inadvertent drilling during the post-closure period.

Many of the design features described in Alternative 4 are similar to those that are being used to construct both the Texas Compact Waste Disposal Facility (CWF) and the Federal Facility Waste Disposal Facility (FWF) in Andrews County, Texas.

For example, the CWF and FWF design features include placing waste inside of reinforced concrete canisters, a one-foot concrete base, geomembrane liners, leachate collection system, a 3-ft compacted clay liner, and a 40-foot cover system that will provide additional barriers to prevent inadvertent intrusion into the waste. Class A, B, and C LLW will be placed at a depth of at least 10 m (30 ft) and backfill will be used to raise elevation back to surface grade. E41-2 (Cont.)

Pursuant to Title 30 of the Texas Administrative Code (TAC), Section 336.709, *Technical and Environmental Analyses*, WCS was required to demonstrate that the site characteristics and design were suitable to protect the general population from releases of radioactivity for a minimum period of 1,000 years after closure or the period when peak dose occurs, whichever is longer. The analysis that was approved by the Texas Commission on Environmental Quality successfully demonstrated that a peak dose of less than 10 millirems per year was estimated to occur at approximately 36,000 years into the future.

Based on the geological characteristics and engineering design of our enhanced near-surface disposal facility, WCS believes that Alternative 4 will provide a viable solution for the disposition of some types of GTCC LLW and DOE GTCC-like waste. Therefore, WCS encourages the DOE to evaluate and consider WCS' site characteristics and the design of its enhanced near-surface disposal facility when determining the preferred alternative in the Final EIS.

Continued Coordination with the U.S. Nuclear Regulatory Commission

WCS commends DOE for including NRC as a commenting agency on this EIS and for coordinating with NRC to hold a public workshop (Reference 3) to discuss low-level radioactive waste management issues. The NRC's role is extremely important in the process since they have been designated as the regulatory authority for a GTCC disposal E41-3

E41-3 Comment noted. DOE agrees that the willingness of the host community is an important factor when selecting the preferred alternative.

Waste Control Specialists, LLC, Commenter ID No. E41 (cont'd)

facility. At the workshop, DOE, NRC, and other stakeholders discussed possible changes to Title 10 of the U.S. Code of Federal Regulations, Part 61 (10 CFR 61), *Licensing Requirements for Land Disposal of Radioactive Waste*. WCS believes that these early discussions were very helpful to identify potential technical issues that could affect the manner in which Class A, B, C, GTCC, and DOE GTCC-like wastes are regulated.

NRC promulgated 10 CFR 61 as a final rule in 1982. This regulation established the framework to ensure that occupational workers, the general public, and the environment would be protected against potential releases of radioactive materials from facilities licensed to dispose of LLW. It also established the numerical concentrations that would be used to define Class A, B, C, and GTCC LLW.

Recently NRC has initiated efforts to revise 10 CFR 61. Some stakeholders have encouraged NRC to abandon the waste classification defined in 10 CFR 61 completely and bring the nation's LLW management system into alignment with that established by the International Atomic Energy Agency. Other stakeholders have suggested that NRC revise the classification tables in 10 CFR 61.55 using more recent and up-to-date biokinetic and dosimetric models developed by the International Commission on Radiological Protection. In either case, the boundary could shift relative to whether the responsibility for the disposal of an existing waste stream rests with the States (as is currently the case for commercial Class A, B, and C LLW) or with the federal government (as is currently the case for GTCC waste). That is, the ramifications of such a shift could result in transferring the responsibility for the disposal of certain, more problematic wastes from the States to the federal government. E41-3 (Cont.)

In the NRC's recently issued preliminary proposed rule on site-specific analyses for demonstrating compliance with 10 CFR 61 Subpart C performance objectives (see 76 Fed. Reg. 24831 dated May 3, 2011), they propose a 20,000 year period of performance. This timeframe is longer than the initial period of performance for a high-level waste repository. A well designed and sited LLW repository, such as the WCS facility, could meet the same performance standards as required for high-level waste, including the longer term second period of performance, and thus be equally protective of public health and safety and the environment for ultimate disposition of GTCC waste.

NRC is also revising the 1995 Branch Technical Position on Concentration Averaging and Encapsulation (BTP). This guidance was initially issued to the licensed community to address the manner in which 10 CFR 61 should be interpreted and implemented across the U.S. The BTP provided direction for determining whether certain types of waste, such as sealed sources, could be classified as Class C LLW suitable for disposal licensed under 10 CFR 61. On the other hand, licensees were encouraged to classify radioactive wastes as GTCC LLW if the concentrations exceeded those specified in the BTP. Those waste streams, classified as GTCC, were not generally suitable for shallow land disposal and would thereby become the responsibility of the federal government.

Waste Control Specialists, LLC, Commenter ID No. E41 (cont'd)

Arnold M. Edelman
June 27, 2011
Page 5 of 5

WCS encourages DOE to continue the coordinating efforts to revise both 10 CFR 61 and the BTP as a means to determine which waste streams could be safety disposed of at traditional shallow land disposal facilities or by any one (or combination thereof) of the disposal alternatives analyzed as part the Final EIS.

Site Selection Should Favor Strong Community Support

In addition to the impacts to human health and the environment, selection of the preferred alternative should weigh heavily on the level of stakeholder support provided by regional and local communities that are willing to host such a disposal facility. The successful licensing of the WCS disposal facilities in Andrews County, Texas, would not have occurred without the tremendous support from the regional and local communities. The stakeholders supporting the licensing efforts are familiar with both the potential risk and benefits that the nuclear industry brings to our communities located across the Permian Basin of western Texas and southeastern New Mexico. E41-3 (Cont.)

In closing, WCS commends DOE for achieving this important milestone that is urgently needed not only for public safety and environmental protection, but for reasons of national security. WCS requests that a copy of all correspondence regarding this matter be submitted directly to my attention by fax (575-394-3427) or email (skirk@valhi.net).

Thank you for your consideration of this submission.

Sincerely,

J. Scott Kirk, CHP
Vice President, Licensing, Corporate Compliance & Radiation Safety Officer

cc: Rodney Baltzer, WCS
William P. Dornsife, P.E., WCS
Jeffrey M. Skov, WCS
Linda Beach, P.E., WCS
Tom Jones, WCS

West Valley Citizen Task Force, Commenter ID No. L275

WV CTF

THE WEST VALLEY CITIZEN TASK FORCE

May 6, 2011

received

MAY 2 3 2011

Greater-Than-Class C Low-Level Radioactive Waste EIS
Office of Technical and Regulatory Support (EM-43)
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, DC 20585–0119

RE: Comments of the West Valley Citizen Task Force on the Greater-Than-Class C Low-Level Radioactive Waste EIS

The West Valley Citizen Task Force (CTF) urges the Department of Energy (DOE) and the United States Congress to act in a timely manner in the identification of a preferred alternative for the disposal of Greater-Than-Class C (GTCC) Low Level Radioactive Waste and GTCC-like waste. The CTF is encouraged by the approach and time line that the Department of Energy is pursuing in their accumulation and analysis of public comments on this Draft EIS. We find it distressing that, while the West Valley site does have GTCC and GTCC-like waste, (Table S-2, pg. S-19) the closest public hearing will be in Washington, DC. We also question the exclusion of the Seneca Nation as a participating tribal government (S.1.5, pgs. S 6 &7). L275-1 L275-2

There are several factors that we believe are of significant importance when identifying a preferred alternative. The CTF supports the complete deactivation and decommissioning of the West Valley Demonstration Project site. It is our belief that all waste should be removed and the site should be available for public reuse. The removal of GTCC LLRW and GTCC-like waste will be another step in that direction.

The CTF urges the DOE to carefully examine the comments received from the public and stakeholders. We also believe that cost should not be the driving factor in the preferred alternative decision. The CTF urges that an independent cost analysis be conducted before an alternative is chosen. Public safety, average dose, and long term impact should be weighed more heavily than any cost factor. We also suggest that all relevant studies be completed prior to recommending an alternative to the Congress. With the recent devastation in Japan due to seismic activity, we urge that all alternatives and sites be subject to the most rigid of standards. L275-3

West Valley Citizen Task Force
c/o The Logue Group
PO Box 270270 – West Hartford, CT 06127
860-521-9122

L275-1 DOE's goal with regard to its public participation process is to be able to disseminate the information to the public so that input from the interested public can be obtained to inform the Final EIS. To this end, nine public hearings at venues accessible to the interested public for the various disposal sites evaluated in the EIS were conducted. Notices were placed in various local newspapers to announce the public hearings before and during the scheduled hearings.

L275-2 DOE initiated consultation and communication with the 14 participating American Indian tribes that have cultural or historical ties to the DOE sites analyzed in the EIS. These interactions are summarized in Section 1.8 of the EIS, and they included several meetings, workshops, and the development of tribal narratives that were included in the EIS. In addition to including tribal narratives related to the four sites in the EIS, DOE inquired about tribal interests with regard to the WIPP/WIPP Vicinity and SRS. No tribes came forward in response to the inquiries regarding these two locations. It was not necessary to consult with American Indian tribes with regard to the generic regional locations, since the specific locations of the potential disposal facilities (and the affected tribes) were not known.

DOE will continue to consult with the site-affiliated American Indian tribes, as appropriate, during implementation of the selected alternative.

L275-3 Recommendations were taken into consideration, as appropriate, in the selection of the preferred alternative.

West Valley Citizen Task Force, Commenter ID No. L275 (cont'd)

The DOE has suggested five alternatives for the disposal of GTCC waste (S.2.5). Each of these alternatives was evaluated on eleven separate criteria (S.2.8, pg. S-37). There was also a mention of regional commercial disposal sites, although no specific vendor or site has yet to be identified. Upon examination of the five alternatives, the West Valley CTF strongly supports Alternative 2, WIPP Geologic Repository as the preferred alternative. Our selection of this alternative is based on the data presented in Table S-3, comparisons of potential impacts. Public safety and environmental impact must be primary considerations for any alternative. Table S-3, pg. S-41 supports our belief that the WIPP alternative would offer the lowest worker dose and lowest Latent Cancer Fatality (LCF) risk (Table S-4; pg. S-47). The WIPP site would also have zero long term annual dose and LCF risk (Table S-3; Pg. S-42), although we would urge DOE to conduct studies to accurately determine the impact, if any, to individuals and nearby populations from a waste handling accident at the site. L275-4

The WIPP site would be preferred by the CTF due to the very low impacts that disposal would have on habitat and wildlife as well as other ecological resources compared to the other alternatives (Table S-3, pg. S-43). The siting at WIPP is also preferred due to the existing facility and stable environmental footprint need to dispose of additional waste at the site (S.2.5.2; Figure S-8, pgs. S-20, 21).

Transportation to the WIPP repository is an obstacle and a point of concern for the CTF. We would recommend that studies be conducted to lower the projected impacts of shipping waste to the site. The CTF strongly encourages the use of rail transportation as opposed to trucking materials. Fewer trips would be necessary, resulting in the chance for fewer accidents or exposures (Table S-3; pg. S-45). L275-5

In summation, the West Valley CTF strongly supports the creation of a disposal site for GTCC and GTCC-like wastes. We urge the DOE and the Congress to move judiciously, but as quickly as possible, in the identification of such a disposal site. The CTF supports the WIPP Geologic Repository as the preferred alternative for such a site based on the points discussed in the preceding paragraphs. L275-6

Sincerely,

L275-4 Based on the GTCC EIS evaluation and WIPP's operating record, DOE believes that the WIPP repository would be a safe location for the disposal of GTCC LLRW and GTCC-like wastes, some of which include long-lived radionuclides. DOE recognizes that the use of WIPP for the disposal of GTCC LLRW and GTCC-like wastes would require modification to existing law. In addition, it would be necessary to revise the Agreement for Consultation and Cooperation between the Department of Energy and the State of New Mexico for the Waste Isolation Pilot Plant, the WIPP compliance certification with EPA, and the WIPP Hazardous Waste Facility Permit.

The State of New Mexico has indicated a willingness to accept GTCC LLRW and GTCC-like wastes for disposal at WIPP. Twenty-eight New Mexico State Senators signed a proclamation made in the Fiftieth Legislature, First Session, 2011, stating: "Be it resolved that we, the undersigned, support the opportunity for other potential missions in southeast New Mexico to adequately address the disposal of defense high-level waste, commercial high-level waste, Greater Than Class C LLRW and surplus plutonium waste, as well as the interim storage of spent nuclear fuel." In response to the Draft GTCC EIS, Secretary David Martin, Secretary of the New Mexico Environment Department, sent a letter to DOE on June 27, 2011, stating that "the Department encourages DOE to support the WIPP or WIPP Vicinity proposed locations as the preferred alternatives addressed in the Draft EIS. The geologic repository is the favored alternative being more effective for the enduring time frames for this waste type." In addition, the Governor of New Mexico, in a letter to DOE Secretary Steven Chu on September 1, 2011, stated that the State of New Mexico encourages DOE to support the proposed location of WIPP as the preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes.

L275-5 Follow-on site-specific project studies will further evaluate transportation options for the preferred alternative and will involve transportation stakeholders.

L275-6 See Response L275-4.

Western Governors' Association, Commenter ID No. L99 (W327)

From:	gtcceiswebmaster@anl.gov
Sent:	Monday, June 20, 2011 4:19 PM
To:	*mail_gtcceisarchives; gtcceiswebmaster@anl.gov; gtcceis@anl.gov*
Subject:	Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10327
Attachments:	GTCC_EIS_comments_Final_Draft__2__GTCC10327.pdf

Thank you for your comment, Western Governors'.

The comment tracking number that has been assigned to your comment is GTCC10327. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 20, 2011 04:19:09PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10327

First Name: Western
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Privacy Preference: Don't withhold name or address from public record
Attachment: C:\fakepath\GTCC EIS comments Final Draft _2_.pdf

Comment Submitted:
On behalf of Western Governors, we appreciate the opportunity to comment on the U.S. Department of Energy's (DOE) Draft Environmental Impact Statement (EIS) for Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D), issued in February 2011. Attached are the WGA comments.

If you have any questions, please contact Jennifer Salisbury jsalisbury@westgov.org, ph: 303-623-9378

Thank you,
Toni McCammon, Office Manager
WGA

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

Western Governors' Association, Commenter ID No. L99 (W327) (cont'd)

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June 20, 2011

Arnold Edelman, EIS Document Manager
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Cloverleaf Building, EM-43
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Washington, DC 20585

Dear Mr. Edelman,

On behalf of Western Governors, we appreciate the opportunity to comment on the U.S. Department of Energy's (DOE) "Draft Environmental Impact Statement (EIS) for Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D), issued in February 2011. Western states have a long history of working together regionally and with the Department of Energy on issues related to the transportation, storage and disposal of radioactive waste. Our review of the Draft EIS leads us to conclude that it should be revised and reissued as a draft, as opposed to proceeding directly to a final EIS. To support this request, we would offer the following observations and recommendations on behalf of the Western Governors' Association (WGA): L99-1

1. **Emphasis on Western and Department of Energy Sites**
We have continually and emphatically noted in the past that western states shoulder a disproportionate and unfair burden in supporting the operation and cleanup of the nation's atomic weapons complex. Once again, states in the West are being considered for six of the seven possible sites for the disposal of GTCC and GTCC-like waste. DOE sites are prominently considered despite a lack of congressional direction that this be the case. L99-2

Western DOE sites already have extensive waste cleanup missions and enforceable cleanup agreements, and major challenges remain in meeting these commitments. Many of these sites are focused on cleanup and removal of waste under agreements with host states, not on additional disposal. Bringing in new wastes for disposal is not necessarily compatible with a site's cleanup mission. In some cases it would result in imposing a sizeable additional burden on a site or sites that already face groundwater and other contamination problems well into the future. L99-3

In addition, none of the DOE sites under consideration in the draft EIS contain an NRC-licensed or regulated facility for disposal of LLW or GTCC waste. Disposal of commercial waste at a DOE facility must be L99-4

L99-1 The scope of this EIS is adequate to inform decision-making for the disposal of GTCC LLRW and GTCC-like waste. Sufficient information is available to support the current decision-making process to identify (an) appropriate site(s) and method(s) to dispose of the limited amount of GTCC LLRW and GTCC-like waste identified in the EIS.

DOE believes that this EIS process is not premature and is in compliance with NEPA. On the basis of an assumed starting date of 2019 for disposal operations, more than half (about 6,700 m^3 [240,000 ft^3] of the total GTCC LLRW and GTCC-like waste inventory of 12,000 m^3 [420,000 ft^3]) is projected to be available for disposal between 2019 and 2030. An additional 2,000 m^3 (71,000 ft^3) would become available for disposal between 2031 and 2035. This information is presented in Figure 3.4.2-1. DOE believes this EIS is timely, especially given the length of time necessary to develop a GTCC waste disposal facility.

DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes. DOE plans a tiered decision-making process, in which DOE would conduct further site-specific NEPA reviews before implementing an alternative ultimately selected on the basis of this EIS.

L99-2 The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, LLRWPAA, and Section 631 of the Energy Policy Act of 2005 (P.L. 109 58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

L99-3 DOE is performing environmental restoration activities at the Hanford Site, INL, LANL, NNSS, and SRS. The ongoing cleanup efforts at these sites will continue. If GTCC LLRW or GTCC-like waste were to be disposed at Hanford, DOE does not anticipate negative impacts to ongoing cleanup activities at this site.

L99-4 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

Western Governors' Association, Commenter ID No. L99 (W327) (cont'd)

Arnold Edelman
June 20, 2011
Page 2

licensed or regulated by NRC. The Draft EIS does not address DOE's plans for obtaining an NRC license for disposal of commercial GTCC waste on a DOE facility. L99-4 (Cont.)

Recommendation: Potential sites considered by DOE reflect factors other than presumed DOE siting convenience. As noted above, it does not follow from congressional direction that likely disposal alternatives should be DOE sites with other, current cleanup missions. Siting criteria should include:

- disposal suitability (e.g. trenches for disposal of activated metals);
- minimization of cross-country transport;
- avoidance of potential conflict with other current DOE cleanup missions; and
- NRC licensing of disposal facilities.

Not only should these factors be considered in identifying alternative sites, they also should be addressed with more specificity in impact assessments and siting decisions. L99-5

In addition, with respect to GTCC waste, we recommend DOE follow Western Governors' position on centralized storage of spent nuclear fuel and high-level waste: if deemed necessary, such waste shall be located within a state only with the written consent of the Governor (WGA 09-5, Policy #2). We recommend that a similar policy apply to the disposal of GTCC or GTCC-like waste in a Western state.

Further, we recommend that the principles of volunteerism and consent also be applied. Past experience suggests that departure from these principles creates strife and costly delays, without reliably delivering needed sites.

2. Identification of Alternatives
It is not clear why each disposal method (boreholes, enhanced trenches, above-ground vaults) is considered for disposal of all types of GTCC and GTCC-like wastes. The EIS indicates that some disposal methods are more appropriate for some waste types than for others, and that each disposal method is suboptimal for at least one of the major waste types. Yet there is no attempt to match each major waste type with its most appropriate disposal method.

In addition, it appears that the EIS authors went to great effort to ensure that most options presented in scoping this EIS remained as viable choices, even though a cursory examination clearly demonstrates some of the options at several of the proposed sites are less than ideal. We expect that when this document is revised, many of the proposed options will have been eliminated from further consideration. L99-6

Recommendation: We recommend either a fuller explanation as to why each major GTCC waste type should *not* be matched with its most appropriate disposal method(s) or an assessment of alternatives that do match waste types with their most appropriate disposal methods. In general, the alternatives assessed should reflect realistic and implementable alternatives for DOE action. The alternatives DOE has assessed so far do not appear to meet that criterion.

L99-5 The analysis presented in the GTTC EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. As appropriate additional NEPA review including public participation would be done, before implementation.

DOE is performing environmental restoration activities at the Hanford Site, INL, LANL, NNSS, and SRS. The ongoing cleanup efforts at these sites will continue.

L99-6 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations.

Western Governors' Association, Commenter ID No. L99 (W327) (cont'd)

Arnold Edelman
June 20, 2011
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3. Transportation Impacts and Access to Rail
Using RADTRAN and RISKIND, the EIS estimates routine and accident-related radiological risks. Using the tables in sections 6.1.9 (Hanford) and 10.1.9 (SRS), one can calculate that a shipment campaign for disposal at Hanford would require 10,000 truck shipment miles (59 percent of which would consist of activated metals), while sites closer to the shipment origins could require as few as 3,800 truck shipment miles. Risks associated with the transportation of radioactive waste are directly related to the number of shipments and distance transported. However, no DOE site is eliminated or even properly evaluated on the grounds that it would require a substantial number of long-distance, cross-country shipments (a total of 33,700 truck shipments or 11,800 rail shipments).

Given this potentially large discrepancy among sites, it is important that the EIS evaluate and compare the transportation impacts in relation to each disposal alternative, including but not limited to routing and emergency preparedness impacts of a large shipment campaign, costs (packaging, operations, emergency preparedness and response) to both state and federal governments. etc. Such assessments should compare impacts for each modal (rail vs. truck) alternative, as well as each site. Several of the considered sites lack direct access to the national rail system, which could make them suboptimal for the disposal of activated metals, which are not easily or efficiently transported by truck. L99-7

Recommendation: We recommend that the EIS substantially improve and integrate the assessment of transportation impacts, including the costs of transportation packaging, operations and emergency response associated with transport of different GTCC waste types over different distances. Given substantial costs required for providing rail access where it does not already exist, access to the national rail system also should be factored into cost estimates as appropriate. We recommend that the EIS also assess the handling and packaging costs at origin sites, and discuss who is expected to pay these costs.

We recommend and expect that any transportation program for GTCC or GTCC-like material would be modeled after the Waste Isolation Pilot Program (WIPP) transportation safety program, which is purposefully extra-regulatory and was developed in cooperation with affected states. Additionally, it is expected that any shipment campaign be supported by financial assistance to states for emergency response training and meeting shipment safety protocols similar to those used for shipments to WIPP.

4. Characterization of Other Wastes
It is unclear in the Draft EIS whether all current GTCC and GTCC-like wastes have been characterized to determine their radiological or hazardous components and the requisite packaging for transport and disposal. The EIS does not appear to address the need to characterize "other" GTCC and GTCC-like wastes. "Other" wastes comprise 58% of the projected GTCC and GTCC-like inventory. The EIS assumes that 45% must be remote handled (packaging, transport, and disposal), while 55% may be contact handled. L99-8

Recommendation: The revised EIS should describe how DOE has characterized or will characterize current and prospective GTCC and GTCC-like wastes to determine the most

L99-7 Calculation of the collective population risk (under routine and accident conditions) is provided in the EIS. While these estimates are conservative, the calculations used expected values where practical (e.g., external shipment dose rates) and provide a reasonable measure for comparison among alternatives, as summarized in Tables 2.7 5 and 2.7 6, and the estimates show that the transportation risks would be small. All alternatives involve routes of hundreds of miles through similar types of rural, suburban, and urban areas. For specific local impacts, Section 5.3.9.2 provides information on potential human health impacts on individuals during normal waste transport along a route. However, the consideration of specific local stakeholder concerns is more appropriate during the final planning stages of a project when actual route selections are finalized, not at the level addressed in this EIS. A generic accident consequence assessment was performed because there is no way to predict the exact location and conditions of an accident, as discussed in C.9.3.3 of the EIS. For all alternatives, potential accidents, even those at the same location, could have impacts that range from negligible to significant depending on the waste involved, the accident severity, and weather conditions. Such an analysis would not help distinguish between alternatives because all alternatives involve routes through or near major population centers.

The additional human health impacts from intermodal transfer and transport of waste from the nearest rail access point to those disposal sites without direct rail access is generally a small percentage of the total risk discussed in Section C.9.5.5 of the EIS. Costs involved in either building a rail spur to a site or the additional cost of intermodal operations would need to be considered if that option was considered further. For the rail option, the use of dedicated trains, if sufficient waste is available for transport at the same time, could reduce transportation risks and costs by minimizing transit times. The current rail analysis therefore bounds what might be expected if dedicated trains were used. In general, transportation costs would be similar across all disposal alternatives. The primary difference would be related to the distances traveled in each case. Thus, the transportation costs will scale with the shipment distances travelled as presented in the EIS. Any decisions made by DOE would take these factors into account during implementation.

Once an alternative is selected in a ROD for this EIS for implementation, site-specific NEPA reviews would be conducted as needed, including an assessment of specific routing and an accident analysis, including dedicated trains and the potential for multiple railcar accidents if applicable. This process will include planning that involves transportation stakeholders.

L99-8 The GTCC LLRW and GTCC-like waste inventory evaluated in the EIS is based on the best available information on the stored and projected GTCC LLRW and GTCC-like wastes from ongoing and planned activities. Although characterization information for some of the GTCC LLRW and GTCC-like wastes is limited, DOE believes that sufficient data are available to allow for a comparative analysis of various approaches to dispose of these wastes in the EIS. Adequate data are generally available for the radioactive constituents, but comparable data for chemical constituents are generally lacking. DOE believes that the data presented in the EIS are sufficient to make comparative analyses between and among sites.

Information on waste forms and waste packages and containers is provided in the EIS to allow for a comparative analysis of alternatives for transportation and waste disposal. Treatment of the wastes prior to disposal is outside the scope of the EIS. Such treatment is assumed to be addressed prior to receipt of the waste at the GTCC LLRW and GTCC-like waste disposal facility. DOE agrees that it is important to immobilize long-lived radionuclides such as Tc-99 and I-129 prior to disposal. Solidification techniques (e.g., use of grout) are expected to immobilize certain wastes in the GTCC LLRW and GTCC-like waste inventory. If needed, the actual stabilization methods used will depend, in part, on the waste stream, packaging, and final disposal facility design. DOE considers the assumptions used for waste form stability (see Appendix B) to be reasonable for purposes of the comparative analysis provided in the EIS.

Western Governors' Association, Commenter ID No. L99 (W327) (cont'd)

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Page 4

appropriate packaging, and how this characterization informs choices of packaging, transport and disposal methods. L99-8 (Cont.)

5. Consideration of the Regional Low-level Waste Compacts
Due to the lack of information provided on characterization of waste, it is unclear whether the disposal of GTCC and GTCC-like wastes fall under the jurisdiction of the regional low-level waste compacts as authorized by Congress. L99-9

Recommendation: The EIS should account for all applicable oversight and regulatory authorities as it evaluates individual sites.

6. Summary Recommendation: Revise the Draft EIS
The Draft EIS should be revised and reissued to address the comments above and as summarized below:

- The matching of GTCC waste types with disposal alternatives should be reconsidered and more fully explained. L99-6 (Cont.)
- The selection of alternative sites should be reconsidered and explained in terms of their current uses, missions and regulatory constraints. L99-5 (Cont.)
- Alternative sites should be linked with waste type/disposal options and evaluated in terms of siting criteria identified above. L99-6 (Cont.)
- The DOE commitment to the siting principles of volunteerism and consent and, regarding any Western sites, to WGA Policy resolutions should be discussed and explained. L99-5 (Cont.)
- The analysis of transportation impacts should be developed to consider routing, route preparation and emergency response; and the minimization of transportation impacts, particularly regarding activated metals, should be considered in the identification and selection of site alternatives. L99-7 (Cont.)
- The GTCC waste characterization process should be discussed and the implications for packaging, packaging costs and transportation options should be explained. L99-8 (Cont.)
- The implications of regional low-level waste compacts for GTCC waste disposal and requirements for NRC certification should be considered and explained. L99-9 (Cont.)

Thank you again for the opportunity to review the EIS and we appreciate your attention to our comments and recommendations.

Sincerely,

C.L. "Butch" Otter
Governor of Idaho
Chairman

Christine Gregoire
Governor of Washington
Vice Chair

The waste characteristics and physical form would have to meet the disposal facility waste acceptance criteria. It is expected that these waste acceptance criteria would identify requirements (such as allowable concentrations) for individual radionuclides, including Tc-99 and I-129. The specific waste forms and packages used to dispose of GTCC LLRW and GTCC-like wastes would be determined in the future as part of the waste acceptance criteria and packaging requirements developed. See the discussion in Section B.5 and C.9.4.2 of the EIS for more information on packaging requirements. All GTCC LLRW and GTCC-like wastes would be packaged and transported in accordance with all applicable federal and state requirements, and waste disposal activities would be conducted in accordance with appropriate requirements.

L99-9 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

Whiteaker Community Council, Commenter ID No. T173

Capital Reporting Company 45

MR. BROWN: Louisa. Eva Kronin will follow you.

MS. HANACHEK: I'm Louisa Hamachek from Eugene, and I'm the chair of the Whiteaker Community Council, our neighborhood association, and we have agreed that we oppose the transportation of nuclear waste through our neighborhood. Our neighborhood has a smaller highway. We're about a mile and a half from I-5. We have a smaller highway that is the one chosen as the detour route if there's an accident on I-5, which means that the nuclear trucks would come through our neighborhood. And we have decided to oppose that and not allow any nuclear waste trucks to come through our neighborhood. T173-1

T173-1 Some shipments of GTCC waste may be subject to DOT regulations for Highway Route Controlled Quantities. As such under 49 CFR 172.403, GTCC waste can only be transported on State approved routes that minimize radiological risks. The preferred route for such materials is on the interstate system. In the event of an accident, the detour route must be approved by the state. Given the location of Whiteaker in Eugene, OR., a very limited number of GTCC waste shipments would be routed via Interstate 5 to any of the disposal sites analyzed in the GTCC EIS.

Women for a Better World, Commenter ID No. W21

From:	gtcceiswebmaster@anl.gov
Sent:	Sunday, May 15, 2011 12:58 PM
To:	gtcceiswebmaster@anl.gov
Subject:	Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10021

Thank you for your comment, Stephanie Hiller.

The comment tracking number that has been assigned to your comment is GTCC10021. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: May 15, 2011 12:57:51PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10021

First Name: Stephanie
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Address: 1500 Pacheco Street #111
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Comment Submitted:
I realize that in these hearings and comments DOE and associated agencies prefer rational arguments based on evidence and presented in as scientific a manner as possible. But I am going to try to appeal to your hearts.

Truth is more a matter of the heart than of the brain, and it's time we accepted the rule of heart instead of the tricky machinations of our intellects so easily made to serve our craven hunger for money, conquest of land, and domination of whoever has the misfortune to stand in the way of our relentless movement across the planet, heedless of the destruction in our wake.

Today Fukishima and yesterday Three Mile Island and Chernobyl. Downwinders of the Nevada Test Site and Alamagordo. Neighbors in the vicinity of leaking nuclear plants in the United States and other countries. The fate of uranium miners, soldiers too close to nuclear tests, and others. All show that the spread of radioactive materials throughout our planet is killing us. Cancer rates have risen exponentially since the making of the first bomb. Victims of depleted uranium bombing are giving birth to hideously deformed children. Radiation is wrecking our immune systems and our genome, wasting and polluting essential but diminishing natural resources like soil and water effectively forever, and for what? W21-1

We are not deluded about the "environmental benefits" of nuclear power. The nuclear reactor process has proven to be too dangerous for humans to handle. No adequate form of disposal has been found for the waste. We don't need it and we don't want it. We do not want our state to become a National Sacrifice Zone for the nuclear industry. We want you to stop producing that waste, and then we will consider supporting you in exercising the highest possible caution in storing the nearly one million tons of waste you have already created.

1

W21-1 Stopping the generation of nuclear waste is outside the scope of the GTCC EIS, the scope of which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluates the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes in compliance with the requirements specified in NEPA, the Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240), and Section 631 of the Energy Policy Act of 2005 (P.L. 109-58). The GTCC EIS evaluates the potential environmental impacts of the proposed disposal alternatives for GTCC LLRW and GTCC-like wastes. Based on the evaluation, DOE has determined that there are safe and secure alternatives for the disposal of GTCC LLRW and GTCC-like wastes. The GTCC EIS provides information that supports this determination, and, as discussed in Section 1.1, Purpose and Need for Agency Action, DOE is responsible for the disposal of GTCC LLRW and GTCC-like wastes.

Women for a Better World, Commenter ID No. W21 (cont'd)

Thank you.

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

2

Women's International League for Peace and Freedom, Commenter ID No. T116

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19 MR. BROWN: Thank you. Georgia is next.
20 Konneth Hodge is after her.
21 MS. PINKEL: I'm Georgia Pinkel, and the
22 co-convener of the Women's International League for
23 Peace and Freedom, Portland branch. And, of course,
24 my branch, as well as national and international,
25 supports you in this effort to stop the further

Women's International League for Peace and Freedom, Commenter ID No. T116 (cont'd)

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pollution of our area.

For those that have the little book that they were handing out, on page S16 it shows you where all of that nuclear waste is going to come from. It's all east of the Mississippi. It seems to me we ought to set our scientists to find a way to neutralize it where it sits instead of hauling it all around the countryside. We're opposed to the trucks or the trains. We are dismayed that Hanford is still polluted, and we have had very little effective cleanup in spite of the amount of money that has been spent. T116-1

I think I'll leave you just with this idea. Oh, besides this (pointing to her shirt.) My shirt says, Democracy is not a spectator sport. You guys know that. We need to let everybody know that, and we need to work towards the situation where public opinion becomes public policy. We need to take back our sovereignty and to make them listen to what we are saying and to believe us.

So WIL says, indeed, the only sane approach is to cease production of nuclear weapons and nuclear power plants and to begin dismantling both for the welfare of the entire earth. T116-2

Thank you.

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T116-1 The EIS considered the range of reasonable alternatives for disposal of the inventory of GTCC LLRW and GTCC-like wastes identified for inclusion in these analyses. The development of treatment methods was considered to be outside the scope of the EIS.

T116-2 Stopping the generation of nuclear waste from nuclear power production and the production of nuclear weapons are outside the scope of this EIS, which is to evaluate disposal alternatives to enable the selection of a safe alternative or alternatives for the disposal of GTCC LLRW and GTCC-like waste.

Woodstock Neighborhood Association, Commenter ID No. W266

From: gtcceiswebmaster@anl.gov
Sent: Thursday, June 16, 2011 2:59 PM
To: gtcceiswebmaster@anl.gov
Subject: Receipt: Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10266

Thank you for your comment, Lonnie Port.

The comment tracking number that has been assigned to your comment is GTCC10266. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 16, 2011 02:59:12PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10266

First Name: Lonnie
Middle Initial: L
Last Name: Port
Organization: Woodstock Neighborhood Association
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City: Portland
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Privacy Preference: Don't withhold name or address from public record

Comment Submitted:
Secretary Chu and Mr. Edelman:

Please remove the Hanford Nuclear Reservation from the U.S. Department of Energy's list of candidate sites for a permanent nuclear waste dump site to store radioactive materials coming from across the United States. Hanford is the wrong place to transport and dispose of more highly dangerous radioactive material. W266-1

Hanford is already the most contaminated site in the Western Hemisphere and the Department of Energy is already engaged in one of the largest and most complex cleanup projects in U.S. history at Hanford. The number one priority should be to stop waste from leaking into the Columbia River and clean up the existing waste at Hanford. No new nuclear waste should be stored at Hanford. W266-2

This proposal means that thousands of trucks with dangerous radioactive waste would be traveling along interstate routes, passing through our cities and the Columbia River Gorge National Scenic Area. I-84 travels the length of the Gorge and is often within a few feet of homes, schools, critical wildlife habitat and the Columbia River. The risk of an accident is simply too great, and the environmental and human health costs are unacceptable.

The Draft Environmental Impact Statement (DEIS) fails to consider the risks involved in transporting these waste materials to Hanford. The DEIS does not include a 2008 USDOE study that estimated 800 adult cancer deaths would occur due to ambient radiation from the transport vehicles alone. Nor does the DEIS include the unimaginable number of deaths and environmental damage resulting from a truck accident, an earthquake or an intentional attack. W266-3

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W266-1 The disposal methods and sites evaluated in the EIS represent the range of reasonable alternatives for the disposal of GTCC LLRW and GTCC-like wastes. This range is consistent with NEPA implementing regulations in Parts 1500–1508 of Title 40 of the Code of Federal Regulations (40 CFR Parts 1500–1508). In this GTCC EIS, DOE analyzed a range of disposal methods (i.e., geologic repository, near-surface trench, intermediate-depth borehole, and above-grade vault) and federally owned sites (i.e., Hanford Site, INL, LANL, NNSS, SRS, and the WIPP Vicinity, for which two reference locations – one within and one outside the WIPP Land Withdrawal Boundary – were considered). DOE has determined that it was reasonable to analyze these six sites because they currently have operating radioactive waste disposal facilities, except for the WIPP Vicinity, which is near an operating geologic repository.

DOE also conducted a generic evaluation of commercial disposal facilities on nonfederal lands in the EIS to order to provide, to the extent possible, information regarding the potential long-term performance of other (nonfederal) locations for siting a GTCC waste land disposal facility.

Final siting of a disposal facility for GTCC LLRW and GTCC-like wastes would involve further NEPA review as needed and be in accordance with applicable laws and regulations and would involve local stakeholder involvement and consent.

W266-2 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

W266-3 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

However, regardless of where the GTCC waste disposal facility is ultimately located, a relatively small amount of GTCC LLRW and GTCC-like wastes may be transported through the Columbia River Gorge on their way to the disposal facility. The waste would be generated within the states of Oregon and Washington and would include actinide sealed sources and Cs-137 irradiators from local medical institutions, research facilities, universities, and other NRC and Agreement State licensees.

The transportation of radioactive waste will meet or exceed DOT and NRC regulatory requirements that promote the protection of human health and the environment. These regulations include requirements for radioactive materials packaging, marking, labeling, placarding, shipping papers, and highway routing. The waste shipments would be on preferred routes, which are interstate highways or alternative routes designated by a state routing agency in accordance with DOT regulations (49 CFR Part 397, Subpart D). The GTCC LLRW and GTCC-like wastes would be shipped in approved waste packages and transportation casks. The robust nature of these casks limits the potential release of radioactive and chemically hazardous material under the severest of accident conditions. It is unlikely that the transportation of GTCC LLRW and GTCC-like wastes to any of the alternative sites evaluated in the EIS would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents.

The EIS evaluated the transportation impacts from the shipments that would be required to dispose of all of the GTCC LLRW and GTCC-like wastes at the various disposal sites. The EIS addressed the collective population risks during routine conditions and accidents, the radiological risks to the highest exposed individuals during routine conditions, and the

Woodstock Neighborhood Association, Commenter ID No. W266 (cont'd)

Finally, on the 25th Anniversary of the Columbia River Gorge National Scenic Area Act, we should celebrate the past and future protection of the Columbia Gorge--not propose more dangers to this national treasure.

I am joined in opposition to transporting more nuclear waste to Hanford by Friends of the Columbia Gorge, Heart of America Northwest, Columbia Riverkeeper, 17 Oregon legislators, Congressman Earl Blumenauer, U.S. Senator Merkley, U.S. Senator Wyden and many others.

Thank you for your time and consideration.

Lonnie Port
Portland, Oregon
Board Member of the Woodstock Neighborhood Association

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2

consequences to individuals and populations as a result of transportation accidents, including those that could release radioactive or hazardous chemical materials. About 12,600 shipments would be required to transport all of the GTCC LLRW and GTCC-like wastes to the Hanford Site for disposal. This would result in about 50 million km (30 million mi) of highway travel, with no expected LCFs. One fatality directly related to an accident might occur (see Section 6.2.9.1).

The EIS also evaluated the impact of intentional destructive acts that could occur during waste handling, transportation, and disposal (see Section 2.7.4.3 of the EIS). The potential for such destructive acts is low. DOE sites considered in the EIS are secured, and the packaging for the GTCC LLRW and GTCC-like wastes would be robust. The GTCC LLRW and GTCC-like wastes are not readily dispersible, and the impacts from any attempts to disperse these materials during transportation (such as the impacts from an explosive blast) would be greater than the impacts from any potential release of radioactivity. Impacts from severe natural phenomena, such as earthquakes and tornados, would not be expected to be significant, given that the GTCC LLRW and GTCC-like wastes are largely not dispersible and given the robust nature of the waste packages and containers.

DOE's standard operating procedure for transportation of radioactive waste is developed and continually revised to ensure that the utmost protection of public health and the environment is achieved and that the risk of a traffic accident is minimized. For example, DOE has established a comprehensive emergency management program (Transportation Emergency Preparedness Program or TEPP) that provides detailed, hazard specific planning and preparedness measures to minimize the health impacts from accidents involving loss of control over radioactive material or toxic chemicals. DOE's TEPP was established to ensure that its contractors and state, tribal, and local emergency responders are prepared to respond promptly, efficiently, and effectively to accidents involving DOE shipments of radioactive materials.

If an accident that involved a release of radioactive material to the environment occurred, it would be remediated promptly in accordance with these procedures. These measures would help DOE minimize and mitigate any impacts on the environment.

A number of commenters indicated they believed shipping offsite waste would result in 800 LCFs. This value for transportation risk does not exist in this GTCC EIS. DOE believes that the value of approximately 800 LCFs, cited in the public comments, is from the results provided in the *Draft Global Nuclear Energy Partnership Programmatic Environmental Impact Statement* (GNEP PEIS) regarding transportation of spent nuclear fuel (SNF) and HLW. This value represents the maximum impacts associated with 50 years of transportation activities supporting the operations of all existing U.S. commercial light-water reactors if they all were replaced with high-temperature, gas-cooled reactors. The GNEP PEIS was canceled by DOE on June 29, 2009 (74 FR 31017).

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293

From:	gtcceiswebmaster@anl.gov
Sent:	Monday, June 27, 2011 4:15 PM
To:	mail_gtcceisarchives; gtcceiswebmaster@anl.gov; gtcceis@anl.gov
Subject:	Greater-Than-Class-C Low-Level Radioactive Waste EIS Comment GTCC10543
Attachments:	6-27-2011,_Yakama_Nation_Comment_Package,_GTCC_EIS_GTCC10543.pdf

Thank you for your comment, Russell Jim.

The comment tracking number that has been assigned to your comment is GTCC10543. Please refer to the comment tracking number in all correspondence relating to this comment.

Comment Date: June 27, 2011 04:15:24PM CDT

Greater-Than-Class-C Low-Level Radioactive Waste EIS Draft Comment: GTCC10543

First Name: Russell
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Attachment: C:\fakepath\6-27-2011, Yakama Nation Comment Package, GTCC EIS.pdf

Questions about submitting comments over the Web? Contact us at: gtcceiswebmaster@anl.gov or call the Greater-Than-Class-C Low-Level Radioactive Waste EIS Webmaster at (630) 252-5705.

1

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

received
JUN 27 2011

Confederated Tribes and Bands of the Yakama Nation

Established by the Treaty of June 9, 1855

June 21, 2011

Arnold Edelman, EIS Document Manager
Office of Environmental Management
U.S. Department of Energy
Cloverleaf Building, EM-43
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Edelman,

This letter summarizes the Yakama Nation's comments and concerns regarding the proposed action alternatives presented in the Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D). Our review of the Draft GTCC EIS has found that it is deficient in a number of areas, and will require substantial revisions. Key elements must be thoroughly redone in order for the revised Draft GTCC EIS to be considered technically and legally adequate. We have provided a detailed evaluation of the elements in the attachments that accompany this letter.

The Yakama Nation's vision for the cleanup and closure of the Hanford Site is based on several important principles:

- Recognition of the Yakama Treaty of 1855 as an applicable federal requirement.
- Compliance with Yakama Nation treaty rights, including full access to cultural and natural resources within the ceded land and aboriginal territory, including on the Hanford Site.
- Protection of Yakama Nation tribal members' health and the environment by reducing contamination to levels that are safe under any exposure scenario and for all tribal uses.
- Implementation of permanent cleanup actions that do not rely on the use of long-term institutional controls, stewardship, or surface barriers to prevent exposure to dangerous radionuclides, hazardous chemicals, or other substances.

The key issues or deficiencies in the Draft GTCC EIS include, but are not limited to, the following:

- The Hanford Site is not an appropriate location for the disposal of any additional off-site nuclear waste of any classification for a number of reasons, including the site's proximity to the Columbia River and the high hydraulic conductivity of Hanford soils, the presence of extensive contamination throughout site soils and groundwater, and the direct conflict with L293-1

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L293-1 As discussed in Section 1.4.3, the consideration of Hanford as well as the other sites is based on mission compatibility (i.e., only DOE sites that currently have radioactive waste disposal facilities). These DOE sites have supporting infrastructure already in place that might be useful for future potential GTCC waste disposal activities. Other factors considered were sufficient depth to groundwater, not be located in a 100 year floodplain or in wetlands, consistent with current land use plans and have a low probability for erosion, mass wasting, faulting, folding, and seismic activity that would occur often enough and to a large enough extent that the facility's performance would be affected.

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

Regarding the Yakama Nation's perspectives about tribal treaty rights allowing unrestricted access at Hanford, DOE respectfully disagrees. This EIS presents relevant and essential information important to the evaluation of potential environmental impacts, consistent with NEPA's primary goal of full disclosure to the public as well as agency decision makers. This includes discussion of the history of the settlement of Hanford and the treaties entered into between tribal nations and the U.S. government. There is substantial documentation indicating that the tribes understood at the time these treaties were signed that the lands were no longer "unclaimed" when they were claimed for the purposes of the white settlers' activities. DOE is not aware of any judicially recognized mechanisms that would allow these lands to revert to "unclaimed" status merely through the process of being acquired by the federal government. The portion of Hanford that remained in the public domain in 1943, as well as all the acquired lands, were closed to all access initially under authority of the War Powers Act and then under authority of the AEA. It is therefore DOE's position that the Hanford lands are neither "open" nor "unclaimed." However, the Yakama Nation are active participants in decisions regarding Hanford and their concerns have been considered by DOE in the development of this GTCC EIS.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

ongoing site cleanup activities that have cost tens of billions of dollars over the past 20 years. L293-1 (Cont.)

- The cumulative impacts analysis for the Hanford Site fails to account for the extensive, and in many cases severe contamination already in place. The levels of contamination observed means that addition of any new waste will push already unacceptable exceedances of applicable or relevant and appropriate requirements even higher. L293-2
- Greater-Than-Class-C waste poses a serious threat to human health and the environment, and should be disposed of in accordance with the requirements set by the Nuclear Regulatory Commission in 10 CFR 61, in a deep geologic repository. While the WIPP facility is considered, the Draft GTCC does not consider a new deep geologic repository for disposal of the identified source term. This alternative should be included and evaluated. L293-3
- The proposed action alternatives incorporate a large number of unrealistic and unreasonable assumptions in order to meet performance requirements. Evaluation of many of these assumptions demonstrates that the alternatives would not be able to meet even the most basic performance criteria for disposal of the wastes. L293-4
- The proposed action alternatives presented in the Draft GTCC EIS rely heavily on the use of institutional controls to reduce exposure to disposed waste. Such designs do not respect Treaty Rights or federal trust responsibilities, and are not realistic over the timeframes required for GTCC waste to decay to safe levels. L293-5
- The supporting analysis for the proposed action alternatives is deficient. In particular the sensitivity analysis fails to evaluate any parameters under circumstances worse than the USDOE's base case, which is itself unrealistic. L293-6

The Yakama Nation does not support inclusion of the Hanford Site as a candidate location for the construction of a new GTCC waste disposal facility. A preliminary analysis should have resulted in this site's disqualification from further consideration. Furthermore, the Yakama Nation does not support the importation of new, highly radioactive, and long-lived waste to the site for shallow disposal.

The selection of any alternative that includes the importation of additional waste to the Hanford Site would result in substantial violations of federal environmental standards (including drinking water standards) over a broad geographic area for a period of thousands of years, and would increase already severe threats to the Columbia River, a resource of cultural, regional, and national importance. L293-7

The presence of high levels of contamination has already resulted in Yakama tribal members being unable to fully exercise their Treaty-reserved rights at the Hanford Site. Implementation of the proposed action alternatives would constitute further violation of these rights. In the event that Hanford remains a location under consideration, the Yakama Nation has provided extensive comments regarding necessary revisions to the proposed action alternatives; however, these comments should not be construed in any way as an acceptance of the proposal to develop, operate, and manage a new disposal facility at the Hanford Site.

L293-2 DOE has considered cumulative impacts at the Hanford Site in this GTCC EIS. The disposal of GTCC LLRW and GTCC-like waste at the Hanford Site could result in environmental impacts that may warrant mitigation for Tc-99 and I-129 through limiting receipt of these waste streams (see Table 6.2.4.2 and Figure 6.2.4.1 in this EIS).

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

L293-3 DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault).

The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur. The GTCC EIS evaluation also indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L293-4 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

We request that you revise the Draft GTCC EIS to correct the deficiencies that have been identified and described in this letter and the accompanying comments. We also request that a revised Draft GTCC EIS that identifies a preferred alternative be circulated for public review and comment. L293-8

Sincerely,

Harry Smiskin, Chairman, Yakama Tribal Council

cc/enc: Moses Squeochs, General Council Chairman
Donald Isadore, Jr., Yakama Tribal Council
Warren Spencer, Jr., Yakama Tribal Council
Sam Jim, Sr., Yakama Tribal Council
Phil Rigdon, YN DNR Deputy Director
Russell Jim, Manager, ER/WM Program

measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

L293-5 DOE appreciates the input provided by the Santa Clara Pueblo, the Pueblo de San Ildefonso, and the Confederated Tribes and Bands of the Yakama Nation on the EIS, both in the tribal narratives and in comments on the Draft EIS. This input was considered by DOE in identifying the preferred alternative.

In the EIS, it was assumed that institutional controls of the land disposal units would be maintained for 100 years and that corrective measure could be implemented during this time period to ensure that the engineered barriers lasted for at least 500 years. This assumption is consistent with the institutional control time frame given in both NRC and DOE requirements and was determined to be a reasonable approach for assessing the long-term performance of the disposal units in the EIS.

In evaluating the performance of the proposed land disposal facilities, a number of engineering measures were assumed in the conceptual facility designs to minimize infiltration of water into the wastes and thereby minimize contaminant migration from the disposal units. These measures would also limit exposure pathways, such as the ingestion of plants having very long roots. It was assumed in this EIS that these measures would remain intact for 500 years after the disposal facility closed. Any defects identified in the disposal facilities were assumed to be corrected during the 100-year institutional control period, so that the 500-year time period would be met.

While this time period of 500 years may not be long enough to be of relevance to various American Indian tribes, it was determined to be a reasonable basis to use for comparing the merits of various land-disposal concepts and sites in the EIS and to allow for the selection of a preferred alternative.

L293-6 The stability of one of the waste forms (i.e., the grout material for Other Waste) was evaluated in the sensitivity analysis by varying the effective retardation period of the release of radionuclides. There are many parameters that could affect the modeling results that could be addressed in a sensitivity analysis. However, the essential effects of many of these parameters are the same (i.e., affecting when and how much water would enter the waste containers and contact the waste materials). In the GTCC EIS, both the influence of the water infiltration rate and the influence of when water would enter the waste containers on the dose results were addressed.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

Attachment 1

Yakama Nation ERWM Program General Comments on the *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* (DOE/EIS-0375-D)

This Attachment 1 presents the Yakama Nation Environmental Restoration and Waste Management (ERWM) Program's general comments on the U.S. Department of Energy's (USDOE) Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (referred to here as the Draft GTCC EIS). The general comments presented here summarize the major issues and concerns identified by ERWM on behalf of the Yakama Nation. Attachment 2 presents targeted comments keyed to specific sections or pages of the Draft GTCC EIS. Attachment 3 provides additional detailed comments prepared by the Institute for Energy and Environmental Research (IEER).

ERWM finds that all of the proposed action alternatives are deficient in numerous ways. Primarily, the proposed action alternatives do not comply with environmental regulations or important criteria such as the federal drinking water standards. Furthermore, the proposed action alternatives will result in unacceptable environmental consequences. It is our position that the Draft GTCC EIS must be thoroughly reanalyzed and reevaluated. A revised EIS that addresses the issues and deficiencies identified by the Yakama Nation in its letter, to which this document is an attachment, should be released for public review. The key issues and deficiencies are expanded upon below.

Comment 1. Hanford should not be considered for construction of a GTCC waste disposal facility.

Comment 1a. The Hanford Site is not appropriate for the disposal of additional nuclear waste.

The Hanford Site was evaluated in 1942 as a location on which to build a massive wartime industrial production facility. The features that were found attractive at that time included access to abundant clean water in the Columbia River; loose gravelly and sandy soils covering much of the site; the presence of large quantities of electrical power; access to railroads; significant tracts of land that remained undeveloped; and the relative ease with which the land could be condemned, its residents evicted, and the property withdrawn from the public domain (Gerber, 2002). L293-9

Modeling results can be very sensitive to some factors, such as the Kd for a given radionuclide. Care was taken to use average site values for such input parameters for comparison among alternatives. More extensive and detailed sensitivity analysis may need to be conducted during the implementation phase for a GTCC LLRW and GTCC-like waste disposal facility, based on more specific information on the engineering designs of the disposal facilities and their influence on the integrity of waste packages, waste containers, barrier materials, and the surrounding native soil (e.g., location-specific Kd values); however, the analysis provided in the EIS is sufficient to inform site and technology selection decisions.

L293-7 DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

L293-8 A preferred alternative is not required to be included in a Draft EIS. The Council on Environmental Quality regulations in 40 CFR 1502.14(e) specify that the section on alternatives in an EIS shall identify the agency's preferred alternative or alternatives, if one or more exists, in the Draft EIS and identify such alternative(s) in the Final EIS unless another law prohibits the expression of such a preference; that is, a preferred alternative shall be identified in the Draft EIS if one exists. If no preferred alternative has been identified at the Draft EIS stage, a preferred alternative need not be included. By the time the Final EIS is filed, 40 CFR 1502.14(e) presumes the existence of a preferred alternative and requires its identification in the Final EIS unless another law prohibits the expression of such a preference.

DOE did not have a preferred alternative at the time of issuance of the Draft EIS because of the complex nature of the proposed action and the potential implications for disposal of GTCC LLRW and GTCC-like wastes. To seek public input on how to identify a preferred alternative for inclusion in the Final EIS, the Draft EIS presented considerations for developing a preferred alternative in the Summary (in Section S.6) and in Section 2.9. As required by 40 CFR 1502.14(e), the Final EIS contains a preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes (see Section 2.10). In developing the preferred alternative, DOE took into consideration public comments on the Draft EIS, public EIS scoping comments, and other factors identified in Sections S.6 and 2.9 of the EIS.

The publication by the EPA of a NOA of the Final EIS in the Federal Register initiated a 30-day public availability or "waiting" period. While the availability period is not a formal public comment period, the public can comment on the Final EIS, including the preferred alternative, prior to final agency action. Comments received will be addressed by DOE in a ROD.

As required by the Energy Policy Act of 2005, (P.L. 109-58), DOE must submit a Report to Congress that includes the alternatives considered in the EIS and await Congressional action before making a final decision regarding which alternative(s) to implement. The Report to Congress will be made available to the public on the GTCC EIS website (http://www.gtcceis.anl.gov/).

L293-9 See response to L293-1.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

With the exception of the relatively large expanse of land that remains empty under federal control, *none* of the characteristics described above is considered desirable for the purposes of disposing of long-lived, dangerous radioactive waste. Many of these characteristics, such as proximity to the Columbia River and the high hydraulic conductivity of Hanford soils (i.e., loose gravelly and sandy) are *undesirable* when disposing of nuclear waste.

In the 1980s, during the federal government's search for a location to construct a high-level waste repository, the Hanford Site was found to have several questionable site features, including high geothermal gradients, rapid groundwater flow rates, unusually high shear stresses in bedrock basalt, and local seismicity that made the site unsuitable for repository construction (White,1983). Regardless of these characteristics, the status of the Hanford Site as a solely federally held, pre-existing facility that was already substantially contaminated with nuclear waste proved attractive enough that it was included on the short list for consideration as the site of a high-level waste repository.

Based on the analyses and supporting documentation provided by the Draft GTCC EIS, it appears that the Hanford Site's inclusion as an area under consideration for construction of a GTCC low-level radioactive waste (LLRW) disposal facility is not based on advantageous site characteristics or on sound technical analysis, but rather on political expediency and present site status that includes high levels of pre-existing contamination. While the urgencies associated with World War II and the relative lack of knowledge regarding the dangers, toxicity, environmental behavior, and lasting legacy of nuclear waste may not have provided sufficient reason to reconsider construction of the Hanford Site in 1942, we can apply significantly more information and collective knowledge today when evaluating the site as a location for future disposal of highly radioactive and long-lived nuclear waste. L293-9 (Cont.)

The past activities at the Hanford Site have resulted in extensive contamination throughout site soils and groundwater, making the addition of new waste to the site unacceptable from both a moral and regulatory perspective. Furthermore, the importation of new waste to Hanford is directly contrary to the goals and actions of site cleanup activities that have cost tens of billions of dollars over the past 20 years. Finally, the importation of new waste to the Hanford Site is not compatible with Yakama Nation treaty rights.

Recommendation 1a. The Hanford Site should be removed from consideration in the revised Draft GTCC EIS. The Hanford Site should not be considered further as an appropriate location for the disposal of additional off-site nuclear waste[1].

Comment 1b. The Hanford Site is geologically unsuitable for GTCC waste disposal. L293-10

[1] Comments that propose revisions to Hanford Site-related content in the Draft GTCC EIS have been included in the event that Hanford remains under consideration, against ERWM's recommendation. Inclusion of revision comments regarding the Hanford Site should not be construed in any way to imply, implicitly or otherwise, that the Hanford Site is an acceptable location for disposal of nuclear waste.

L293-10 The site-specific environmental factors – seismicity, volcanism, and flooding – were evaluated in the EIS as appropriate. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

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Nuclear Regulatory Commission (NRC) licensing requirements for land disposal facilities (10 CFR 61) require that for a site to be considered suitable for near-surface disposal, it must be *devoid of tectonic processes such as faulting, folding, seismic activity, or volcanism.* The Hanford Site is located within the seismically active Pasco Basin within the larger Yakima Fold Belt, where tectonic compression continues to the present day (Reidel et al., 1993; Bakun et al., 2002).

Earthquakes in the Hanford region have been calculated to have magnitudes as large as 6.8 (intensity magnitude, M_I; the moment magnitude, M_W, was 6.5 to 7.0 at 95 percent confidence) (Bakun et al., 2002). The potential for earthquakes with magnitudes greater than 7.1 has been identified through focal paleoseismic studies (West et al., 1996). In 1872, shaking from a magnitude 6.8 earthquake resulted in "damage intensities [of Modified Mercalli Intensity VI[2]] that extended west throughout the now densely populated Puget Sound basin and southeast to beyond the Hanford Nuclear Reactor Site" (Stover and Coffman, 1993). The event triggered many landslides within the Columbia River Gorge and resulted in other subsidence in the area.

Hanford was regularly swept by massive glacial outburst flooding from Glacial Lake Missoula in the recent geologic past. These floods deposited the glaciofluvial sedimentary units that currently mantle the site bedrock (Fecht and Marceau, 2006), which the proposed action alternatives would use for permanent disposal. L293-10 (Cont.)

Further, the Grand Coulee Dam (constructed 1933–1942) is approximately 200 miles upstream of the Hanford Site on the Columbia River. While the Draft GTCC EIS briefly considers the extent of a probable maximum flood in the Columbia River and potential 25 percent and 50 percent failure of Grand Coulee Dam, no analysis was made of the effects of a 100 percent dam failure or glacial outburst flooding of the site.

Such events should be considered in the site selection process given the timescale over which GTCC and GTCC-like waste will remain dangerous. Large erosive events such as those that could result from glacial outburst flooding or wholesale failure of dams on the Columbia River could remove a significant portion of the overburden used to isolate the disposed waste. Volcanic damming of the Columbia River or the upstream pooling of water that occurs during glacial outburst flooding could result in complete submersion of the disposal facility[3]. The USDOE presumes that the rate of waste migration is directly proportional to the infiltration rates,

[2] "...[T]he Modified Mercalli Intensity Scale...[is] composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction...The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage...[An abbreviated description of Level VI intensity is:] Felt by *all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight*" (USGS 2011b).

[3] Pooling of water at elevations that exceed those observed at the Central Plateau has been recorded in the geologic record through deposition of the Touchet Beds, which were described by Newcomb et al. (1972).

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which means that such an event could result in large-scale mobilization of wastes over a very short period, invalidating many of the assumptions used to control the dose to exposed individuals outside the disposal facility.

Recommendation 1b. The revised Draft GTCC EIS should acknowledge and address the risks described in this Attachment 1 and the relevant references. Any further analysis performed for the Hanford Site should evaluate scenarios in detail that include: L293-10 (Cont.)

- ***100 percent failure of Grand Coulee Dam and lower Columbia River dams***
- ***Volcanic damming of the Columbia River and flooding of the Hanford Site***
- ***Glacial outburst flooding at the Hanford Site***

Comment 2. GTCC waste should be disposed of in a deep geologic repository.

In accordance with NRC regulation 10 CFR 61, GTCC waste must be disposed of in a deep geologic repository unless alternative methods of disposal are proposed to and approved by the NRC. This regulation was enacted in due deference to the danger posed by the high activity, long half-lives, and high biologic quality factors of the wastes that fall into the GTCC classification. The proposed action alternatives included in the Draft GTCC EIS do not adequately isolate and contain the wastes, protect the public, or limit public exposure sufficiently to meet the requirements in 10 CFR 61.

The proposed action alternatives are clearly deficient when evaluated in the context of the highly variable and frequently suboptimal conditions imposed by the real world, as opposed to the static and favorable conditions used in the Draft GTCC EIS to evaluate the alternatives' performance. Attachment 3 provides an alternative analysis of the proposed action alternatives. The alternative analysis demonstrates using *the same information provided in the Draft GTCC EIS* that the proposed action alternatives fail to meet regulatory compliance using the unaltered RESRAD-OFFSITE modeling software. Although appropriate documentation was not provided in the Draft GTCC EIS, it appears that the USDOE chose to modify the existing, accepted software in order to achieve an acceptable level of performance from the proposed action alternatives. This approach is not acceptable and must not be used in the revised Draft GTCC EIS or for the purposes of comparing the proposed action alternatives. L293-11

The USDOE has justified its failure to include an alternative for a new deep geologic repository on the premise that the total waste volume does not justify construction of a new facility. While this claim could be acceptable when considered in a vacuum, significant evidence suggests that a new deep geologic repository is required for the nation's nuclear waste and that constructing one should therefore be seriously considered. This evidence includes the Blue Ribbon Commission on America's Nuclear Future's consideration of a deep geologic repository for defense-related high-level waste, as well as the presence of many other orphan wastes that are

L293-11 See response to L293-3.

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not addressed in the Draft GTCC EIS, such as the large amounts of depleted or recycled uranium that are also unsuitable for shallow land disposal (see Attachment 3 for additional discussion of orphan source terms).

Finally, the justification applied by the USDOE in rejecting consideration of a new deep geologic repository ignores that such a facility, if built to appropriate standards, could be used for disposal of other highly radioactive and long-lived wastes. This is the same logic that is applied to *justify* the inclusion of the Waste Isolation Pilot Project (WIPP) facility for disposal of GTCC waste. L293-11 (Cont.)

> ***Recommendation 2. The revised Draft GTCC EIS should include an alternative for construction of a new deep geologic repository of appropriate size and specifications to meet all NRC 10 CFR 61 requirements for the identified source term, as well as other orphan wastes that have not yet been addressed. The new deep geologic repository alternative should be identified as the preferred alternative.***

Comment 3. Transuranic waste should be disposed of in accordance with regulatory requirements regardless of origin.

Waste inventory information provided in Appendix B of the Draft GTCC EIS identifies 402,000 curies of radioactivity that are attributable to transuranic (TRU) radionuclides. The estimated total volume of all the waste destined for disposal is approximately 12,000 cubic meters. Assuming that the entire waste volume has the density of solid rock[4], there is still enough TRU-derived activity to contaminate every cubic meter of waste proposed in the Draft GTCC EIS to more than 100 times the level specified in the Environmental Radiation Protection Standards (40 CFR 191). The Draft GTCC EIS identifies "about 56 percent of the entire waste inventory...[as meeting] the USDOE definition of TRU waste" (p. 3-18). This suggests that the aforementioned waste contains *at least* 100 times the transuranic radionuclide activity required for deep geologic disposal. L293-12

The origin of the TRU radionuclides addressed by the Draft GTCC EIS should be irrelevant when considering disposal alternatives, especially given that the USDOE has now assumed responsibility for the waste's disposal. The long half-lives and high biologic quality factor associated with transuranic waste justify the stringent disposal requirements described in 40 CFR 191. It is not acceptable to use the Draft GTCC EIS as an opportunity to improperly dispose of these dangerous wastes.

[4] Density of rock is approximately 2,600 kg/m^3. While the assumption that the entire inventory has the density of solid rock is not realistic, any correction for a more appropriate *lower* unit weight will only increase the concentration of transuranics per gram.

L293-12 DOE recognizes that including GTCC-like wastes within the scope of this EIS along with GTCC LLRW may complicate the implementation of GTCC LLRW disposal alternative(s). However, DOE determined that the most efficient approach was to address both types of waste, which have many similar physical and radioactive characteristics, in a single NEPA process. DOE's intent is to facilitate the overall process for addressing the disposal needs of both waste types. Issues associated with potential regulatory changes or NRC licensing would be addressed as necessary to enable implementation.

DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

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The Draft GTCC EIS indicates that 56 percent of the entire waste inventory is derived from cleanup operations at the West Valley Site, New York, and that much of this waste meets the USDOE definition of TRU waste. Importation of waste from the West Valley Site is directly contrary to the goals and objectives of more than 20 years of cleanup work performed at the Hanford Site. The intent of the West Valley Demonstration Project Act (P.L. 96-368), which charged the USDOE with responsibility for cleaning up the West Valley Site, was not that the USDOE would simply move dangerously contaminated waste to an alternative federally held site with a larger pre-existing inventory of waste. The existing level of contamination at the Hanford Site does not provide justification for importation of additional waste; on the contrary, it should be treated as a strong deterrent. L293-12 (Cont.)

> ***Recommendation 3. The revised Draft GTCC EIS should not consider waste that meets the definition of transuranic waste and transuranic-like waste for inclusion in any of the Draft GTCC EIS action alternatives or other alternatives that utilize shallow land burial. These wastes should be disposed of in a deep geologic repository.***
>
> ***The revised Draft GTCC EIS should include an alternative for construction of a new deep geologic repository that meets the disposal requirements for transuranic waste, including transuranic waste from the West Valley Site.***

Comment 4. The evaluation of cumulative impacts at Hanford is deficient.

The cumulative impacts analysis in the Draft GTCC EIS does not take into consideration the total inventory of pre-existing radioactive waste at the Hanford Site. The Draft GTCC EIS must consider all waste that is excluded or not discussed in the Tank Closure and Waste Management (TCWM) EIS (USDOE, 2009). Existing contamination at the site is the result of extensive waste disposal activities during plutonium production that included liquid waste discharges into open bottom cribs and trenches; leakage from waste tanks in the Central Plateau; operation of the US Ecology Low-Level Radioactive Waste Dump; and cleanup activities performed at the site. Importation of additional waste to the Hanford Site contravenes the efforts that have been pursued by the USDOE, the Washington State Department of Ecology, and the U.S. Environmental Protection Agency (USEPA) for the past 20 years to stabilize and remove radioactive contamination at the Hanford Site at a cost of tens of billions of dollars. L293-13

The high concentrations of technetium-99 (Tc-99) and iodine-129 (I-129) expected to be in Hanford groundwater (350,000 and 697 picocuries per liter [pCi/L]; respectively) as a result of waste disposal activities identified in the TCWM EIS for Alternative Combination 1 will significantly exceed compliance with USEPA groundwater maximum contaminant levels (MCLs). In the case of beta-emitting radionuclides, exceedances of the drinking water MCL range in magnitude from 700 times (in the case of I-129 alone) to more than 1,000 times (I-129 and Tc-99 together) the allowable limit.

L293-13 See response to L293-2.

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While the USDOE has found it prudent in the Draft GTCC EIS to suggest not adding waste that includes significant Tc-99 or I-129, such a measure would require the construction of multiple disposal facilities and ignores the reality that many other radionuclides are already present in the Hanford subsurface and groundwater including, but not limited to, strontium-90, cesium-137, and tritium. The addition of any beta-emitting radionuclide, or radionuclides with intermediate or long-lived beta-emitting daughter products, would ultimately result in even greater exceedances of applicable regulations, since all beta-emitters contribute toward a common MCL.

High levels of contamination are not confined only to beta-emitting radionuclides. As was the case with I-129 and Tc-99, the TCWM EIS estimates that uranium groundwater contamination will greatly exceed the applicable MCL of 30 pCi/L, even before the addition of the new wastes identified in the Draft GTCC EIS. However, the Draft GTCC EIS fails to acknowledge that such *an exceedance would already exist and does not suggest limiting the amount of uranium* brought to the Hanford Site. L293-13 (Cont.)

Finally, the Draft GTCC EIS fails to acknowledge and evaluate the significant concentrations of transuranic radionuclides already disposed of in the US Ecology site, the high concentrations of plutonium that are expected to reach the river corridor, and the large amounts of transuranics buried or discharged on the Hanford Site prior to 1970 (see Attachment 3 for additional detail). The Draft GTCC EIS *does*, however, propose to import more of all of these substances to the Hanford Site under the proposed action alternatives.

> ***Recommendation 4. The cumulative impacts analyses provided in the Draft GTCC EIS are so deficient that they should be discarded and redone in their entirety for the revised Draft GTCC EIS to take into full account the existing contamination as well as contamination that will result from future cleanup and disposal activities.***

Comment 5. The Draft GTCC EIS analysis of proposed action alternatives is deficient.

Comment 5a. Analysis of proposed action alternatives incorporates numerous unrealistic assumptions in order to "meet" performance requirements.

The Draft GTCC EIS analysis of the performance of the proposed action alternatives incorporates multiple simplifying assumptions, some stated explicitly and others implied. Many of these assumptions are not well justified and are generally unrealistic. Selected assumptions made in the Draft GTCC EIS are outlined below to provide some context for additional comments that follow. Flawed assumptions used in analysis of the proposed action alternatives include the following: L293-14

- *Surface barriers will function flawlessly, preventing all infiltration into the waste interval* for a minimum of 500 years.

L293-14 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

DOE believes that 500 years is a realistic time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

Estimated radiation doses and LCFs were calculated for each site and disposal concept for 10,000 years, and if the peak impact did not occur during this time frame, the analysis was extended out to 100,000 years. DOE believes that the assumptions made to support the long-term modeling calculations for the groundwater pathway are reasonable and enable a comparative evaluation of the impacts between alternatives. The results of the evaluation presented in the EIS are sufficient to inform the selection of sites and methods for disposal. Site-specific NEPA reviews would be conducted as needed.

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- Surface barriers will not become degraded as a result of environmental weathering or human or biological activity for a minimum of 500 years.
- Eroded or otherwise degraded barriers will maintain a minimum of 80 percent effectiveness at preventing infiltration into buried waste.
- Stabilizing grout or other forms of waste "improvement" will experience no degradation for a minimum of 500 years.
- Erosion rates at the site and of the engineered barriers will not exceed 0.01 millimeters per year for more than 10,000 years[5].
- Infiltration rates at the disposal site will not change at all over the next 10,000 or 100,000 years, and there will be no overland flow or irrigation at the site[6].
- Resident farmers or other occupants will never occupy, or otherwise disturb, land directly over the waste site, even with complete loss of institutional controls and memory. L293-14 (Cont.)
- All three near-surface disposal alternatives are of equal integrity despite differences in disposal depth, construction materials, waste concentration, and barrier use.
- Groundwater elevations will not change appreciably within the next 10,000 or 100,000 years.
- Waste will be leached only by precipitation that infiltrates straight down from within the disposal facility boundary. At no time during the next 100,000 years will the buried waste encounter lateral groundwater flow.
- Infiltration of precipitation surrounding the disposal facility is *completely uncontaminated*, and therefore dilutes any contaminated water that emanates from the facility.
- At no time in the next 100,000 years will a surface water exposure pathway develop within the disposal facility.

[5] This erosion rate is extremely low by geologic standards and rarely seen outside of very low-denudation environments acting on very strong or resilient rocks (Bierman and Turner, 1994; Brook et al., 1995), neither of which apply to surface barriers at Hanford.

[6] The assumed infiltration rate for the Hanford Site is 1 millimeter per year; this value is *lower* than the infiltration rate observed on the site at present. The Draft GTCC EIS acknowledges that a change of ±10 percent in precipitation is possible at the candidate sites. However, no discussion is included that describes the corresponding change in infiltration rate. Infiltration may increase significantly with a modest change in precipitation as a result of cooler temperatures (Musgrove and Schrag, 2006). Other complications that were not considered include precipitation falling as snow, which also increases infiltration relative to total precipitation, and deep root penetration into surface barriers, which would also enhance surface infiltration.

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Many of these assumptions are demonstrably false, such as the assumed erosion rate, restriction of infiltration to vertical flow, and cleanliness of the site soils. Other assumptions such as the presumption of barrier and grout performance generally contradict both published research and in some cases common sense (such as in the case of institutional controls). This is discussed in greater detail below. L293-14 (Cont.)

> ***Recommendation 5a. Analysis performed to support action alternatives in the revised Draft GTCC EIS must use realistic assumptions that accurately reflect environmental variables and human behavior.***

Comment 5b. Assumptions of barrier integrity and performance are unrealistic and poorly justified.

All of the proposed action alternatives presented in the Draft GTCC EIS rely on surface barriers in order to meet basic performance criteria in the first 10,000 years following facility closure. This is in part a reflection of the USDOE's assumption that the release of radionuclides from disposed GTCC and GTCC-like waste is directly proportional to the infiltration rate of water through the waste (p. 6-91; Appendix E).

The Draft GTCC EIS characterizes the assumptions of barrier and waste stabilization performance as "conservative because the engineered systems (including the disposal facility cover) [will] last longer than 500 years even in the absence of active maintenance measures" (Appendix E). No substantive documentation is offered to support this assertion. However, such assumptions are not conservative and are not consistent with published research. L293-15

Degradation of surface barriers that can reasonably be expected to occur and that could lead to decreased performance include damage from desiccation, freezing, and thawing; differential settlement; deep root penetration by trees or other vegetation; and burrowing by terrestrial mammals, insects, or birds. Research by Smith et al. (1997) found that even without direct human intrusion or vandalism, natural biologic activity may significantly compromise barrier integrity through animal burrowing activity and root intrusion. As part of their conclusions, Smith et al. suggested that monitoring and maintenance of capped, inactive, hazardous waste burial sites should be continued *indefinitely* and not end after the period mandated by regulatory requirements.

In fact, long-term performance problems associated with surface barriers are hardly unusual. In a case study performed in Wenatchee, Washington, Benson and Khire (1997) found that after just two years of observation, cumulative percolation into a test clay barrier had increased from 1 to 3 centimeters as a result of extensive cracking associated with desiccation[7].

[7] Wenatchee is approximately 70 miles north-northwest of the Hanford Central Plateau and shares climate characteristics as well as orographic patterns with the Hanford Site.

L293-15 See response to L293-14.

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The National Research Council's *Assessment of the Performance of Engineered Waste Containment Barriers* provided an example in which 22 of 77 test pads in active landfills did not achieve their goal hydraulic conductivity when tested (National Research Council, 2007). The report went on to reiterate that clay barriers are generally acknowledged to be susceptible to *significant increases* in conductivity as a result of desiccation cracking, differential settlement, lateral spreading, freezing, thawing, and root penetration.

The National Research Council published a report titled *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites* (2000) that addressed the USDOE's use of barriers as a tool for isolating and containing waste. This report drew a number of conclusions, including the following:

- "Physical barrier systems [that] keep hazardous wastes in isolation will require their own *ongoing* support from [an] institutional management system." (emphasis added)
- "Without constant attention, stewardship measures imposed today are not likely to remain effective for as long as residual contamination presents risks."
- "Given that decisions that affect sites' futures are often made under conditions of considerable uncertainty, the best decision strategy overall...takes seriously the prospects that failures of engineered barriers, institutional controls and other stewardship measures in the future could have ramifications that a good steward would want to avoid." L293-15 (Cont.)

The USDOE's assumptions in the Draft GTCC EIS are all but mutually exclusive with the conclusions presented above. Analysis offered in the Draft GTCC EIS assumes only the most optimal barrier performance in conjunction with extensive cooperation from the surrounding environment and future human populace. This is not a conservative approach and should not be represented as such. Analysis by the IEER determined that the performance of barriers did not significantly affect the overall performance of proposed action alternatives at the Hanford Site (see Attachment 3). However, this does not excuse reliance on barrier performance, particularly at other sites or at a future Hanford Site with a significantly different climate.

Recommendation 5b. The revised Draft GTCC EIS should present action alternatives that do not rely on surface barriers to maintain their long-term integrity. The revised action alternatives should be capable of meeting performance requirements without depending heavily on assumed climate, environmental conditions, and human behavior.

Comment 5c. Use of institutional controls in action alternatives is unclear, inconsistent, and unrealistic. L293-16

L293-16 In evaluating the performance of the proposed land disposal facilities, a number of engineering measures were assumed in the conceptual facility designs to minimize infiltration of water into the wastes and thereby minimize contaminant migration from the disposal units. Monitoring and maintenance of the land disposal units were assumed to be for 100 years, and corrective measures could be implemented during this time period to ensure that the engineered barriers lasted for at least 500 years. This is consistent with the institutional control time frame given in both NRC and DOE requirements and was determined to be a reasonable approach for assessing the long-term performance of the disposal units.

It was assumed that after 500 years, the barriers would gradually fail. To account for these measures in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the assessment time period (10,000 years). A water infiltration rate of 20% of the natural rate for the area was used only for the waste disposal area; the natural background infiltration rate was used at and beyond the perimeter of the waste disposal units.

Additional assumptions were used for a number of parameters, including the distance to a nearby hypothetical receptor (100 m or 330 ft. from the edge of the disposal facility). The analyses in the EIS indicate that a near-surface trench facility at NNSS and the WIPP Vicinity can be safely used (e.g., estimates indicated no dose to a hypothetical nearby receptor at 10,000 years).

DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion into a trench is from a future drilling event, such as drilling for a water well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC trench disposal facility at the reference locations evaluated because of (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control at these sites, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of an inadvertent human intruder in this EIS. Site-specific NEPA reviews would be conducted as needed.

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The Draft GTCC EIS states that protection against inadvertent human intrusion will be accomplished in part by "design features [including] institutional controls" (p. 5-95) that would be maintained "as long as necessary to perform their intended protective purposes" (p. 5-96). However, in the same section, the USDOE implies that active institutional controls would be discontinued 100 years after site closure despite the fact that "it would take several millennia for many of the long-lived radionuclides to decay to low levels." These statements are not internally consistent. It is not possible to maintain institutional controls as long as is necessary, while *simultaneously not maintaining the same controls as long as is necessary on the basis that the* prescribed time period is simply too long. If active institutional controls cannot be maintained for the time period required to ensure that the disposal site is safe for unrestricted access, *then the disposal method used should not rely on institutional controls.*

The Draft GTCC EIS's inconsistent application of and presumed effectiveness of institutional controls recur repeatedly throughout the document, including in the following statement made to justify the parameters used to calculate exposure:

> ...the long-term human health impacts are addressed by considering the future radiation dose and LCF risk to a hypothetical individual who resides 100 m (330 ft) from the edge of the disposal facility and develops a farm. This resident farmer scenario is assumed to be conservative (i.e., one that overestimates the *expected dose and LCF risk) because it assumes a total loss of institutional* control and institutional memory with regard to the disposal facility.

L293-16 (Cont.)

The Draft GTCC EIS does not elaborate on how exposed individuals over multiple generations are capable of avoiding—consistently, without fail, and by a margin of *at least 100 meters*—the disposal facility of which they have no knowledge or memory. This statement is not internally consistent and appears to simultaneously concede that any institutional control will ultimately fail, while also remaining effective. This rationale is illogical and unacceptable.

The Yakama Nation ERWM Program has previously commented on the USDOE's reliance on institutional controls (Yakama Nation ERWM Program, 2010). Those comments noted that institutional controls could not be assumed to remain effective over long periods of time and that they also conflict with Yakama Nation treaty rights.

No government in history has existed for as long as 10,000 years, let alone 100,000. It is unreasonable to assume that measures such as federal ownership of the disposal site and land designations will provide any form of protection against future intrusion. Other similarly passive *controls such as unmaintained "fences, signs and other markers" are not expected to provide* better protection over such an extended time period.

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Recommendation 5c. The revised Draft GTCC EIS should provide alternatives that do not rely on institutional controls to limit doses and achieve an acceptable level of performance within the 10,000-year period required. Any alternative proposed for the Hanford Site must respect Yakama Nation treaty rights and be compatible with clean closure requirements on the site.

Discussion of institutional controls in the revised Draft GTCC EIS must be internally consistent and include the following:

L293-16 (Cont.)

- ***Specific, detailed information on the length of active maintenance.***
- ***Detailed information for long-term monitoring and maintenance or the lack thereof.***
- ***Clearly stated, consistent, and realistic assumptions of the long-term efficacy of the passive institutional controls.***
- ***Plans, or lack thereof, for ensuring the stability of long-term institutional controls through multiple successive governments, so that the site remains isolated for the requisite 10,000 years.***

Comment 5d. Direct intrusion into the disposal facility and facility barriers should be evaluated in detail.

The Draft GTCC EIS acknowledges that "the NRC [has] already determined that for waste classified as GTCC, conventional near-surface land disposal is generally not protective of an inadvertent intruder." The USDOE found this to be sufficient justification for not considering the scenario in any quantitative form for the proposed action alternatives.

However, an intruder in the disposal facility poses serious problems to much of the analysis provided in the Draft GTCC EIS. Intrusion into the disposal facility clearly could result in significant dismantling of the many carefully laid assumptions that have already been identified. Direct physical intrusion into the facility may result in:

L293-17

- Significantly reduced distances at which exposure to waste and contaminated groundwater occur (which was specifically not evaluated in the Draft GTCC EIS).
- Surface irrigation that dramatically increases infiltration into waste disposal intervals.
- Waste or contaminated backfill that is brought to the surface, allowing for direct ingestion and other exposure pathways.
- Deconstruction of cover by resident farmers to access the clay or other earthen materials for use in lining irrigation ditches or other building purposes.
- Residences that require dug-out foundations or basements being built directly on top of the barrier.

L293-17 DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder, especially for the wastes disposed of in an enhanced near surface trench. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC waste trench disposal facility because of (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Site-specific NEPA reviews would be conducted as needed.

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- Regrading or large-scale earthwork associated with redevelopment, conversion to farmland, or other changes in land use that significantly reduce the overburden above the waste interval.
- Intentional intrusion to remove waste under the misconception that it is valuable.

Exposure to an inadvertent or intentional intruder could be significantly higher than any of the estimates provided in the Draft GTCC EIS, which are based on many best-case assumptions and limited exposure pathways. Furthermore, the activities of an intruder clearly have the potential to significantly increase off-site doses. These consequences should not be ignored or downplayed simply as a matter of convenience. L293-17 (Cont.)

Recommendation 5d. The revised Draft GTCC EIS must incorporate an extensive quantitative evaluation of intentional and unintentional intrusion into any disposal facility related to the proposed action alternatives.

Comment 5e. Performance assessment of the proposed action alternatives cannot be verified and appears to significantly underpredict future doses.

Analysis performed by IEER using the same parameters as those provided in the Draft GTCC EIS was unable to replicate the reported doses using RESRAD-OFFSITE. Calculations performed for trench and borehole disposal delivered significantly higher doses (trenches: 300 millirem; boreholes: 177 millirem) than those reported in the Draft GTCC EIS.

Because the vault dose reported in the Draft GTCC EIS was similar to the trench dose, it is reasonable to assume that the vault dose is also incorrect. The USDOE acknowledges that some modifications to RESRAD-OFFSITE were made, but does not provide adequate information to account for the large differences between doses predicted in the Draft GTCC EIS and those calculated by IEER. Please refer to Attachment 3 for additional information on this comment. L293-18

Recommendation 5e. Calculation of exposure that results from a proposed action alternative disposal facility should be redone. Additional, detailed information should be incorporated into the revised Draft GTCC EIS so that the USDOE calculations can be replicated and examined in appropriate detail.

Comment 5f. Sensitivity analysis performed for the proposed action alternatives is abnormal, unusual, and non-conservative.

The sensitivity analysis performed for the Draft GTCC EIS proposed action alternative-derived doses does not follow normal protocols that evaluate scenarios both better and worse than the base case provided. Rather, the USDOE has adopted the stance that the base case (including, and heavily relying upon, the assumptions noted above) is the *worst-case scenario* and that parameters affecting proposed action alternative performance can *only improve*. This is L293-19

L293-18 The modeling with the RESRAD-OFFSITE code utilized a specific feature of the code. That is, the leach rates of radionuclides were calculated separately and entered as input values to the code for subsequent transport modeling through the unsaturated zones and the groundwater aquifer. In the process of calculating leach rates to input into the RESRAD-OFFSITE code, the influence of the waste forms was considered. For activated metals, a constant release fraction was assumed, reflecting that the imbedded radionuclides in the metal would not dissolve in water until the metal was corroded. For Other Wastes, the release rates were calculated by considering the retardation provided by grouting; therefore, measured Kd values of radionuclides in cementitious materials as available in published literature were used for the release calculations. For sealed sources, because the waste forms can vary greatly, the release rates were calculated by assuming the waste forms would behave like soils and would not provide extra protection against leaching. The consideration for releases from activated metals was similar to a dissolution mechanism. The consideration for releases from sealed sources was similar to a surface rinse mechanism. The consideration for releases from Other Waste was similar to a surface rinse mechanism, but with non-zero Kds for the waste form.

The integrity of waste packages, waste containers, and barrier materials over time was not specifically modeled in the RESRAD-OFFSITE code. Their performance over time depends on the engineering designs of the disposal facility. Compared with the analysis time frame that extends to 10,000 (or possibly up to 100,000) years into the future, the integrity periods of the waste packages, waste containers, and barrier materials are relatively short. Therefore, in the GTCC EIS, the integrity periods are evaluated as one single parameter, which is assumed to be 500 years in the analysis. To study the influence of this assumption, a sensitivity analysis was conducted. This approach provides a perspective on performance for the long term.

DOE believes that sufficient information has been provided in the EIS to enable third parties to independently verify the results presented.

L293-19 See response to L293-6.

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unrealistic and scientifically unsupportable even when using appropriate base-case parameters. Taking into consideration the assumptions and parameters provided in the base case, the sensitivity analysis included in the Draft GTCC EIS is meaningless.

A more appropriate sensitivity analysis performed by IEER using parameters less favorable than the USDOE's base case found that doses delivered by a proposed action alternative disposal facility could be substantially larger than those provided in the Draft GTCC EIS. The analysis also identifies significantly reduced travel times to groundwater and reasonable parameters that could result in total removal of surface barriers within 5,000 years. These analyses are discussed in greater detail in Attachment 3. L293-19 (Cont.)

Recommendation 5f. In the revised Draft GTCC EIS, sensitivity analysis must evaluate facility performance using realistic parameters. The analysis must evaluate scenarios that are less favorable than the USDOE-provided base case.

Sensitivity analysis should also evaluate scenarios in which unrealistic assumptions previously discussed, such as consistent low rates of erosion and infiltration for 10,000 years, are replaced with higher or increasing rates.

Comment 6. The Draft GTCC EIS must comply with federal and state environmental laws.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 states that GTCC waste is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. NRC regulations state that GTCC waste is generally not acceptable for near-surface disposal and must be disposed of in a deep geologic repository unless alternative methods of disposal are proposed to and approved by the NRC. L293-20

Recommendation 6. The revised Draft GTCC EIS must explain how the selection of a USDOE-operated facility will meet the requirements for NRC licensing and regulation and how such a facility will be determined to adequately protect public health and safety.

Comment 7. The Draft GTCC EIS must recognize Yakama Nation treaty rights.

The Treaty of 1855 between the United States and the Yakama Nation (12 Stat. 951) is not mentioned in the Draft GTCC EIS. Under that treaty, the United States has accepted a trust responsibility to ensure that the Yakama people and resources are not harmed by federal actions. L293-21

L293-20 The LLRWPAA (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. The LLRWPAA (P.L. 99-240) specifies that GTCC LLRW, designated a federal responsibility under section 3(b)(1)(D) that results from activities licensed by the NRC, is to be disposed of in an NRC-licensed facility that has been determined to be adequate to protect public health and safety. However, unless specifically provided by law, the NRC does not have authority to license and regulate facilities operated by or on behalf of DOE. Further, the LLRWPAA does not limit DOE to using only non-DOE facilities or sites for GTCC LLRW disposal. Accordingly, if DOE selects a facility operated by or on behalf of DOE for disposal of GTCC LLRW for which it is responsible under section 3(b)(1)(D), clarification from Congress would be needed to determine NRC's role in licensing such a facility and related issues. In addition clarification from Congress may be needed on NRC's role if DOE selects a commercial GTCC LLRW disposal facility licensed by an Agreement State rather than by NRC.

L293-21 The text within brackets has been incorporated into the GTCC EIS (Section 6.1.10): [DOE's relationship with American Indian tribes is based on treaties, statutes, and DOE directives. Representatives of the United States negotiated treaties with leaders of various Columbia Plateau American Indian tribes and bands in June 1855 at Camp Stevens in the Walla Walla Valley. The negotiations resulted in three treaties, one with the 14 tribes and bands of the group that would become the Confederated Tribes and Bands of the Yakama Nation, one with the 3 tribes that would become the Confederated Tribes of the Umatilla Indian Reservation, and one with the Nez Perce Tribe. The U.S. Senate ratified the treaties in 1859. The negotiated treaties are as follows:

- Treaty with the Walla Walla, Cayuse, etc., Tribes (June 9, 1855; 12 Stat. 945);
- Treaty with the Yakama Nation (June 9, 1855; 12 Stat. 951); and
- Treaty with the Nez Perce Tribe (June 11, 1855; 12 Stat. 957).

The Confederated Tribes and Bands of the Yakama Nation of the Yakama Reservation, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe of Idaho are federally recognized tribes that are eligible for funding and services from the U.S. Bureau of Indian Affairs by virtue of their status as Indian tribes (68 FR 68180, December 5, 2003).

The terms of the three preceding treaties are similar. Each of the three tribal organizations agreed to cede large blocks of land to the United States. Hanford is within the ceded lands. The treaties reserved to the tribes certain lands for their exclusive use (the three reservations). The treaties also secured to the tribes certain rights and privileges to continue traditional activities outside the reservations. These included (1) the right to fish at usual and accustomed places in common with citizens of the United States and (2) the privileges of hunting, gathering roots and berries, and pasturing horses and cattle on open and unclaimed lands. No portion of the Hanford Site constitutes open and unclaimed land.]

Regarding the Yakama Nation's perspectives about tribal treaty rights allowing unrestricted access at Hanford, DOE respectfully disagrees. This EIS presents relevant and essential information important to the evaluation of potential environmental impacts, consistent with NEPA's primary goal of full disclosure to the public as well as agency decision makers. This includes discussion of the history of the settlement of Hanford and the treaties entered into between tribal nations and the U.S. government. There is substantial documentation indicating that the tribes understood at the time these treaties were signed that the lands were no longer "unclaimed" when they were claimed for the purposes of the white settlers' activities.

DOE is not aware of any judicially recognized mechanisms that would allow these lands to revert to "unclaimed" status merely through the process of being acquired by the federal government. The portion of Hanford that remained in the public domain in 1943, as well as all

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The treaty supports protection of natural and cultural resources for the Yakama Nation. The Draft GTCC EIS incorrectly includes trust responsibility and treaty rights under the umbrella of environmental justice, which implies that all treaty rights have been appropriately considered in accordance with the National Environmental Policy Act and other federal laws, which is not the case. Considering tribal views and perspectives is very different from full and fair consideration of tribal treaty rights and federal trust responsibility.

Recommendation 7. The revised Draft GTCC EIS must recognize the Treaty of 1855 as a requirement that applies to the proposed action alternatives. Potential impacts to treaty-reserved rights and resources should be identified and evaluated in the revised Draft GTCC EIS. Any action alternative included in the Final GTCC EIS should adequately address tribal exposures based on full access to treaty-reserved resources, and should be consistent with the USDOE's American Indian Policy.

L293-21 (Cont.)

Comment 8. The Draft GTCC EIS does not appropriately address cultural and natural resources at the Hanford Site.

Comment 8a. Evaluation of cultural and natural resources is incomplete.

The Draft GTCC EIS frequently uses language that suggests cultural resources in the Draft GTCC EIS reference area have been thoroughly surveyed and evaluated. However, the locations identified have not been professionally surveyed for cultural resources, and the subsurface has not been evaluated. Many of the surveys that have been performed were spatially restricted, were associated with local projects, and did discover physical cultural resources. It is reasonable to expect that significant cultural resources may be present in the Draft GTCC EIS reference area and surrounding the Central Plateau of the Hanford Site (known as the 200 Area), but that those resources are as-yet undiscovered.

As in the TCWM EIS, the Draft GTCC EIS places heavy emphasis on physical objects and artifacts that can be positively identified as of Native American origin. However, there are many other cultural and natural resources that the USDOE does not (and cannot) assign a value to. These resources include the cultural significance of sacred sites within the Hanford Site boundaries and along the Columbia River, as well as protection of all natural resources, including surface waters, groundwater, geologic resources, air, plants, fish, and wildlife within usual and accustomed places.

L293-22

Recommendation 8a. The revised Draft GTCC EIS should acknowledge that significant cultural resources exist within the reference area for the Hanford Site and that the full extent of impacts to these resources has not been evaluated in detail. The revised Draft GTCC EIS should provide appropriate detail that identifies the cultural resource surveys to date, including their spatial extent and the activities conducted.

the acquired lands, were closed to all access initially under authority of the War Powers Act and then under authority of the AEA. It is therefore DOE's position that the Hanford lands are neither "open" nor "unclaimed."

L293-22 As required by NEPA, the Final EIS (Appendix G) evaluates the potential impacts of the proposed action on cultural and natural resources at the various DOE sites in sufficient detail to assess the potential impacts of the proposed alternatives. DOE recognizes that development of a disposal facility for GTCC LLRW and GTCC-like wastes would require that future land uses be restricted at and near the site for the protection of the general public. This action could affect areas that may be important to American Indian tribes.

DOE considered the text provided by the participating affiliated American Indian tribes for each of DOE sites evaluated in selection of the preferred alternative. Information provided by the tribal governments associated with exposure pathways unique to American Indian tribes (e.g., greater intakes of fish, game, and plants; use of sweat lodges; use of natural pigment paints for traditional ceremonies) would be evaluated in site-specific NEPA reviews for the alternative(s) selected in a ROD for this EIS.

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Comment 8b. The Draft GTCC EIS does not appropriately address Tribal Cultural Properties.

The Rattlesnake Mountain and Gable Mountain Gable Butte Cultural District are eligible Traditional Cultural Properties (TCP). The Draft GTCC EIS understates the significance of these sites to the Yakama Nation and other native tribes. This status should be recognized and incorporated into the revised Draft GTCC EIS. L293-22 (Cont.)

> ***Recommendation 8b. The Cultural Resources section in the revised Draft GTCC EIS should acknowledge and discuss the presence of TCPs in the vicinity of the reference area. The revised Draft GTCC EIS should acknowledge the impact that construction of a new facility will have on TCP visual resources, TCP access, and levels of contamination at TCPs.***

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References

Bakun, W., R. Haugerud, M. Hopper and R. Ludwin. 2002. *The December 1872 Washington State Earthquake.* Bulletin of the Seismological Society of America, v. 92, n.8, pp. 3239-3258. December.

Benson, C. and M. Khire. 1997. *Earthen Material in Surface Barriers.* Barrier Technologies for Environmental Management: Summary of a Workshop. Committee on Remediation of Buried and Tank Wastes, National Research Council. 188 pages.

Bierman, P. and J. Turner. 1994. *^{10}Be and ^{26}Al Evidence for exceptionally low rates of Australian bedrock erosion and the likely existence of pre-Pleistocene Landscapes.* Quaternary Research, vol. 44, pages 378-382.

Brook E., E. Brown, M. Kurz, R. Ackert, G. Raisbeck and F. Yiou. 1995. *Constraints on age, erosion, and uplift of Neogene glacial deposits in the Transantarctic Mountains determined from in situ cosmogenic ^{10}Be and ^{26}Al.* Geology, vol. 23, no. 12, pages 1063-1066.

Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes. Code of Federal Regulations Tile 40, Part 191. 50 FR 38084, September 19, 1985; 58 FR 66414 December 20, 1993.

Fecht, K. and T. Marceau. 2006. *Late Pleistocene- and Holocene-Age Columbia River Sediments and Bedforms: Hanford Reach Area, Washington; Part 2.* WCH-46. Washington Closure Hanford. March.

Gerber, M. 2002. *On the Home Front; The Cold War Legacy of the Hanford Nuclear Site.* University of Nebraska Press, Lincoln and London. 363 pages.

Licensing Requirements for Land Disposal of Radioactive Waste. Code of Federal Regulations Part 61. 47 FR 57463, December 27, 1982; 49 FR 9405 March 12, 1984.

Musgrove, M. and D.P. Schrag. 2006. *Climate Change at Yucca Mountain: Lessons from Earth History, in Uncertainly Underground: Yucca Mountain and the Nation's High-Level Nuclear Waste.* Edited by Allison M. Macfarlane and Rodney C. Ewing. The MIT Press, Cambridge, Massachusetts, pages 149-162.

National Research Council. 2000. *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites. Commission of Geosciences, Environment and Resources.* National Academies Press, N.W. Washington, DC.

National Research Council. 2007. *Assessment of the Performance of Engineered Waste Containment Barriers.* National Academy of the Sciences. 134 pages.

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Newcomb, R., J. Strand and J. Frank. 1972. *Geology and Ground-Water Characteristics of the Hanford Reservation of the U.S. Atomic Energy Commission, Washington.* Geological Survey Professional Paper 717. United States Government Printing Office, Washington.

Public Law 96-368 [S.2443]: October 1 1980. West Valley Project Demonstration Act.

Reidel, S., N. Campbell, K. Fecht and K. Lindsey. 1993. *Late Cenozoic Structure and Stratigraphy of South Central Washington* (WHC-SA-1764-FP). Prepared for the U.S. Department of Energy Office of Environmental Restoration and Waste Management.

Smith, E., R. Luxmoore, and G. Suter. 1997. *Natural Physical and Biological Processes Compromise the Long Term Performance of Compacted Soil Caps.* Barrier Technologies for Environmental Management: Summary of a Workshop. Committee on Remediation of Buried and Tank Wastes, National Research Council. 188 pages.

Stover, C. and J. Coffman. 1993. *Seismicity of the United States, 1568-1989 (Revised).* United States Geological Survey Professional Paper 1527. United States Government Printing Office, Washington.

U.S. Department of Energy (USDOE). 2009. *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (DOE/EIS-0391). Prepared by the U.S. Department of Energy, October.

U.S. Environmental Protection Agency (USEPA). 1988. *Federal Guidance Report Number 11. Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion* (EPA-520/1-88-020). Prepared by the Office of Radiation Programs, U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency (USEPA). 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents.* EPA 315-R-99-002.

U.S. Geological Survey (USGS). 2011a. *Earthquake Hazards Program.* Available online: http://earthquake.usgs.gov/earthquakes/states/events/1872_12_15.php. Accessed 5/12/2011.

U.S. Geological Survey (USGS). 2011b. *Earthquake Hazards Program: The Modified Mercalli Intensity Scale.* Available online: http://earthquake.usgs.gov/learn/topics/mercalli.php. Accessed June 16, 2011.

West, M., F. Ashland, A. Busacca, G. Berger and M. Shaffer. 1998. *Late Quaternary deformation, Saddle Mountains anticline, south central Washington.* Geology, v. 24, no.12, p 1123-1126; 5 figures. December.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

White, D. 1983. *Background Paper for Assessment of Basalt Lava Flows (BWIP), Washington. Supplement to a Study of the Isolation System for Geologic Disposal of Radioactive Wastes.* National Academy Press, Washington D.C. Republished with permission as an Appendix to *Heat, High Water and Rock Instability at Hanford* by Makhijani A., and K. Tucker. 1985. Health and Energy Institute, Washington D.C.

Yakama Nation ERWM Program. *Letter to David A. Brockman, U.S. Department of Energy.* March 19.

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Attachment 2

Yakama Nation ERWM Program General Comments on the
Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D)

ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
1	1	1.1	1-2	NA	EIS Contents	Further clarification is requested on the purpose and need by which USDOE is responding. Although there is currently no disposal capability for other GTCC low-level radioactive waste (LLRW) or GTCC-like waste, there is also no path to disposal for a vast quantity of USDOE waste with characteristics that are similar to GTCC LLRW (e.g. graphite reactor blocks and depleted uranium hexafluoride). Consider including National Environmental Policy Act (NEPA) analysis for developing additional disposal capability for all EIS waste similar to GTCC LLRW.	L293-23
2	1	1.4	1-4	NA	West Valley Waste	The West Valley Site cleanup accounts for 68 percent of the total waste discussed in the EIS. It is not reasonable that cleanup of this one site is responsible for such a large percentage of the total waste. Cleanup of the West Valley Site should not simply consist of transferring this waste to the floor surface of the Hanford Site or some other location. The waste from West Valley should be disposed of in a deep geologic repository in accordance with applicable federal regulations (10 CFR 61, 40 CFR 191).	L293-24
3	1	1.4.1.3	1-10	NA	GTCC Waste Type	The statement that West Valley-related waste does not meet the requirements for disposal at the Waste Isolation Pilot Project (WIPP) facility is redundant with the definitions already established by the USDOE for GTCC and GTCC-like waste. Inclusion of such a statement is misleading because it implies that this waste is some how different from other types of GTCC and GTCC-like waste addressed by the Draft GTCC EIS. Remove this text and clarify that the suggestion that WIPP stabilized waste is not suitable for various subclasses of the waste considered. Further revise the text of the Draft GTCC EIS introduction to more clearly state that disposal of all the waste at the WIPP facility is a viable alternative.	L293-25
4	1	1.4.2	1-20	NA	Action Alternatives	10 CFR 61 states, "Of the primary emphasis is placed on the question of suitability of alternatives to location of waste, a matter having long-term impacts and/or disposal site characteristics that ensure that the long-term performance objectives of subpart C of this part are met, as opposed to short-term convenience or benefits." Revise the Draft GTCC EIS to specifically identify what long-term storage benefits are achieved using near-surface disposal and how they compare to deep geologic disposal.	L293-26
5	1	1.4.2	1-21	NA	Surface Barriers/ Institutional Controls	All the conceptual designs for the land disposal alternatives show a surface barrier as a key element to prevent intrusion. Surface barriers do not prevent bioturbation and the potential spread of contamination from burrowing animals. Revise the Draft GTCC EIS to include discussion of alternatives that include enhanced barriers to maximum isolation of waste, including the improved long-term stability and durability of such barriers to withstand significant degradation and are as stable as rock.	L293-27
6	1	1.4.2.1	1-21	NA	Deep Geologic Disposal	The 48 miles of caverns for deep geologic disposal in rock salt has not addressed in the Draft GTCC EIS. Presently WIPP is the only deep geologic option closer and gives the concept its weight in the scheme of the EIS. Revise the Draft GTCC EIS to include discussion of the suitability of the WIPP facility to accommodate the GTCC waste. Include in the revised text enclosure disposal in a mined geological formation from a conceptual point of view that does not emphasize the existing legal impediments for WIPP disposal.	L293-28
7	1	1.4.2.2	1-22	NA	Action Alternatives	Boreholes and trenches as shown are both at the bottom, allowing any leachate to migrate directly to the underlying geologic material. Near-surface contaminants at Hanford pass relatively quickly through the vadose zone to the water table. It is also well established that groundwater can migrate from the central portion of the Hanford Site to the Columbia River in a timeframe of months. The Hanford GTCC disposal area is a recognized waste site with significant radiogenic contamination of the underlying soils and groundwater. Consider the potential for adverse impacts to the underlying groundwater and the surrounding soils and potentially mobilize radioactive contaminants already contained at the disposal area. Any further site-specific evaluation should include additional detail regarding the expected final location of the disposal facility, the extent of any contaminants present, and plans to mitigate disturbed contamination.	L293-29

L293-23 The Low-Level Radioactive Waste Policy Amendments Act (P.L. 99-240) assigns DOE responsibility for the disposal of GTCC LLRW generated by NRC and Agreement State licensees. GTCC-like waste was also included in our analysis to address waste owned or generated by DOE that has similar characteristics to GTCC LLRW which can be disposed of in a similar manner.

The GTCC LLRW and GTCC-like waste inventory evaluated in the EIS is based on the best available information on the stored and projected GTCC LLRW and GTCC-like wastes from ongoing and planned activities. The estimated 12,000 m^3 of GTCC LLRW and GTCC-like wastes is a relatively small volume of waste when compared to other wastes disposed of by DOE. For example, this volume of GTCC LLRW and GTCC-like wastes is only about 20% of the 59,000 m^3 of LLRW disposed of at one site (NNSS) in one year (fiscal year 2010). DOE canceled the *Draft Global Nuclear Energy Partnership Programmatic Environmental Impact Statement* (GNEP PEIS) (74 FR 31017); therefore, the generation of additional GTCC LLRW under GNEP is not included in the GTCC EIS inventory. In addition, the inventory includes wastes expected to be generated during the production of Mo-99 for medical applications from two potential generators. While the potential generator(s) of this waste may change, the estimated characteristics and volumes are representative of the amounts expected to supply the demand for the Mo-99. DOE believes that expanding the inventory to include potential GTCC LLRW and GTCC-like wastes from undefined or unplanned future activities would introduce excessive uncertainty in the EIS evaluations. DOE believes that the inventory included in the GTCC EIS is reasonable for the purposes of the NEPA process and that it provides a supportable basis for conducting the EIS evaluation and the identification of the preferred alternative in the Final EIS. In the future, should additional waste be identified, appropriate NEPA review would be conducted to reflect these changes and also changes that would be needed to the existing infrastructure or the identification of additional disposal sites.

Although characterization information for some of the GTCC LLRW and GTCC-like wastes is limited, DOE believes that sufficient data are available to allow for a comparative analysis of various approaches to dispose of these wastes in the EIS. Adequate data are generally available for the radioactive constituents, but comparable data for chemical constituents are generally lacking. DOE believes that the data presented in the EIS are sufficient to make comparative analyses between and among sites.

Depleted uranium is not included in the GTCC LLRW waste inventory because this material is not GTCC LLRW. Likewise, Class B and C wastes are not GTCC LLRW and are out of scope for this EIS.

L293-24 Future waste that will be generated from the cleanup the West Valley Site does make up a large proportion of the GTCC inventory, especially if a decision is made to exhume the waste from the West Valley site State-licensed Disposal Area and the NRC licensed Disposal Area. Follow on analysis would be conducted to determine characteristics of this waste and any final packaging configurations. Based on the current analysis of this waste, it would be subject to disposal in a deep geologic repository (Table 2.10-1)

DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L293-25 The discussion in Section 1.4.1.3 to which the comment refers, is referring to the entire GTCC-like Group 1 Other Waste category, not just that from West Valley [i.e., "Much of the waste in this category is expected to meet the DOE definition for TRU waste (i.e., waste that contains more than 100 nCi/g of alpha-emitting TRU radionuclides with half-lives longer than 20 years). This TRU waste may not meet the waste acceptance criteria for disposal at WIPP as defense-generated TRU waste…]

L293-26 While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced nearsurface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L293-27 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2, each concept has been used to some degree in the United States or other countries. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail.

The conceptual nature of these configurations takes into account the characteristics of all of the disposal sites for which they were considered, but their designs (e.g., width, depth, cover depth, reinforced containment) could be altered or enhanced, as necessary, to provide an optimal solution at a specific location. As an example, the cover depth could be adjusted to ensure that roots from vegetation would not compromise the top of the engineered barrier. In addition, the dimensions of the generic land disposal units (e.g., trench - width and depth, borehole – diameter and depth, vault – width, depth, and height) were selected based on similar existing facilities, existing equipment and methods for construction, and optimized (maximized waste volume disposed of for a given disposal unit volume; simple waste handling procedures to minimize exposure) for the types of waste packages considered. All designs could also accommodate different disposal packages (existing and proposed) with minor variations in their dimensions, but the EIS analyses would remain relevant for each option considered.

For example, if borehole disposal at NNSS became a preferred alternative, any capacity in the existing boreholes would have been considered in follow-up studies. For an above-grade vault with a 5 m cover, long-term impacts from the above-grade vault as determined by modeling for the EIS would be expected to be similar to those for a vault set lower with respect to grade, including with the top of the vault at or below grade, except in the case where the bottom of the waste confinement was closer to the groundwater table. For any disposal option, the bottom of any disposal unit would not be located at or below the water table to exclude the chance of groundwater migration into the disposal unit. Actual implementation of a disposal option at a specific location at a given site may have to be modified (i.e., the depth of a trench or a borehole may need to be reduced to avoid groundwater issues).

Past operational experience with these types of disposal facilities at DOE sites has shown that when properly implemented, they can provide isolation of radioactive waste from the environment for extended time periods. Past problems that have arisen with each option provide additional information to improve the design and performance of future land disposal facilities. Issues related to performance over time would be analyzed in a project-specific analysis to address technical and long-term concerns.

L293-28 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

L293-29 The specific locations that would be used at each potential site for development of a disposal facility for GTCC LLRW and GTCC-like wastes are not known at this time. The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. The RESRAD-OFFSITE computer code was used to model the migration of radionuclides from the GTCC LLRW and GTCC-like wastes placed into the conceptual disposal facility designs for the three land disposal methods (not all three methods were evaluated for each site). Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. While the computer model was largely developed to support environmental restoration activities, it has a number of features that make it a good choice for use in this EIS. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. However, DOE recognizes that additional project- and site-specific information, such as the actual depth to groundwater over the entire disposal area, could be used to inform the implementation of a disposal facility at a given location. This additional information is expected to reduce the uncertainty associated with these types of evaluations to the extent possible. Site-specific information would be evaluated in any site-specific NEPA review that would be conducted based on a ROD for this EIS.

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Yakama Nation EM&W Program GTCC Eis Comments
Attachment 2
Page 2

ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment
8	1	1.4.2.2	1-22	N/A	Action Alternatives	Provide additional detail regarding waste placement, such as how operators will ensure that waste will be placed upright and secured during loading.
9	1	1.4.2.3.1	1-22	N/A	Action Alternatives	The approach to land disposal construction phasing/sequencing should be included in Section 5 of the Draft GTCC EIS. Construction sequencing information is scattered throughout the EIS in a disorganized fashion that requires the reader to hunt through several sections to locate the relevant information. Revise the Draft GTCC EIS so that all this information is compiled in at least one location for review.
10	1	1.4.2.3.2	1-23	N/A	Action Alternatives	The aboveground vault alternative will not remain intact for 10,000 years without active institutional controls. Revise the Draft GTCC EIS to provide action alternatives that do not include the vault alternative.
11	1	1.4.2.3.2	1-24	N/A	Action Alternatives	Revise the Draft GTCC EIS to provide estimates of how much gamma radiation would be attenuated by shielding incorporated into remote handled waste conditions and disposal structure.
12	1	1.4.3	1-25	N/A	Hanford Site	Using the 100-year flood plain for the purpose of disposal facility location is not reasonable. The location of the site should not be within the 100-year flood plain. Hanford's Hydrology Program has documented that the 100-year flood plain is not a reliable indicator of future flooding or other similar events. A waste disposal facility should not be located where such events could potentially damage the facility.
13	1	1.4.3	1-26	N/A	Cultural Resources	Hanford cultural and natural resources have not been adequately addressed as part of the Draft GTCC EIS, and the included information is not accurate. Revise the Draft GTCC EIS to include detailed information regarding how cultural resources will be evaluated for any disposal facility at the Hanford Site.
14	1	1.5.1	1-49	Figure 1.5-1	EIS Contents	It is inappropriately implied that the Draft GTCC EIS provides sufficient information for a comparative analysis of proposed action alternative impacts to allow selection of a preferred alternative. Site-specific evaluations are needed for a meaningful assessment of human health impacts before a GTCC waste land disposal alternative(s) or site(s) can be selected as the preferred alternative. Furthermore, public participation in the EIS process has been adversely curtailed without identification of a preferred alternative in the Draft GTCC EIS because there will not be an opportunity for public comment on the preferred alternative if it is not identified until the Final EIS is issued. The USDOE should release a revised Draft GTCC EIS with an identified preferred alternative.
15	1	1.5.1	1-41	N/A	Hanford Site	A thorough analysis to support GTCC waste disposal decision-making should have clearly demonstrated that Hanford is not a viable location for disposal of GTCC wastes. Disposal of GTCC wastes would be incompatible with efforts to clean up extensive contamination. Revise the Draft GTCC EIS to include information which demonstrates that Hanford is not a viable environmental location for GTCC waste disposal. Hanford is not included as a candidate site for construction of a disposal facility.
16	1	1.5.1	1-41	N/A	Deep Geologic Disposal	The Nuclear Regulatory Commission (NRC) cannot approve GTCC LLRW land disposal alternatives that violate protection against release of long-lived radionuclides (and their short-lived progenitors) after institutional controls, improved waste form, and deeper disposal have ceased to be effective (10 CFR 61). Disposal of GTCC LLRW and GTCC-like wastes in a deep geologic repository is the only method that would ensure isolation of long-lived radionuclides from the environment. Revise the Draft GTCC EIS to identify disposal in a deep geologic repository as the preferred alternative.

L293-30 See response to L293-27.

L293-31 The land disposal construction phasing/sequencing is discussed in Section 5.1.4.1 of the EIS.

L293-32 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation). For additional information, see Section J.2.7.

L293-33 The amount of shielding used in the near-surface vault construction is estimated to be sufficient to reduce external exposure outside of the facility walls to below contact-handled levels (<200 mrem/h) at the surface and near background levels above the vault cover.

L293-34 Site-specific environmental factors, such as flooding, were evaluated in the EIS as appropriate. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

L293-35 As required by NEPA, the Final EIS evaluates the potential impacts of the proposed action on cultural and natural resources at the various DOE sites in sufficient detail to assess the potential impacts of the proposed alternatives. DOE recognizes that development of a disposal facility for GTCC LLRW and GTCC-like wastes would require that future land uses be restricted at and near the site for the protection of the general public. This action could affect areas that may be important to American Indian tribes.

DOE considered the text provided by the participating affiliated American Indian tribes (Appendix G) for each of the DOE sites evaluated in selection of the preferred alternative. Information provided by the tribal governments associated with exposure pathways unique to American Indian tribes (e.g., greater intakes of fish, game, and plants; use of sweat lodges; use of natural pigment paints for traditional ceremonies) would be evaluated in site-specific NEPA review for the alternative(s) selected in a ROD for this EIS.

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L293-36 The specific locations that would be used at each potential site for development of a disposal facility for GTCC LLRW and GTCC-like wastes are not known at this time. The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS.

A preferred alternative is not required to be included in a Draft EIS. The Council on Environmental Quality regulations in 40 CFR 1502.14(e) specify that the section on alternatives in an EIS shall identify the agency's preferred alternative or alternatives, if one or more exists, in the Draft EIS and identify such alternative(s) in the Final EIS unless another law prohibits the expression of such a preference; that is, a preferred alternative shall be identified in the Draft EIS if one exists. If no preferred alternative has been identified at the Draft EIS stage, a preferred alternative need not be included. By the time the Final EIS is filed, 40 CFR 1502.14(e) presumes the existence of a preferred alternative and requires its identification in the Final EIS unless another law prohibits the expression of such a preference.

DOE did not have a preferred alternative at the time of issuance of the Draft EIS because of the complex nature of the proposed action and the potential implications for disposal of GTCC LLRW and GTCC-like wastes. To seek public input on how to identify a preferred alternative for inclusion in the Final EIS, the Draft EIS presented considerations for developing a preferred alternative in the Summary (in Section S.6) and in Section 2.9. As required by 40 CFR 1502.14(e), the Final EIS contains a preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes (see Section 2.10). In developing the preferred alternative, DOE took into consideration public comments on the Draft EIS, public EIS scoping comments, and other factors identified in Sections S.6 and 2.9 of the EIS.

The publication by the EPA of a NOA of the Final EIS in the Federal Register initiated a 30-day public availability or "waiting" period. While the availability period is not a formal public comment period, the public can comment on the Final EIS, including the preferred alternative, prior to final agency action. Comments received will be addressed by DOE in a ROD. As required by the Energy Policy Act of 2005 (P.L. 109-58), DOE must submit a Report to Congress that includes the alternatives considered in the EIS and await Congressional action before making a final decision regarding which alternative(s) to implement. The Report to Congress will be made available to the public on the GTCC EIS website (http://www.gtcceis.anl.gov/).

L293-37 DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

L293-38 See response to L293-28.

L293-39 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

Estimated radiation doses and LCFs were calculated for each site and disposal concept for 10,000 years, and if the peak impact did not occur during this time frame, the analysis was extended out to 100,000 years. DOE believes that the assumptions made to support the long-term modeling calculations for the groundwater pathway are reasonable and enable a comparative evaluation of the impacts between alternatives. The results of the evaluation presented in the EIS are sufficient to inform the selection of sites and methods for disposal. Site-specific NEPA reviews would be conducted as needed.

The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

L293-40 The EIS considered the range of reasonable alternatives for the disposal of the GTCC waste inventory, including disposal in a deep geologic repository. DOE did not evaluate developing a geologic repository exclusively for disposal of GTCC LLRW and GTCC-like wastes because DOE determined that such an alternative is not reasonable due to the time and cost associated with siting a deep geologic repository and the relatively small volume of GTCC LLRW and GTCC-like wastes identified in the GTCC EIS. DOE believes that the results presented in this EIS for the WIPP geologic repository alternative are indicative of the high degree of waste isolation that would be provided by disposal in a geologic repository. DOE has included analysis of generic commercial facilities in the event that a facility could become available in the future. In that case, before making a decision to use a commercial facility, DOE would conduct further NEPA reviews, as appropriate.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
17	1	1.5.1	1-42	NA	Long-Term Impacts	The impacts on groundwater beyond 10,000 years are not considered for comparison of proposed disposal sites as the test impact. Revise the Draft GTCC EIS to consider long-term impacts to groundwater beyond 10,000 years to the point of maximum dose and least cancer fatalities (LCF) risk so that action alternatives at proposed disposal sites can be compared. Provide additional analysis that compares future doses without regard to natural doses that exceed 10 CFR 61 or Radioactive Waste Management Manual limits. Alternatives that cannot meet the long-term requirements for waste containment should be removed from the Draft GTCC EIS.	L293-39
18	1	1.5.2	1-43	NA	Deep Geologic Disposal	The EIS Notice of Intent (72 FR 46183) indicates a deep geologic repository other than WIPP will not be evaluated due to concerns related to schedule, cost, and waste volume. However, it has now been a quarter-century since Section 3(b)(1)(D) of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) (42 USC 2021b(b)(1)(D)) established the requirement for GTCC LLRW disposal and by USDOE (USDOE, 1987, page 1-1) and GTCC LLRW is NRC-regulated. Since the GTCC LLRW generated by Commercial Nuclear Power Plants (CNPP) is the most limiting waste, the cost of disposal of GTCC LLRW generated by USDOE facilities should be no greater than that of GTCC LLRW generated by CNPP. Section 3(b)(1)(D) ensure GTCC LLRW generated by Commercial Nuclear Power Plants (CNPP) should be implemented. There also remains a transnational burden of USDOE waste similar to GTCC LLRW, waste with no path to disposal that has not been, but should be, addressed. For this USDOE is now cite concerns of schedule, cost, and limited waste volume in dismissing serious consideration of deep geologic repository alternatives is not acceptable. Revise the Draft GTCC EIS to include this analysis at minimum, appropriate candidate sites.	L293-40
19	1	1.5.2	1-43	NA	EIS Comments	Revise the Draft GTCC EIS to clarify that Congressional direction in Section 631 of the Energy Policy Act of 2005 does not require an EIS and a Record of Decision (ROD) for a permanent disposal facility for GTCC-like waste. Revise the incorrect implication that the No Action alternative is adequately evaluated. It is not.	L293-41
20	1	1.5.2	1-44	NA	Waste Volume	Revise the Draft GTCC EIS to acknowledge the direct relationship between the projected volume of GTCC LLRW and the EIS scope evaluating potential environmental impacts using various disposal options. Implementation of the stage identified by USDOE to ensure GTCC LLRW generators bear disposal costs (USDOE, 1987) should be implemented, recovery of waste management costs from commercial generators would provide an incentive for waste reduction and would reduce environmental impacts through pollution prevention.	L293-42
21	1	1.5.2	1-44	NA	Long-Term Impacts	The resident farmer scenario is dependent on land use designations and institutional controls in violation of 10 CFR 61. The scenario underestimates expected dose and LCF risk and is not based on conservative assumptions as indicated. Revise the Draft GTCC EIS by removing this statement and all other statements that indicate the resident farmer scenario is conservative.	L293-43
22	1	1.5.2	1-45	NA	Hanford Site	Site-specific evaluations must consider transition scenarios based on the potential expansion of land disposal impacts beyond the 10,000 year limit. Revise the Draft GTCC EIS to include analysis of the potential expansion of land disposal impacts beyond 10,000 years. Revise that the specific characteristics and conditions of each site be evaluated in advance and that this information has not yet been provided, making the analysis presented incomplete.	L293-44
23	2	NA	2-1	NA	EIS Comments	See previous comment regarding clarification on the purpose and need to which USDOE is responding. Also see previous comment requesting clarification that Congressional direction in the Energy Policy Act of 2005 does not require an EIS and a ROD for a permanent waste disposal facility for GTCC-like waste.	L293-45
24	2	NA	2-1	NA	GTCC Waste Types	Revise the Draft GTCC EIS to define what the specific processing and design will be for the GTCC LLRW waste that is to be sent to disposal is selected. In particular, description in detail any volume reduction that is performed and the limits on activity per unit volume that will be ordered.	L293-46

L293-41 Section 631 b (1) of the Energy Policy Act of 2005 (P.L. 109-58) requires the Secretary of Energy to submit a report to Congress containing an estimate of the cost and proposed schedule to complete an EIS and ROD for a permanent disposal facility for GTCC waste.

The No Action Alternative is evaluated in Chapter 3 of the Final EIS, and under this alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5.

As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

L293-42 The GTCC LLRW and GTCC-like waste inventory evaluated in the EIS is based on the best available information on the stored and projected GTCC LLRW and GTCC-like wastes from ongoing and planned activities. The estimated 12,000 m^3 of GTCC LLRW and GTCC-like wastes is a relatively small volume of waste when compared to other wastes disposed of by DOE. For example, this volume of GTCC LLRW and GTCC-like wastes is only about 20% of the 59,000 m^3 of LLRW disposed of at one site (NNSS) in one year (fiscal year 2010). DOE canceled the *Draft Global Nuclear Energy Partnership Programmatic Environmental Impact Statement* (GNEP PEIS) (74 FR 31017); therefore, the generation of additional GTCC LLRW under GNEP is not included in the GTCC EIS inventory. In addition, the inventory includes wastes expected to be generated during the production of Mo-99 for medical applications from two potential generators. While the potential generator(s) of this waste may change, the estimated characteristics and volumes are representative of the amounts expected to supply the demand for the Mo-99. DOE believes that expanding the inventory to include potential GTCC LLRW and GTCC-like wastes from undefined or unplanned future activities would introduce excessive uncertainty in the EIS evaluations. DOE believes that the inventory included in the GTCC EIS is reasonable for the purposes of the NEPA process and that it provides a supportable basis for conducting the EIS evaluation and the identification of the preferred alternative in the Final EIS. In the future, should additional waste be identified, appropriate NEPA review would be conducted to reflect these changes and also changes that would be needed to the existing infrastructure or the identification of additional disposal sites.

Although characterization information for some of the GTCC LLRW and GTCC-like wastes is limited, DOE believes that sufficient data are available to allow for a comparative analysis of various approaches to dispose of these wastes in the EIS. Adequate data are generally available for the radioactive constituents, but comparable data for chemical constituents are generally lacking. DOE believes that the data presented in the EIS are sufficient to make comparative analyses between and among sites.

Depleted uranium is not included in the GTCC LLRW waste inventory because this material is not GTCC LLRW. Likewise, Class B and C wastes are not GTCC LLRW and are out of scope for this EIS.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
25	2	NA	2-2	Figure 2-1	EIS Contents	There are no quantitative data provided to support the claim that "estimated potential impacts would probably be small or could be mitigated." Provide the data that supported this claim, and include geology and other resources, as appropriate, that are critically affected by the various options. Also, provide a discussion that GTCC EIS is provide sufficient information and analysis of the various options to demonstrate that potential impacts are bounded.	L293-47
26	2	NA	2-3	NA	EIS Contents	Site provided comments regarding the box of a preferred alternative in the Draft GTCC EIS. Revise the Draft GTCC EIS to identify disposal in a deep geologic repository as the preferred alternative.	L293-48
27	2	2.1	2-4	NA	Long-Term Impacts	The No Action alternative has the potential to cause significant long-term environmental degradation, but the EIS's qualitative evaluation does not bound potential long-term impacts. The resident farmer scenario assumes institutional controls will remain intact indefinitely, which is not valid. In addition, the evaluation of long-term impacts does not consider surface runoff and particulate air emission mechanisms even though storage of GTCC waste is at the ground surface. Proper evaluation of the impacts of the No Action alternative is required for comparison with the proposed action alternatives and selection of a preferred alternative. Revise the Draft GTCC EIS analysis of the No Action alternative to demonstrate that potential long-term impacts are bounded.	L293-49
28	2	2.3	2-6	NA	Action Alternatives	The Draft GTCC EIS should identify the minimum acceptable depth to groundwater for each of the boreholes, trenches, and vaults to be constructed at the candidate sites.	L293-50
29	2	2.3	2-6	NA	Action Alternatives	The text states that shallower bore holes could be used for GTCC waste. If the waste is disposed of less than 50 meters below ground surface, it would be considered near-surface disposal. Revise the Draft GTCC EIS to acknowledge this distinction and describe additional engineering and design measures that would be required for such an action.	L293-51
30	2	2.3	2-6	NA	Hanford Site	A thorough analysis to support GTCC waste disposal decision-making should identify demonstrate that Hanford is not a viable location for disposal of these highly radioactive and long-lived wastes. See previous comments regarding disposal of additional waste at Hanford. Revise the Draft GTCC EIS so that Hanford is no longer a candidate site for disposal of GTCC waste.	L293-52
31	2	2.6	2-9	NA	Hanford Site	Oak Ridge was eliminated as a candidate site because it is "not capable for disposal of LLRW containing high concentrations of long-lived radionuclides (such as those found in GTCC waste), especially those with high mobility in the subsurface environment." This definition is vague and also applies to the Hanford Site, which also has subsurface conditions that promote movement of contaminants. This is illustrated by the numerous groundwater plumes that have already reached the Columbia River from the Central Plateau. The same criteria that were applied to Oak Ridge should be applied to Hanford, and the Hanford Site should be removed from consideration in the revised Draft GTCC EIS.	L293-53
32	2	2.7.1	2-10	NA	Short-Term Impacts	The impacts to air quality during the construction phase at the Hanford Site should be of particular concern. Using the Idaho site as an example, the soils and sediments are highly contaminated. Excavating and moving the radionuclide areas the potential to create additional risks that the Draft GTCC EIS does not sufficiently address.	L293-54
33	2	2.7.2	2-11	NA	Long-Term Impacts	Surface libration and bioturbation controls are not appropriate for isolating waste that will remain dangerous for thousands of years. Surface libration and bioturbation controls are not appropriate for isolating waste that will remain dangerous for thousands of years. There is no way to ensure that humans can prevent man-made or environmental intruders for the minimum based upon half of 10 half-lives required for long-lived isotopes. Revise the Draft GTCC EIS to further acknowledge that near-surface disposal is not appropriate, and identify disposal in a deep geologic repository as the preferred alternative.	L293-55

DOE's Report to Congress required by Section 631 of the Energy Policy Act, 2005 (P.L. 109-58), will identify options for ensuring that the beneficiaries of the activities resulting in the generation of GTCC LLRW bear all reasonable costs of disposing of such wastes.

L293-43 The resident farmer scenario is not dependent on land use designations or institutional controls. As discussed in Section 2.7.4.2, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-44 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

L293-45 DOE developed this EIS to support a decision on selecting a disposal facility or facilities for GTCC LLRW and GTCC-like waste, to address legislative requirements, to address national security concerns (especially for sealed sources), and to protect public health and safety. The purpose and need for the proposed action, as discussed above, is stated in the EIS (Section 1.1). The scope of the EIS is focused on addressing the need for developing a disposal capability for the identified inventory of GTCC LLRW and GTCC-like wastes.

As required by the Energy Policy Act of 2005, (P.L. 109-58), DOE must submit a Report to Congress that includes the alternatives considered in the EIS and await Congressional action before making a final decision regarding which alternative(s) to implement. The Report to Congress will be made available to the public on the GTCC EIS website (http://www.gtcceis.anl.gov/).

L293-46 Information on waste forms and waste packages and containers is provided in the EIS to allow for a comparative analysis of alternatives for transportation and waste disposal. Treatment of the wastes prior to disposal is outside the scope of the EIS. Such treatment is assumed to be addressed prior to receipt of the waste at the GTCC LLRW and GTCC-like waste disposal facility. DOE agrees that it is important to immobilize long-lived radionuclides such as Tc-99 and I-129 prior to disposal. Solidification techniques (e.g., use of grout) are expected to immobilize certain wastes in the GTCC LLRW and GTCC-like waste inventory. If needed, the actual stabilization methods used will depend, in part, on the waste stream, packaging, and final disposal facility design. DOE considers the assumptions used for waste form stability (see Appendix B) to be reasonable for purposes of the comparative analysis provided in the EIS.

The waste characteristics and physical form would have to meet the disposal facility waste acceptance criteria. It is expected that these waste acceptance criteria would identify requirements (such as allowable concentrations) for individual radionuclides, including Tc-99 and I-129. The specific waste forms and packages used to dispose of GTCC LLRW and GTCC-like wastes would be determined in the future as part of the waste acceptance criteria and packaging requirements developed.

L293-47 Detailed information related to the potential impacts on the various resource areas are provided in the individual site chapters as well as in Chapter 5 (Common elements for Alternatives 3,4, and 5) and Appendix D (Conceptual Disposal Facility Design), and Appendix E (Evaluation of Long-Term Human Health Impacts). All relevant potential exposure pathways and resources

were considered in the analyses presented in the EIS, including impacts from surface runoff and airborne emissions. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. Site-specific NEPA reviews would be conducted as needed.

L293-48 A preferred alternative is not required to be included in a Draft EIS. The Council on Environmental Quality regulations in 40 CFR 1502.14(e) specify that the section on alternatives in an EIS shall identify the agency's preferred alternative or alternatives, if one or more exists, in the Draft EIS and identify such alternative(s) in the Final EIS unless another law prohibits the expression of such a preference; that is, a preferred alternative shall be identified in the Draft EIS if one exists.

If no preferred alternative has been identified at the Draft EIS stage, a preferred alternative need not be included. By the time the Final EIS is filed, 40 CFR 1502.14(e) presumes the existence of a preferred alternative and requires its identification in the Final EIS unless another law prohibits the expression of such a preference.

DOE did not have a preferred alternative at the time of issuance of the Draft EIS because of the complex nature of the proposed action and the potential implications for disposal of GTCC LLRW and GTCC-like wastes. To seek public input on how to identify a preferred alternative for inclusion in the Final EIS, the Draft EIS presented considerations for developing a preferred alternative in the Summary (in Section S.6) and in Section 2.9. As required by 40 CFR 1502.14(e), the Final EIS contains a preferred alternative for the disposal of GTCC LLRW and GTCC-like wastes (see Section 2.10). In developing the preferred alternative, DOE took into consideration public comments on the Draft EIS, public EIS scoping comments, and other factors identified in Sections S.6 and 2.9 of the EIS.

The publication by the EPA of a NOA of the Final EIS in the Federal Register initiated a 30-day public availability or "waiting" period. While the availability period is not a formal public comment period, the public can comment on the Final EIS, including the preferred alternative, prior to final agency action. Comments received will be addressed by DOE in a ROD. As required by the Energy Policy Act of 2005 (P.L. 109-58), DOE must submit a Report to Congress that includes the alternatives considered in the EIS and await Congressional action before making a final decision regarding which alternative(s) to implement. The Report to Congress will be made available to the public on the GTCC EIS website (http://www.gtcceis.anl.gov/).

DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

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L293-49 The No Action Alternative is evaluated in Chapter 3 of the EIS, and under this alternative, current practice for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5. As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

L293-50 See response to L293-29.

L293-51 The text states "The borehole method entails emplacement of waste in boreholes at depths below 30 m" and "The conceptual design evaluated in this EIS employs boreholes that are 2.4 m (8 ft.) in diameter and 40-m (130-ft.) deep." Waste can still be buried in shallower boreholes (less than 40 m) and still keep the waste below 30 m (at intermediate depths, not near-surface).

L293-52 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

L293-53 Disposal of LLRW at Oak Ridge Reservation (ORR) is currently limited to only CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) waste. Based on reviews conducted by the Low-Level Waste Disposal Facility Federal Review Group, DOE determined the site is not appropriate for disposal of LLRW containing high concentrations of long-lived radionuclides (such as those found in GTCC LLRW and GTCC-like wastes), especially those with high mobility in the subsurface environment. For this reason, DOE concluded that the ORR is not a reasonable disposal site alternative and eliminated it from detailed evaluation. Hanford, on the other hand, exhibits different soil and depth to groundwater characteristics that do not exclude it from being considered in the GTCC EIS evaluation.

L293-54 Potential air quality impacts at Hanford were evaluated sufficiently in Section 6.2.1 in the EIS. It is not expected that the disposal facility would be constructed in contaminated soil.

L293-55 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
34	2	2.7.2	2-11	NA	Long-Term Impacts	The statement "the land currently used for storage would continue to be used" does not address the long-term risk involved in the use of trench storage that was not designed for long-term use. Contrary to the EIS's claim, Alternative 3-3 implemented at Hanford could have significant impacts. Refer to previous comments regarding subsurface contamination in the Hanford reference area and comments regarding Hanford cumulative impacts. Revise the Draft GTCC EIS in accordance with these comments.	L293-56
35	2	2.7.2	2-12	NA	Environmental Variables	Assuming that the erosion rate will always be less in western states is not reasonable for the duration of storage. Episodic, very large runoff events are known to result in significant erosion that may not be apparent in short-term records. Additional mechanisms such as equipment failure, human error, and natural events should be considered. Revise the Draft GTCC EIS to better quantify erosion in western states so that the rates realistically represent the sum of all factors. Revise the Draft GTCC EIS to delete that acknowledges any assumptions made that artificially reduce the assumed erosion rate for a given region as these assumptions can be accounted for.	L293-57
36	2	2.7.2	2-12	NA	Environmental Variables	It is not realistic to assume that very low erosion rates observed on a newly constructed barrier can be maintained beyond 100 years. Revise the Draft GTCC EIS to establish a variable or increasing erosion rate over time to reflect the impact of barrier degradation.	L293-58
37	2	2.7.3	2-12	NA	Short-Term Impacts	The impact that will result from spreading the identified volumes of water around and allowing the water to infiltrate are significant. This water will mobilize contaminants already present in the vadose zone at Hanford. Revise the Draft GTCC EIS to fully account the impact of artificially increased flux infiltration rate during construction and faster rate into the groundwater exposure pathway, which according to the Draft GTCC EIS is proportional to infiltration.	L293-59
38	2	2.7.3	2-12	NA	Long-Term Impacts	Potential risks to the aquifers at Hanford are not sufficiently addressed. The groundwater under the reference area is already physically contaminated. See comments in Attachment 1 regarding Hanford cumulative impacts.	L293-60
39	2	2.7.3	2-12	NA	Long-Term Impacts	Potential long-term impacts from surface runoff were not analyzed. Given that waste is stored at or near the ground surface in the No Action, trench, and vault alternatives, and given that institutional controls are not reliable beyond 100 years, failure to analyze long-term impacts from surface runoff is inappropriate. Revise the Draft GTCC EIS to include the surface water pathway for exposure.	L293-61
40	2	2.7.3	2-13	NA	Long-Term Impacts	The Draft GTCC EIS identifies significant impacts to Hanford groundwater including large doses of I-129, Tc-99, U-238, and other radionuclides. Several of the radionuclides (other than Tc-99) have half-lives of more than 1,000,000 years and are transuranic. It is not reasonable to assume that Hanford can provide a stable environment for the long-term storage of these radionuclides and groundwater. Revise the Draft GTCC EIS so that the Hanford Site is no longer considered for construction of a GTCC waste facility.	L293-62
41	2	2.7.4.1	2-13	NA	Short-Term Impacts	Revise the Draft GTCC EIS to identify the cost to Native American cultural resources specifically will receive during excavation activities.	L293-63
42	2	2.7.4.1	2-13	NA	Long-Term Impacts	The EIS's risk assessment did not include all relevant pathways for exposure. Post-closure exposure pathways should reasonably include ingestion, inhalation, and dermal contact with groundwater, surface water, and sediment. Refer to previous comments (Ecolog, 2007) and incorporate the exposure pathways identified therein into the risk analysis presented in the revised GTCC Draft EIS.	L293-64
43	2	2.7.4.2	2-14	Table 2.7-3	Action Alternatives	Because current storage of GTCC wastes is at the ground surface and institutional controls are not reliable beyond 100 years (10 CFR 61), it is essential to conduct a quantitative evaluation of the impacts of the No Action alternative using the runoff and airborne particulate release mechanisms (in addition to the leaching to groundwater pathway that was evaluated) for a meaningful comparison of the proposed action alternatives.	L293-65

sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder, especially for the wastes disposed of in an enhanced near surface trench or vault.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC near-surface disposal facility because of (1) the use of intruder barriers, (2) the remoteness of the sites, (3) DOE's commitment to long-term institutional control, (4) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (5) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Site-specific NEPA reviews would be conducted as needed.

L293-56 See response to L293-2.

L293-57 Site-specific environmental factors, such as erosion rates, runoff coefficient, slope length and steepness, cover and management and soil erodability, were evaluated in the EIS as appropriate (Refer to Table E-3 (INL), E-5 (Hanford), E-7, (LANL), E-9 (NNSS) and E-13 (WIPP)). The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

L293-58 The erosion rates used for Hanford were selected to be conservative (i.e., higher than expected) to produce results that would not underestimate potential impacts. Appendix E in the EIS covers the model input parameters used for Hanford and the other sites evaluated.

L293-59 The use of water during construction would not occur over emplaced GTCC or GTCC-like waste other than minor amounts for used for re-vegetation of any final ground cover. The volume of water anticipated for construction is small (maximum of about 0.4% of the annual water use at the 200 East Area) as discussed in Section 6.2.3.1. Such an increase is not expected to have an appreciable effect on existing contamination in the vadose zone.

L293-60 See response to L293-2.

L293-61 All relevant potential exposure pathways were considered in the analyses presented in the EIS, including impacts from surface runoff (Refer to Appendix E). These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. Site-specific NEPA reviews would be conducted as needed.

L293-62 See response to L293-2.

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L293-63 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

L293-64 See response to L293-63.

L293-65 The No Action Alternative is evaluated in Chapter 3 of the EIS, and under this alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue. These practices are described in Sections 3.2 (GTCC LLRW) and 3.3 (GTCC-like wastes) in the Final EIS. It was necessary to make a number of simplifying assumptions to address the long-term impacts of this alternative, and these are described in Section 3.5. As discussed, airborne releases were considered to be negligible. As part of this assessment, it was assumed that these wastes would remain in long-term storage indefinitely, including wastes from the West Valley Site as discussed in Section 3.5.3, and that no maintenance of either the storage facility or waste packages would occur after 100 years. These results indicate that very high radiation doses and cancer risks could occur under this alternative in the long term.

The No Action Alternative is evaluated in sufficient detail in the EIS as required by NEPA. Comparatively high potential radiation doses and cancer risks could occur should this alternative be selected. While a more detailed analysis could reduce the uncertainties associated with estimating these doses and risks, the conclusion of comparatively high impacts would not change for this alternative.

The No Action Alternative is evaluated in the EIS to provide a baseline for comparison with the action alternatives. This evaluation confirmed the risks posed by these wastes and the need to develop appropriate disposal capability. The potential radiation doses for the No Action Alternative covered a time period of 10,000 years in a manner comparable to that done for the action alternatives. Relatively high impacts could occur shortly after the 100-year institutional control period under this alternative.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
44	2	2.7.4.2	2-15	NA	Surface Barriers/ Institutional Controls	Refer to the comments in Attachment 1 regarding land use and site occupation following loss of institutional controls. Post-closure occupation is not outside any closer to the facility than 100 meters from the boundary. This is not a reasonable assumption given a hypothetical scenario where institutional controls are lost. Rather, it is more likely that people would occupy the site as usual and accustomed places and to hunt and gather on open lands such as that Hanford Site. Revise the Draft GTCC EIS to incorporate the requirements of the Treaty of 1855, and provide action alternatives that do not conflict with the rights granted by the Treaty of 1855.	L293-66
45	2	2.7.4.2	2-15	NA	Human Exposure	It is unreasonable to assume that the resident farmer scenario is a conservative estimate. By assuming a total loss of institutional controls and inadvertent memory of the facility, unintentional or intentional intrusion into the waste site is very likely. Revise the Draft GTCC EIS to include a detailed inadvertent intruder scenario for any near-surface proposed action alternative.	L293-67
46	2	2.7.4.2	2-15	NA	Human Exposure	This paragraph concludes that farm pasture on this parcel, which states that all institutional controls will be lost. Conversion loss of institutional controls is a reasonable assumption, but the conclusion that the farmer would not occupy the site closer than 100 meters from the boundary is not reasonable. The concept that a farmer or future resident would intuitively avoid a facility of which he or she has no knowledge whatsoever is not justifiable. For example, because the farmer does not know the facility exists, he may choose to locate his farm directly on top of said facility, which may prove particularly attractive after repairing the imported topsoil and barriers into a well-forested field. This proposed scenario is not conservative and should not be accepted as such. Revise the Draft GTCC EIS to include significantly more intrusive and damaging scenarios that involve direct occupation of the facility, intentional damage to surface barriers, and dramatically increased infiltration rates as may occur as a result of irrigation within the facility boundary.	L293-68
47	2	2.7.4.2	2-15	NA	Long-Term Impacts	This does not take into account the cumulative impacts at the Hanford Site. Please refer to comments in Attachment 1 regarding cumulative impacts. Cumulative impacts need to account for all pre-existing contamination at the site, not just those identified in the Tank Closure and Waste Management (TC&WM) EIS (USDOE, 2009) and should include the exposure pathways identified in the Yakama Nation Exposure Scenario (Jaldoff, 2007). Revise the Draft GTCC EIS to include all pre-existing contamination at the Hanford Site in the cumulative impacts analysis.	L293-69
48	2	2.7.4.2	2-15	NA	Human Exposure	The determination that the surface runoff transport mechanism is not relevant to the No Action, Intrusion, and Vault alternatives is inappropriate and unjustified. See previous comments about the need to include the surface water exposure pathway in the revised Draft GTCC EIS.	L293-70
49	2	2.7.4.2	2-15	NA	Human Exposure	Underlying assumptions here and throughout the Draft GTCC EIS reflect conservatism and underestimation of risk. Rather than focusing on the most likely exposure pathways, the Draft GTCC EIS has focused on highly improbable exposure scenarios. Rather than focusing on the most likely exposure pathways unique to specific sites for a more meaningful evaluation of subsequent NEPA analysis, it would have to consider exposure pathways unique to specific sites for a more meaningful evaluation of expected dose and LCF risk. Remove speculation on the likelihood of the resident farmer scenario occurring at Hanford's sites and delete the reference to Hanford as an example.	L293-71
50	2	2.7.4.2	2-15	NA	Surface Barriers/ Institutional Controls	The effectiveness of stabilization agents such as grout to reduce the leaching of Cs/Sr Waste has not been established, and such agents may be inconsequential when compared to the long half lives of waste radionuclides. Revise the Draft GTCC EIS to specifically state that the effectiveness of stabilization agents has not been demonstrated, and their performance over very long periods of time has not been evaluated using a scientifically rigorous methodology.	L293-72

L293-66 See response to L293-21.

L293-67 DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder, especially for the wastes disposed of in an enhanced near surface trench. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC waste trench disposal facility because of (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Site-specific NEPA reviews would be conducted as needed.

Potential inadvertent human intrusion into WIPP is addressed in the documentation supporting its current operations. Inclusion of GTCC LLRW and GTCC-like wastes with the wastes already planned for disposal in this repository would not be expected to change the results associated with this hypothetical intrusion event.

L293-68 See response to L293-67.

L293-69 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1-1 Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians. In a similar fashion, additional cumulative impacts analyses would be conducted by using additional site-specific information when the location selected for a GTCC LLRW and GTCC-like waste disposal facility was determined.

DOE has considered cumulative impacts at the Hanford Site in this GTCC EIS. The disposal of GTCC LLRW and GTCC-like waste at the Hanford Site could result in environmental impacts that may warrant mitigation for Tc-99 and I-129 through limiting receipt of these waste streams (see Table 6.2.4.2 and Figure 6.2.4.1 in this EIS).

DOE's ROD 78 FR 75913 dated December 13, 2013, stated that DOE has deferred a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with the State of Washington Department of Ecology) for disposal at Hanford at least until WTP is operational.

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L293-70 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-71 In evaluating the performance of the proposed land disposal facilities, a number of engineering measures were assumed in the conceptual facility designs to minimize infiltration of water into the wastes and thereby minimize contaminant migration from the disposal units. Monitoring and maintenance of the land disposal units were assumed to be for 100 years, and corrective measures could be implemented during this time period to ensure that the engineered barriers lasted for at least 500 years. This is consistent with the institutional control time frame given in both NRC and DOE requirements and was determined to be a reasonable approach for assessing the long-term performance of the disposal units.

It was assumed that after 500 years, the barriers would gradually fail. To account for these measures in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the assessment time period (10,000 years). A water infiltration rate of 20% of the natural rate for the area was used only for the waste disposal area; the natural background infiltration rate was used at and beyond the perimeter of the waste disposal units.

Additional assumptions were used for a number of parameters, including the distance to a nearby hypothetical receptor (100 m or 330 ft. from the edge of the disposal facility). The analyses in the EIS indicate that a near-surface trench facility at NNSS and the WIPP Vicinity can be safely used (e.g., estimates indicated no dose to a hypothetical nearby receptor at 10,000 years).

DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion into a trench is from a future drilling event, such as drilling for a water well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC trench disposal facility at the reference locations evaluated because of (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control at these sites, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of an inadvertent human intruder in this EIS. Site-specific NEPA reviews would be conducted as needed.

Issues associated with potential inadvertent human intrusion into WIPP have been addressed in the documentation supporting its current operations. Disposal of the GTCC LLRW and GTCC-like waste inventory in addition to the wastes already planned for disposal in this repository would not be expected to change the results associated with this hypothetical event.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
51	2	2.7.4.2	2-16	NA	Long-Term Impacts	The text incorrectly implies that 100 meters is the minimum distance for the downgradient point of compliance allowed by LLRW performance assessments conducted under the Radioactive Waste Management Manual (USDOE M 435.1-1). Revise the text to explain that, "at smaller buffer zone may be used if adequate justification is provided" (USDOE M 435.1-1).	L293-73
52	2	2.7.4.2	2-16	NA	Environmental Variables	The assumption that the infiltration rate will be 20 percent of the "natural rate" once the waste area has not been shown to apply at the Hanford Site. It is an optimistic assumption that underestimates the total information through the waste interval to keep most performance criteria in the first 10,000-year evaluation period. Revise the Draft GTCC EIS to evaluate higher infiltration rates than 20 percent, including 50 percent, 100 percent and 150 percent of average infiltration. Provide a sensitivity analysis using parameters that are less favorable rather than more favorable to maintaining waste isolation.	L293-74
53	2	2.7.6	2-21	NA	Long-Term Impacts	That Draft GTCC EIS must consider the full range of impacts associated with proposed land disposal to ensure protection of local ecological and cultural resources. A disposal facility land use would preclude use of the land at any time for other purposes by the public or by Native Americans, regardless of current land use designations. Revise the Draft GTCC EIS to provide more in-depth site-specific analyses that fully assess land use impacts for the proposed land disposal alternative.	L293-75
54	2	2.7.12	2-23	NA	Long-Term Impacts	Revise the Draft GTCC EIS to clarify that the level of cumulative impacts analysis should be commensurate with potential impacts (USEPA, 1997).	L293-76
55	2	2.7.12	2-24	NA	Surface Barriers/ Institutional Controls	Clarify that the Draft GTCC EIS uses the resident farmer scenario only for comparative purposes and that subsequent NEPA analyses would have to consider applicable exposure pathways unique to specific sites for a more meaningful evaluation. See previous comments and comment in Attachment 1 regarding use of the resident farmer scenario and reliance on institutional controls and surface barriers. Revise the Draft GTCC EIS in accordance with these comments.	L293-77
56	2	2.8.4	2-58	NA	Surface Barriers/ Institutional Controls	Assumptions made for the resident farmer scenario reflect systematic overreliance on current land use designations and institutional controls to reduce estimated long-term exposures. See previous comments on use of the resident farmer scenario and reliance on institutional controls. Revise the Draft GTCC EIS in accordance with these comments.	L293-78
57	2	2.8.4	2-58	NA	Human Exposure	Revise the text to explain that discussion the resident farmer scenario ever relies on current land use designations and institutional controls, may further design considerations or site-specific modeling must consider exposure pathways unique to specific sites for a meaningful evaluation of the expected dose and LCF risk.	L293-79
58	2	2.9	2-59	NA	EIS Constants	In citing 10 CFR 61, the text incorrectly implies that special considerations may warrant near-surface disposal for all current and anticipated future GTCC LLRW. Revise the Draft GTCC EIS to clarify that near-surface disposal of GTCC LLRW remains generally prohibited. Also revise the Draft GTCC EIS to explain that the waste is suitable for the NRC for disposal of some waste types, depending upon a limited concentration of long-lived radionuclides in the waste.	L293-80
59	2	2.9	2-59	NA	Human Exposure	The Draft GTCC EIS supports the implication that protection of individuals from radioactivity during disposal and from intrusion warrants greater consideration than does protection from long-term impacts after facility closure. Revise the Draft GTCC EIS to clearly state that protection of the preferred alternative must give long-term protection of populations from radioactivity equal weight to or greater weight than protection of individuals from radioactivity during disposal.	L293-81

All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-72 Information on waste forms and waste packages and containers is provided throughout the EIS to allow for a comparative analysis of alternatives for transportation and waste disposal. Treatment of the wastes prior to disposal is outside the scope of the EIS. Such treatment is assumed to be addressed prior to receipt of the waste at the GTCC LLRW and GTCC-like waste disposal facility. DOE agrees that it is important to immobilize long-lived radionuclides such as Tc-99 and I-129 prior to disposal. Solidification techniques (e.g., use of g rout) are expected to immobilize certain wastes in the GTCC LLRW and GTCC-like waste inventory. If needed, the actual stabilization methods used will depend, in part, on the waste stream, packaging, and final disposal facility design. DOE considers the assumptions used for waste form stability (see Appendix B) to be reasonable for purposes of the comparative analysis provided in the EIS.

L293-73 The minimum distance of 100 m is adequate for the analyses conducted in this EIS. The 100 m distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1-1, Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-74 The assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

A limited sensitivity analysis was conducted to obtain an idea of the uncertainties involved in the long-term post-closure human health estimates as described in Appendix E, Section E.6. The sensitivity analysis did include an analysis of the infiltration rate.

L293-75 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. The specific locations that would be used at each potential site for development of a disposal facility for GTCC LLRW and GTCC-like wastes are not known at this time. The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated. Fate and transport parameters utilized in the estimations were based on site-specific (e.g., specific to the reference location to the extent available) information and, as such, are considered reasonable for the purpose of the comparison made in the EIS. However, DOE recognizes that additional project- and site-specific information, such as the actual depth to groundwater over the entire disposal

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
00	2	2.0	2-49	NA	Human Exposure	Although proper evaluation of the No Action alternative is required (40 CFR 1500) and essential for evaluation of proposed action impacts, the No Action alternative should not be considered a viable option for a final disposal alternative, even in combination with other action alternatives.	L293-82
01	2	2.0.3.1	2-2 82	NA	Surface Stabilization Institutional Controls	Institutional controls can be effective in reducing the potential for inadvertent intrusion and potential intruder exposures. However, institutional controls are effective only inasmuch as they are in place (U.S. Nuclear Regulatory Commission, 1991). Revise the Draft GTCC EIS to clarify that the design, operations, and closure of the land disposal facility must ensure protection of any individual for 10,000 years after the facility is closed. Institutional controls are not a substitute for engineered controls over the disposal site and are limited (10 CFR 61). See previous comments on surface barriers and institutional controls. Revise the Draft GTCC EIS in accordance with these comments.	L293-83
02	2	2.0.3.3	2-63	NA	Surface Stabilization Institutional Controls	Given that institutional controls are not to reflect upon for more than 100 years (10 CFR 61) and that no long-term assurances of the used alternative depends on maintaining post-closure care, it is not appropriate for the performance evaluation to consider the long-term effectiveness of such disposal as equal to that of the bentonite and trench alternatives. Revise the Draft GTCC EIS to evaluate the proposed action alternatives without the assumption that all three are of equal integrity, which is demonstrably false. See comments in Attachment 1 that address the use of surface barriers and institutional controls at any new disposal facility.	L293-84
03	2	2.0.4.2	2-67	NA	Cultural Resources	Cultural resources include much more than simply Traditional Cultural Properties (TCPs). At the Draft GTCC EIS has defined it, the entire Hanford Site, public lands, and the lands of the Columbia River, is a TCP because the entire area has traditional cultural and religious significance to the Yakama people. In the case of the Yakama Nation, Hanford cultural resources are also treaty resources and the United States is obligated to ensure that the Yakama people and resources are not harmed by federal actions. Revise the Draft GTCC EIS to explain that cultural resources are far broader than calculated historic locations of occupation or specific food items.	L293-85
04	2	2.0.4.3	2-67	NA	EIS Contents	Treaty rights are not recognized in the Draft GTCC EIS for actions at Hanford. Revise the Draft GTCC EIS to recognize the Treaty of 1855 (12 Stat. 951) that reserves specific rights and resources for the Yakama Nation.	L293-86
05	5	NA	NA	NA	Action Alternatives	Revise the Draft GTCC EIS to provide more information on the Standard Waste Box (SWB). Include information on dimensions, materials, and shielding beyond the Class A designation.	L293-87
06	5	5.1.1	5-5	NA	Action Alternatives	Revise the Draft GTCC EIS to provide additional information regarding how the bentonite diameter was selected.	L293-88
07	5	5.1.3	5-12	NA	Action Alternatives	Revise the Draft GTCC EIS to identify the source of the additional test for equal cover. The Draft GTCC EIS has already acknowledged that no cumulative work on the Hanford Site has created a "kind of crack", making the source of this material a significant issue.	L293-89
08	5	5.1.4.3	5-18	NA	Action Alternatives	The assumption that the near-surface land disposal facilities are all of equal integrity is not valid, and any analysis presented based on that assumption is deficient. The Draft GTCC EIS concludes that this approach is used to "allow for a comparison of the disposal methods on the basis of the general geophysical conditions at each site." Such an approach is not logical and cannot be justified, because it heuristically ignores highly relevant characteristics of each disposal alternative, such as the depth of disposal, presence of a liner, types of backfill, concentration of waste, volume and placement of concrete, and other factors. Revise the Draft GTCC EIS to include the specified features of each action alternative and compare the integrity of the disposal facilities based on these specific parameters.	L293-90

area, could be used to inform the implementation of a disposal facility at a given location. This additional information is expected to reduce the uncertainty associated with these types of evaluations to the extent possible. Site-specific information would be evaluated in any site-specific NEPA review that would be conducted based on a ROD for this EIS.

L293-76 As required by NEPA, all impact analyses not just for cumulative impacts, in the EIS are commensurate with the potential significance of the impact. Cumulative impacts were evaluated in Sections 4.5, 5.3.12, 6.4, 7.4, 8.4, 9.4, 10.4, and 11.4 in the EIS and were summarized in Section 2.7.12.

L293-77 As stated in Section 2.7.4.2 of the EIS, "The use of the resident farmer scenario is intended to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated (e.g., Hanford Site). " Additional text was appended to this statement – "Subsequent NEPA analysis would use additional site-specific information, if available, for the evaluation of potential impacts should a site be selected for a GTCC disposal facility."

L293-78 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1-1, Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 in the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

L293-79 See response to L293-78.

L293-80 See response to L293-28.

L293-81 As stated in Section 2.9 of the EIS, DOE is concerned with the protection of human health, during construction and operation of the facility, as well as in the long-term after facility closure.

L293-82 The No Action Alternative is evaluated in sufficient detail in the EIS as required by NEPA. Comparatively high potential radiation doses and cancer risks could occur should this alternative be selected. While a more detailed analysis could reduce the uncertainties associated with estimating these doses and risks, the conclusion of comparatively high impacts would not change for this alternative. The comment recommendation was taken into consideration, as appropriate, in the selection of the preferred alternative.

L293-83 See response to L293-67.

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L293-84 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2 of the EIS, each concept has been used to some degree in the United States or other countries. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

L293-85 As required by NEPA, the EIS evaluates the potential impacts of the proposed action on cultural resources at the various DOE sites in sufficient detail to assess the potential impacts of the proposed alternatives. DOE recognizes that development of a disposal facility for GTCC LLRW and GTCC-like wastes would require that future land uses be restricted at and near the site for the protection of the general public. This action could affect areas that may be important to American Indian tribes.

DOE considered the text provided by the participating affiliated American Indian tribes for each of DOE sites evaluated in selection of the preferred alternative. Information provided by the tribal governments associated with exposure pathways unique to American Indian tribes (e.g., greater intakes of fish, game, and plants; use of sweat lodges; use of natural pigment paints for traditional ceremonies) would be evaluated in site-specific NEPA analyses for the alternative(s) selected in a ROD for this EIS.

L293-86 See response to L293-21.

L293-87 Information on waste forms and waste packages and containers, including the SWB, is provided in the EIS to allow for a comparative analysis of alternatives for transportation and waste disposal. See the discussion in Section B.5 and C.9.4.2 of the EIS for more information on packaging and requirements. All GTCC LLRW and GTCC-like wastes would be packaged and transported in accordance with all applicable federal and state requirements, and waste disposal activities would be conducted in accordance with appropriate requirements.

L293-88 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2 of the EIS, each concept has been used to some degree in the United States or other countries. Section 1.4.2.2 discusses the selected borehole diameter. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail.

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L293-89 The amount of additional soil that might be required for the implementation of a near-surface vault facility would depend on the site-specific implementation. Site-specific NEPA reviews would be conducted as needed.

L293-90 The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2 of the EIS, each concept has been used to some degree in the United States or other countries. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail.

The conceptual nature of these configurations takes into account the characteristics of all of the disposal sites for which they were considered, but their designs (e.g., width, depth, cover depth, reinforced containment) could be altered or enhanced, as necessary, to provide an optimal solution at a specific location. As an example, the cover depth could be adjusted to ensure that roots from vegetation would not compromise the top of the engineered barrier. In addition, the dimensions of the generic land disposal units (e.g., trench - width and depth, borehole – diameter and depth, vault – width, depth, and height) were selected based on similar existing facilities, existing equipment and methods for construction, and optimized (maximized waste volume disposed of for a given disposal unit volume; simple waste handling procedures to minimize exposure) for the types of waste packages considered. All designs could also accommodate different disposal packages (existing and proposed) with minor variations in their dimensions, but the EIS analyses would remain relevant for each option considered. Such characteristics as depth of disposal, waste concentrations, and disposal unit geometry were specifically accounted for in the EIS analysis.

For example, if borehole disposal at NNSS became a preferred alternative, any capacity in the existing boreholes would have been considered in follow-up studies. For an above-grade vault with a 5 m cover, long-term impacts from the above-grade vault as determined by modeling for the EIS would be expected to be similar to those for a vault set lower with respect to grade, including with the top of the vault at or below grade, except in the case where the bottom of the waste confinement was closer to the groundwater table. For any disposal option, the bottom of any disposal unit would not be located at or below the water table to exclude the chance of groundwater migration into the disposal unit. Actual implementation of a disposal option at a specific location at a given site may have to be modified (i.e., the depth of a trench or a borehole may need to be reduced to avoid groundwater issues).

Past operational experience with these types of disposal facilities at DOE sites has shown that when properly implemented, they can provide isolation of radioactive waste from the environment for extended time periods. Past problems that have arisen with each option provide additional information to improve the design and performance of future land disposal facilities. Issues related to performance over time would be analyzed in a project-specific analysis to address technical and long-term cultural concerns (e.g., tribal issues).

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
69	5	5.1.1	5-5	NA	Action Alternatives	Revise the Draft GTCC EIS to provide additional construction details, including how radiologically contaminated equipment such as the borehole casing will be handled, stored, and disposed of.	L293-91
70	5	5.3.2	5-34	NA	Action Alternatives	The vault alternative will have significant impacts to geologic and soil resources. Revise the Draft GTCC EIS to evaluate impacts to geologic and soil resources at source areas (sites for materials in greater detail than is currently provided).	L293-92
71	5	5.2.4.2	NA	NA	Human Exposure	Revise the Draft GTCC EIS to evaluate external hazards, include Other Waste in the chemical assessment for wide variety of materials such as sludges, salts, charcoal, scrap metal, glass beads, solidified solutions, particulate solids, and organic and inorganic products.	L293-93
72	5	5.2.4.2	5-30	NA	Human Exposure	Revise the assessment of Beryllium Rebirth in the Draft GTCC EIS to qualitatively evaluate inadvertent and deliberate human intrusion. This is a probable and reasonably expected event in the next 10,000 years for any of the non-certain alternatives. It is particularly likely if the vault alternative is selected.	L293-94
73	5	5.2.4.3	5-30	NA	Long-Term Impacts	Revise the Draft GTCC EIS to identify long-term monitoring and maintenance period that would follow site decommissioning to ensure that the disposal facility was adequately containing the disposed wastes. The monitoring program should demonstrate that the facility will meet 10 CFR 61 requirements.	L293-95
74	5	5.2.3.3	5-11	NA	Action Alternatives	The Draft GTCC EIS states that the effects of two atmospheric conditions were considered, "neutral and stable." Revise the Draft GTCC EIS to explain how these two conditions differ from each other and include more scenarios that address unusual and severe weather such as large hail, tornadoes, and cloudbursts.	L293-96
75	5	5.3.3	5-40	Table 5.3.2-1	Short-Term Impacts	The values presented in Table 5.3.2-1 do not match the values provided in Appendix D. Large additional off-site movements for clay are specified in the trench and borehole methods in the appendix. Revise the Draft GTCC EIS to provide consistent resource estimates and provide additional justification for these estimates.	L293-97
76	5	5.3.4	5-51	NA	Short-Term Impacts	Evaluation of potential impacts only to workers and the general public does not constitute a complete analysis. Hanford is part of the Yakama Nation's usual and accustomed fishing areas and unrestricted access is a guaranteed by the Treaty of 1855. The Yakama Nation must be considered a particularly exposed receptor group in the short term and long term. The unique exposure pathways specific to Yakama tribal members must be evaluated, such as high exposure rates for surface water, groundwater, fish, game, and wild plant ingestion; sweat lodge use; and other cultural and subsistence activities that utilize Hanford Site natural resources.	L293-98
77	5	5.3.4	5-60	NA	Short-Term Impacts	Exposure estimates following a hypothetical accidental radiological release are not complete. In addition to external radiation from radioactive material in the air, the ingestion of radioactive material in food and water must also be evaluated and added to the exposure estimates. In addition, because GTCC LLRW includes very long-lived radionuclides, exposure should be estimated for much longer than 1 year following an accidental release. Thousands of years (as for the post-closure assessment) would be more appropriate.	L293-99
78	5	5.3.4.3	5-63	NA	Surface Biological Institutional Controls	The assumption that individuals will not move closer than 100 meters from the facility boundary is not justified and is not valid particularly many thousands of years into the future. Site documents in Attachment 1 and previous documents in this attachment regarding site occupation and exposure following closure. Revise the Draft GTCC EIS to evaluate exposure to an individual at the center of the disposal facility following closure of the site as well as at the site boundary. Revise the Draft GTCC EIS to include long-term institutional controls such as regrading, drilling, and plowing of the disposal facility as part of the exposure scenario.	L293-100

L293-91 Additional construction details would not provide any information that would help to discriminate between alternatives because construction of a particular disposal unit is expected to be similar for each site. Also, borehole casings would not be expected to be contaminated as all waste emplacements would involve packages without external contamination. Should such contamination occur, it would be handled according to a specific site's procedures for handling radioactively contaminated material.

L293-92 The amount of additional soil that might be required for the implementation of a near-surface vault facility would depend on the site-specific implementation. Site-specific NEPA reviews would be conducted as needed.

L293-93 DOE agrees that some GTCC LLRW and GTCC-like wastes may be characterized as mixed waste (waste containing hazardous chemical constituents in addition to radionuclides). However, currently available waste characterization information is limited, and these wastes only constitute approximately 4% by volume of the Group 1 wastes as discussed in Section 1.4.1 of the EIS. Additional information would be obtained prior to any disposal, however, and the mixed waste would be rendered nonhazardous before being submitted for disposal. In addition, potential health impacts from hazardous chemicals are expected to be small when compared to radiological risks presented in the EIS (due to the higher volume and activity from the radioactive component of the GTCC LLRW and GTCC-like waste inventory). Any mixed waste in the GTCC EIS inventory would be managed in accordance with federal and state laws and requirements.

L293-94 See response to L293-67.

L293-95 DOE believes that the simplified approach for estimating the effectiveness of the facility containment system is reasonable for the comparative analyses given in the EIS. It is not possible at this time to provide specific information on the expected monitoring and maintenance program to be used for the land disposal methods. Information on the facility designs is limited to conceptual descriptions of these facilities as given in Appendix D of the EIS. The monitoring and maintenance program would be tailored to the actual design of the disposal facility and would be developed during the implementation phase for a GTCC waste disposal facility.

The types of activities that would be expected to occur during the post-closure phase of a GTCC waste disposal facility would include: visually inspecting cover systems and security fences; monitoring the nearby air, soil, surface water, and groundwater; and repairing any defects in the facility, including cracks or holes in the soil cover. A detailed program would be developed to ensure that the wastes remained safely contained within the disposal unit for as long as possible.

L293-96 The difference between neutral and stable weather conditions is discussed in footnote 'b' in Table 5.3.9-3 of the EIS. The overall impact from severe weather conditions such as tornadoes would result in further dilution of air concentrations and generally reduce overall population exposure estimates.

L293-97 The resource values listed in Table D-9 are the correct values. The values for trench construction in Table 5.3.2-1 were revised to reflect the correct values.

L293-98 See response to L293-78

L293-99 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. The assessment of impacts from accidents occurring hundreds to thousands of years into the future was considered too speculative to include because of the large uncertainty associated with estimating future land use and population patterns.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
70	5	5.3.4.3	5-43	NA	Surface Barriers/ Institutional Controls	It is impossible to assume that engineering controls combined with natural features will ensure long-term stability of the disposal facility. See previous comments regarding reliance on surface barriers and institutional controls. Revise the Draft GTCC EIS in accordance with these comments.	L293-101
80	5	5.3.4	5-44	NA	Human Exposure	Clarify what uses of contaminated groundwater associated with leaching were evaluated. The evaluation should include not only irrigating with and drinking the groundwater, but also direct contact and inhalation of water vapors via bathing and, for a resident farmer who is Native American, sweat lodge use.	L293-102
81	5	5.3.4.3	5-44	NA	Human Exposure	Failure to include a surface water exposure pathway for a resident farmer living at the edge of an inactive disposal facility is not justified and is not acceptable. Review previous comments regarding site access, institutional controls and barriers, and post-closure exposure. Revise the Draft GTCC EIS to include a surface water exposure pathway in the post-closure dose assessment beginning 100 years after closure of the facility.	L293-103
82	5	5.3.4.3	5-45	NA	Human Exposure	Revise the Draft GTCC EIS to decrease the distance of the hypothetical resident farmer from the facility boundary, including exposure within the facility. Sensitivity analysis should evaluate scenarios that are worst, not better, than the maximum design standards specified. Exposure should be evaluated at 50 and 0 meters from the facility boundary, as well as at the most contaminated portions of the facility, and not at increasingly greater distances from the point of release. Similarly, revise the Draft GTCC EIS to include sensitivity analysis that accounts for higher rates of erosion, larger changes in temperature, and higher rates of erosion when evaluating near-surface disposal alternatives.	L293-104
83	5	5.3.4.3	5-45	NA	Surface Barriers/ Institutional Controls	It is unknown whether controls will remain 100 percent effective for 500 years and 80 percent effective for 10,000 years without implementing a thorough inspection and maintenance program. Revise the Draft GTCC EIS to provide additional, thorough justification for this use of these values. Demonstrate that they are valid assumptions in each region of the United States.	L293-105
84	5	5.3.4.3	5-46	NA	Human Exposure	The paragraph beginning at line 37 states: "The human health impacts to the hypothetical resident farmer given in this EIS are intended to serve as indicators of the relative performance of each of the three land disposal methods...by using robust engineering designs and radionuclide measures to contain the radionuclides in the disposal units, the potential releases of radionuclides would be delayed and reduced to very low levels..." The human health impacts that are cited/detail in the Draft GTCC EIS are based on as many unjustified and unreasonable assumptions that it is misleading to compare them as a means of evaluating performance of each radionuclide disposal alternative. The additional claim that releases can be delayed and reduced is similarly lacking in supporting evidence and based on many of the same faulty assumptions put forth in the analysis of disposal alternatives. No "robust engineering measures" are provided or discussed for any of the near-surface alternatives. Furthermore, these statements are not supported by other portions of the Draft GTCC EIS that describe radionuclides as high as 2,300 millirem/year resulting from near-surface disposal alternatives or by Appendix E, which states "...[given] the unknown behavior of the engineered barriers and waste containers over a very long period of time, estimates of the peak annual radiation doses and LCF risks to human health are very difficult to predict...". Revise the Draft GTCC EIS to accurately reflect the large degree of uncertainty associated with the performance of the near-surface alternatives. Revise the performance assessment of each alternative so that realistic performance criteria are used. Remove or revise language suggesting that near-surface disposal alternatives can be engineered to perform at unrealistic levels.	L293-106

L293-100 DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder. On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low because of: (1) the use of intruder barriers, (2) the remoteness of the sites, (3) DOE's commitment to long-term institutional control, (4) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (5) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Site-specific NEPA reviews would be conducted as needed.

Potential inadvertent human intrusion into WIPP is addressed in the documentation supporting its current operations. Inclusion of GTCC LLRW and GTCC-like wastes with the wastes already planned for disposal in this repository would not be expected to change the results associated with this hypothetical intrusion event.

L293-101 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS.

By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

Estimated radiation doses and LCFs were calculated for each site and disposal concept for 10,000 years, and if the peak impact did not occur during this time frame, the analysis was extended out to 100,000 years. DOE believes that the assumptions made to support the long-term modeling calculations for the groundwater pathway are reasonable and enable a comparative evaluation of the impacts between alternatives. The results of the evaluation presented in the EIS are sufficient to inform the selection of sites and methods for disposal. Site-specific NEPA reviews would be conducted as needed.

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L293-102 As discussed in Section 5.3.4.3 of the EIS, contaminated groundwater was assumed to be used for drinking and irrigation of crops, leading to the ingestion of contaminated foodstuffs. All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

L293-103 The surface water pathway was not analyzed quantitatively in the EIS for the reasons summarized in Appendix E – "Releases to surface water would only occur once the entire engineered cover over the disposed wastes had eroded away. Because of the thick cover layer and the use of very robust engineering techniques to construct it, it was assumed for the analyses in the EIS that the buried GTCC wastes would always be overlain by some cover material through 10,000 years, eliminating surface water runoff as a potential exposure mechanism for the action alternatives.

Even if releases to surface water were to occur, it is not expected that these releases would be significant or result in higher peak annual doses or latent cancer facility (LCF) risks than would releases to groundwater. The disposal facility and waste containers are assumed to maintain their integrity for at least 500 years, and this factor would allow many of the shorter-lived radionuclides to decay to innocuous levels prior to any releases to the environment. In addition, it is expected that releases to surface water would be much more diluted in the environment (such as in a river or lake) before being ingested by the hypothetical receptor than would comparable releases to groundwater (in which case the hypothetical receptor would extract water for use from a well). Because of this smaller amount of dilution, the groundwater pathway would likely be much more significant than the surface water pathway."

L293-104 All relevant potential exposure pathways were considered in the analyses presented in the EIS, including impacts from erosion. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1-1, Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 in the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated.

In addition, a sensitivity analysis was also conducted to assess the impacts of infiltration rates of 50 and 100%. Details of the analysis are presented in Appendix E, Section E.6 of the EIS. Site-specific NEPA reviews would be conducted as needed.

L293-105 See response to L293-95.

The types of activities that would be expected to occur during the post-closure phase of a GTCC waste disposal facility would include visually inspecting cover systems and security fences; monitoring the nearby air, soil, surface water, and groundwater; and repairing any defects in the facility, including cracks or holes in the soil cover. A detailed program would be developed to ensure that the wastes remained safely contained within the disposal unit for as long as possible.

L293-106 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites.

Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

Estimated radiation doses and LCFs were calculated for each site and disposal concept for 10,000 years, and if the peak impact did not occur during this time frame, the analysis was extended out to 100,000 years. DOE believes that the assumptions made to support the long-term modeling calculations for the groundwater pathway are reasonable and enable a comparative evaluation of the impacts between alternatives. The results of the evaluation presented in the EIS are sufficient to inform the selection of sites and methods for disposal. Site-specific NEPA reviews would be conducted as needed.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
85	5	5.3.11	5-87	NA	GTCC Waste Type	This section does not identify potential Resource Conservation and Recovery Act (RCRA) hazardous wastes. Revise the Draft GTCC EIS to identify potential RCRA hazardous wastes and associated volumes. Identify characteristic wastes and/or listed waste. Include identification of how all RCRA hazardous wastes would be determined, managed, and disposed of in compliance with RCRA regulations. For other waste types discussed, address how the wastes would be managed and disposed of in accordance with state and federal requirements.	L293-107
86	5	5.3.11	5-89	Table 5.3.11-1	GTCC Waste Type	This table indicates that approximately 18 to 160 cubic yards of hazardous waste (hazardous "debris") will be generated by the three methods of land disposal. Revise the Draft GTCC EIS to identify the hazardous wastes, provide information on how these wastes may qualify as RCRA wastes, and provide management and disposal information on how disposal actions will comply with RCRA.	L293-108
87	5	5.3.11	5-90	Table 5.3.11-2	GTCC Waste Type	Hanford Site hazardous liquid and solid wastes would be "hand off-site for treatment, recycle, recovery, and disposal at RCRA-permitted commercial facilities." Depending on the type of hazardous waste, recycling and recovery are often not options. Provide more detailed information of how these RCRA wastes would be generated, managed, and disposed of. Revise the Draft GTCC EIS to provide information regarding generator status for these wastes. Provide information describing the storage time prior to disposal of these wastes. Also provide information on RCRA permitting for these wastes.	L293-109
88	5	5.3.12	5-92	NA	Long-Term Impacts	Revise the Draft GTCC EIS to explain that although the impacts of various disposal alternatives may appear minor when viewed individually, these impacts may be significant when viewed collectively in the context of a state other than Washington, and Nevadaside Protected Areas. Also explain that any additional impacts are unacceptable if the cumulative impacts are already exceed regulatory limits.	L293-110
89	5	5.5	5-93	NA	Human Exposure	Failure to evaluate the impacts of direct intrusion into the disposal facility is inexcusably unjustified. See previous comments regarding the direct intruder scenario, and revise the Draft GTCC EIS to address this scenario in detail.	L293-111
90	5	5.6	5-95	NA	Surface Barriers/ Institutional Controls	Revise the Draft GTCC EIS to specifically note that active institutional controls will not be maintained after the first 100 years of disposal and thus will not dependably prevent inadvertent intrusion into disposed waste. Add additional text to note that disposal depth does not apply to the vault alternative as an effective mechanism for preventing intrusion. See previous comments regarding adequate of the surface water exposure pathway to the revised Draft GTCC EIS.	L293-112
91	5	5.6	5-95	NA	Surface Barriers/ Institutional Controls	According to 10 CFR 61, institutional controls include an environmental monitoring program, but no such plan is presented in this section of the report. Revise the Draft GTCC EIS to include a long-term environmental monitoring plan.	L293-113
92	6	5.6	5-95	NA	Surface Barriers/ Institutional Controls	Based upon the tests presented in the text, two types of waste will be disposed of within the three disposal options: waste that will not be a hazard within 100 years and waste that will be hazardous for 10,000 years. Based on this assumption, the argument is made to reduce the institutional control period to much more than 100 years after closure" given that the waste would be hazardous for 10,000 years. The justification provided is illogical. Waste that is dangerous for 10,000 or more years should be disposed of in a deep geologic repository because it remains dangerous over that time by definition. Revise the Draft GTCC EIS to describe and evaluate the requirements for waste segregation and identify disposal in a deep geologic repository as the preferred alternative.	L293-114

L293-107 See response to L293-93.

L293-108 The hazardous waste that could be generated during construction of a near-surface disposal facility could include typical industrial construction wastes such as liquids – used oil, grease, and organic solvents – and solids – batteries, mercury construction lights, cleaning materials (e.g., wipes), and solids generated during the cleanup of spills (e.g. absorbents, contaminated soil). At the time of construction, such wastes would be identified and properly disposed of according to their waste characteristics and the appropriate local, state, and federal regulations.

L293-109 Same response as above for L293-108.

L293-110 DOE believes that the analyses presented in the EIS are sufficient to compare the potential cumulative impacts of GTCC LLRW and GTCC-like waste disposal for the sites that were evaluated. In particular, existing concentrations of various radionuclides in contaminated soil and groundwater at the candidate sites were taken into consideration in the selection of the preferred alternative. Also, while up to 12,600 truck shipments were assessed for transport of the GTCC LLRW and GTCC-like wastes to a proposed disposal facility, these shipments would be spread out over a 60 year time period, with the result that only about one to two shipments a day might be expected at the facility in addition to current traffic. Additional cumulative impact analyses would be conducted in site-specific NEPA reviews, if needed, for the alternative selected in a ROD. Such follow-on reviews would be based on additional site-specific information.

L293-111 See response to L293-67.

L293-112 The EIS analysis assumes 100 years of institutional control after closure of a GTCC disposal facility, but that control period could be for a longer time period. As discussed in Section 2.9, the exposure to an inadvertent intruder is to be limited even after the period of active institutional control.

The depth of disposal (5 m from the ground surface to the top of the disposal unit) for the proposed vault facility is the same as that for the trench. With reinforced concrete sides, the vault may be less vulnerable to inadvertent intrusion than for the proposed trench design and also less vulnerable to erosion and subsequent exposure to surface water.

DOE agrees that the GTCC waste disposal facility must ensure the protection of a hypothetical future inadvertent human intruder, especially for the wastes disposed of in an enhanced near surface trench. In the conceptual design for the trench disposal facility, the trenches are about 3 m (10 ft.) wide, 11 m (36 ft.) deep, and 100 m (330 ft.) long. The GTCC waste disposal placement is assumed to be about 5 to 10 m (16 to 33 ft.) below ground surface.

On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC waste trench disposal facility because of: (1) the narrow width of the trench, (2) the use of intruder barriers, (3) the remoteness of the sites, (4) DOE's commitment to long-term institutional control, (5) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (6) waste form stability. On the basis of these considerations, DOE did not include a quantitative analysis of inadvertent human intruder in the EIS. Site-specific NEPA reviews would be conducted as needed.

L293-113 See response to L293-95.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
93	6	NA	6-1	NA	Hanford Site	The Hanford Site is not a appropriate location for the GTCC waste disposal facility because of its potential for reliance activity, complex subsurface environment, highly permeable geologic units, proximity to one of the largest rivers in the contiguous United States, and existing high level of contamination. Importation of radioactive waste to the Hanford Site is contrary to the objectives and actions pursued and performed over the last 20 years of cleanup at the Hanford Site, which remains the largest Superfund site in the United States. Revise the Draft GTCC EIS to identify disposal in a deep geologic repository as the preferred alternative and remove the Hanford Site from the list of candidate sites for construction of a disposal facility.	L293-115
94	6	NA	6-1	NA	EIS Contents	Full and fair consideration of tribal rights and concerns is not necessarily ensured by presenting tribal perspectives as stated. Explain that the Treaty of 1855 reserves specific Yakama Nation resource rights. Also revise the text to remove the incorrect implication that treaty rights have been adequately considered.	L293-116
95	6	NA	NA	Table 6.1.1-2	Human Environment	Revise the Draft GTCC EIS to identify what portion of the "other toxic pollutants" is made up of carbon tetrachloride.	L293-117
96	6	6.1	6-1	NA	Environmental Variables	The final location of the disposal facility has not been identified. Therefore, the range of conditions for the entire site should be considered in the Draft GTCC EIS. Using select meteorological stations does not appropriately characterize a site that experiences many environmental extremes. Revise the Draft GTCC EIS to consider environmental conditions over the entire Hanford Site.	L293-118
97	6	6.1.1	6-3	NA	Environmental Variables	See previous comments regarding environmental variables. Revise the Draft GTCC EIS to give greater consideration to existing wind data such as that published in the reports of the Hanford Environmental Data Reconstitution Project and collected throughout the site via the Hanford Meteorological Monitoring Network, not just at selected meteorologic stations.	L293-119
98	6	6.1.1.1	NA	NA	Environmental Variables	Revise the Draft GTCC EIS to identify the temperature gradient from the surface downward and the observed depth of bioturbation at the Hanford Site.	L293-120
99	6	6.1.1.2	NA	NA	Environmental Variables	Revise the Draft GTCC EIS to provide a reference for the information on carbon tetrachloride emissions in the 200 Area.	L293-121
100	6	6.1.1.3	6-10	NA	Environmental Variables	Measurement of participate matter at the site between 2001 and the present does not constitute a full characterization. Revise the Draft GTCC EIS to incorporate older data, including data from periods of active operations and incident.	L293-122
101	6	6.1.2.1	6-14	NA	Environmental Variables	This section does not provide an analysis, but rather a generalized summary that diverges all aspects of the geology and, as a result, is misleading. Signal out a specific area of the site, such as the 200 Area, and provide a more detailed and specific geologic description. Revise the Draft GTCC EIS to include information on the geologic and hydrologic conditions at the site, including the presence of faults, fractures, and other structural features that may be conducive to the transport of contaminants. Existing contaminants are a concern mentioned at all. The existence of cracks, faults, which have a possible effect on groundwater flow, is also not discussed. Revise the Draft GTCC EIS to address this or topics in chapter.	L293-123
102	6	6.1.2.3	6-16	NA	Environmental Variables	This section provides a partly detailed overview of the stratigraphy of the entire Hanford Site. Revise the Draft GTCC EIS to include an additional section that discusses the stratigraphy specifically of the potential disposal site.	L293-124
103	6	6.1.2.4	6-22	NA	Environmental Variables	The largest recorded earthquake in Washington State was the North Cascades Earthquake near Lake Chelan. This earthquake had a calculated magnitude of 6.5 (moment magnitude, Mw, was 6.5 to 7.0 at 95 percent confidence). Recent studies have identified faults proximate to the Hanford Site capable of generating earthquakes of magnitude 7.1 or greater. Refer to comments in Attachment 1 on this topic. Revise the Draft GTCC EIS to include this information. Further revise the Draft GTCC EIS to incorporate a seismic hazard analysis and ecologically protective design based on significant seismic events in the Hanford Site, to appropriately and ecologically protective design based on significant seismic events in the Hanford Site, to	L293-125
104	6	6.1.2.1.4	6-22	NA	Environmental Variables	The probabilistic seismic hazard analysis should be moved to an appendix and significantly expanded. See previous comments on Hanford data and other potential variables and revise the Draft GTCC EIS accordingly.	L293-126

L293-114 DOE agrees that use of a geologic repository would be a protective and safe method for the disposal of the entire inventory of GTCC LLRW and GTCC-like wastes. The GTCC EIS evaluation for the WIPP geologic repository alternative supports this statement. However, the degree of waste isolation provided by a geologic repository may not be necessary for all of the GTCC LLRW and GTCC-like wastes evaluated in the GTCC EIS. The GTCC EIS evaluation indicates that certain wastes (e.g., those containing short-lived radionuclides such as Cs-137 irradiators) could be safely disposed of in properly designed land disposal facilities at sites with suitable characteristics, such as low precipitation rates, high soil distribution coefficients, and sufficient depths to groundwater. Based on the GTCC EIS evaluation, land disposal facilities located in arid climates (e.g., NNSS and WIPP Vicinity) would isolate radionuclides for a sufficient period of time to allow for significant radioactive decay to occur.

L293-115 The site-specific environmental factors identified – seismic activity, subsurface movement, proximity to the Columbia River, and high levels of contamination – were considered in the EIS. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

DOE is performing environmental restoration activities at the Hanford Site. The ongoing cleanup effort will continue.

The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. Exclusion of a reasonable alternative from the EIS without first evaluating the site is contrary to a thorough NEPA analysis. All alternatives are retained in the Final EIS because such evaluations are needed to support selection of the preferred alternative. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations. Thus, poor performance in the EIS analysis does not necessarily exclude an alternative from consideration.

L293-116 See response to L293-21.

L293-117 Other toxic pollutants releases are a composite of calculated estimates of toxic air pollutants, excluding ammonia, from the 200-East and 200-West Areas tank farms, 200 Area Effluent Treatment Facility, Central Waste Complex, T Plant Complex, and Waste Receiving and Processing Facility. As referenced, further information on the composition of the other toxic pollutants can be found in Poston, T.M., et al. (editors), 2007, Hanford Site Environmental Report for Calendar Year 2006, prepared by Pacific Northwest National Laboratory, Richland, Wash., for U.S. Department of Energy, Sept.

L293-118 See response to L293-29.

L293-119 The use of "reference locations" was used in the EIS to allow for a quantitative assessment of the impacts that could occur at each site. While some parameters could change within a short distance, most would not. The RESRAD-OFFSITE computer code was used to model the migration of radionuclides from the GTCC LLRW and GTCC-like wastes placed into the conceptual disposal facility designs for the three land disposal methods (not all three methods were evaluated for each site). Site-specific information provided by technical staff from various sites that were evaluated was used in these modeling analyses to the extent it was available, and conservative assumptions were used to fill any remaining data gaps. While the computer model was largely developed to support environmental restoration activities, it has a number of features that make it a good choice for use in this EIS. The analysis presented in the EIS is adequate for the comparison of the disposal alternatives evaluated.

L293-120 Same response as above for L293-119.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment
105	6	6.1.2.1.4	6-22	NA	Environmental Variables	The seismic analysis cited in the Hanford Site NEPA characterization (Duncan et al. 2007) did not determine the ability of Hanford facilities to withstand seismic hazards, as the Draft GTCC EIS asserts. The 1993 Hanford Seismic Hazard Analysis (Geomatrix Consultants, 1993) simply estimated the probability of seismic activity for use in facility design and evaluation at five specific Hanford areas, including the 200 East GTCC reference location. Cite the 1993 Hanford Seismic Hazard Analysis and correctly explain the assumptions and conclusions. See previous comments regarding seismic risk at the Hanford Site. Revise the Draft GTCC EIS in accordance with these comments.
106	6	6.1.2.1.4	6-22	NA	Environmental Variables	The 1993 Hanford Seismic Hazard Analysis (Geomatrix Consultants, 1993) referenced in the Hanford Site NEPA characterization contains a "probabilistic seismic hazard analysis" that estimates the probability of ground motions at the Hanford Site. The 1993 Hanford Seismic Hazard Analysis does not describe the seismic potential and earthquake ground motion characteristics of the Hanford Site. A separate study that more fully addresses the seismic potential and earthquake ground motions regarding the characteristics of an earthquake of ground motions at the individual Hanford plant (Geomatrix Consultants, 1993). Revise the Draft GTCC EIS to include this additional evaluation.
107	6	6.1.3.1.1	6-29	NA	Environmental Variables	Revise the Draft GTCC EIS by adding to this paragraph that the Columbia River supports numerous natural resources, including spawning and rearing areas for salmon, steelhead, sturgeon, and other migratory and resident fish species, and is of major cultural importance to numerous Indian tribes.
108	6	6.1.3.1.3	6-35	NA	Environmental Variables	Revise the Draft GTCC EIS by adding to this paragraph the fact that groundwater contaminated with many of the same radionuclides is currently discharged to the Columbia River.
109	6	6.1.3.2.3	6-40	NA	Long-Term Impacts	Revise the Draft GTCC EIS to address potential future changes in groundwater recharge rates that result from changes in precipitation due to climate change. Also, the Draft GTCC EIS should address the fact that, if institutional controls fail, increased irrigation of farm land could cause contaminated groundwater (impacted at the intersection, should be discussed.
110	6	6.1.4	6-43	NA	Human Exposure	Uranium has all the physical, chemical, and radiological characteristics of a transuranic radionuclide and should be included with plutonium and other transuranics. Uranium is a radionuclide that, in addition to its radiation exposure, also causes chemical toxicity. Revise the Draft GTCC EIS to include depleted uranium and other waste uranium as GTCC or GTCC-like waste and perform a thorough evaluation of both radiologic and chemical exposure that results from disposal activities.
111	6	6.1.4	6-44	Table 6.1.4-1	Human Exposure	Native Americans are not given consideration as a unique potentially exposed receptor group. Existing processes and radiation doses to past two receptor groups, workers and the general public, are inadequate. Native American exposure must also be evaluated and estimated to add to their unique exposure parameters, such as those identified in the Yakama Nation Exposure Scenario (Radcliff, 2007). Revise the Draft GTCC EIS to include Native Americans as a separate and unique group of receptors.
112	6	6.1.4	6-44	Table 6.1.4-1	Human Exposure	Exposure pathways listed in this table are not complete. In addition to external radiation, inhalation, and ingestion of water, beans, and potatoes, exposure via ingestion of soil, roots, and wildlife should also be considered. Revise the Draft GTCC EIS to include these.
113	6	6.1.4	6-45	NA	Human Exposure	Exposure appears to be based on very specific data sets from past monitoring. Although this characterization is not adequate relative to the size of the Hanford Site, there are many additional monitoring data sets available that can be used to estimate worst-case exposure. Revise the Draft GTCC EIS to estimate exposure based on a larger set of monitoring data. Additionally, revise the Draft GTCC EIS to estimate future exposures, such as well drilled in the TCWM EIS (USDOE, 2009), based on projected total groundwater contamination that will result from plutonium migrating from the Central Plateau and proposed waste disposal actions.
114	6	6.1.4	6-47	NA	Cultural Resources	Because there is no narrative associated with this (or any) Native American text box, it is unclear how the four categories of goods and services provided by an undisturbed environment and that contribute to human health are evaluated in the Draft GTCC EIS. Revise the Draft GTCC EIS to clearly state how land where in the document) impacts to these important categories are evaluated in the EIS.

L293-121 The reference is provided in the text.

L293-122 Ten years of data is sufficient for the purposes of the EIS and provides the current baseline needed for evaluation. Site remediation efforts have also been on-going over this period of time.

L293-123 The site-specific environmental factors identified in the comment were evaluated in the EIS as appropriate in Sections 6.1.2 and 6.1.3. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

L293-124 See response to L293-118.

L293-125 The seismic activity in the area surrounding the Hanford Site was evaluated in the EIS as appropriate in Section 6.1.2.1.4. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

L293-126 See response to L293-125.

L293-127 In the TC&WM 2012 EIS "Probabilistic seismic hazard analyses are used to determine ground motions expected from multiple earthquake sources, which are then used to design or evaluate facilities at Hanford. On the basis of the most recent site-specific seismic analyses, it is estimated that an earthquake producing a horizontal (ground) acceleration of 0.10 g at Hanford would be experienced on average every 500 years (annual probability of occurrence of 1 in 500). An earthquake producing a peak horizontal (ground) acceleration of 0.2 g is calculated to have an annual probability of occurrence of 1 in 2,500, which is in approximate agreement with the national seismic hazard maps produced by USGS (Duncan 2007:4.46). As stated in DOE Order 420.1B, Change 1, DOE requires nuclear and nonnuclear facilities to be designed, constructed, and operated so that the public, workers, and environment are protected from adverse impacts of natural phenomena hazards, including earthquakes. A site-specific ground response model developed for the WTP being constructed at Hanford stipulated increased ground motions for the design basis of this facility by up to 40 percent to be more conservative (Duncan 2007:4.46)."

L293-128 See response to L293-125.

L293-129 The American Indian Text box in Section 6.1.3.1.1of the EIS discusses the importance of the Columbia River to the Indian People, and Section 6.1.3.1.3 discusses the importance of the designation of the Columbia River as "'salmon and trout spawning, noncore rearing, and migration.'"

L293-130 Radionuclides in the Columbia River originating from Hanford are discussed in Section 6.1.3.1.3 in the EIS (e.g. "These constituents are known to be entering the river from contaminated groundwater beneath the Hanford Site.").

L293-131 See response to L293-118.

L293-132 Depleted uranium is not included in the GTCC LLRW waste inventory because this material is not GTCC LLRW.

L293-133 See response to L293-78.

L293-134 See response to L293-78.

L293-135 See response to L293-78.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment
115	6	6.1.10	6-72	NA	Cultural Resources	Provide a reference for stating that humans have been present on the Hanford Site for approximately 8,000 years. Other sources state that there has been human presence at the site for 10,000 years. In addition, the timeframe during which there has been a human presence at the site in fact represents historical use of the site. Therefore, it is inappropriate to state that "historic use of the site began in 1805." Revise the Draft GTCC EIS to specify that the timeframe presented is only for Euro-American use.
116	6	6.1.10	6-72	NA	EIS Contents	Revise the Draft GTCC EIS to include the full name of the Yakama Nation as the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation).
117	6	6.1.10	6-73	NA	Cultural Resources	The entire Hanford Site, including the Central Plateau and 200 Areas, is rich in culturally important sites, many of which do not include physical artifacts that can be easily identified using normal archaeological survey methods. Sacred sites may be seen as such by the Yakama Nation and other tribes, but may not be identified as such by other cultural resource specialists and may not yet have been identified. Revise the Draft GTCC EIS to clarify that the entire site is culturally important to the Yakama Nation regardless of documented archaeological sites.
118	6	6.2.1	6-77	NA	Human Exposure	
119	6	6.2.1	6-77	NA	Long-Term Impacts	Revise the Draft GTCC EIS explore pathways to include contaminated dust.
120	6	6.2.3	6-82	NA	Short-Term Impacts	Revise the Draft GTCC EIS to include and not underestimate risks of this arid land are particularly susceptible to injury from disturbances, have long recovery times, and have high potential for colonization by invasive weeds.
121	6	6.2.4	6-83	NA	Human Exposure	Revise the Draft GTCC EIS by substantially increasing the attention to address the potential effects of releases of tritium on the Columbia River. Tritium is a highly mobile radionuclide. The Hanford Site is upstream of the Columbia River and the rate of flow toward the Columbia River of existing groundwater plumes from the 200 Areas is relatively slow.
122	6	6.2.4	6-85	Table 6.2.4-1	Environmental Vulnerabilities	See previous comments regarding inclusion of Yakama Nation members and Native Americans as a unique receptor group. Revise the Draft GTCC EIS to consider all the pathways that affect the Native American exposure group.
123	6	6.2.4	6-86	NA	Human Exposure	Cultural-specific foods that have been affected much of Eastern Washington have occurred historically. Revise the Draft GTCC EIS to include culturally-specific foods as a hypothetical accident scenario for Hanford.
124	6	6.2.4	6-87	Tables 6.2.4-2 and 3	Long-Term Impacts	The residual dose scenario and other human health analysis not related to worker health are based on a distance of 100 meters from the boundary of the Hanford Site. Since the Hanford Site is a contaminated site, distances from the disposal facility and contaminated areas should be appropriately added to the total potential dose. Revise the Draft GTCC EIS to appropriately reflect the total potential dose.
125	6	6.2.4	6-89	NA	Human Exposure	It is unclear how (and whether) the groundwater doses estimated from the GTCC waste inventory will be added to the groundwater contamination that already exists at Hanford. It is critical that the Draft GTCC EIS explain that the entire dose and associated LCF risk calculated from post-closure contaminant migration will occur in addition to already-existing groundwater contamination from current waste inventories, including existing plumes of Tc-99 and I-129, which its associated with elevated doses and cancer risks (as discussed in the TC/SX EIS/ USDOE, 2000). While the presentation in this table may be useful for comparing technologies, it is misleading to the public regarding the appropriateness of Hanford for any of the technologies. See comments in Attachment 1 regarding cumulative impacts.
126	6	6.2.11	6-103	NA	GTCC Waste Type	It is not adequate to indicate only exposure distances greater than or equal to 100 meters; the distances cannot be considered conservative. See previous comments regarding human exposure, distance from radiation, and pathways. Revise the Draft GTCC EIS to incorporate these comments.
127	6					The description of solid and hazardous waste management is vague. The same inadequate paragraph (verbatim) is included for all the other potential disposal sites. Revise the Draft GTCC EIS to provide detailed descriptions of waste generated (both hazardous and solid) for all potential disposal sites, as well as regulatory requirements, management to comply with those requirements, and disposal options.

L293-136 DOE respects the unique and special relationship between American Indian tribal governments and the Government of the United States. For this reason, DOE has presented and considered tribal views and perspectives throughout the GTCC EIS (and not on one page or section) to ensure full and fair consideration of tribal rights and concerns before making decisions or implementing programs that could affect tribes.

All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1 1, Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 in the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

L293-137 More than 8,000 years of prehistoric human activity in the largely arid environment of the middle Columbia River region have left extensive archaeological deposits along the river shores. Well-watered areas inland from the river also show evidence of concentrated human activity, and recent surveys have indicated transient use of arid lowlands for hunting. These cultural sites were occupied continuously or intermittently over substantial timespans. For this reason, a single location may contain evidence of use during both the prehistoric and historic periods, and thus the number of — occupationsl could prove substantially greater than the number of identified sites (Neitzel 2005).

To date, approximately 32,630 hectares (80,640 acres) of Hanford and adjacent areas have been surveyed for archaeological resources. Approximately 1,550 cultural resource sites and isolated finds and 531 buildings and structures have been documented. 49cultural resource sites are listed in the National Register. Most of these sites are associated with the American Indian landscape and are part of six archaeological districts situated on the shores and islands of the Columbia River. To protect resources, the National Historic Preservation Act (16 U.S.C. 470 et seq.), Section 304, and the Archaeological Resources Protection Act (16 U.S.C. 470aa et seq.), Section 9, require agencies to withhold from public disclosure information on the location and character of cultural resources (Duncan 2007).

Prehistoric period sites common to Hanford include remains of numerous pit house villages, various types of open campsites, spirit quest monuments (rock cairns), hunting camps, game drive complexes, quarries in mountains and rocky bluffs, hunting and kill sites in lowland stabilized dunes, and small temporary camps near perennial sources of water away from the river (Duncan 2007:4.120).

Although development and amateur artifact collectors have disturbed many prehistoric resources throughout the region, restricted public access imposed at Hanford has resulted in less destruction than in many other areas (Duncan 2007:4.120). Destruction from other causes is also slight.

L293-138 The text was revised as suggested.

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L293-139 As required by NEPA, the EIS evaluates the potential impacts of the proposed action on cultural resources at the various DOE sites in sufficient detail to assess the potential impacts of the proposed alternatives. DOE recognizes that development of a disposal facility for GTCC LLRW and GTCC-like wastes would require that future land uses be restricted at and near the site for the protection of the general public. This action could affect areas that may be important to American Indian tribes. Text was added to Section 6.1.10 of the EIS describing the concept of traditional cultural properties and those associated with the Hanford Site.

L293-140 Existing site-specific contamination was considered where appropriate. Additional information concerning air monitoring and air releases in the 200 west area was added to Section 6.1.1.2. All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-141 Section 6.2.5 of the EIS discusses the need to quickly revegetate disturbed land at Hanford so that non-native species do not become established.

L293-142 The water use during construction of a potential disposal facility at the Hanford Site was evaluated in the EIS as appropriate. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS. Information on water use and consumption from the construction and operation of a GTCC Disposal facility is found in Appendix D 6.1 and D 6.2 of the EIS.

L293-143 See response to L293-78.

L293-144 The potential for flooding at the Hanford Site was evaluated in the EIS as appropriate in Section 6.1.3.1.1. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS.

L293-145 See response to L293-78.

L293-146 See response to L293-2.

L293-147 See response to L293-78.

L293-148 The hazardous waste that could be generated during construction of a near-surface disposal facility could include typical industrial construction wastes such as liquids – used oil, grease, and organic solvents – and solids – batteries, mercury construction lights, cleaning materials (e.g., wipes), and solids generated during the cleanup of spills (e.g. absorbents, contaminated soil). At the time of construction, such wastes would be identified and properly disposed of according to their waste characteristics and the appropriate local, state, and federal regulations.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
127	6	6.3	6-104	NA	Human Exposure	It is incomplete to evaluate potential impacts only to workers and the general public. Hanford is a part of the Yakama Nation's usual and accustomed use areas, to which unrestricted access is guaranteed by the Treaty of 1855. The Yakama Nation must be *considered a potentially exposed receptor group in the short term and long term, and the unique exposures of the Yakama people* must be evaluated, such as high exposure rates for surface water, groundwater, fish, game, and wild plant ingestion; sweat lodge use; and other cultural and subsistence uses of natural resources. Revise the Draft GTCC EIS to incorporate these pathways and doses as outlined in the Yakama Nation Exposure Scenario (Ridolfi, 2007).	L293-149
128	6	6.3	6-105	NA	Human Exposure	It is important to explain that the dose estimates presented in this summary will occur in addition to doses from already-existing groundwater contamination from current waste inventories, including extensive plumes of Tc-99 and I-129. It is misleading to present results and state that there will be no LCF without noting that additional doses will certainly occur. Note that doses presented here do *not take into account additional doses from existing contamination at Hanford, which suggests that Hanford is an unacceptable location* for any of the action alternatives. See previous comments on this topic. Revise the Draft GTCC EIS in accordance with these comments.	L293-150
129	6	6.4.1.1	6-107	NA	Long-Term Impacts	Disposal within waste sites located in the reference area[1] may involve disturbing contaminated sediments at depths greater than currently accounted for in the presented cleanup methods. Revise the Draft GTCC EIS to incorporate all existing contamination and cleanup activities at the Hanford Site in the estimate of cumulative impacts on the site. [1] Underlying the reference area UPR-200-E-83 or Non-Radioactive Dangerous Waste Landfill (NRDWL) or an immediate neighbor of the B/C trenches and one of PUREX's primary liquid effluence disposal trenches 216-A-30.	L293-151
130	6	6.4.2	6-109	NA	Long-Term Impacts	The text should be revised to clarify that post-closure impacts presented in Section 6.2.4.2 3 indicate that groundwater impacts for the land disposal alternatives (borehole, trench, and vault facilities) would contribute to overall cumulative impacts from past, present, and reasonably foreseeable future actions at Hanford. The level of cumulative impact analysis should be commensurate with potential *impacts, and the long-term groundwater impacts should be closely scrutinized* (USEPA, 1999). However, a careful examination of cumulative impacts at Hanford would first require a comprehensive cumulative risk assessment for the entire site, which has not yet been conducted. A complete cumulative impacts analysis could then provide an understanding of whether the proposed alternatives might push a resource, ecosystem, or human community beyond a critical threshold and preclude sustainability (CEQ, 1997). The cumulative impacts assessment also needs to further evaluate combined impacts to specific resources (e.g., land use, surface water). The cumulative impacts of proposed alternatives combined with other USDOE actions (e.g., on-site waste disposal) should be documented. In addition, planned land use restrictions by USDOE in conjunction with Department of Interior limitations on land use in the Arid Lands Ecology (ALE) Reserve may result in cumulative impacts that have not yet been fully assessed. Revise the Draft GTCC EIS to incorporate these analyses.	L293-152
131	6	6.4.2	NA	NA	Long-Term Impacts	Cumulative impacts evaluated in this section are not accurate and do not account for all impacts at the Hanford Site. Revise the Draft GTCC EIS to include all additional impacts identified in the TCWM EIS (USDOE, 2009), such as operation of the waste treatment plant; cleanup of the river corridor; transport of waste to the Central Plateau; impacts from the Environmental Restoration Disposal Facility; impacts from the US Ecology LLRW disposal facility; and existing contamination associated with former Central Plateau waste disposal practices. See previous comments regarding complete assessment of cumulative impacts at the Hanford Site.	L293-153
132	6	6.5	6-111	NA	EIS Contents	There is no mention of treaty rights in this section. Revise the Draft GTCC EIS to incorporate treaty rights.	L293-154
133	12	NA	12-1	NA	EIS Contents	Revise the Draft GTCC EIS to provide estimates of resource impacts for generic sites that are not included in the current draft. Provide a discussion of when this evaluation will be conducted, what will be included, and how this information will be available for public review.	L293-155

L293-149 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1 1, Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 of the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed. This information could include sensitive subpopulations and specific pathways of exposure for American Indians.

This EIS presents relevant and essential information important to the evaluation of potential environmental impacts, consistent with NEPA's primary goal of full disclosure to the public as well as agency decision makers. This includes discussion of the history of the settlement of Hanford and the treaties entered into between tribal nations and the U.S. government. There is substantial documentation indicating that the tribes understood at the time these treaties were signed that the lands were no longer "unclaimed" when they were claimed for the purposes of the white settlers' activities. DOE is not aware of any judicially recognized mechanisms that would allow these lands to revert to "unclaimed" status merely through the process of being acquired by the federal government. The portion of Hanford that remained in the public domain in 1943, as well as all the acquired lands, were closed to all access initially under authority of the War Powers Act and then under authority of the AEA. It is therefore DOE's position that the Hanford lands are neither "open" nor "unclaimed."

L293-150 See response to L293-2.

L293-151 See response to L293-118.

L293-152 See response to L293-2.

L293-153 See response to L293-2.

L293-154 See response to L293-21.

L293-155 The alternatives suggested for evaluation are not within the reasonable range of alternatives for disposal of GTCC LLRW and GTCC-like wastes. Evaluation of additional generic sites would not provide further benefit in the decision to provide a disposal pathway for GTCC LLRW and GTCC-like waste and is considered outside the scope of the EIS.

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment
154	12	12.1	12-1	NA	Human Exposure	It is impossible to establish potential impacts only to workers and the general public. Since Region IV (western United States) was the alternative technologies and the majority of alternatives are in the western states, it is likely that a generic disposal facility would be located near Native Americans. The Draft GTCC EIS should be revised to include a Native American section when estimating doses and cancer risk, including high consumption rates for cultural reasons, groundwater, fish, game, and wild plant ingestion, event logs use, and other cultural and subsistence uses of ceremonial resources.
155	12	12.1	12-3	NA	Surface Barriers/ Institutional Controls	It is not realistic or appropriate to assume that engineered covers and waste containers will not begin to degrade until after 500 years. See previous comments regarding the barrier dependence and expected longevity in the action alternatives. Revise the Draft GTCC EIS to provide alternatives that do not depend on surface barriers and optimistic assumptions to meet performance requirements.
156	12	12.2	12-3	NA	Human Exposure	To say that "...no or only minimal site impacts are expected because the waste packages would contain the radioactive materials and because the engineered barriers would be expected to last for 500 years..." is misleading and misrepresentative. Revise the Draft GTCC EIS to provide more specific information about what monitoring would be implemented, how often it would be conducted, and how long it would continue. Clearly what parameters would be monitored (for example, groundwater, barrier integrity, infiltration) and possible contingency actions that would be pursued if contamination were found to be migrating. Provide contingency plans for the escape of radioactivity from the proposed disposal structures.
157	12	12.2	12-3	NA	Surface Barriers/ Institutional Controls	Revise the Draft GTCC EIS to give examples of the types of engineering controls that would be used in the event of contaminant releases. Describe in detail how likely it is that the proposed controls will control and reduce those releases. Provide examples of substantial release and contamination should engineering controls prove inadequate to carefully stopping and substantially reducing contaminant releases.
158	12	12.3	12-4	NA	Human Exposure	See previous comments regarding intentional intruder scenarios and post-closure exposure scenarios that should be included. Revise the Draft GTCC EIS to include these scenarios and exposures.
159	12	12.3	12-5	NA	Surface Barriers/ Institutional Controls	Revise the Draft GTCC EIS to provide specific corrective actions that would be taken if water were found to be infiltrating waste within the first 500 years of closure. See previous comments regarding assumed barrier performance and infiltration rates. Revise the Draft GTCC EIS in accordance with these comments.
160	12	12.3	12-17	NA	Environmental Variables	See previous comments regarding underlying assumptions used to estimate releases from the proposed disposal facility in the first 10,000 years. Revise the Draft GTCC EIS to provide realistic assumptions based on environmental parameters that are not optimal for facility performance.
161	13	13.3	13-2	NA	EIS Contents	The Yakama Nation's treaty rights are not acknowledged in this section. Revise the Draft GTCC EIS to acknowledge the Yakama Nation's treaty rights.
162	13	13.3.1	13-3	NA	EIS Contents	Revise Section 13 of the Draft GTCC EIS to include the Treaty of 1855 (12 Stat. 951) as a requirement to be considered in the EIS process.
163	13	13.4	13-11	NA	EIS Contents	Executive Orders that may be violated by the Draft GTCC EIS include EO-11514 (Protection and Enhancement of Environmental Quality Requirements for Federal Agencies), EO-13175 (Consultation and Coordination with Indian Tribal Governments), EO-13045 (Protection of Children from Environmental Risks), and EO-13423 (Strengthening Federal Environmental, Energy, and Transportation Management). Revise the Draft GTCC EIS to be compliant with these Executive Orders.

L293-156 See response to L293-78.

L293-157 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail.

To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE believes that 500 years is a realistic time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

L293-158 See response to L293-95.

L293-159 While radionuclide releases are not anticipated during operation of the proposed disposal facility, the generic facility would be expected to have contingency plans similar to the existing federal sites. Emergency response plans and procedures, based on further review should a decision be made to build such a facility, would be in place before the receipt of any radioactive waste.

L293-160 See response to L293-67.

L293-161 Site-specific NEPA reviews would be conducted as needed once an alternative is selected to tailor the proposed disposal facility to the selected site. The types of activities that would be expected to occur during the post-closure phase of a GTCC waste disposal facility would include visually inspecting cover systems and security fences; monitoring the nearby air, soil, surface water, and groundwater; and repairing any defects in the facility, including cracks or holes in the soil cover. A detailed program would be developed to ensure that the wastes remained safely contained within the disposal unit for as long as possible.

L293-162 The EIS analyses are based on conceptual engineering information and necessitated the use of a number of simplifying assumptions. This approach is consistent with NEPA, which requires such analyses to be made early in the decision-making process. The various land disposal conceptual designs were assumed to be constructed and operated in a comparable manner at each of the various sites. Information on the conceptual engineering designs for the three proposed land disposal methods is provided in Section D.3 of Appendix D in the EIS. By using the same conceptual designs at all of the sites evaluated in the GTCC EIS, except for cases where a design did not apply (e.g., an intermediate-depth borehole at a site with shallow groundwater), the potential impacts (e.g., radionuclides reaching the groundwater) at the different environmental settings could be readily compared.

In performing these evaluations, a number of engineering measures were included in the conceptual facility designs to minimize the likelihood of contaminant migration from the disposal units. No facility design can guarantee that radionuclide migration from the facility would not occur over and beyond a 10,000-year time period. It was assumed that these measures would perform similarly for all conceptual designs, remaining intact for 500 years after the disposal facility closed. After 500 years, the barriers would gradually fail. To account for these engineered features in the modeling calculations, it was assumed that the water infiltration to the top of the waste disposal area would be zero for the first 500 years and then 20% of the natural rate for the area for the remainder of the time period (through 10,000 years). A water infiltration rate of 20% of the natural rate for the area was only used for the disposal area; the natural background infiltration rate was used at the perimeter of the waste disposal units. Again, this approach enables a comparative evaluation of the influence that site-specific environmental factors would have on the potential migration of radionuclides from the disposal facilities and the potential impacts on human health. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes.

DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in these designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).

DOE believes that 500 years is a realistic time period for the longevity of the types of engineering barriers assumed in the analyses. DOE believes the approach and the assumptions used in the EIS are reasonable for performing the comparative analysis of alternatives required by NEPA. For example, as discussed in Section E.2.2, the assumption of a 20% natural background infiltration rate after 500 years was based on a study at SRS (Phifer et al. 2007) that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with an effectiveness that would be greater before 10,000 years, then decrease very slowly after 10,000 years. The approach used in the EIS is more conservative than indicated by this study.

L293-163 See response to L293-21.

L293-164 See response to L293-21.

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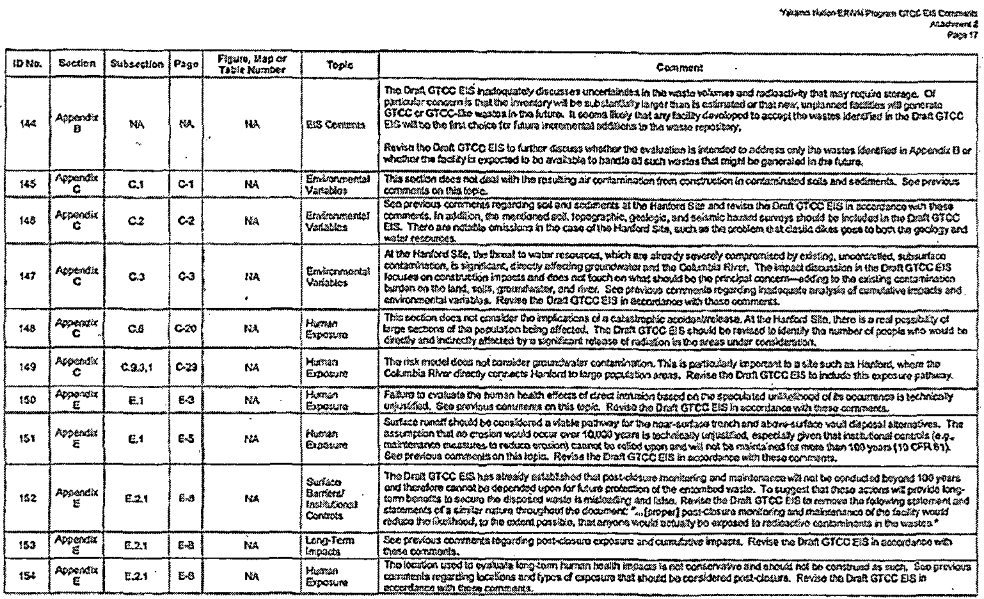

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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment	
144	Appendix B	NA	NA	NA	EIS Contents	The Draft GTCC EIS inadequately discusses uncertainties in the waste volumes and radioactivity that may require storage. Of particular concern is that the inventory will be substantially larger than is estimated or that new, unplanned facilities will generate GTCC or GTCC-like wastes in the future. It seems likely that any facility developed to accept the wastes identified in the Draft GTCC EIS will be the first choice for future incremental additions to the waste repository. Revise the Draft GTCC EIS to further discuss whether the evaluation is intended to address only the wastes identified in Appendix B or whether the facility is expected to be available to handle all such wastes that might be generated in the future.	L293-166
145	Appendix C	C.1	C-1	NA	Environmental Variables	This section does not deal with the resulting air contamination from construction in contaminated soils and sediments. See previous comments on this topic.	L293-167
146	Appendix C	C.2	C-2	NA	Environmental Variables	See previous comments regarding soil and sediments at the Hanford Site and revise the Draft GTCC EIS in accordance with these comments. In addition, the mentioned soil, topographic, geologic, and seismic hazard surveys should be included in the Draft GTCC EIS. There are notable omissions in the case of the Hanford Site, such as the problem that clastic dikes pose to both the geology and water resources.	L293-168
147	Appendix C	C.3	C-3	NA	Environmental Variables	At the Hanford Site, the threat to water resources, which are already severely compromised by existing, uncontrolled, subsurface contamination, is significant, directly affecting groundwater and the Columbia River. The impact discussion in the Draft GTCC EIS focuses on construction impacts and does not touch on what should be the principal concern—adding to the existing contamination burden on the land, soils, groundwater, and river. See previous comments regarding inadequate analysis of cumulative impacts and environmental variables. Revise the Draft GTCC EIS in accordance with these comments.	L293-169
148	Appendix C	C.6	C-20	NA	Human Exposure	This section does not consider the implications of a catastrophic accident/release. At the Hanford Site, there is a real possibility of large sections of the population being affected. The Draft GTCC EIS should be revised to identify the number of people who would be directly and indirectly affected by a significant release of radiation in the areas under consideration.	L293-170
149	Appendix C	C.9.3.1	C-29	NA	Human Exposure	The risk model does not consider groundwater contamination. This is particularly important to a site such as Hanford, where the Columbia River directly connects Hanford to large population areas. Revise the Draft GTCC EIS to include this exposure pathway.	L293-171
150	Appendix E	E.1	E-3	NA	Human Exposure	Failure to evaluate the human health effects of direct intrusion based on the speculated unlikelihood of its occurrence is technically unjustified. See previous comments on this topic. Revise the Draft GTCC EIS in accordance with these comments.	L293-172
151	Appendix E	E.1	E-5	NA	Human Exposure	Surface runoff should be considered a viable pathway for the near-surface trench and above-surface vault disposal alternatives. The assumption that no erosion would occur over 10,000 years is technically unjustified, especially given that institutional controls (e.g., maintenance measures to reduce erosion) cannot be relied upon and will not be maintained for more than 100 years (10 CFR 61). See previous comments on this topic. Revise the Draft GTCC EIS in accordance with these comments.	L293-173
152	Appendix E	E.2.1	E-8	NA	Surface Barriers/ Institutional Controls	The Draft GTCC EIS has already established that post-closure monitoring and maintenance will not be conducted beyond 100 years and therefore cannot be depended upon for future protection of the entombed waste. To suggest that these actions will provide long-term benefits to secure the disposed waste is misleading and false. Revise the Draft GTCC EIS to remove the following statement and statements of a similar nature throughout the document: "...[proper] post-closure monitoring and maintenance of the facility would reduce the likelihood, to the extent possible, that anyone would actually be exposed to radioactive contaminants in the wastes."	L293-174
153	Appendix E	E.2.1	E-8	NA	Long-Term Impacts	See previous comments regarding post-closure exposure and cumulative impacts. Revise the Draft GTCC EIS in accordance with these comments.	L293-175
154	Appendix E	E.2.1	E-8	NA	Human Exposure	The location used to evaluate long-term human health impacts is not conservative and should not be construed as such. See previous comments regarding locations and types of exposure that should be considered post-closure. Revise the Draft GTCC EIS in accordance with these comments.	L293-176

L293-165 Many of these Executive Orders apply to implementation activities. The construction and operation of a GTCC disposal facility will be done in accordance with existing federal, state, and local laws and regulations, including Presidential Executive Orders.

L293-166 The GTCC LLRW and GTCC-like waste inventory evaluated in the EIS is based on the best available information on the stored and projected GTCC LLRW and GTCC-like wastes from ongoing and planned activities. The estimated 12,000 m^3 of GTCC LLRW and GTCC-like wastes is a relatively small volume of waste when compared to other wastes disposed of by DOE. For example, this volume of GTCC LLRW and GTCC-like wastes is only about 20% of the 59,000 m^3 of LLRW disposed of at one site (NNSS) in one year (fiscal year 2010). DOE canceled the *Draft Global Nuclear Energy Partnership Programmatic Environmental Impact Statement* (GNEP PEIS) (74 FR 31017); therefore, the generation of additional GTCC LLRW under GNEP is not included in the GTCC EIS inventory. In addition, the inventory includes wastes expected to be generated during the production of Mo-99 for medical applications from two potential generators. While the potential generator(s) of this waste may change, the estimated characteristics and volumes are representative of the amounts expected to supply the demand for the Mo-99. DOE believes that expanding the inventory to include potential GTCC LLRW and GTCC-like wastes from undefined or unplanned future activities would introduce excessive uncertainty in the EIS evaluations. DOE believes that the inventory included in the GTCC EIS is reasonable for the purposes of the NEPA process and that it provides a supportable basis for conducting the EIS evaluation and the identification of the preferred alternative in the Final EIS. In the future, should additional waste be identified, appropriate NEPA review would be conducted to reflect these changes and also changes that would be needed to the existing infrastructure or the identification of additional disposal sites.

L293-167 DOE does not anticipate constructing any new facilities in contaminated areas. Site surveys will be conducted prior to the start of any construction activities.

L293-168 Site-specific environmental factors were evaluated in the EIS as appropriate in Section 6.1.3.23. The results of the evaluation were taken into consideration in identifying the preferred alternative presented in the Final EIS. Once a decision is made concerning the selection of a site and disposal methods for GTCC LLRW, additional site-specific NEPA and other review will be conducted to evaluate soils, sediments, seismic, geologic and other factors.

L293-169 See response to L293-2.

L293-170 Details of the facility accident analysis can be found in Sections 5.3.4.2.1 and 6.2.4.1 in the EIS regarding Hanford. Only a small subset of potential accident impacts are analyzed because such impacts are dependent on the severity of the accident, the amount of material released, how readily the material can be dispersed, the weather conditions (wind direction and speed) at the time of the accident, and the land use of the affected area. Human health impacts were bounded, but such socioeconomic impacts are not as readily quantified. As shown in the accident analysis, the potential human health accident impacts do not vary significantly among the potential sites because all sites are in relatively remote areas. Likewise, the potential socioeconomic impacts are not expected to vary significantly among sites and would not be a discriminator when selecting the preferred alternative.

L293-171 All relevant potential exposure pathways were considered in the analyses presented in the EIS. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. A transportation accident involving dispersal of radioactive material into a water body would be an extremely rare event and is not considered credible for the transportation risk analysis conducted for this EIS.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

Yakima Nation EIS/Air Project GTCC EIS Comments
Attachment 2
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ID No.	Section	Subsection	Page	Figure, Map or Table Number	Topic	Comment
155	Appendix E	E.2.1	E-4	NA	Human Exposure	The assumption that the resident farmer scenario at distant sites is conservative because it presumes farming would not be possible [illegible] depend on rainfall to irrigate crops. Revise the Draft GTCC EIS to remove this statement and all others like it and replace them with text that acknowledges (1) that farming could occur at any candidate site sometime within the next 10,000 to 100,000 years and (2) that there is no empirical way to demonstrate this is not the case. See previous comments on this topic.
156	Appendix E	E-2.2	E-9	E-2	Human Exposure	While conceptually straightforward, this section and the associated figure do not account for the feedback loops that the type of long-lived contamination has been noted to follow. Numerous constituents of the radionuclides preferentially accumulated in nature have been documented in tree and terrestrial ecology. Revise the Draft GTCC EIS to acknowledge and incorporate this feedback.
157	Appendix E	E-3	E-13	NA	Human Exposure	Because current storage of GTCC wastes is at the ground surface and institutional controls are not relied upon for more than 100 years, evaluation of long-term impacts for the No Action alternative should consider surface runoff and airborne releases (including particulates). A cumulative human health analysis of all potential impacts of the No Action alternative in repository for a meaningful comparison of the No Action and action alternatives. See previous comments on this topic and revise the Draft GTCC EIS to incorporate these pathways.
158	Appendix E	E.6	E-50	Table E-15	Environmental Variables	The infiltration rate provided for Hanford is lower than website zero to infiltration rates measured at Hanford. A conservative estimate of infiltration has been found to be 10 cm/year. The infiltration rate in the Draft GTCC EIS significantly underestimates the potential movement of contaminants. In addition, the extension rate may change significantly over time as a result of climate change and lower temperatures.
159	Appendix E	E-6	E-53	Table E-16	Environmental Variables	The minimum 10,000-year period over which the disposal facility must isolate waste requires that higher rates be considered in the analysis. Revise the Draft GTCC EIS to evaluate higher infiltration rates at the waste site. See previous comments regarding assumed precipitation and infiltration rates used to analyze the Hanford Site. Revise the Draft GTCC EIS to use increased precipitation and infiltration within a reasonable range that could result from significant climate change in the next 10,000 to 100,000 years.

L293-177 L293-178 L293-179 L293-180 L293-181

L293-172 See response to L293-67.

L293-173 The surface water pathway was not analyzed quantitatively in the EIS for the reasons summarized in Appendix E – "Releases to surface water would only occur once the entire engineered cover over the disposed wastes had eroded away. Because of the thick cover layer and the use of very robust engineering techniques to construct it, it was assumed for the analyses in the EIS that the buried GTCC wastes would always be overlain by some cover material through 10,000 years, eliminating surface water runoff as a potential exposure mechanism for the action alternatives.

Even if releases to surface water were to occur, it is not expected that these releases would be significant or result in higher peak annual doses or latent cancer facility (LCF) risks than would releases to groundwater. The disposal facility and waste containers are assumed to maintain their integrity for at least 500 years, and this factor would allow many of the shorter-lived radionuclides to decay to innocuous levels prior to any releases to the environment. In addition, it is expected that releases to surface water would be much more diluted in the environment (such as in a river or lake) before being ingested by the hypothetical receptor than would comparable releases to groundwater (in which case the hypothetical receptor would extract water for use from a well). Because of this smaller amount of dilution, the groundwater pathway would likely be much more significant than the surface water pathway."

L293-174 See response to L293-95.

L293-175 See response to L293-2.

L293-176 All relevant potential exposure pathways were considered in the analyses presented in the EIS, including impacts from surface runoff and airborne emissions. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. Locations closer than the 100 m (330 ft.) evaluated would result in higher dose and cancer risk estimates. The 100 m (30 ft.) distance was used to be consistent with the minimum buffer zone distance surrounding a DOE LLRW disposal site identified in DOE Manual 435.1 ,1 Radioactive Waste Management Manual. As discussed in Section 2.7.4.2 in the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-177 All relevant potential exposure pathways were considered in the analyses presented in the EIS, including impacts from surface runoff and airborne emissions. These analyses addressed a range of reasonable scenarios and estimated the potential impacts on all environmental resources consistent with NEPA requirements. For the human health assessment, the focus was on the groundwater pathway, since this is the most likely manner in which someone could be exposed to the radioactive contaminants in the GTCC LLRW and GTCC-like wastes in the distant future. As discussed in Section 2.7.4.2 in the EIS, the hypothetical resident farmer scenario was only used to provide estimates for comparing the various sites evaluated; however, this scenario may not be consistent with the reasonably foreseeable future scenario at some of the sites evaluated. Site-specific NEPA reviews would be conducted as needed.

L293-178 See response to L293-177.

L293-179 See response to L293-65.

L293-180	See response to L293-29.	
L293-181	DOE recognizes that modeling potential releases of radionuclides from the conceptual disposal sites far into the future approximates what might actually occur. Sufficient detail was included in the conceptual disposal facility designs for use in the EIS analyses, consistent with the current stage of this process. Some of the input values may change in the future and could result in higher impacts (such as from increased precipitation at some sites due to climate change), while others could result in lower impacts (due to decreased precipitation).	

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Reference List

CEQ. 1997. *Considering Cumulative Effects under the National Environmental Policy Act*. National Environmental Policy Act Website. Available online: http://ceq.hss.doe.gov/nepa/ccenepa.htm. Accessed 6/3/2011.

Duncan, J., K. Burk, M. Chamness, R. Fowler, B. Fritz, P. Hendrickson, E. Kennedy, G. Last, T. Poston, M. Sackschewsky, M. Scott, B. Snyder, M. Sweeney, and P. Thorne. 2007. *Hanford Site National Environmental Policy Act (NEPA) Characterization* (PNNL-6415 Rev. 18). September.

Energy Policy Act. 2005. Energy Policy Act of 2005 §631. Public Law 109-58. August 8. Available online: http://doe.gov/EnergyPolicyActof2005.pdf. Accessed 6/3/2011.

Geomatrix Consultants. 1993. *Probabilistic Seismic Hazard Analysis, DOE Hanford Site, Washington* (WHC-SD-W236A-TI-002 Rev. 0). Prepared for Westinghouse Hanford Company. December.

RIDOLFI Inc. (Ridolfi). 2007. *Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, Richland, Washington*. Prepared for the Yakama Nation ERWM Program. September.

U.S. Department of Energy (USDOE). 1987. *Recommendations for Management of Greater-Than-Class-C Low-Level Radioactive Waste*. DOE/NE-0077. February. Available online: http://www.ntscpis.sol.gov/documents/docs/DOE_NE-0077.pdf.

U.S. Department of Energy (USDOE). 2009. *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (DOE/EIS-0391). Prepared by the U.S. Department of Energy. October.

U.S. Environmental Protection Agency (USEPA). 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. EPA 315-R-99-002. May. Available online: http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf. Accessed 6/3/2011.

U.S. Nuclear Regulatory Commission. 1981. *Draft Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Wastes* (NUREG-0782 Volume 2). September.

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Attachment 3

Comments of the Institute for Energy and Environmental Research on the Department of Energy's
Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste
(DOE/EIS-0375-D), published in February 2011
9 June 2011
Prepared for Ridolfi, Inc., by
The Institute for Energy and Environmental Research

These comments on the *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* (DOE/EIS-0375-D), published by the Department of Energy (DOE) in February 2011, were prepared by the Institute for Energy and Environmental Research under contract to Ridolfi, Inc. This Draft GTCC EIS is referred to in the comments below as "Draft EIS." IEER had submitted comments to the DOE on its draft implementation (or scoping) plan in September 2007.[1]

Overview and Recommendations for a Revised Draft EIS

Our analysis indicates that the Draft EIS is very incomplete and in many respects scientifically ill-founded. These points are called out explicitly in the discussion below. As a result we have concluded that it is necessary to re-do the draft and republish a Draft EIS for public comment. The recommendations below for a revision indicate the breadth and depth of the scientific and regulatory gaps and problems with the Draft EIS. They are based on the analysis and review of the EIS below (including Appendix A).

Section A Recommendations: DOE's responses to some public comments on scope (with four subsections)

A revised draft EIS should be published that includes a deep geologic repository alternative other than WIPP. L293-182

[1] Arjun Makhijani. *Comments of the Institute for Energy and Environmental Research on the Department of Energy's Notice of Intent to Prepare an Environmental Impact Statement for the Disposal of Greater-Than-Class-C Low-Level Radioactive Waste, Federal Register*, Institute for Energy and Environmental Research, September 21, 2007, on the Web at http://www.ieer.org/comments/gtccnoi.pdf. Hereafter Makhijani 2007.

L293-182 See response to L293-24.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

The EIS should include an alternative that combines hardened on site storage of commercial reactor decommissioning GTCC for 30 to 60 years combined with disposal. L293-183

A revised draft EIS should be published that explicitly addresses cancer risks to children and especially female children, to estimate whether the proposed disposal methods meet the standards for public health protection in existing regulations, notably Subpart C of 10 CFR 61.[2] In light of Executive Order 13045, the DOE should also consider non-cancer risks in utero and non-cancer risks to children. L293-184

A revised draft EIS should be published that explicitly includes depleted uranium from enrichment plants as GTCC-like waste. This should include both existing stocks of DU at DOE sites as well as stocks of DU anticipated from the centrifuge enrichment plant that has been licensed and operating in New Mexico and the one likely to be operational in the future in Idaho. L293-185

Section B Recommendation: Standards to be applied for performance assessment

The DOE should apply the criteria of 10 CFR 61.41 for assessing whether a site and disposal method meets minimal disposal criteria. It is essential to calculate organ doses and to do so for the age and gender that would be the most exposed for a given set of environmental conditions. For CERCLA sites, like Hanford, ARARs, including radionuclide drinking water MCLs and a lifetime cancer risk of at most one in 10,000, need to be maintained. The DOE should also take treaty compliance into account through use of appropriate scenarios and by assuming that institutional controls will end when DOE site cleanup is completed. Sites and disposal methods that do not meet these criteria should be ruled out. Hanford does not meet the criteria for any disposal method and should be ruled out as a disposal site for GTCC and GTCC-like waste. The Draft EIS should be reissued for public comment with the changes in this set of recommendations since the failure to use the appropriate standards and ARARs as reference points is a fundamental analytical and legal problem. The Draft EIS as it stands gives the false impression that the choices of sites and disposal approaches are much wider than they are if reasonable existing health and environmental standards are applied. L293-186

Section C Recommendations: Source terms that are not, but should be, included in a revised Draft EIS

Recommendation: The DOE should reissue a Draft GTCC EIS for public comment with the following source terms included: L293-187

1. Depleted uranium from enrichment plants
2. Recycled uranium, including the recycled uranium in the DOE complex and that generated from operations at West Valley
3. Hanford reactor graphite moderator blocks

[2] United States. Nuclear Regulatory Commission. *Code of Federal Regulations. Title 10 –Energy: Chapter I – Nuclear Regulatory Commission; Part 61 – Licensing Requirements for Land Disposal of Radioactive Waste.* 1-1-11 Edition. Washington, DC: Office of the Federal Register, National Archives and Records Administration; U.S. Government Printing Office, 2011. On the Web at http://www.gpo.gov/fdsys/pkg/CFR-2011-title10-vol2/pdf/CFR-2011-title10-vol2-part61.pdf.

2

L293-183 The use of HOSS and other approaches for long-term storage of GTCC LLRW and GTCC-like wastes are outside the scope of this EIS because they do not meet the purpose and need for agency action. Consistent with Congressional direction in Section 631 of the Energy Policy Act of 2005 (P.L. 109-58), DOE plans to complete an EIS and a ROD for a permanent disposal facility for this waste, not for long-term storage options. The GTCC EIS evaluates the range of reasonable disposal alternatives and, as also required under NEPA, a No Action Alternative. Under the No Action Alternative, current practices for storing GTCC LLRW and GTCC-like wastes would continue in accordance with current requirements.

L293-184 Disposition of the GTCC LLRW and GTCC-like wastes will be handled in a manner that is protective of human health and the environment and in compliance with applicable requirements and regulations. Doses to workers and the public will be minimized to the extent practical. The methodology used to estimate the radiological human health impacts in the EIS is based on standard practices that are subject to revision as our understanding of the effects of radiation on humans evolves (e.g., effects on children vs. adults and/or consideration of organ dose vs. total effective dose). The same methodology is used in the evaluation of all alternatives; thus, any modification of this methodology would not affect the comparisons among alternatives and the identification of the preferred alternative.

L293-185 See response to L293-132.

L293-186 The EIS analysis is used to assess the viability of an alternative as well as its relative performance compared to the other alternatives. The three land disposal facility conceptual designs (above-grade vault, enhanced near-surface trench, and intermediate-depth borehole) were selected as being representative of a range of land disposal configurations (varying degrees of waste consolidation and geometry) that could be employed for the disposal of the GTCC LLRW and GTCC-like waste inventory. As discussed in Section 1.4.2 of the EIS, each concept has been used to some degree in the United States or other countries. The same vault, borehole, and trench characteristics were considered for the disposal sites evaluated in order to compare the performance of each site's natural hydrological, geological, and meteorological properties relative to contaminant fate and transport once any engineered barriers would begin to fail. It should be emphasized that project- and site-specific engineering factors would be incorporated into the actual facility designs of the site or sites selected in a ROD to dispose of GTCC LLRW and GTCC-like wastes. Thus, comparison against specific performance criteria is premature at this time. In addition, as discussed in Section 1.4.2, the conceptual disposal facility designs analyzed in the EIS could be modified to perform better in specific locations.

L293-187 The wastes cited in the comment are not included in the GTCC LLRW waste inventory because these materials are not GTCC LLRW.

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4. The plutonium-containing waste that was buried as transuranic waste at the US Ecology commercial low-level waste site prior to 1970.
5. Buried transuranic waste and plutonium containing waste in trenches and cribs at Hanford
6. *"Immobilized Low Activity Waste" resulting from the high-level waste* processing and vitrification work planned at Hanford.
7. High-level waste tanks when they are removed from the Hanford Site after the waste is removed for vitrification.
8. Soil around the high-level waste tanks that contains high-level waste that leaked from dozens of the tanks over the decades.

L293-187 (Cont.)

Section D Recommendations: Health and Environmental Impact

Recommendations

The present Draft EIS does not meet the minimum standards of transparency that would allow an independent verification of the DOE's estimates. Nor does it meet the minimum tests of estimating health and environmental impacts that would give credence to the results that claim that public health would be protected in the trench, vault, or borehole scenarios. It is also far too limited in considering a single geologic repository site, WIPP, that is limited by law to only defense transuranic waste. In other words, the Draft EIS does not meet the test of scientific integrity and a reasonable range *of alternative as required by NEPA. The DOE should publish a revised Draft EIS with the* following changes in the scenarios:

1. All base case scenarios should assume a complete loss of institutional control. Therefore all resident farmer and tribal scenarios should assume that there will be people residing on the disposal site rather than away from it. These residents would therefore use water from the site below the disposal layer for domestic, agricultural, and cultural purposes. L293-188
2. The revised Draft EIS should incorporate the fact of pre-existing contamination on *DOE sites when it models disposal at such sites.* L293-189
3. The revised Draft EIS should have at least one scenario in which the cover is completely eroded away (on the order of 1mm/year of erosion) in order to assess the effect of disposal on surface water and aquatic food contamination. Besides RESRAD default consumption, the Yakama lifestyle scenario should also be evaluated in this case. L293-190
4. The revised draft EIS should provide sound, scientific technical justification for key parameters such as the lifetime of grout and infiltration rate as well as possible future rainfall and climate variations. There has been ample work in these areas that is not reflected in the Draft EIS at present. L293-191
5. The revised Draft EIS should have a normal sensitivity analysis in which parameter variation results in dose estimates on both sides (higher and lower) of the base case. L293-192
6. A realistic assessment of the trench, vault, and borehole disposal options shows that the basic health protection and dose limits would be violated by large margins. These methods are unsuitable for disposal of GTCC and GTCC-like waste and should be explicitly rejected when the Draft EIS is revised. We L293-193

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L293-188 On the basis of the depth of waste disposal, DOE believes that the only reasonable potential for intrusion is from a future drilling event, such as drilling for a well. The likelihood of inadvertent intrusion from a drilling event would be very low for a GTCC near-surface disposal facility because of (1) the use of intruder barriers, (2) the remoteness of the sites, (3) DOE's commitment to long-term institutional control, (4) site conditions such as the general lack of easily accessible resources and the great depth to groundwater, and (5) waste form stability. On the basis of these considerations, DOE did not include a quantitative evaluation of this scenario in the EIS. Site-specific NEPA reviews would be conducted as needed.

L293-189 Where significant, pre-existing contamination is considered under cumulative impacts. Pre-existing contamination at Hanford was evaluated in Section 6.4.2.

L293-190 See responses to L293-57 and L293-135.

L293-191 See responses to L293-42 and L293-14.

L293-192 See response to L293-6.

L293-193 While 10 CFR Part 61 identifies one NRC-approved method for GTCC LLRW disposal (disposal in a geologic repository), these regulations also indicate that other disposal methods could be approved. The GTCC EIS evaluates three land disposal methods (i.e., enhanced near-surface trench, intermediate-depth borehole, and above-grade vault). The GTCC EIS evaluation indicates that land disposal methods employed at sites with suitable characteristics would be viable and safe alternatives for the disposal of GTCC LLRW.

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understand that Congress is to have its say about a preferred alternative when the Final EIS is published. But that should not prevent the DOE from clearly pointing out that some methods of disposal violate existing regulations and in the case of DOE Superfund sites, ARARs, not to speak of tribal treaty rights. L293-193 (Cont.)

7. The doses to a resident farmer are far higher when realistic scenarios about loss of institutional control and memory are evaluated (rather than the DOE's assumption of a permanent knowledge of the site boundary). The DOE should include an onsite farmer using irrigation water from the disposal site in its trench, vault, and borehole scenarios. L293-194
8. The DOE's recognition that offsite wastes containing Tc-99 and I-129 should not be brought to Hanford for disposal should lead it to the conclusion that no GTCC or GTCC-like wastes should be brought to Hanford for a variety of reasons, including the need to develop more than one site if they are, the exacerbation of contamination at Hanford from other wastes that would be brought in, the need, in fact to remove existing wastes from Hanford in order to meet drinking water standards and other ARARs, etc. L293-195
9. The DOE should calculate organ as well as total body effective doses. This will enable an evaluation of the degree to which disposal methods comply with dose limits in existing regulations such as the drinking water standards (40 CFR 141.66) and the low-level waste rule (10 CFR 61 Subpart C). L293-196
10. The DOE should consider at least one deep geologic repository other than WIPP as one of the alternatives. L293-197

A. DOE's responses to some public comments on scope

The DOE has not given a satisfactory response to a number of public comments regarding the scope and nature of the alternatives to be considered and the manner in which they should be evaluated. The response to some of the key comments on the scope is non-responsive enough to warrant revision of the draft and republication of a new draft for public comment.

1. *The DOE has considered no alternative for deep geologic disposal other than the Waste Isolation Pilot Plant (WIPP)*

Section 1.5.2 of the Draft EIS[3] states that

> DOE does not plan to evaluate an additional deep geologic repository facility because siting another deep geologic repository facility for GTCC LLRW and GTCC-like waste would be impractical due to the cost and time involved and the relatively small volume of GTCC LLRW and GTCC-like waste. L293-198

WIPP is presently restricted by law to defense transuranic waste. Yet, almost all the radioactivity in the source term, as defined by DOE in the Draft EIS, is commercial GTCC. There is no guarantee that Congress would enact a law to accommodate GTCC and GTCC-like waste at WIPP. A number of commenters, including IEER, had asked that WIPP be ruled out, in part for this reason. We understand that the DOE can ask for the law to be changed and that Congressional action will be required prior to

[3] Draft EIS Section 1.5.2 (pp. 1-43 to 1-45) is called: Comments Determined to be Outside EIS Scope.

4

L293-194 See response to L293-98.

L293-195 See response to L293-2.

L293-196 See response to L293-180.

L293-197 See response to L293-24.

L293-198 This section is an elaboration on the preceding comments, L293-178 through L293-193. The responses to the preceding comments adequately address issues raised in this section. More detailed information on specific issues can also be found in the responses to comments L293-1 through L293-177.

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actual final selection of a preferred alternative. However, it is essential that a repository other than WIPP also be evaluated, since WIPP is restricted by law to defense waste and since deep geologic disposal is the option with the lowest long-term radiological impacts. Moreover, the DOE did not compare the cost and time for creating a new repository with that of expanding WIPP. Finally, the Blue Ribbon Commission on America's Nuclear Future (BRC) may consider an option of a repository for defense high-level waste separate from a commercial spent fuel repository. While WIPP may eventually be considered for such a mission, we note that the BRC is not going to recommend any specific sites for any waste. A new site would therefore also be among the options for defense high-level waste. That site could also accommodate GTCC and GTCC-like waste, a number of other "orphan" wastes, like large amounts of depleted uranium from enrichment plants and recycled uranium from the nuclear weapons complex (see below). Congressional action would be required in all of these cases.

Recommendation: A revised draft EIS should be published that includes a deep geologic repository alternative other than WIPP.

2. *The DOE has rejected Hardened On Site Storage (HOSS) of GTCC without an adequate analysis.*

In Section 1.5.2 (p. 1-43) of the Draft EIS, the DOE states that it did not consider HOSS because the GTCC EIS process is about "permanent disposal" and on site storage does "not meet the purpose and need for agency action." While we recognize that HOSS is not a permanent disposal option, HOSS could be a complement to permanent disposal, especially for commercial GTCC generated by the decommissioning of reactors, which accounts for about 98 percent of the radioactivity considered in the Draft EIS. Onsite storage of reactor decommissioning GTCC for 60 years would greatly decrease the total amount of radioactivity relative to that estimated by the DOE at disposal time (six years after reactor shut down). This is because the vast majority of the radioactivity in reactor decommissioning GTCC consists of relatively short-lived radionuclides such as manganese-54, iron-55, cobalt-60, and others. At the end of 60 years of storage after reactor shut down, this portion of the radioactivity would have decayed away almost totally. Much of it also decays after the six years of storage assumed by the DOE. However, the radioactivity remaining at 60 years after storage is only about 11 percent of that at six years. That remaining at 30 years is about 15 percent of that at six years after reactor shutdown.[4] This decrease in radioactivity would therefore also greatly reduce the largest source of decay heat in the overall GTCC and GTCC-like source term that the DOE has considered in the Draft EIS. It would also greatly reduce the total GTCC and GTCC-like source term to be disposed of. L293-198 (Cont.)

Onsite storage of commercial GTCC from reactor decommissioning would add little to the cost of the decommissioning of reactor sites, in view of the cancellation of the Yucca Mountain Project. Commercial spent fuel will likely have to be stored on site for decades. While the BRC is considering an option of consolidated storage, the practical failure of the Private Fuel Storage Project in Utah[5] to

[4] Calculated by applying the decay constants of the eight most important radionuclides (carbon-14, manganese-54, iron-55, nickel-59, nickel-63, cobalt-60, molybdenum-93, and niobium-94) to the inventory at 6 years and 60 years. See Appendix C (begins at pdf p. 254) of J. Schelling, C. D. Leigh, et al., *Supporting Nuclear Utility Inventory Estimates for the Greater-Than-Class-C Low-Level Radioactive Waste Environmental Impact Statement Evaluations*. This document is available as Appendix H (begins at pdf p. 226) in *Basis Inventory for Greater-than-Class-C Low-Level Radioactive Waste Environmental Impact Evaluations*, Rev 1, Sandia National Laboratories, May 2008, on the Web at http://www.gtccels.anl.gov/documents/docs/Task_3_2_Revision_1_FINAL.pdf. Also see Table 4 (p. 16) of this main document.

[5] The project failed in practice to create a storage site even though the federal legal formalities of obtaining a license from the Nuclear Regulatory Commission were successfully completed.

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actually open even after obtaining a license from the Nuclear Regulatory Commission (NRC) is an indication that onsite storage of spent fuel is the most likely outcome for the foreseeable future. Even if the storage period is not 60 years, a storage period of just half that would still eliminate by decay almost 94 percent of the radioactivity in the entire GTCC and GTCC-like source term.

Finally, the DOE needs to evaluate the cost impact of a combined onsite storage approach for 30 to 60 years followed by disposal with the option of no onsite storage beyond the six years delay between reactor shutdown and waste disposal now envisioned in the Draft EIS.

Recommendation: The EIS should include an alternative that combines hardened on site storage of commercial reactor decommissioning GTCC for 30 to 60 years combined with disposal.

3. *The Draft EIS has essentially dismissed without analysis the comments made on the implementation plan that it should address the issue of doses and cancer risks to women and children and risks during in utero exposure (p. 1-44 to 1-45). The Draft EIS has also not considered non-cancer risks in utero and to children.*

IEER had made the following recommendation in its comments on the implementation plan:

> The BEIR VII report of the National Research Council concluded that females face a much higher overall risk than males and that children face higher risks than adults. The risk factors for cancer incidence, by sex and age, published in BEIR VII should be used to estimate risks in the GTCC EIS. Non-cancer risks considered in the BEIR VII report should also be evaluated. If any EPA guidance is used it should be EPA Federal Guidance Report 13, and not Federal Guidance Report 11.
>
> We note here that external dose risk factors FGR 13 (and FGR 12) are explicitly based on Reference Man, a hypothetical young "Caucasian" male. The EIS should explicitly reject this model. Dose estimates should be made for the most vulnerable – that is, those most at risk for a given exposure. It is critical in this area therefore to use the BEIR VII report especially for external dose estimates, since it does not suffer from this limitation.
>
> *Recommendation: Radiation dose calculations should include separate estimates of doses to males and females in various ages groups from infant on up. Cancer risks should be based on the results of the BEIR VII report. All cancer risks should consider incidence as well as mortality. Non-cancer risks should also be considered.*[6]

L293-198 (Cont.)

The Draft EIS contains what is essentially a non-response and continues to use Reference Man:

> The concerns with regard to the increased sensitivity of various elements of the population are noted. The EIS presents a comparative analysis of the potential radiation doses and LCF (latent cancer fatalities) risks to members of the general public (as represented by an adult receptor) from use of the various disposal alternatives presented in the NOI. As such, the level of detail requested here is not necessary for the purposes of this EIS, and the hazards associated with management of these wastes are

[6] Makhijani 2007 p. 10

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presented in terms of the annual dose and LCF risk to a potentially exposed adult receptor.

The estimates for dose and LCF risk were based on a resident farmer receptor, which is considered a conservative scenario that accounts for the largest number of pathways of potential exposure. The primary pathway of concern, however, is the ingestion of groundwater potentially contaminated with radionuclides released from wastes at the proposed disposal facility. The estimated dose and LCF risk to an adult receptor presented in the EIS are considered conservative (relative to any other potential receptor) because the ingestion rate assumed for water intake is the 90th percentile value for the general public recommended by the EPA (i.e., two liters per day for 365 days per year) (EPA 2000).

Follow-on NEPA evaluations will be conducted, as needed, to assess potential human health impacts on a site-specific basis (accounting for sensitive populations as applicable) when a disposal site or location is identified.

The continued use of an adult male resident farmer is not responsive to the comment at all. The comment that the DOE is using a 90th percentile value for water intake does not compensate for the added doses and risks faced by children even when lower intakes for the latter are taken into account. For instance, the table below shows that the risks for infants and five-year old female children are considerably higher than female 30-year-olds even when lower intakes by children are taken into account. For instance, the risk of breast cancer for a female child is more than 20 times greater than for an adult female, *for the same level of environmental contamination*. The differential between female children and men is even greater than shown in Table 1.

L293-198 (Cont.)

Table 1: Lifetime cancer incidence risk for exposure at stated age, fluid ingestion, females only (fluid intakes adjusted for age)

Cancer	Radionuclide	Infant Risk/Bq	Age 5 Risk/Bq	Age 30 Risk/Bq	Overall Risk Ratio Infant/Age 30 (Note 1)	Overall Risk Ratio Age 5/Age 30 (Note 1)
Leukemia	Sr-90	2.79E-08	3.06E-09	1.13E-09	6.2	1.7
Breast	Sr-90	1.38E-09	2.60E-10	1.68E-11	20.6	10.0
Thyroid	I-131	2.32E-07	8.63E-08	1.77E-09	32.8	12.2

Notes: 1. Fluid intakes for females assumed as follows: infant = 350 cc per day, 5-year old = 900 cc/day; 30-year-old = 1,400 cc/day. The fluid intake figures for children were computed at 50 cc/day/kilogram of weight, using mean weights for the United States. These are total fluid intakes, including, but not limited to, water. 2. Bq = Becquerel.

Source: Adapted from Makhijani, Smith, and Thorne, *Science for the Vulnerable*, Institute for Energy and Environmental Research, 2006, p. 40, on the web at http://www.ieer.org/campaign/report.pdf.

The DOE and all federal agencies are required to take into account the higher sensitivity of children. Indeed, the explicit failure to do so and the explicit reliance on an adult receptor are arguably in violation of the Executive Order on Children. Specifically, Executive Order 13045, *Protection of Children From Environmental Health Risks and Safety Risks*, states:[7]

[7] William J. Clinton. "Executive Order 13045 – Protection of Children From Environmental Health Risks and Safety Risks." *Federal Register*, v. 62, no. 78 (April 23, 1997), pp. 19883-19888. On the Web at http://www.epa.gov/fedrgstr/eo/eo13045.pdf, p. 19885. Emphasis added.

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> A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because: children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's size and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves. Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency:
>
> **(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children;**
>
> and
>
> **(b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.**

It is clear from the phrases in we have put in bold in the above quote that the DOE is both required to identify risks that disproportionately affect children and to ensure that its programs and actions address any disproportionate risks. It is also clear from Table 1 above that disproportionate risks to children do exist, even when female children are compared to female adults. The difference is much greater when female children are compared to male adults. As a result, the Draft EIS's failure to explicitly estimate doses and risks to children fails to even minimally meet the requirements of Executive Order 13045. L293-198 (Cont.)

Recommendation: A revised draft EIS should be published that explicitly addresses cancer risks to children and especially female children, to estimate whether the proposed disposal methods meet the standards for public health protection in existing regulations, notably Subpart C of 10 CFR 61.[8] In light of Executive Order 13045, the DOE should also consider non-cancer risks in utero and non-cancer risks to children.

4. *The Draft EIS has not included depleted uranium from enrichment plants in its source term.*

IEER provided an extensive factual, regulatory, and analytical basis in its comments on the implementation plan that depleted uranium from enrichment plants should be included as part of the GTCC and GTCC-like source term for this EIS. IEER also provided analysis indicating that the DU from enrichment plants was unsuitable for shallow land burial, which could not meet 10 CFR 61 Subpart C

[8] United States. Nuclear Regulatory Commission. *Code of Federal Regulations. Title 10 –Energy: Chapter I – Nuclear Regulatory Commission; Part 61 – Licensing Requirements for Land Disposal of Radioactive Waste.* 1-1-11 Edition. Washington, DC: Office of the Federal Register, National Archives and Records Administration; U.S. Government Printing Office, 2011. On the Web at http://www.gpo.gov/fdsys/pkg/CFR-2011-title10-vol2/pdf/CFR-2011-title10-vol2-part61.pdf.

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health protection criteria.[9] The Draft EIS has not addressed any of the substance of the comments, in *effect ignoring them altogether.*

Further, the analysis provided by IEER clearly fits into DOE's own definition of GTCC-like waste in the Draft EIS:

> *GTCC-like waste refers to radioactive waste that is owned or generated by DOE and has characteristics sufficiently similar to those of GTCC LLRW such that a common disposal approach may be appropriate. GTCC-like waste consists of LLRW and potential non-defense-generated TRU waste that has no identified path for disposal. The use of the term "GTCC-like" is not intended to and does not create a new DOE classification of radioactive waste.*[10]

The vast majority of DU from the three gaseous diffusion plants was generated by the DOE and is owned by it. IEER showed that it has characteristics sufficiently similar to GTCC for it to be disposed of in the same manner. For instance, its long-lived alpha-emitting specific activity is well over 100 nanocuries per gram, which is the threshold for GTCC in 10 CFR 61.55. It has no identified path for disposal at the present time. The DOE was required by law to address comments substantively. This comment is a very important one in terms of the scope of the GTCC EIS, the health impact of GTCC and GTCC-like low-level waste, and cost. It is therefore imperative that DOE revise and republish its Draft EIS for public comment to include DU from past, existing, and proposed enrichment plants for technical, *environmental, and legal considerations.*

Recommendation: A revised draft EIS should be published that explicitly includes depleted uranium from enrichment plants as GTCC-like EIS. This should include both existing stocks of DU at DOE sites as well as stocks of DU anticipated from the centrifuge enrichment plant that has been licensed and operating in New Mexico and the one likely to be operational in the future in Idaho. L293-198 (Cont.)

B. Standards to be applied for performance assessment

The DOE is charged with the responsibility for providing alternatives for disposal of GTCC (and GTCC-like) waste under the general framework of the NRC's low-level waste rule 10 CFR 61.

> In 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," the NRC classifies LLRW into four classes (Classes A, B, and C, and GTCC LLRW) on the basis of the concentrations of short-lived and long-lived radionuclides (10 CFR 61.55). By controlling isotope concentrations in each class, the NRC regulations seek to control potential radiation exposures to future receptors, including inadvertent human intruders (e.g., a water well driller) after the period of active institutional control has ended. The NRC states in 10 CFR 61.55 that GTCC LLRW is not "generally acceptable" for near-surface disposal, although the NRC recognizes in 10 CFR 61.7(b)(5) that "there may be some instances where waste with concentrations greater than permitted for Class C

[9] Makhijani 2007 pp. 3 to 8
[10] Draft EIS v. 1, p. 1-1

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> waste would be acceptable for near surface disposal with special processing or design."[11]

What is "acceptable" and "not acceptable" for disposal under 10 CFR 61 is primarily defined by whether the disposal meets the health protection criteria specified in terms of maximum dose in 10 CFR 61 Subpart C, which states in part:

> **§ 61.40 General requirement.**
> Land disposal facilities must be sited, designed, operated, closed, and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objectives in §§ 61.41 through 61.44.
>
> **§ 61.41 Protection of the general population from releases of radioactivity.**
> Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

The rule also requires that the health of inadvertent intruders also be protected but does not explicitly provide a dose limit:

> **§ 61.42 Protection of individuals from inadvertent intrusion.**
> Design, operation, and closure of the land disposal facility must ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed.

L293-198 (Cont.)

It is important to note that no time limit for the protection of the health of the public is specified in 10 CFR 61.

All disposal of low-level waste under 10 CFR 61, whatever its class, must meet these health protection criteria. Despite these very clear rules, the Draft EIS does not use 10 CFR 61 Subpart C as the basic criterion for deciding whether a disposal method is acceptable. For instance, while 10 CFR 61.41 requires the calculation of organ doses, the Draft EIS does not provide any estimates of organ doses. It does not eliminate options that exceed 10 CFR 61.41 dose limits even in terms of whole body effective dose equivalents.

Further, at sites such as Hanford, which are Superfund (CERCLA) sites, the DOE is required to meet other regulatory criteria that go under the collective rubric of Applicable or Relevant and Appropriate Requirements (ARARs). These include groundwater protection to drinking water standards and Superfund standards that limit the cancer risk from residual contamination to the range of 10^{-4} to 10^{-6}, that is, between one in ten thousand and one in a million.[12]

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[11] Draft EIS v. 1, p. 2-59

[12] The CERCLA (or Superfund) remediation standard is at 40 CFR 300.430. http://edocket.access.gpo.gov/cfr_2010/julqtr/pdf/40cfr300.430.pdf. The risk limit is specified at 40 CFR

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The Draft EIS does not discuss ARARs for CERCLA sites. Specifically, the EPA defines a 15 millirem per year dose as being acceptable, even though it acknowledges that it exceeds the 10^{-4} lifetime cancer risk specified in the CERCLA regulation.[13] However, the EPA's risk coefficient of 0.000575 fatal cancers per rem for low-level radiation[14] equals a dose limit of about 3 millirem per year to meet the 10^{-4} risk limit. None of the approaches for disposal studied for Hanford meet this 3 millirem/year criterion of 10^{-4} lifetime cancer risk even if it is interpreted as fatal cancer risk and not cancer incidence risk and even if the DOE's estimates of doses are accepted. Specifically, the DOE calculates the annual doses for borehole, trench, and vault disposal as 4.8, 48, and 49 millirem respectively. As is shown in Appendix A and also discussed below, the borehole result is an artifact of selecting a resident 100 meters away from the site boundary, even thousands of years into the future, effectively assuming institutional control for unprecedented periods against historical evidence, against the assumption of maximum institutional control of 100 years in 10 CFR 61, and against the best prevailing scientific judgment that institutional control should not be assumed for more than about 100 years. Specifically, 10 CFR 61.59(b) specifies that "institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner." Placing a resident farmer on the site itself, since institutional control cannot be assumed for thousands of years, is the appropriate approach to estimating long-term doses and health effects. The DOE has not done this for any scenario. The doses in such a case would be much higher, as illustrated in Section III of Appendix A.

Finally, it is essential to take treaty compliance issues into account. An assumption of institutional control for thousands of years does not fulfill this criterion.

Recommendations: The DOE should apply the criteria of 10 CFR 61.41 for assessing whether a site and disposal method meets minimal disposal criteria. It is essential to calculate organ doses and to do so for the age and gender that would be the most exposed for a given set of environmental conditions. For CERCLA sites, like Hanford, ARARs, including radionuclide drinking water MCLs and a lifetime cancer risk of at most one in 10,000, need to be maintained. The DOE should also take treaty compliance into account through use of appropriate scenarios and by assuming that institutional controls will end when DOE site cleanup is completed. Sites and disposal methods that do not meet these criteria should be ruled out. Hanford does not meet the criteria for any disposal method and should be ruled out as a disposal site for GTCC and GTCC-like waste. The Draft EIS should be reissued for public comment with the changes in this set of recommendations since the failure to use the appropriate standards and ARARs as reference points is a fundamental analytical and legal problem. The Draft EIS as it stands gives the false impression that the choices of sites and disposal approaches are much wider than they are if reasonable existing health and environmental standards are applied.

L293-198 (Cont.)

300.430(e)(2)(i)(A)(2).) It should be noted that the range is for the combination of chemicals and radionuclides. It is discussed here assuming no carcinogenic chemicals are present.

[13] Stephen D. Luftig (Office of Emergency and Remedial Response) and Larry Weinstock (Office of Radiation and Indoor Air). *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination.* (OSWER No. 9200.4-18) Washington, D.C.: Environmental Protection Agency, Office of Solid Waste and Emergency Response, August 22, 1997. On the Web at http://www.epa.gov/superfund/health/contaminants/radiation/pdfs/radguide.pdf.

[14] Keith F. Eckerman, Richard W. Leggett, Christopher B. Nelson, Jerome S. Puskin, Allan C.B. Richardson. *Cancer Risk Coefficients for Environmental Exposure to Radionuclides: Radionuclide-Specific Lifetime Radiogenic Cancer Risk Coefficients for the U.S. Population, Based on Age-Dependent Intake, Dosimetry, and Risk Models.* (Federal Guidance Report No. 13) (EPA 402-R-99-001) Oak Ridge, TN: Oak Ridge National Laboratory; Washington, DC: Office of Radiation and Indoor Air, United States Environmental Protection Agency, September 1999, on the web at http://www.epa.gov/radiation/docs/federal/402-r-99-001.pdf, p.179.

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C. Source terms that are not, but should be, included in a revised Draft EIS

A number of source terms that should be included in the GTCC-like definition because they do not meet the health criteria of 10 CFR 61 or other ARARs for Hanford:

1. Depleted uranium from enrichment plants,
2. Recycled uranium, including the recycled uranium in the DOE complex and that generated from operations at West Valley,
3. Hanford reactor graphite moderator blocks,
4. The plutonium-containing waste that was buried as transuranic waste at the US Ecology commercial low-level waste site prior to 1970,
5. Buried transuranic waste and plutonium containing waste in trenches and cribs at Hanford,
6. "Immobilized Low Activity Waste" resulting from the high-level waste processing and vitrification work planned at Hanford,
7. High-level waste tanks when they are removed from the Hanford Site after the waste is removed for vitrification,
8. Soil around the high-level waste tanks that contains high-level waste that leaked from dozens of the tanks over the decades.

At present DOE plans to dispose of source terms numbers 3 to 8 in the list above in shallow land burial facilities on the Hanford Central Plateau, notably the Integrated Disposal Facility (East and/or West) and the Environmental Restoration Disposal Facility (ERDF) or to leave them in place where they are now. Yet, the DOE's own calculations show that its plans for the disposal of existing Hanford wastes related to remediation, as well as waste migration from past disposal practices, will result in violation of the drinking water levels by hundreds or even thousands of times to periods extending out hundreds or even thousands of years. While we recognize that variances from CERCLA ARARs are possible, such variances would result in a violation of the treaty rights of the Yakama Nation to unrestricted exercise of hunting, fishing, and gathering and other activities on the area now taken up by DOE Hanford facilities. Moreover, the DOE has not shown that retrievable storage of remediation wastes from Hanford with future disposal in a suitable deep geologic repository is not an option. Variances should not be given when there are viable alternatives to meet the ARARs. Indeed, given the threats to the most important surface water resource in the Northwest, deep disposal may well be the most attractive option, especially in combination with retrieval and similar disposal of wastes that have been disposed of in the past in ways that would not be acceptable today (such as discharge of plutonium-laden liquids to cribs and trenches). When there are not viable technologies available, a research and development program should be initiated. L293-198 (Cont.)

We have already discussed the reasons for not disposing of the wastes listed in items 6 to 8 in the above list in IEER comments on the Tank Closure and Waste Management Draft EIS for the Hanford Site[15] and will not repeat them here. The rationale for including the other items in the GTCC EIS and designating them for deep geologic disposal is outlined here.

[15] See Attachment 3 to the letter from Harry Smiskin, Chairman, Yakama Tribal Council to David A. Brockman, Manager, Richland Operations Office, U.S. Department of Energy and Mary Beth Burandt, Document Manager, Office of River Protection, U.S. Department of Energy, March 19, 2010.

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1. Depleted uranium

This is covered extensively in the IEER's comments on the implementation plan cited above. None of the facts or analysis have changed. The Draft EIS ignored both the facts and the analysis. The only thing that has changed is that the source term is likely to be bigger, since a new enrichment plant had begun operating since those comments were sent and at least one other new plant will be built. Table 2 shows the expected source term for depleted uranium from enrichment plants:

Table 2: Depleted uranium source term from past and future enrichment plant operations

	Current/Projected	Metric tons	Cubic meters	Curies
DOE complex	Current	5.58E+05	6.72E+04	1.90E+05
LES (NM)	Projected	3.09E+05	3.72E+04	1.05E+05
Areva (ID)	Projected	3.46E+05	4.16E+04	1.17E+05
Total	Current and Projected	1.21E+06	1.46E+05	4.12E+05

Source: Estimated by IEER from various sources.

2. Recycled Uranium

Recycled uranium has a higher specific activity than depleted uranium. It can range from 400 nanocuries per gram to over 1,000 nanocuries per gram depending on the enrichment level of the uranium (from depleted to slightly enriched). There are about 250,000 metric tons (13,200 cubic meters) of recycled uranium in various degrees of enrichments located at various sites of the DOE complex.[16] If the average activity is assumed to be 1,000 nanocuries per gram, then the number of curies is 250,000, which is somewhat greater than the historical source term of 190,000 curies for depleted uranium from the three DOE complex gaseous diffusion enrichment plants (see the first row of numbers in Table 2 above). The same scientifically based arguments made above for classifying depleted uranium as TRU waste hold *a fortiori* for recycled uranium (RU). That is to say, the specific activity for long-lived alpha-emitting radionuclides of RU is higher and, in addition, recycled uranium contains transuranic radionuclides (mainly plutonium isotopes and neptunium-237) and fission products (mainly technitium-99) that add to its radiotoxicity. L293-198 (Cont.)

3. Hanford single pass reactor graphite moderator blocks

The DOE has proposed to dispose of the graphite moderator blocks of the single pass reactors in the shallow land disposal sites on the Hanford Central Plateau. This is entirely inappropriate for regulatory and environmental reasons.

About 5,700 cubic meters of graphite moderator blocks from the eight plutonium producing plants contain, all together, 37,000 curies of carbon-14. IEER's calculation shows that this waste is slightly under GTCC in terms of its concentration of radioactivity per cubic meter of waste. Yet, if buried at

[16] United States. Department of Energy. *A Preliminary Review of the Flow and Characteristics of Recycled Uranium throughout the DOE Complex 1952-1999, Project Overview and Field Site Reports.* (F-001-001) DOE, March 2001. p. 8.

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Hanford and the carbon-14 reaches the groundwater, its concentration would well exceed the drinking water standards. The DOE's own estimate of carbon-14 contamination due to its disposal practices at ERDF is that the peak concentration will reach 1.3 million picocuries per liter about 520 years from now at the ERDF boundary.[17] The drinking water standard is 2,000 picocuries per liter by DOE's calculation.[18] Hence, according to DOE's own calculation the drinking water limit would be exceeded by 650 times 520 years from the present – well after the loss of institutional control. Moreover, the concentrations would be much greater than the drinking water limit for considerable periods before and after the estimated peak in about the year 2630.

A significant portion of the carbon-14 would likely be oxidized over the long-term since shallow land burial implies oxidizing conditions. If only half of the total is oxidized, about 18,500 curies of carbon-14 dioxide would be released to the atmosphere. This would be larger than the entire carbon-14 source term from all existing reactors from a geologic repository permitted under 40 CFR 191, the EPA rule that applies to all geologic repositories except Yucca Mountain. The permitted amount is 100 curies per 1,000 metric tons of heavy metal. Roughly 100,000 to 120,000 metric tons are to be expected from the operation of existing commercial reactors, which would mean a maximum permitted release of 10,000 to 12,000 curies of carbon-14 in the form of carbon-14 dioxide.

Indeed, it is important to remember in this context that a large, possibly central, part of the reason that Congress asked the National Academies to create a special standard for Yucca Mountain is because the EPA Science Advisory Board concluded that an oxidizing repository environment (like Yucca Mountain) may release carbon-14 in excess of the allowable one-tenth of the EPA estimated inventory and, by implication, that such a repository may not meet the carbon-14 emission part of 40 CFR 191.[19]

While it is difficult to calculate the emissions of carbon-14 from spent fuel disposed of in a deep geologic repository due to the many complex barriers to release and the complex physical and chemical pathways between the disposal location in an engineered deep geologic repository and the atmosphere, it is much less complicated to understand that a substantial fraction of the carbon-14 disposed of in shallow land burial under oxidizing conditions would be oxidized and released relatively rapidly to the atmosphere. Assuming half of the graphite block inventory is released, the total release to the atmosphere would be 18,500 curies. This would result in very small individual radiation doses – on the

L293-198 (Cont.)

[17] United States. Department of Energy. *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility.* (DOE/RL 93-99 rev.1] Richland, WA: DOE Richland Operations Office, October 1994. On the Web at http://www5.hanford.gov/pdw/fsd/AR/FS00001/FS00047/D196061256/D196061256_58632036_76907_802.pdf. Table 4-10 (pp. 4T-10c to 4T-10d)

[18] Drinking water standards for man-made beta and photon emitters, except tritium and strontium-90 are calculated assuming a 4 millirem per year maximum organ or whole body effective dose equivalent (whichever is greater) and a 2 liter daily intake of water by an adult. A list of "Benchmark Concentrations," which are equivalent to federal primary drinking water maximum contaminant levels (MCLs), is given in TC&WM Draft EIS Table O-4 (Appendix O, v. 2, p. O-31). The concentrations are derived from the drinking water annual dose limit of 4 mrem for man-made beta and photon emitters (except tritium and strontium-90) as specified in 40 CFR 141.66.

[19] The Science Advisory Board concluded that the uncertainties in modeling the release were very large and that the release could range from essentially zero to the entire inventory of C-14. The inventory itself was deemed to be somewhat uncertain. The EPA's estimate of inventory was 1 curie per metric ton. (United States. Environmental Protection Agency, Science Advisory Board, *An SAB Report : Review of Gaseous Release of Carbon-14 : Review, by the Radiation Advisory Committee, of the Release of Carbon-14 in Gaseous Form from High-Level Waste Disposal,* (EPA-SAB-RAC-93-010) EPA, April 1993. Hereafter cited as SAB 1993.)

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order of ten microrem per person per year[20]) since the carbon-14 dioxide would be dispersed throughout the troposphere. Some of it would remain in the air and some would mix into the oceans. The collective doses to the global population over 10,000 years (less than two half lives of carbon-14) would be high.

Using the parameter of 400 person-rem per curie of carbon-14 dioxide (used by the EPA Science Advisory Board in its estimates[21]) the cumulative dose over 10,000 years would be on the order of 7.4 million rem. The BEIR VII risk factor for cancer incidence is 1.1 cancers per 1,000 person-rem of population dose. This means that 7.4 million person-rem would lead to more than 8,000 cancers globally. This is a very tiny fractional increase in the cancer rate that would not be detectable by any known technique; nonetheless it is a cumulatively large absolute number due to the long-half life of carbon-14 (5,730 years) and the fact that carbon-14 dioxide is chemically identical to non-radioactive ordinary carbon dioxide and as such is taken up by plants for their growth. About half of these cancers – over 4,000 – can be expected to be fatal.

In addition, the lifetime cancer incidence risk from drinking water contaminated with carbon-14 to 1.3 million picocuries per liter to a resident farmer would be about 1 in 10. That is, about 10 percent of a population of resident farmers would get cancer from consuming the water on site over a lifetime, without even taking into account the non-cancer risks associated with the fact the carbon-14 became organically bound and part of the food chain if the water is used for irrigation. One of every two such cancers would be fatal. According to the scaling factors developed by Argonne National Laboratory for the Draft EIS, the dose (and hence risk) from carbon-14 would more than double when all other pathways, including food grown with contaminated water, are taken into account. Note that Argonne assumed that just half the food came from the site, instead of all of it.[22] Overall therefore, one in every five people living a quasi-resident farmer lifestyle. All together, the lifetime cancer incidence risk to a resident farmer from both drinking water and diet would be more than one in five – over 2,000 times higher than the maximum allowable cancer risk of 10^{-4} under CERCLA. It would be more than 1,000 times the maximum CERCLA risk if that risk is interpreted as fatal cancer risk and not cancer incidence risk. L293-198 (Cont.)

Finally, the Wigner energy stored in the graphite blocks could be released during handling, processing, and transport and cause a fire. This will require particular care regardless of the option chosen for disposal. But it causes a special problem for shallow land burial. Specifically, the low-level waste rule stipulates at 10 CFR 61.56(a)(6) that "[w]aste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable." The DOE has no proposed method to make the graphite nonflammable before disposal.

In sum, a number of scientific, regulatory, environmental, and health considerations lead to the conclusion that the disposal of Hanford graphite moderator blocks in shallow land facilities, including vaults and boreholes, would be inappropriate.. It is therefore reasonable and appropriate to consider the Hanford graphite moderator blocks as GTCC-like waste and to prepare them for deep geologic

[20] SAB 1993 p. 21 (where the dose is given as 0.01 mrem = 10 microrem).
[21] SAB 1993 p. 21
[22] Argonne National Laboratory, Environmental Science Division, *Post-Closure Performance Analysis of the Conceptual Disposal Facility Designs at the Sites Considered for the Greater-than-Class-C Environmental Impact Statement*, (ANL/EVS/R-10/8), ANL, October 2010, on the Web at http://www.gtcceis.anl.gov/documents/docs/ANL_EVS_R-10_8.pdf. See Appendix C, p. 150 and Table C-1.

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disposal where the fractional release of carbon-14 would be very small or even essentially zero if the site is well-selected.

4. The plutonium-containing waste that was buried as transuranic waste at the US Ecology commercial low-level waste site prior to 1970.

Prior to 1970 plutonium containing wastes were disposed of as low-level waste without particular regard to the specific activity of the transuranic alpha-emitting radionuclides in them. In 1970s the category of TRU waste was defined as that containing more than 10 nanocuries per gram of long-lived alpha-emitting radionuclides. The limit of 10 was raised to 100 in the 1980s.

One of the problems with US Ecology waste containing significant concentrations of transuranic radionuclides is that the batches of waste with concentrations more than 100 nanocuries per gram can no longer be segregated from those below that limit. Hence, one reasonable approach is to recover the entire TRU buried waste from the US Ecology site and treat is as TRU waste to be disposed of in a geologic repository. Since this is waste in a commercial site, it would then be an additional type of GTCC-like waste at least for the portion that was more than 100 nanocuries per gram. Since it is not now segregable, it should all be treated as TRU waste for recovery and deep geological disposal, especially since it will exacerbate the violation of drinking water limits and other ARARs at the site due to the other transuranic wastes disposed of on site in the early decades.

Specifically, the issue of transuranic contamination of the groundwater on the Central Plateau and in the longer term, the River Corridor, due to US Ecology operations, should not be seen in isolation from the other transuranic waste that the DOE treats as already disposed of or the plans of the DOE described in the Tank Closure and Waste Management Draft EIS (cited here as TC&WM Draft EIS). That EIS shows that the plutonium contamination from non-tank sources will contaminate water to greater than the drinking water limit far into the future. The drinking water limit for plutonium-239 is 15 picocuries per liter, in the absence of other alpha-emitting radionuclides such as radium-226 and americium-241. L293-198 (Cont.)

In the TC&WM Draft EIS, the DOE estimated that the peak concentration of plutonium in the River Corridor would occur in the year 2983 – that is more than eight centuries from the present; that level would be 4,250 picocuries per liter,[23] or more than 280 times the drinking water standard. The plutonium would be migrating from the Central Plateau, where the US Ecology site is located with its estimated 140 kilograms of plutonium.[24] In addition, other radionuclides like iodine-129 and strontium-90 would also exceed the drinking water limit for considerable periods.

These facts point to a very different remediation approach for Hanford than assuming buried plutonium contaminated wastes to be already disposed of and therefore requiring no further action. The designation of US Ecology plutonium wastes as transuranic wastes should be an integral part of the evaluation of a strategy that approaches the Hanford Site as one that would be released for unrestricted use after completion of remediation, with such use being defined so as to include and respect the Yakama Nation's treaty rights. We understand that the US Ecology site would eventually revert to the

[23] TC&WM Draft EIS v. 2, Appendix U, Table U-2.

[24] All alpha-emitting isotopes. Calculated from Table 2.0 of Department of Health, *Commercial Low-Level Waste Disposal Site, Richland, Washington: Final Environmental Impact Statement*, Volume I, (DOH Publication 320-031) Richland, WA, Washington State Department of Health and Department of Ecology, May 28, 2004, on the Web at http://www.doh.wa.gov/ehp/rp/waste/vol1.pdf. Hereafter referred to as DOH EIS 2004.

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State of Washington after operations are finished as per the procedure specified in 10 CFR 61. But this should provide all the more incentive to the State to negotiate an understanding with the DOE that transuranic wastes, broadly defined, at the US Ecology site would be recovered for disposal offsite as GTCC-like waste.

5. *Buried transuranic waste and plutonium containing waste in trenches and cribs at Hanford*

The DOE considers the pre-1970 waste, whether solid or liquid, discharged or buried at the Hanford Site to be permanently disposed of. Some of it, especially in liquid form, has migrated to the vadose zone and the DOE considers that it would be too difficult to retrieve it. However, this waste is, by DOE's own calculation, going to contribute to massive contamination of the groundwater at the site for centuries. While some parts of the problem are indeed difficult, this is a matter for determined research and development rather than resignation to a highly contaminated future that would violate Yakama Nation treaty rights, among other things.

The source term for pre-1970 buried and discharged plutonium-contaminated waste at Hanford is quite large. About 362 kilograms of solid waste containing plutonium was buried at Hanford, of which the DOE itself has classified about 343 kilograms as being contained in transuranic waste that has plutonium concentrations of more than 100 nanocuries per gram.[25]

Before 1970, liquid waste containing transuranic elements was directly dumped into the soil. According the Appendix S of the Draft Tank Closure EIS the amount of plutonium-239 and plutonium-240 is about 200 kg.[26]

All told, about 543 kilograms of plutonium in defense transuranic waste was disposed of prior to 1970 that should now be recognized (and in the case of 343 kilograms of plutonium in the pre-1970 solid waste is recognized) as TRU waste by the DOE. A critical question is: why does the DOE consider this waste as already disposed of without a serious assessment of the technology needed to recover it and dispose it of according to present law and regulation, which requires repository disposal for defense TRU waste? A second and related question is: why is the DOE recovering the TRU waste from Pit 9 at Idaho, given that (i) there is also a large amount at Hanford, which, moreover, appears to be migrating faster than that at Idaho, and (ii) that the Hanford waste is in much closer proximity to a critical surface water resource, the Columbia River?

L293-198 (Cont.)

[25] See Table 4-1 of W. O. Greenhalgh, *Pre-1970 Buried Transuranic Solid Waste at the Hanford Site.* (WHC-SD-WM-ES-325, Rev.0) Westinghouse Hanford Company, May 23, 1995, on the Web at http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/27/002/27002757.pdf. Note: this does not include post-1970 TRU waste or US Ecology TRU waste or TRU liquid discharges. Nineteen kg of the 362 kg total in buried plutonium was omitted because it was not identified as TRU waste in the data. Hence the total TRU solid and liquid pre-1970 waste TRU source term is (362-19)+200 = 543 kilograms.

[26] TC&WM Draft EIS, v. 2, Appendix S, total compiled from Tables S-35b to S-60b.

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Recommendation: The DOE should reissue a Draft GTCC EIS for public comment with the following source terms included:

1. Depleted uranium from enrichment plants
2. Recycled uranium, including the recycled uranium in the DOE complex and that generated from operations at West Valley
3. Hanford reactor graphite moderator blocks
4. The plutonium-containing waste that was buried as transuranic waste at the US Ecology commercial low-level waste site prior to 1970.
5. Buried transuranic waste and plutonium containing waste in trenches and cribs at Hanford
6. "Immobilized Low Activity Waste" resulting from the high-level waste processing and vitrification work planned at Hanford.
7. High-level waste tanks when they are removed from the Hanford Site after the waste is removed for vitrification.
8. Soil around the high-level waste tanks that contains high-level waste that leaked from dozens of the tanks over the decades.

D. Health and Environmental Impact

IEER carried out some verification calculations of radiation dose using the DOE's assumptions for a resident farmer 100 meters from the site. We did so using DOE's assumptions as well as more realistic assumptions for parameters relating to the site, using the same software, RESRAD-OFFSITE. IEER also performed some calculations for an onsite resident staying over the disposal site after a complete loss of institutional control and institutional memory. These calculations are shown in Appendix A. The analysis is summarized here in order to connect the analysis to the other comments and to provide a summary basis for the recommendations for a revised Draft EIS. Please refer to Appendix A for more details. L293-198 (Cont.)

1. DOE's scenario assumptions

The DOE has a number of assumptions that artificially make doses via all but the water pathway disappear and go down to zero. For instance, the DOE assumes an erosion rate of only 0.01 millimeters per year – just four-tenths of an inch in a thousand years. This means that the DOE is effectively assuming that the five-meter cover for the waste will remain functionally intact for hundreds of thousands of years – despite the rain, snow, run off, and winds. Further the DOE makes non-conservative assumptions about infiltration, and hence the amount of water that travels through the waste layer. And, in one of the most surprising and unrealistic of assumptions, the DOE assumes that infiltration of water from any place other than above the GTCC disposal site would be across clean soil so that all other infiltration would dilute water contamination. Given that the proposed Hanford disposal site is on the Central Plateau, at about the core zone boundary, this assumption shows a shocking disregard of the extensive contamination of the Central Plateau from past disposal practices such as discharges into trenches and cribs, and leaks of high-level wastes from the tanks over the decades. It is essential for the DOE to take existing contamination as well as contamination from its proposed cleanup and disposal activities in the core zone into account when estimating the water contamination for a resident farmer 100 meters from the GTCC disposal site.

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Assuming that a resident farmer will be at least 100 meters away from the GTCC disposal site boundary thousands of years into the future rests on the notion that the site boundary will be known in some way at that time. This implies some form of institutional control for thousands of years, which is completely unrealistic and contrary to scientific advice and understanding that has been given to the DOE, including by the National Academies. Specifically, the National Research Council has explicitly commented on this in regard to DOE cleanup plans. The same would apply to GTCC disposal. In a report on long-term management, the Council concluded as follows:

> The Committee on Remediation of Buried and Tank Wastes finds that much regarding DOE's intended reliance on long-term stewardship is at this point problematic....
> [...]
> Other things being equal, **contaminant reduction is preferred to contaminant isolation and imposition of stewardship measures whose risk of failure is high.**
> [...]
> *The committee believes that the working assumption of DOE planners must be that many contamination isolation barriers and stewardship measures at sites where wastes are left in place will eventually fail, and that much of our current knowledge of the long-term behavior of wastes in environmental media may eventually be proven wrong. Planning and implementation at these sites must proceed in ways that are cognizant of this potential fallibility and uncertainty.*[27]

The DOE has ignored this by assuming that a resident farmer will be at least 100 meters from the site in all scenarios. The DOE has not done even a single case that assumes a failure of controls and loss of institutional memory, thus dismissing the advice that it should assume that stewardship measures "will eventually fail." But, surprisingly, it implicitly claims that in adopting the 100-meter distance from the site boundary it is actually following this advice: L293-198 (Cont.)

> Under Alternatives 3 to 5, the long-term human health impacts are addressed by considering the future radiation dose and LCF risk to a hypothetical individual who resides 100 m (330 ft) from the edge of the disposal facility and develops a farm. This **resident farmer scenario is assumed to be conservative** (i.e., one that overestimates the expected dose and LCF risk) **because it assumes a total loss of institutional control and institutional memory with regard to the disposal facility** and because the radiation doses and LCF risks estimated to occur to this individual would likely never occur.[28]

This statement is internally contradictory. How can a person know to set up their home at least 100 meters from the disposal site in every case if there is a total loss not only of control but also of institutional memory? A total loss of control and memory requires an assumption that a future resident farmer or tribal member will actually live on the disposal site with their families, since they will have no way of knowing where the site boundary was located in the distant past. Therefore the DOE's claim that an assumption that a resident farmer will be at least 100 meters

[27] National Research Council, Board on Radioactive Waste Management, Commission on Geosciences, Environment, and Resources, *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites*, Washington, DC: National Academy Press, 2000, on the Web at http://www.nap.edu/catalog.php?record_id=9949, pp. 3 and 5. Original italics; bold added.
[28] Draft EIS v. 1, p. 2-15, emphasis added.

away is consistent with a complete loss of institutional control and memory is incorrect and scientifically unsupportable. Moreover, it is not conservative, as shown in Appendix A.

The DOE does not provide adequate technical justification for key parameter choices such as infiltration rate through the waste layer and the lifetime of the engineered barriers even though the former is rather low (resulting in lower dose estimates) and the latter, at 500 years, is rather high, also resulting in lower dose estimates than more realistic assumptions.

2. Verification of DOE's dose estimates for trench disposal method at the Hanford Site

The specific scenario that IEER tried to reproduce was the trench disposal method at Hanford with default parameters as used in the Draft EIS, which estimates a peak dose of 48 mrem/year; the largest component is Remote Handled (RH) Other Waste category, whose peak dose the DOE estimates at 39 mrem per year. The scenario is the DOE's base case with the resident farmer being 100 meters from the site using all the other assumptions as well, so far as they are specified in the Draft EIS.

Figure 1 shows the results of IEER's verification calculations using the DOE assumptions so far as we could determine them from the Draft EIS (see Appendix A for more details).

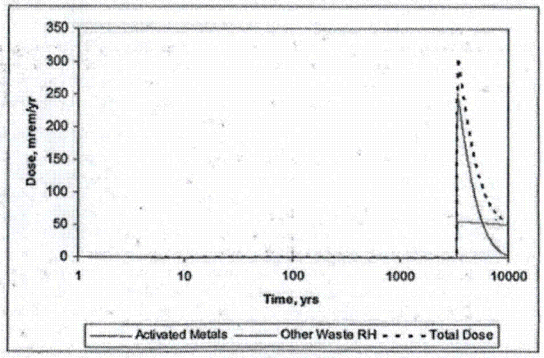

Figure 1: IEER's modeling results for trench disposal of GTCC and GTCC-like waste in a trench at Hanford

As can be seen from Figure 1, IEER's peak dose estimate using the DOE's parameters so far as they could be determined is about 300 millirem per year. The activated metals dose is about 50 millirem and the Other Waste - RH dose is about 250 millirem. The total peak dose is about six times the DOE's estimate of 48 millirem noted above. Figure 2 below shows the results of DOE's trench disposal modeling in more detail.

L293-198 (Cont.)

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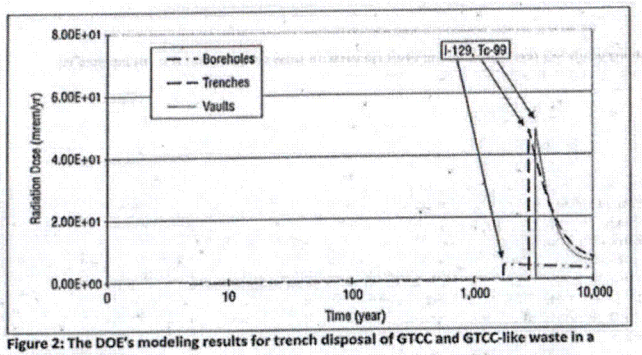

Figure 2: The DOE's modeling results for trench disposal of GTCC and GTCC-like waste in a trench at Hanford
Source: Figure 6.2.4-1 in Draft GTCC EIS (Volume 1)

Further, it should be noted that the vast majority of the dose results from iodine-129 and technetium-99. The water pathway is the only one considered (both direct use and indirect doses via agriculture) and those doses are dominated by I-129 and Tc-99. This is a critical result that has considerable implications for the total body effective dose equivalent used by the DOE to the exclusion of organ dose estimation. This is discussed below when the sensitivity analysis is considered. L293-198 (Cont.)

The most important conclusions from this verification exercise are:

- The DOE's peak dose estimates for the first 10,000 year period appear to be significant underestimates.[29]
- Both the DOE peak dose estimate and the IEER peak dose estimate are considerably higher than the allowable maximum limit under 10 CFR 61 Subpart C, the NRC's low-level waste dose limit, even for the non-conservative assumptions used in this scenario.[30] Hence, they indicate that trench disposal is unsuitable. Since the vault disposal doses are very similar (49 mrem/yr peak), that approach is also unsuitable.[31]

The reasons for the large differences in results are unclear. One reason may be that the DOE has not used the standard RESRAD-OFFSITE model but rather modified it in a three-step process

[29] On the other hand, the DOE's peak dose estimates for the period between 10,000 and 100,000 years are larger than those of IEER. See Appendix A.
[30] "Non-conservative" is used here in the sense that it does not adequately represent public health protection and that doses tend to be underestimates relative to realistic as well as conservative assumptions. "Conservative" would be designed to give a great deal of confidence that radiation doses and health impacts would likely be below those estimated.
[31] We comment on the borehole method below.

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for estimating non-drinking water doses; the reasons that the DOE used this estimation process are unclear to us. Further, the properties of the agricultural areas are not specified either in the Draft EIS or the key reference that the Draft EIS used for dose calculations. It is not possible to properly analyze and verify the DOE's calculations without key input parameters. Further, we have reasons to be skeptical, because much of the approach and several of DOE's assumptions are clearly non-conservative.

3. Sensitivity analysis

The DOE has done a very abnormal, unusual, and non-conservative sensitivity analysis. A normal sensitivity analysis varies the base case parameters on both sides – that is, in ways that would give an optimistic picture and a pessimistic picture in terms of health and environmental outcomes and reflect a realistic range for the possible variation in parameters in the future. A normal sensitivity analysis is also a useful way of exploring the possibility that key assumptions may be wrong in ways that might worsen the health outcomes. This is in keeping with the basic spirit of the National Research Council recommendation that it is important to understand what may occur in technical and institutional barriers fail in the long term and if key assumptions are wrong.

In contrast, the Draft EIS effectively treats the base case as the worst case in its sensitivity analysis even though it contains non-conservative and in some cases dubious and internally inconsistent assumptions. For instance, a normal sensitivity analysis would assume that a farmer might live closer to the site boundary than 100 meters or even within the site boundaries; it would also include a scenario in which a farmer lived farther away. The Draft EIS only considers that case in which a farmer would live farther away. Similarly, for the durability of performance (no infiltration for 500 years and durability of grout for 500 years), the DOE assumes that the performance quality will extend out much farther in time -2,000 to 5,000 years – but makes no provision for failure in a much shorter time. These assumptions not only did not conform to normal sensitivity analysis practice, they also fly in the face of available facts of barrier performance degradation. There are very large uncertainties with respect to the performance of grout, which can and has deteriorated rapidly under certain conditions. Experiments under adverse conditions of large surface to volume ratios done at Oak Ridge National Laboratory, for instance, showed a release fraction of strontium-90 from grout between 3.9% and over 50% in only 80 days.[32]

L293-198 (Cont.)

More details on Draft EIS approach to sensitivity analysis can be found in Appendix A.

IEER performed its own sensitivity analysis to test the effect of erosion (1 mm per year at the upper limit was assumed), climate, and other parameters, using variations both higher and lower than the base case. For instance, the infiltration rate was doubled from 20 to 40% and also halved to 10%. However, the resident farmer was still assumed to be 100 meters outside

[32] As discussed and cited in Brice Smith, *What the DOE Knows it Doesn't Know about Grout: Serious Doubts Remain About the Durability of Concrete Proposed to Immobilize High-Level Nuclear Waste in the Tank Farms at the Savannah River Site and other DOE Sites*, Institute for Energy and Environmental Research, Takoma Park, Maryland updated October 18, 2004, p. 3. On the web at http://www.ieer.org/reports/srs/grout.pdf. The conditions of the experiment would likely be more adverse than in subsurface disposal, but then 80 days is less than 0.1 percent of the time for which DOE assumes complete barrier integrity.

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the site, so some comparison would be possible when other technical parameters were varied. The results of the sensitivity analysis regarding distance from the site boundary to the well are shown in Figure 3.

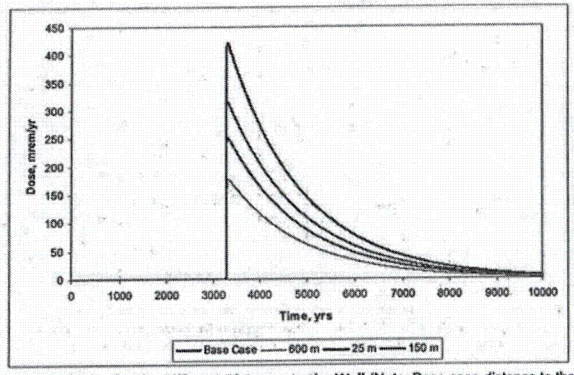

Figure 3: Total Dose for the Different Distances to the Well (Note: Base case distance to the well is 300 m, which is in between the case of very close (25 m) to the site boundary and 600 m).

It is clear that the variation of a single parameter increases the dose from the most important component of the waste in terms of peak dose (Other Waste - RH) from about 250 mrem/year to over 400 mrem per year.

When all parameters are varied the upper limit of dose increases by about a factor of four for total dose and by more than a factor of four for the Other Waste - RH category. See Figure 4 below and Appendix A for more details.

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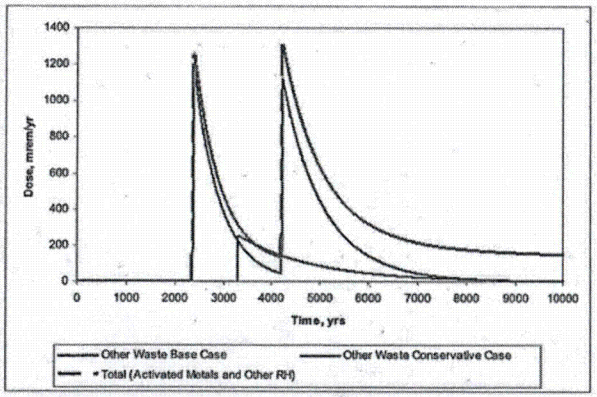

Figure 4: Base Case and Conservative Case for the Other Waste - RH category. (Note: The green line represents the total of activated metals and Other Waste - RH. The red line is Other Waste - RH alone)

L293-198 (Cont.)

Finally, a sensitivity test could be done by estimating organ dose in addition to whole body effective dose. 10 CFR 61 limits the dose to the most exposed organ or to the whole body to 25 mrem/year (except for 75 mrem to the thyroid). For instance, a total body effective dose of 20 millirem, under the limit, from iodine-129 translates into about 400 mrem/year to the thyroid, which would be an unacceptably high dose. It is essential that the revised Draft EIS consider organ as well as total body effective doses. This is because organ dose is essential to determining compliance with radiation protection regulations and with some CERCLA ARARs, such as drinking water standards.

4. Cover erosion scenario

The choice of an extremely low erosion rate in the Draft EIS rules out air and surface water doses, because there is a substantial cover on the waste in all the scenarios. A more conservative erosion rate of 1 mm/year is reasonable for a semi-arid area like Hanford and should be considered. IEER modeled this to evaluate the significant of cover erosion. It turns out that the erosion parameter is especially significant for Hanford and for the Yakama Nation.

An erosion rate of 1 mm/year results in the 5-meter thick trench cover being completely eroded in 5,000 years. Hence, at that point, rain and snow contact the waste, some of which gets washed off into surface water. This means that the dose from the aquatic food pathway is significantly increased. Figure 5 shows the results for the cover erosion scenario. The red line shows the dose from Other Waste RH and the green line shows the total dose. Note that even though the other parameters, such as infiltration have been maintained the same as in the base case IEER model, there is a second peak dose, after the cover erodes, of about 1,600 mrem/year at somewhat over 5,000 years after disposal;

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this is much greater than the first peak, which occurs due to groundwater use. The main reason for the higher second peak is the dose from consuming surface water and aquatic food from surface water sources.

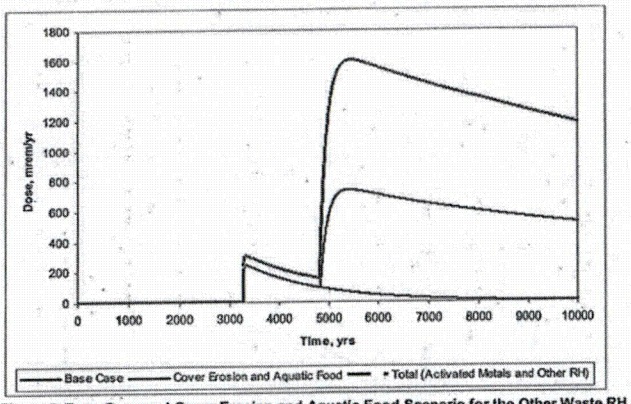

Figure 5. Base Case and Cover Erosion and Aquatic Food Scenario for the Other Waste RH Category (red line). The green line shows dose for the total source term (other waste plus activated metals)

L293-198 (Cont.)

Further, the major contributors to the second peak are the transuranic radionuclides Cm-245, Pu-239, and Pu-240. This is completely different from the Tc-99 and I-129 doses, which are important in the earlier peak.

It should also be noted that the aquatic pathways doses estimated here use the standard RESRAD parameters, which include only 5.4 kilograms of fish consumption per year. The Yakama scenario developed by the Yakama Nation and Ridolfi, Inc., has vastly different and higher fish consumption. At 150 grams per day on average, fish consumption in a traditional Yakama diet would be ten times higher than the RESRAD default value. Similarly other consumption parameters, such as meat and plants, are also different.[33]

5. Borehole disposal and the resident farmer scenario

IEER also tested the case of borehole disposal in several variations with a farmer living at the site boundary, using water that has passed next to the waste, but not over it, and finally using water that has passed through the waste. Infiltration rates were also varied. Figure 6 shows the results. The lowest peak dose was 177 mrem/year about 2,650 years in the future while the

[33] Ridolfi, Inc., *Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, Richland, Washington*, Yakama Nation ERWM Program, September 2007, Figure 8.

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case of using irrigation from the site had two peaks – one of 5,050 mrem/year 235 years in the future due to I-129 and Tc-99 and one at 6,431 mrem/year 372 years into the future due to uranium isotopes. For context, the Draft EIS's estimate of peak dose due to borehole disposal was just 4.8 mrem/year – 37 times lower than the lowest borehole estimate when institutional controls are relaxed and more than 1,300 times lower when there is total loss of institutional control and memory.

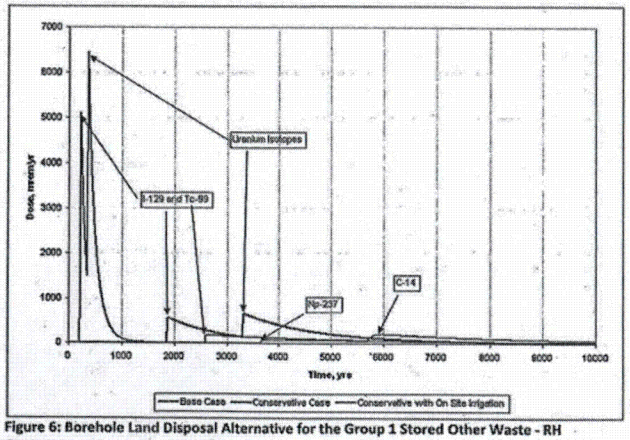

Figure 6: Borehole Land Disposal Alternative for the Group 1 Stored Other Waste - RH Category

Note that the highest dose in the irrigation scenario case is due to uranium – a strong reminder that large amounts of uranium are unsuitable for disposal even in boreholes as much as 40 m deep. So long as the disposal is relatively shallow and water is available beneath the disposal, the method is likely to be a problem from the point of view of a resident farmer and loss of institutional control.

5. Iodine-129 and Technetium-99 at Hanford

We appreciate that DOE acknowledges pre-existing contamination at Hanford by iodine-129 and technetium-99 and the difficulties that this entails for disposal of GTCC and GTCC-like waste at Hanford:

> A potential long-term impact from the GTCC proposed action would be the groundwater radionuclide concentrations that could result if the integrity of the facility did not remain intact in the distant future. The human health evaluation for the post-closure phase of the proposed action indicates that a dose of up to 48 mrem/yr (trench disposal

L293-198 (Cont.)

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method) or 49 mrem/yr (vault method) could be incurred by the hypothetical resident farmer assumed to be located 100 m (330 ft) from the edge of the disposal facility. It is estimated that the dose to the hypothetical receptor would be about 10 times lower if the borehole disposal method was used. These doses were calculated to occur about 1,800 years (borehole method), 3,300 years (vault method), and 2,900 years (trench method) after failure of the cover and engineered barriers, which are assumed to retain their integrity for 500 years following the closure of the disposal facility.

These doses would be primarily associated with GTCC-like RH waste, and the primary radionuclide contributors within 10,000 years would be Tc-99 and I-129. The Hanford TC&WM EIS (DOE 2009) cumulative estimates for Alternative Combination 1 indicate that the peak concentrations for Tc-99 and I-129 would be about 350,000 pCi/L [almost 400 times the drinking water limit] and 697 pCi/L [almost 700 times the drinking water limit], respectively, 2,000 to 3,000 years in the future. The GTCC EIS estimates of the peak concentrations for Tc-99 and I-129 corresponding to the highest dose given above (49 mrem/yr) are about 10,000 pCi/L and 100 pCi/L; these concentrations would occur at approximately the same time as the time reported in the Hanford TC&WM EIS. As stated in the Hanford TC&WM EIS (DOE 2009), when the impacts of technetium-99 from past leaks and cribs and trenches (ditches) are combined, DOE believes it may not be prudent to add significant additional technetium-99 to the existing environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of off-site waste streams containing iodine-129 or technetium-99 at Hanford. Finally, follow-on NEPA evaluations and documents prepared to support any further considerations of siting a new borehole, trench, or vault disposal facility at Hanford would provide more detailed analyses of site-specific issues, including cumulative impacts.[34]

L293-198 (Cont.)

This is an important acknowledgement that waste containing Tc-99 and I-129 should not be brought to Hanford. Yet it is far too limited in the following ways:

- It does not acknowledge that borehole disposal could result in high doses if institutional control is truly lost.
- It does not acknowledge that at 49 mrem/year total body effective dose equivalent, the drinking water limit would be exceeded by more than 100 times (combined Tc-99 and I-129).[35] By implication, even the borehole disposal dose of 4.8 mrem/year estimated by the DOE would violate the drinking water limit by more than 10 times, presuming the dose comes mainly from Tc-99 and I-129, as is true of the trench disposal case.
- It does not take other radionuclides into account. For instance, we showed above that with onsite irrigation, the peak borehole disposal dose would be from uranium and it would be more than 1,300 times the dose estimated for borehole disposal calculated for Hanford in the Draft EIS.
- It does not take into account the contamination of the site by a vast array of other radionuclides, like plutonium-239/240 and strontium-90, which would also greatly exceed standards far into the future, even though the peak doses may not coincide.

[34] Draft EIS v. 1, pp. 6-110 and 6-111

[35] The drinking water limit for Tc-99, when present alone, is 900 pCi/L and for I-129, when present alone is 1 pCi/L. hence, 10,000 pCi/L of Tc-99 is 11 times the drinking water limit and 100 pCi/L for I-129 is 100 times the limit. When both are present the limit is exceeded by 100+11 = 111 times.

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Coincidence of the peak dose is not the only important criterion. Indeed, when all radionuclides are taken into account, the overall timing of the peak dose might change.

- The above quote does not explicitly acknowledge that if GTCC-like wastes containing I-129 and Tc-99 are not brought to Hanford but other GTCC and GTCC-like wastes are, two disposal sites would have to be developed.

Recommendations

The present Draft EIS does not meet the minimum standards of transparency that would allow an independent verification of the DOE's estimates. Nor does it meet the minimum tests of estimating health and environmental impacts that would give credence to the results that claim that public health would be protected in the trench, vault, or borehole scenarios. It is also far too limited in considering a single geologic repository site, WIPP, that is limited by law to only defense transuranic waste. In other words, the Draft EIS does not meet the test of scientific integrity and a reasonable range of alternative as required by NEPA. The DOE should publish a revised Draft EIS with the following changes in the scenarios:

1. All base case scenarios should assume a complete loss of institutional control. Therefore all resident farmer and tribal scenarios should assume that there will be people residing on the disposal site rather than away from it. These residents would therefore use water from the site below the disposal layer for domestic, agricultural, and cultural purposes.
2. The revised Draft EIS should incorporate the fact of pre-existing contamination on DOE sites when it models disposal at such sites.
3. The revised Draft EIS should have at least one scenario in which the cover is completely eroded away (on the order of 1mm/year of erosion) in order to assess the effect of disposal on surface water and aquatic food contamination. Besides RESRAD default consumption, the Yakama lifestyle scenario should also be evaluated in this case.
4. The revised draft EIS should provide sound, scientific technical justification for key parameters such as the lifetime of grout and infiltration rate as well as possible future rainfall and climate variations. There has been ample work in these areas that is not reflected in the Draft EIS at present.
5. The revised Draft EIS should have a normal sensitivity analysis in which parameter variation results in dose estimates on both sides (higher and lower) of the base case.
6. A realistic assessment of the trench, vault, and borehole disposal options shows that the basic health protection and dose limits would be violated by large margins. These methods are unsuitable for disposal of GTCC and GTCC-like waste and should be explicitly rejected when the Draft EIS is revised. We understand that Congress is to have its say about a preferred alternative when the Final EIS is published. But that should not prevent the DOE from clearly pointing out that some methods of disposal violate existing regulations and in the case of DOE Superfund sites, ARARs, not to speak of tribal treaty rights.
7. The doses to a resident farmer are far higher when realistic scenarios about loss of institutional control and memory are evaluated (rather than the DOE's assumption of a permanent knowledge of the site boundary). The DOE should include an onsite farmer

L293-198 (Cont.)

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using irrigation water from the disposal site in its trench, vault, and borehole disposal scenarios.

8. The DOE's recognition that offsite wastes containing Tc-99 and I-129 should not be brought to Hanford for disposal should lead it to the conclusion that no GTCC or GTCC-like wastes should be brought to Hanford for a variety of reasons, including the need to develop more than one site if they are, the exacerbation of contamination at Hanford from other wastes that would be brought in, the need, in fact to remove existing wastes from Hanford in order to meet drinking water standards and other ARARs, etc.
9. The DOE should calculate organ as well as total body effective doses. This will enable an evaluation of the degree to which disposal methods comply with dose limits in existing regulations such as the drinking water standards (40 CFR 141.66) and the low-level waste rule (10 CFR 61 Subpart C).
10. The DOE should consider at least one deep geologic repository other than WIPP as one of the alternatives.

L293-198 (Cont.)

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Comments of the Institute for Energy and Environmental Research on the Department of Energy's *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* (DOE/EIS-0375-D), published in February 2011

8 JUNE 2011

APPENDIX A

ELENA KALININA

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Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

SECTION I

KEY POINTS IN THIS PRELIMINARY REVIEW OF THE POST-CLOSURE HUMAN HEALTH IMPACTS EVALUATION PRESENTED IN DRAFT GTCC EIS

The main goal of the preliminary review was to identify the key technical issues related to the post-closure human health impacts evaluation presented in the draft EIS. In addition to this review IEER has commissioned an independent RESRAD-OFFSITE modeling which was performed to provide more detailed evaluation of some of these issues. The results of this modeling are provided in a Section II of this Appendix.

The following materials were reviewed as a part of this work:

- Summary of the Draft GTCC EIS
- Chapter 3 of the Draft GTCC EIS (Alternative 1: No Action)
- Chapter 5 of the Draft GTCC EIS (Evaluation Elements Common to Alternatives 3, 4, and 5).
- Chapter 6 of the Draft GTCC EIS (Hanford Site: Affected Environment and Consequences of Alternatives 3, 4, and 5).
- Appendix E of the Draft GTCC EIS (Evaluation of Long-Term Human Health Impacts for the No Action Alternative and the Land Disposal Alternatives, specifically subsections on RESRAD-OFFSITE, Simulation Approaches, Inputs, Results, and Sensitivity Analysis)
- User's Manual for RESRAD-OFFSITE, Version 2
- ANL 2010, *Post-Closure Performance Analysis of the Conceptual Disposal Facility Designs at the Sites Considered for the Great-than-Class-C Environmental Impact Statement*, ANL/EVS/R-10/8. L293-199

Note that RESRAD-OFFSITE computer code was used in the Draft GTCC EIS to evaluate human health impacts related to all the land disposal alternatives. However, the assumptions, mathematical formulation, and numerical implementation related to this evaluation are not all explicitly described in the Draft GTCC EIS. Because of this, the RESRAD-OFFSITE user's manual that contains all this information was included in the review.

Key Technical Issues Related to the Post-Closure Human Health Impacts Evaluation for the Land Disposal Alternatives

The key issues identified during the preliminary review are considered below.

Infiltration Rate

The infiltration rate is one of the most important parameters affecting the long-term waste disposal performance. Even a very limited sensitivity analysis conducted in the draft EIS demonstrated that the peak total dose to the residential farmer is roughly proportional to the infiltration rate. Yet, the base case assumes that the infiltration through the waste will be 20% of the ambient infiltration rate during all the 10,000 year period. Also, the infiltration rate is constant and is equal to the present day ambient infiltration rate for both, 10,000 year period and 100,000 year period.

The justification provided in the draft EIS for assuming that the infiltration rate will be 20% of the ambient infiltration is "based on a study at the SRS that indicated that after 10,000 years, the closure cap at the F-area would still shed about 80% of the cumulative precipitation falling on it, with a higher degree of

L293-199 An analysis of this study presented by the Institute for Energy and Environmental Research on behalf of the Yakama Nation is outside the scope of the GTCC EIS.

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effectiveness occurring before 10,000 years (Phifer et al. 2007)."[35] This justification is not sufficient. As it is discussed below, the sensitivity analysis does not address this issue because it is limited in its applications.

Maintaining the present day infiltration rate constant for 10,000 years is not a conservative assumption. For instance, extensive long-term climate change studies were performed for the Yucca Mountain project. The following assumptions were made for the Yucca Mountain site:

The first climate stage is a continuation of current present-day climate conditions from present day to approximately 400 to 600 years into the future.

The second climate stage begins approximately 400 to 600 years from present day and is characterized as a monsoon climate with wetter summers relative to present-day climate. The monsoon climate is predicted to last between 900 to 1,400 years.

The third climate stage begins between 1,300 and 2,000 years from present day and is characterized as a glacial-transition climate with cooler air temperatures and on average higher annual precipitation relative to present-day climate. The duration of the glacial-transition climate is estimated to be 10,000 years. Similar assumptions should be applicable to the other sites, especially Hanford. Consequently, the infiltration rate for most of the 10,000 year period will be greater than the present-day infiltration rate. This consideration should be included in the human health impact analysis.

Human Intrusion

Direct physical intrusion, such as by a future inadvertent intruder into the disposal facility after the site closure, is not analyzed quantitatively in the draft EIS. Consequently, the human health analysis does not include the potential impacts from the inadvertent intrusion. Direct intrusion into the waste disposal units was qualitatively considered in Chapter 5.5 of the draft EIS. However, this qualitative approach is not sufficient for justifying exclusion of the inadvertent intruder scenario. L293-199 (Cont.)

Sensitivity Analysis

The human health impacts were evaluated deterministically for each land disposal alternative. The deterministic dose and risk values were calculated using RESRAD-OFFSITE computer code.

A simplified sensitivity analysis was performed to evaluate potential impacts from the uncertainty in the major parameters. "Three parameters were addressed in this sensitivity analysis: (1) the water infiltration rate through the disposal facility cover after 500 years following closure of the facility, (2) the effectiveness of the stabilizing agent (grout) used for Other Waste, and (3) the distance to the assumed hypothetical receptor. These three parameters address issues related to disposal facility design, waste form stability, and site selection."[37] Ten combinations (ten cases) of these parameters were considered.

The applicability of this sensitivity analysis is limited due to the reasons discussed below.

The sensitivity analysis considered a less conservative effective period for the grout (2,000 yrs and 5,000 yrs) than the one used in the base case (500 yrs).

[35] ANL 2010 p. 26
[37] ANL 2010 p. 154

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The sensitivity analysis considered a less conservative exposure distance to the resident farmer from the edge of the disposal facility (300 m and 500 m) that the one used in the base case (100 m).

Note, that a common practice is to consider more conservative parameter values in the sensitivity analysis than the ones used in the base case. This is because the major concern is how much worse, not how much better, it can get. This is especially important in this case because neither the grout effective period nor the distance to the resident farmer used in the base case represent the worst case scenario. 500 yrs for the grout performance and 100 m for the exposure distance are not conservative assumptions. It is not clear why a resident farmer location could not have been on the edge of the disposal facility. No data are provided in support of 500 year grout performance.

The sensitivity analysis considered only two sites. The SRS site represented a site in the Eastern United States (a humid site). The WIPP Vicinity site represented a site in the Western United States (an arid site). The WIPP Vicinity site does not represent the Western sites because the infiltration rate at this site is a few orders of magnitude lower than at the other western sites and as a result none of contaminants reach the groundwater table in either 10,000 or 100,000 years.

Only the trench disposal alternative was considered in the sensitivity analysis. The results do not necessarily apply to the other alternatives.

Very strong limitations are also imposed by considering only Other Waste CH (contact handled) type. As it was noted in the draft EIS "[b]ecause the radionuclide mix for each waste type (i.e., activated metals, sealed sources, and Other Waste) is different, the peak annual doses and LCF risks for each waste type do not necessarily occur at the same time. In addition, the peak annual doses and LCF risks for the entire GTCC waste inventory considered as a whole could be different from those for the individual waste types." (p. 5-66) L293-199 (Cont.)

Note that the doses associated with the Other Waste CH type are the smallest ones. Much higher doses and LCF risks result either from the Other Waste RH [remote handled] type or for the activated metals, depending on the land disposal alternative. It would make more sense to consider the Other Waste RH type in the sensitivity analysis because it is the major contributor to the doses and LCF risks in the case of the trench disposal.

The sensitivity analysis should have been considered for each site, for each land disposal alternative, and for each waste category and should have used the conservative parameters values in order to be applicable to the different conditions considered in the draft EIS.

As a result, the following statements made in the draft EIS needs additional justification: "The results of the sensitivity analysis for this waste type and disposal method at these two sites can be used to infer conclusions about different waste streams disposed of at other alternate sites by using the three land disposal methods. This analysis also gives some indication of the level of conservatism in the results, which is useful information for the decision-making process."(p. E-21)

Finally, the sensitivity analysis did not consider other parameters that might be of importance, such as radionuclide partition coefficients, irrigation rates, consumption factors, and other. These parameters were considered in IEER's independent modeling described in Section II of this Appendix. The radionuclide partition coefficients (K_ds) and consumption factors were found to be of a great importance to the land disposal performance as described in Section II of this Appendix.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

Infiltration along the Length of the Offsite Transport

The conceptual model used in the human health impact evaluation assumes that there is infiltration of clean water along the length of the offsite transport. The clean infiltration water dilutes the contaminant plume at the offsite locations and results in smaller doses and LCF risks, as noted in the draft EIS: "In addition, because of the extra dilution by clean water coming down from the ground surface, the potential radiation dose would also be lower than that in the Base Case." (p. E-22)

The impacts from assuming clean infiltration water are described in the draft EIS as: "The radiation dose incurred by the hypothetical resident farmer considered for post closure impact analyses would decrease with increasing exposure distance, as demonstrated by the results for the Base Case and Cases IX and X (see also Figure E-9). As mentioned before, this result would occur because additional dilution of radionuclide concentrations in groundwater would result from the additional transport distance toward the location of the off-site well. As the distance would increase from 100 m (330 ft) to 500 m (1,600 ft), the maximum annual radiation dose would decrease by more than 70%." (p. E-27) L293-199 (Cont.)

Note that this assumption is not adequate for this analysis because a significant portion of the offsite soils might be contaminated with the radionuclides deposited from contaminated irrigation water and from the surface runoff and dust originated from the contaminated site. Consequently, the infiltration water leaching through the contaminated offsite soils will be contaminated as well. RESRAD-OFFSITE only partially addresses this problem by considering the additional impacts from contaminated offsite soils. RESRAD-OFFSITE does not consider leaching of radionuclides from the contaminated offsite soils into the groundwater.

The exposure pathways associated with the use of contaminated groundwater implemented in RESRAD-OFFSITE are shown in Figure 1. The red arrow is added to the original figure presented in the draft EIS to demonstrate the missing link (irrigation recycling) between the contaminated offsite soil and the groundwater.

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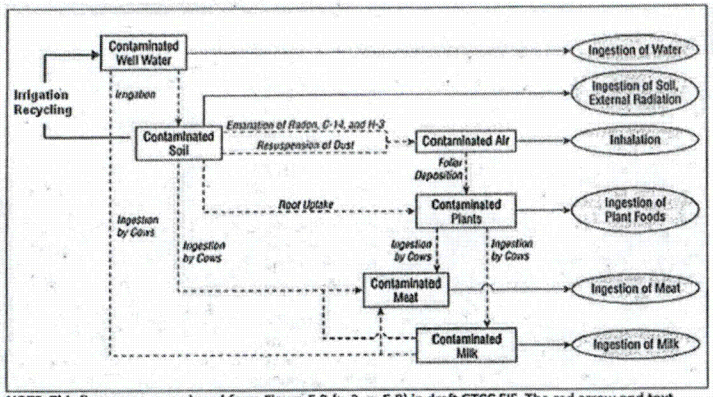

NOTE: This figure was reproduced from Figure E-2 (v. 2, p. E-9) in draft GTCC EIS. The red arrow and text box were added to the original figure.

Figure 1. Exposure Pathways Associated with the Use of Contaminated Groundwater

L293-199 (Cont.)

In summary, both the treatment of the offsite contaminated soils in RESRAD-OFFSITE and the assumption of clean infiltration water along the offsite transport made in the draft EIS, are not conservative and lead to underestimating potential doses and LCF risks.

Toxic Chemicals

The human health impact analysis presented in the draft EIS does not address potential toxic chemical releases from the wastes; it is limited to radioactive constituents only. The toxic chemicals have to be identified for each waste type and some analysis of the potential impacts associated with these chemicals should be performed and presented.

Exposure Distance

A hypothetical individual is assumed to move near the site and reside in a house located 100 m from the edge of the disposal facility. This location was selected "because it is the minimum distance identified in Manual DOE M 435.1-1 (DOE 1999a) for the location of the buffer zone surrounding a DOE LLRW disposal site at which compliance with dose standards needs to be demonstrated." (p. 5-63) On the other hand, it is stated in the draft EIS that "The resident farmer scenario is assumed to be conservative (i.e., one that overestimates the expected dose and LCF risk) because it assumes a total loss of institutional control and institutional memory with regard to the disposal facility." (p. 2-24) The two citations provided above are in contradiction with each other. The location of the residential farmer should not be limited to off site in the case of a total loss of institutional control and institutional memory.

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As it was demonstrated in the draft EIS and confirmed by IEER's independent modeling, the closer the exposure location, the higher the doses and LCF risks. Either a base case or a sensitivity analysis should have considered closer locations (immediately at the fence or even on site.

Engineered Barrier Performance

As it is described in the draft EIS "the engineering barriers incorporated in the disposal facility would keep percolating water out of the waste units for 500 years following closure of the disposal facility" and [a]fter 500 years, the integrity of the barriers and waste containers would begin to degrade, allowing for water infiltration into the top of the disposal units at 20% of the natural infiltration rate for the area." The same assumption is used for the grout: "A stabilizing agent (grout) would be used to solidify the Other Waste type, and this grout would maintain its effectiveness for 500 years." (p. E-20)

At the same time, it is pointed out in the draft EIS that the "[d]ata on the performance of waste packages and engineering barriers over an extended time period are limited. ... How and when the waste packages and engineering barriers would begin to degrade and how this degradation would progress over time are very difficult to determine." (p. 5-64)

No justification for the performance period of 500 years is provided in the draft EIS. Instead, even longer performance periods of 2,000 years and 5,000 years are considered in the sensitivity analysis.

As was concluded based on IEER's independent modeling results, the engineering barrier performance has little impact on the land disposal performance in the Hanford Site specific conditions. However, this may not be the case for the other sites. L293-199 (Cont.)

Human Health Impact Results for the 100,000 Year Period

The human health impact evaluation was extended to 100,000 years in the post-closure analysis for the Hanford Site. The results of this analysis demonstrated that a second peak dose (mostly associated with uranium isotopes) occurs around 21,000 years.

IEER's independent modeling demonstrated that the time of peak dose associated with uranium isotopes can occur significantly earlier (around 4,200 years) if uranium K_d is 0.06 mL/g in both unsaturated layers and the saturated zone and if the ambient infiltration rate is 5 mm/yr. The base case considered in the draft EIS assumed uranium K_d of 0.6 mL/g in the first unsaturated layer and saturated zone and uranium K_d of 0.06 mL/g in the second unsaturated layer. The base case ambient infiltration was 3.5 mm/yr. Both, lower K_d and higher ambient infiltration rate are plausible conditions and should have been considered in the draft EIS either in the base case or sensitivity analysis.

Cover Erosion and Aquatic Food Pathway

The base case scenario as implemented in the draft EIS assumes that the cover will not completely erode either in 10,000 or 100,000 years. The base case also does not consider aquatic food consumption. IEER's independent modeling demonstrated that if the cover erodes during the 10,000 year of simulation, it will result in a significant total dose mainly due to the aquatic food consumption. The major contributors to the total dose will be plutonium isotopes and curium-245 transported from the contaminated zone to the surface water body by the surface water.

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Justifications for excluding cover erosion and aquatic food pathway are not provided in the draft EIS.

Modeling Approach

The human impact analysis for all sites and all land disposal alternatives was conducted using RESRAD-OFFSITE computer code. Consequently, the assumptions incorporated in this code were inherited by this analysis.

RESRAD-OFFSITE does not allow for modeling of multiple contaminated zones with different release rates. As a result, each waste type was modeled separately using a simplified approach. In this approach, all the wastes included in the specific waste category type (i.e. GTCC Group 1 Projected Activated Metals category) were consolidated in the middle of the disposal facility. The area occupied by the wastes was calculated as the sum of the areas occupied by the disposal units required to store these wastes. The waste thickness was assumed to be equal to the thickness of the overall waste interval used in each disposal alternative. The waste was uniformly distributed within the volume defined by the waste area and waste thickness. A homogeneous waste cover was assumed at the top of the waste with the cover depth equal to the depth of the top of the waste interval used in each disposal alternative.

As a result, the conceptual representation used in the modeling is significantly simplified with regard to the conceptual design of a corresponding land disposal alternative as shown in the draft EIS. It does not account for the combined effects from the different contaminant plumes originating from the different waste sources either in time or in space.

Also, this simplified conceptualization results in the distance of 175 to 225 m (depending on the consolidated source area) between the down-gradient edge of the wastes and the facility fence. The groundwater well was assumed to be 100 m from the fence (275 to 325 m from the wastes) in the draft EIS. The additional distances to the well considered in the sensitivity analysis (Appendix E of the draft EIS) were 300 m and 500 m. According to the conceptual design, the actual distance to the fence can be 50 m for some contaminated sources. L293-199 (Cont.)

Key Technical Issues Related to the Post-Closure Human Health Impacts Evaluation for the No Action Alternative in Region IV

The long-term human health impacts for the No Action alternative were evaluated using a similar approach as the one used for the land disposal alternatives. It was assumed that all the wastes generated in a specific region will be stored in this region indefinitely. For the modeling purpose, each waste category was considered separately. The waste was consolidated in the center of the 300 m by 300 m disposal facility.

No Action alternative differs from the land disposal alternatives by the following assumptions. No Action alternative assumes that there are neither engineered barriers nor a cover and that the wastes are placed on the ground surface. The DOE No Action alternative does not include atmospheric transport; only the groundwater pathway is considered. The waste inventory represents only the inventory generated in the region considered, not the overall waste inventory. The other conceptual assumptions are the same as in the land disposal alternatives.

The main key technical issues associated with No Action alternative are described below with the focus on Region IV. Note that the key technical issues associated with the land disposal alternatives are also applicable to the No Action alternative because a similar modeling approach and conceptualization were used.

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Airborne Releases and Surface Water Runoff

Airborne releases and surface water runoff were excluded from the evaluation of the long-term human health impacts from the No Action alternative. Note that airborne release (gases and water vapor) was included in the evaluation of the land disposal alternatives even though the land disposal facilities provide better waste isolation than the No Action alternative.

The airborne pathway was excluded because "dispersion of any released radionuclides by the wind would greatly decrease the air concentrations." (p. 3-11) This justification is not sufficient for excluding the airborne releases.

The surface water runoff was excluded because "the storage sites would probably have berms or other engineered features to minimize water runoff from the site." (p. E-3) This contradicts the main assumption concerning the total loss of institutional control 100 years after the facility closure.

Both, airborne releases and surface water runoff have to be included in the analysis of the No Action alternative because the wastes are assumed to be stored on the ground surface without any engineered barriers and covers. It is especially important in this alternative because the wastes become available for release 100 years from the facility closure, which is significantly earlier than it was assumed in the land disposal alternatives (500 years after the closure).

Based on IEER's independent modeling analysis performed for the land disposal alternatives, the contaminant transport via surface water runoff might significantly contribute to the total dose. L293-199 (Cont.)

Infiltration Rate

The infiltration rate on the top of the wastes in the case of No Action alternative is equal to the ambient infiltration rate because there are no engineered barriers in place. This assumption makes the infiltration rate especially important.

The infiltration rate assumed for Region IV was 1 mm/yr. Note that it is 3.5 times lower than the ambient infiltration used for the Hanford Site (3.5 mm/yr). The mean annual present day infiltration rate estimated for the area above the proposed repository at the Yucca Mountain is 15 mm/yr. The mean annual infiltration rates estimated for the monsoon and glacial transition climate are 28 mm/yr and 29.3 mm/yr respectively. While there are some areas in Region IV with infiltration rates below 1 mm/yr (for example, some areas at the Nevada National Security Site(NNSS)), the infiltration of 1 mm/yr is not representative for many other areas in Region IV, including the Hanford Site.

Because the ambient infiltration rate used for Region IV analysis was very low, none of the radionuclides reached the groundwater table in 10,000 years. This resulted in 0 dose because the groundwater pathway was the only exposure considered: "it is estimated that there would be no groundwater dose within 10,000 years for a generic commercial facility located in Region IV because the radioactive contamination would not reach the groundwater table in 10,000 years as a result of the arid conditions at this location." (p. E-19)

Yet, this conclusion of zero dose does not even apply to a generic disposal facility if it is located at Hanford.

Human Health Impact Results for the 100,000 Year Period

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

The results of the human health impact evaluation for the period of 100,000 years for Region IV reported in the draft EIS indicate that uranium isotopes and plutonium-238 reach the groundwater well around 40,000 years (Figure 3.5-7 in draft EIS). The uranium isotopes were shown to reach the groundwater well in 21,000 years for the land disposal alternatives considered for Hanford. Note that radionuclide leaching rates are significantly slower in the land disposal alternatives because only 20% of the ambient infiltration is assumed to pass through the wastes. IEER's independent modeling of the trench disposal alternative demonstrated that the uranium isotopes may reach groundwater at Hanford in 4,200 years if a more conservative uranium partition coefficient and ambient infiltration rate are used. Consequently, under the No Action alternative, the breakthrough time might be even smaller. This raises another question regarding the applicability of the generic facility in Region IV No Action alternative results to the Hanford Site. L293-199 (Cont.)

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SECTION II

RESULTS OF RESRAD-OFFSITE MODELING OF THE TRENCH LAND DISPOSAL ALTERNATIVE FOR THE HANFORD SITE

This report presents the results of an independent modeling performed to simulate trench land disposal alternative at the Hanford Site. The first objective of this modeling was to supplement a very limited sensitivity analysis conducted as a part of the draft EIS. The second objective was to modify the conceptual assumptions and parameters used in EIS to better represent the Hanford specific site conditions. A modeling approach similar to the one used in the draft EIS was implemented. Using an identical approach would probably be more consistent. However, this was not an option due to the lack of the detailed information needed for this implementation either in the draft EIS or the supporting references.

As a first step in this study, a test base case RESRAD-OFFSITE model was developed in an attempt to reproduce the results reported in the draft EIS. This model represents an interpretation of the conceptual approach and data described in the draft EIS and ANL 2010. This base case model was then modified to conduct sensitivity study and to consider additional parameters and scenarios.

The major results discussed in the draft EIS are the estimated peak annual doses from the use of contaminated groundwater within 10,000 years of disposal. These results for the Hanford Site are presented in Table 6.2.4-2 of the draft EIS. The peak annual doses were estimated for each of the following conditions:

- Land disposal alternative: borehole, vault, and trench
- Waste group: Group 1 stored, Group 1 projected, and Group 2 projected
- Waste category: GTCC and GTCC-like
- Waste type: activated metals, sealed sources, other waste CH, and other waste RH

L293-199 (Cont.)

Because each combination was considered separately, there are 24 individual peak annual doses (3 waste groups x 2 waste categories x 4 waste types) for each land disposal alternative. The total dose versus time for each alternative was calculated as the sum of the individual dose histories and the peak total dose was derived based on this calculation. Note that because the peak times of the individual doses may be different from each other, the peak time of the total dose does not necessarily coincide with any individual peak time and the total peak dose may be smaller than the sum of the individual peak doses.

The total annual doses versus time for the borehole, vault, and trench disposal alternatives are presented in Figure 4-9 (ANL 2010) for the period of simulation of 10,000 yrs and in Figure 4-10 for the period of simulation of 100,000 years.

The results presented in the draft EIS indicate that the vault and trench land disposal alternatives are very similar with regard to the individual peak annual doses, total peak annual doses, and the peak total dose timing. The borehole land disposal alternative has significantly smaller estimated individual doses and total dose than the trench and vault alternatives. Based on these results, we concluded that considering trench land disposal alternative in the independent modeling would be sufficient to represent the case with the highest total dose.

Two cases were selected for modeling. The first case considers the GTCC-like other waste RH in Group 1 stored waste. This case has the DOE's highest peak dose estimate among all the other individual doses (48 mrem/yr). In the second case, the DOE considers the GTCC activated metals in Group 1 projected waste.

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The DOE estimates the second highest peak dose in this case (5 mrem/yr). All the other peak doses are significantly smaller (0 to 2.5 mrem/yr).[38]

Modeling Approach

Same simplified modeling approach was used for each case presented in Table 6.2.4-2 in the draft EIS. In this approach, all the wastes included in the specific case were consolidated in the middle of the disposal facility. The area occupied by the wastes was calculated as the sum of the areas occupied by the disposal units required to store these wastes. Table 5.1-3 in the draft EIS shows the number of the disposal units for each waste type. Table 4-2 in ANL 2010 shows the corresponding consolidated waste areas.

For example, 2.1 trenches are required to dispose of the GTCC-like other waste RH in Group 1 stored waste category (2,500 55-gallon drums). The trench horizontal dimensions are 3 m wide and 100 m long (Figure 1). Consequently, the consolidated waste area is 3m x 100m x 2trenches = 600 m^2. The contaminated area is assumed to be a square. The waste thickness was assumed to be equal to the thickness of the overall waste interval used in each disposal alternative. This thickness was equal to 5.6 m for the trench alternative. The waste was uniformly distributed within the volume defined by the waste area and waste thickness. A homogeneous waste cover was assumed at the top of the waste with the cover depth equal to the depth of the top of the waste interval used in each disposal alternative. This depth was equal to 5 m in the trench alternative.

As a result, the conceptual representation used in modeling is significantly simplified with regard to the conceptual design shown in Figures 1 and 2. It is not clear either from draft EIS or ANL 2010 whether the facility area was assumed to be a square as well or whether the actual proposed dimensions were used. For example, in the case of the trench alternative the facility is 550m by 330m. The same area can be represented with a square with the side of 426 m. The square shape was assumed in the independent modeling to be consistent with the square shape contaminated zone (Figure 3). L293-199 (Cont.)

This conceptualization results in the distance of 175 (source area 2,600 m^2) to 225 m (source area 0.1 m^2) between the down gradient edge of the wastes and the facility fence. The groundwater well was assumed to be 100 m from the fence (275 to 325 m from the wastes) in the draft EIS. The additional distances to the well considered in the sensitivity analysis (Appendix E of the draft EIS) were 300 m and 500 m. According to the conceptual design shown in Figure 1, the actual distance to the fence can be 50 m for some contaminated sources.

[38] Draft EIS, Vol. 1, Table 6.2.4.2, p. 6-87

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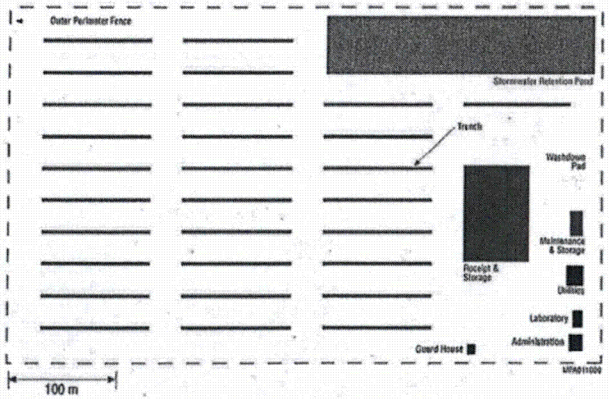

NOTE: This figure was reproduced from Figure D-12 in Draft GTCC EIS (Volume 2)

Figure 1. Layout of a Conceptual Trench Disposal Facility

L293-199 (Cont.)

The following assumptions were used in the modeling (as inferred from the draft EIS):

- All agricultural areas and the dwelling site are located outside the facility fence.
- The wastes are intact for 500 years while engineering barriers are in place.
- The water starts infiltrating onto the wastes at 500 years after the facility closure.
- The infiltration rate on the top of the wastes is 20% of the ambient infiltration rate during all the period of simulation (either 10,000 on 100,000 years).
- The ambient infiltration is equal to the present-day infiltration and remains constant during all period of simulation.
- The infiltration rate at the bottom of the waste is equal to the ambient infiltration rate.
- The cover does not erode to the top of the waste during all the period of simulation. Consequently, the contaminant transport via runoff from the contaminated source is not considered.
- The contaminants are released from the wastes to the groundwater based on the contaminant-specific leaching rates.
- Because the cover does not erode to the top of the wastes, the contaminant releases from the wastes to the atmosphere are considered only for gases formed by carbon-14, tritium, and radon.
- There is no surface water (pond) on the site and consumption of the contaminated fish is not considered.
- There is no irrigation within the facility. Only the agricultural areas outside of the facility fence are irrigated.
- Only 50% of the food comes from the contaminated areas.
- Farmer spends 50% of time indoors and 25% outdoors. The remaining 25% of time is spent outside of the contaminated areas.

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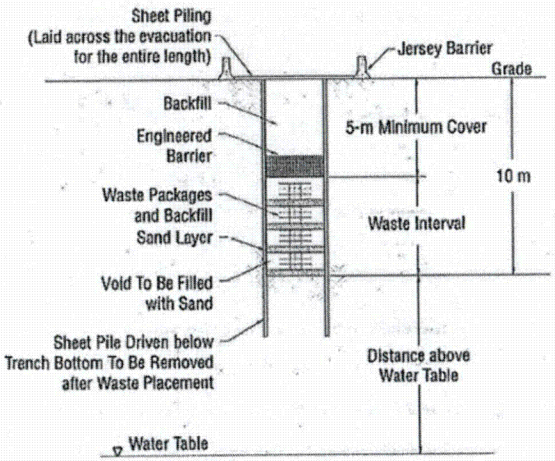
- The dose conversion factors are for an adult.



NOTE: This figure was reproduced from Figure D-1 in Draft GTCC EIS (Volume 2)

Figure 2. Cross Section of a Conceptual Trench Disposal Unit

L293-199 (Cont.)

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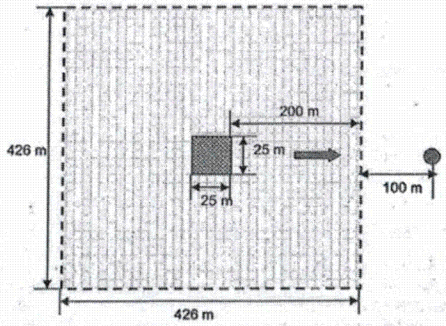
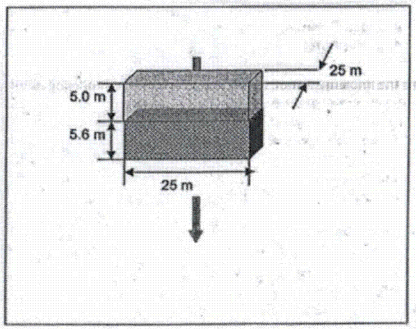


NOTE: The source dimensions corresponds to the GTCC-like other waste RH Group1 stored category. The facility dimensions corresponds to the trench disposal alternative.

Figure 3. Conceptual representation of the contaminated site used in RESRAD-OFFSITE modeling.

L293-199 (Cont.)



NOTE: The small blue arrow represents the infiltration into the waste (20% of ambient infiltration). The large blue arrow represents the ambient infiltration.

Figure 4. Conceptual representation of the contaminated zone used in RESRAD-OFFSITE modeling.

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The radionuclide–specific leaching rate r_i (or release fraction) was calculated as:

$$r_i = \frac{I}{\theta_{cz} B_0 R_{cz,i}} \qquad R_i = 1 + \frac{\rho_b K_{d,i}}{\theta_{cz}} \qquad (1)$$

where I is infiltration rate on the top of the wastes, B_0 is the initial thickness of the contaminated zone, and R_i is the radionuclide-specific retardation factor (equal to 1 for non sorbing radionuclides), ρ_b is the contaminated zone bulk density, θ_{cz} is the moisture content of the contaminated zone, and $K_{d,i}$ is the radionuclide-specific partition coefficient.

Note that Equation (1) is not provided either in draft EIS or ANL 2010. ANL 2010 provides radionuclide-specific release fractions for activated metals (Table 4-5), sealed sources (Table 4-8), and other waste (Table 4-11). Equation (1) is from RESRAD-ONSITE. It was used to check the release rates in ANL-2010. The same release rates were obtained with I=0.000 m/yr (20% of ambient infiltration rate of 0.0035 m/yr), ρ_b =1.8 g/cm^3, B_0 =5.6 m, θ_{cz} =0.2, and radionuclide-specific $K_{d,i}$ values for soil (same as the $K_{d,i}$ vales for the upper unsaturated zone layer in Table 4-17) and for cementitious system (Table E-1 in draft EIS). In the case of activated metals, all the release rates calculated using equation (1) greater than 1.19x10^{-5} 1/yr were substituted with the release rate of 1.19x10^{-5} 1/yr, which corresponds to the corrosion rate of metals.

As it follows from Equation (1), the release rates need to be recalculated if a different infiltration rate I, or different K_d values, or different contaminated zone parameters (bulk density, thickness, and moisture content) are used.

L293-199 (Cont.)

Two conditions regarding the modeling approach remain unclear due to the limited information presented in this regard in the draft EIS and ANL 2010.

The first condition concerns the implementation of release rates used for modeling other waste. It is stated in the ANL 2010 and draft EIS that the releases were simulated using the rates calculated based on the K_ds in cementitious system during the first 500 years (these are very small releases). After 500 years it was assumed that the cement degraded and the release rates based on the soil K_ds were used. This is not clears because RESRAD-OFFSITE uses constant with time release rates. Only one rate for each radionuclide can be specified. In the independent modeling, it was assumed that no release occurs during the first 500 years. The released rates in Table 4-8 based on soil K_ds (Table 4-17) were used after this time.

The second condition concerns the calculation of the total dose. As it is described in the ANL 2010, the total doses were calculated by following a three-step procedure." The first step of the procedure was to calculate the radiation dose from the drinking water pathway for individual radionuclides contained in the waste materials. In the second step, the radiation dose associated with the drinking water pathway was scaled to obtain the radiation dose associated with all the groundwater-related pathways. The all-pathway dose summed across all radionuclides contained in the waste material yielded the final dose results". "The scaling factor is the ratio of radiation dose associated with all groundwater-related pathways to the radiation dose associated with only the drinking water pathway". The scaling factors were developed for each radionuclide in Appendix C of ANL-2010. It is not clear why the three step procedure was necessary when RESRAD-OFFSITE is capable of calculating all the water related doses, including drinking water pathway in one run. All the applicable exposure pathways were considered together in the independent modeling instead of using a three-step approach.

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Modeling Parameters

A number of parameters are required for the modeling. Some of these parameters are included either in draft EIS or ANL 2010, some of them required additional calculations.

Initial Radionuclide Concentrations in Contaminated Zone

These initial concentrations are not provided in the draft EIS or ANL 2010. These concentrations were calculated as follows.

The radionuclide inventories were taken from Table B-5 for the case of GTCC-like other waste RH, group 1 stored category. The radionuclide inventories were taken from Table B-6 for the case of GTCC activated metals, group 1 projected category.

The first-order decay equation was used to calculate radionuclide inventories after 500 years during which the engineered barriers were assumed to be in place. For the sake of simplicity, the ingrowth was not accounted for.

The radionuclide concentrations were calculated based on this inventory, contaminated zone volume, and contaminated zone bulk density.

Radionuclide Release Rates and K_ds

These parameters were specified as described above.

L293-199 (Cont.)

Infiltration Rate

The infiltration rate is calculated internally in RESRAD-OFFSIE based on evaporation coefficient, runoff coefficient, irrigation rate, and precipitation. These coefficients were specified the same as in Table E-5 in the draft EIS to get an ambient infiltration rate of 0.0035 m/yr.

Cover Erosion Rate

The cover erosion rate is calculated internally in RESRAD-OFFSIE based on the rainfall and runoff factor, soil erodibility factor, slope length-steepness factor, crop/cover management factor, supporting practice factor, and soil bulk density. These coefficients were specified the same as in Table E-5 in the draft EIS to get an erosion rate of 1×10^{-5} m/yr (0.1 m eroded by the end of 10,000 year simulation period or 1 m eroded by the end of 100,000 year simulation period).

Unsaturated and Saturated Zone Properties

These properties were defined based on the data in Table E-5 in the draft EIS.

Agricultural Areas Properties

The properties of the agricultural areas are described in ANL 2010. However, the locations of these areas are not specified. It is only stated that they are outside of the facility fence. The grazing area and the pasture area are assumed to be 10,000 m^2 with irrigation rate of 0.1 m/yr. The fruit, grain, and non-leafy vegetables area and leafy vegetables area are assumed to be 1,000 m^2 with the irrigation rate of 0.2 m/yr.

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The data on the dwelling site area and irrigation rate are not provided. The dwelling site used in the independent modeling was set equal to 625 $m^2$and the irrigation was assumed to be 0.

Consumption Fractions

All consumption fraction were set equal to 0.5.

Occupancy Parameters

The occupancy parameters were specified in accordance with the once used in EIS: 50% of time spent indoors, 25% time spent outdoors, 0.05% time spent outside in each of the agricultural area and dwelling site.

Well Pumping Rate

Well pumping rate was set equal to 2,500 m^3/yr. If the user-specified pumping rate is smaller than the total water demand including drinking water, household water and irrigation, RESRAD changes the pumping rate to set it equal to the annual water demand.

The water demand as defined based on the parameters described in EIS is 2,678 m^3/yr. To get the pumping rate of 2,500 m^3/yr, the irrigation rate of the grazing and pasture areas in the independent modeling was set equal to 0.0907 m/yr to make the total water demand go down to 2,493 m^3/yr. It is not clear how this problem was managed in the EIS. L293-199 (Cont.)

Default Parameters

The default RESRAD-OFFSITE parameters were used for the radionuclide-specific transfer factors, air transport parameters, inhalation, life stock intake, plant factors, and ingestion rates (except drinking water intake of 730 L/d).

Surface Water Parameters

No surface water parameters are provided in EIS because these are only required if the aquatic foods pathway is used. This pathway was excluded from the calculations in EIS.

Site Layout

Site layout used in the independent modeling is shown in Figure 5. The surface water pond was defined because it was used in one of the runs. The location of the well is 300 m from the down gradient edge of the contaminated zone. This location corresponds to the base case. Other locations were considered in the sensitivity analysis.

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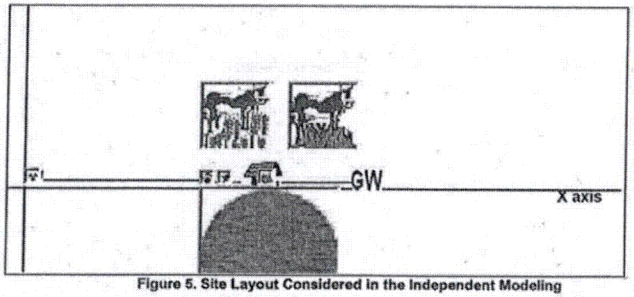

Figure 5. Site Layout Considered in the Independent Modeling

The cross section through the contaminated zone used in the independent modeling is shown in Figure 6.

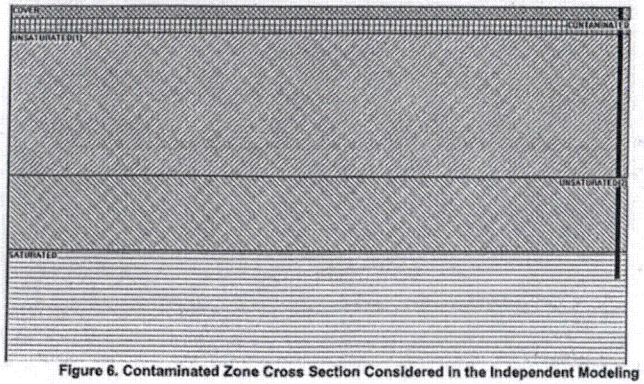

Figure 6. Contaminated Zone Cross Section Considered in the Independent Modeling

L293-199 (Cont.)

Base Case Test Runs

The base case was developed in an attempt to reproduce the results presented in the draft EIS (Table 6.24-2). Two cases were considered: (1) GTCC-like other waste RH, Group 1 stored category and (2) activated metals, Group 1 projected category.

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As it was discussed above, the intent was to use the same modeling approach and parameters as in the draft EIS. However, because not everything was clear about the approach and not all parameters were provided, some differences may exist between the independent modeling set up and the set up used in the draft EIS.

The results of the independent modeling are presented in Figures 7 and 8. The results from the draft EIS are reproduced in Figure 9 and 10.

L293-199 (Cont.)

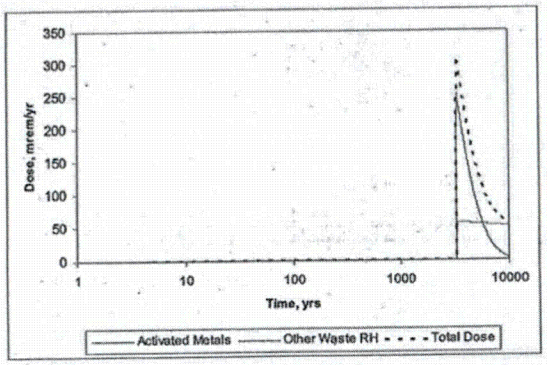


Figure 7. Base Case Independent Modeling Results for the 10,000 Year Simulation Period.

Yakama Nation Environmental Restoration Waste Management Program, Commenter ID No. L293 (cont'd)

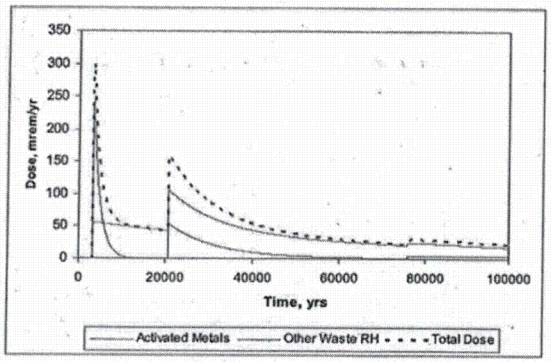
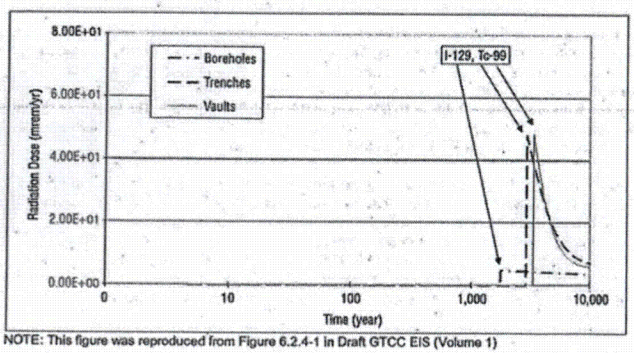


Figure 8. Base Case Independent Modeling Results for the 100,000 Year Simulation Period.

L293-199 (Cont.)



NOTE: This figure was reproduced from Figure 6.2.4-1 in Draft GTCC EIS (Volume 1)

Figure 9. Draft EIS Modeling Results for the 10,000 Year Simulation Period.

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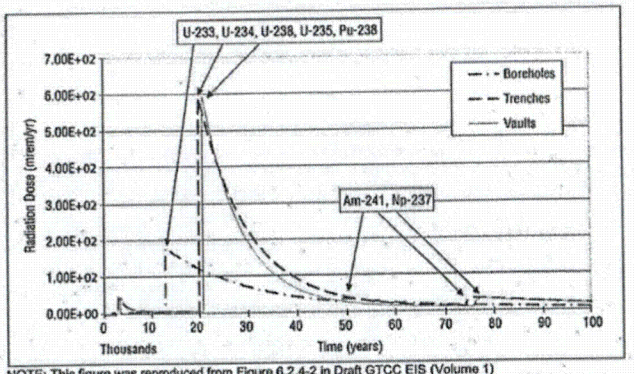

NOTE: This figure was reproduced from Figure 6.2.4-2 in Draft GTCC EIS (Volume 1)

Figure 10. Draft EIS Modeling Results for the 100,000 Year Simulation Period.

L293-199 (Cont.)

The peak doses during the 10,000 year period obtained in the independent modeling are 250 mrem/yr (other waste) and 56 mrem/yr (activated metals). The peak time is 3,300 years for both types of waste. This is because the dose is associated with non-sorbing radionuclides – I-129 and Tc-99 in the other waste case and Tc-99 in the activated metals case. All the other radionuclides have partition coefficient greater than 0 and do not reach the groundwater table in 10,000 years in this modeling approach. The total dose shown in Figures 7 and 8 represents the sum of the doses from two categories. The other categories have very small contributions based on the data in the draft EIS (Table 6.2.4-2).

The peak dose timing coincides with the peak time obtained in the draft EIS. However, the peak doses in the draft EIS are noticeably smaller – 39 mrem/yr in the case of other waste and 5 mrem/yr in the case of activated metals. The major contributors are the same – I-129 and Tc-99. The same peak dose timing suggests that the unsaturated and saturated zone transport parameters are the same in both models. The difference in doses may be related to the differences in the release rates and exposure parameters. However, this can only be established by comparing actual RESRAD-OFFSITE input files. As it was discussed above, an attempt was made to use the same parameters as in the draft EIS, but the actual input files are not available to us.

The peak doses during the period of time from 10,000 years to 100,000 years obtained in the independent modeling are 50 mrem/yr. (other waste) and 103 mrem/yr (activated metals). The peak time is 21,100 years for both types of waste. The major contributors to these doses are U-233 in the case of the other waste and U-233 and Tc-99 in the case of activated metals. Uranium has low K_ds values (0.6 mL/g in the 1st unsaturated layer and saturated zone and 0.06 mL/g in the 2nd unsaturated layer) and it reaches the groundwater table in 21,000 years. None of the other radionuclides reach the groundwater table within the 100,000 years.

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The peak dose timing during 10,000 to 100,000 year period coincides with the peak time obtained in the draft EIS. However, the total peak doses in the draft EIS is larger (600 mrem/yr). The major contributors are the same as in the independent modeling.

In summary, under the base case conditions assumed in the draft EIS for the Hanford Site the only two radionuclides that reach groundwater table within 10,000 year simulation period are I-129 and Tc-99. These are long-lived radionuclides with 0 K_ds and retardation factor of 1. The time of travel of these radionuclides to the well is around 3,300 years. Because the time of travel to the well is inversely proportional to the retardation factor, only the radionuclides with retardation factors smaller than 3 will reach the well in 10,000 years (~3,300x3). The retardation factor is smaller than 3 when a radionuclide K_d is smaller than 0.23 mL/g, assuming the waste specific bulk density and moisture content used in the draft EIS. Among all the radionuclides present in the wastes, the only radionuclide with K_d smaller than 0.23 mL/g is uranium. However, as it was discussed above, this K_d is only considered for the 2nd layer in the unsaturated zone. The uranium K_ds in the 1sr unsaturated layer and in the saturated zone are 0.6 mL/g. Uranium and neptunium isotopes reach the groundwater in about 21,000 years from the beginning of simulation. All the other radionuclides do not reach the well within 100.000 years. Because all the radionuclides that reach the groundwater well within either 10,000 years or 100,000 years are long-lived, the only effect of the engineered barriers under the Hanford specific conditions is in delaying the timing of the peak dose, the dose magnitude remains the same.

Sensitivity Analysis

The sensitivity analysis considered only the "other waste" category. The same conclusions should be applicable to the other waste category.

L293-199 (Cont.)

The following parameters were studied in the sensitivity analysis:

- Leaching rates (infiltration rate at the top of the wastes in the case of non sorbing contaminants)
- Ambient infiltration rate
- Irrigation rates at the agricultural areas
- Distance to the groundwater well
- Fraction of food from contaminated areas
- Well pumping rate
- Depth of aquifer contributing to pumping
- Uranium K_d

The parameters that had small impact on the peak dose (within the parameter ranges considered) were: irrigation rate of grazing area and pasture area, well pumping rate, and the depth of aquifer contributing to pumping. The other parameters have either noticeable or significant impact on the total doses.

Figure 11 shows the impacts from using 2 times higher and 2 times lower leaching rate for I-129 and Tc-99. Because I-129 and Tc-99 are non-sorbing radionuclides (with retardation factor of 1), this is the same as to change infiltration rate at the top of the waste (Equation 1). A two-times higher infiltration rate represents 40% of the ambient infiltration case and two times lower infiltration rate represents 10% ambient infiltration case. The maximum dose related to I-129 increases 2 times when 2 times higher infiltration rate is used. Same is true for Tc-99. The increase in the total dose is smaller than 2 times because only one leaching rate was varied at the time (either I-129 or Tc-99).

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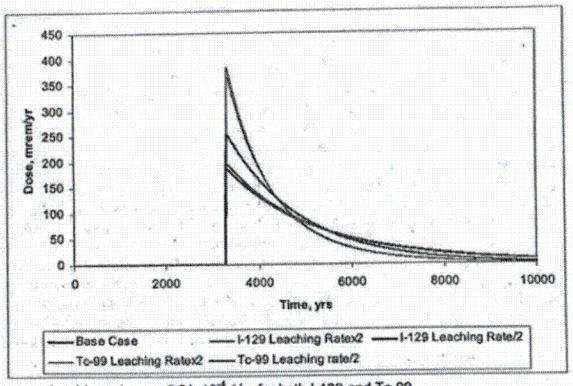
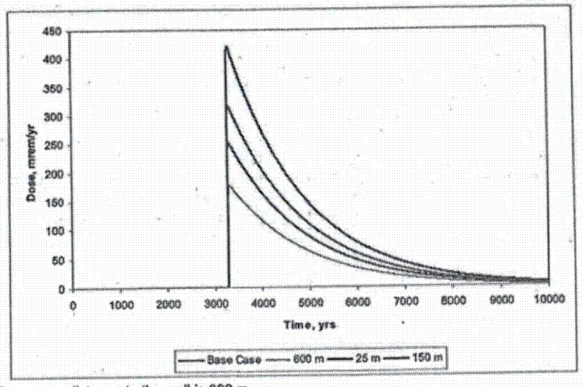


NOTE: Base case leaching rates are 6.31×10^{-4} 1/yr for both I-129 and Tc-99.

Figure 11. Total Dose for the Different Leaching Rates

The impacts from the different distances to the groundwater well are shown in Figure 12. The dose increases 1.5 times due when the distance to the well is 2 times smaller and decreases 1.5 when it is 2 times greater. L293-199 (Cont.)



NOTE: Base case distance to the well is 300 m.

Figure 12. Total Dose for the Different Distances to the Well

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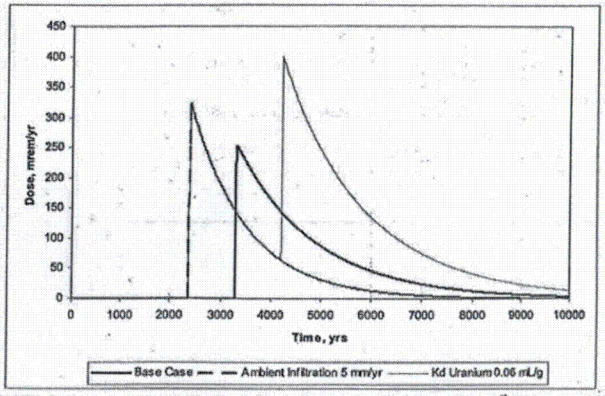
Figure 13 shows the impacts from the different ambient infiltration rates. When the ambient infiltration rate is 5 mm/yr, the peak dose is higher and it occurs about 1,000 years earlier. The peak dose is higher because the radionuclide release rates are higher (20% of 5 mm/yr instead of 20% of 3.5 mm/yr as in the base case). The peak occurs earlier because the travel time is faster under the higher infiltration conditions.

Note that the uranium isotopes do not reach the water table within the 10,000 year period in the base case. This is also true for the case with ambient infiltration of 5 mm/yr. Note that the uranium K_d s were set equal to 0.6 mL/g in the 1st layer of the unsaturated zone and in the saturated zone and to 0.06 mL/g in the 2nd layer of the unsaturated zone. The red line in Figure 13 shows the case with the ambient infiltration of 5 mm/yr in which uranium isotopes were assigned K_d of 0.06 mL/g in the unsaturated and saturated zone. In this situation uranium isotopes reach the groundwater table within 10,000 years and result in the second peak around 4,200 years.

Figure 14 shows the impacts due to the different consumption fractions. When 100% of food comes from contaminated areas (2 times more than in the base case), the total dose increases 1.6 times.

L293-199 (Cont.)



NOTE: Base case ambient infiltration is 3.5 mm/yr, uranium K_d is 0.6 mL/g in 1st UZ layer and SZ

Figure 13. Total Dose for the Different Ambient Infiltration Rates and Uranium Partition Coefficients

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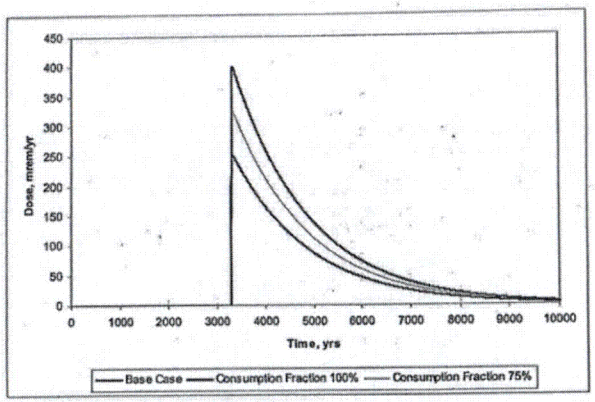
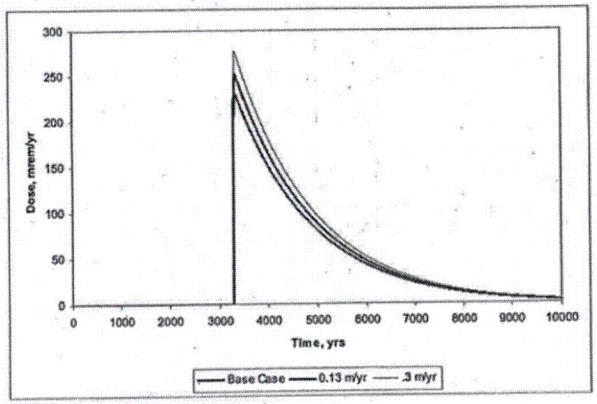


NOTE: Base case consumption fraction is 0.5.

Figure 14. Total Dose for the Different Consumption Fractions

Figure 15 shows the impacts from the irrigation rate of the fruit, grain, and non-leafy vegetables. The impacts are smaller than in the previous cases, but still noticeable. L293-199 (Cont.)



NOTE: Base case irrigation rate is 0.2 m/yr

Figure 15. Total Dose for the Different Irrigation Rates of Fruits, Grains and Non-Leafy Vegetables.

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A conservative case was developed to demonstrate the potential impacts from all the sensitive parameters on the total dose both for the other RH waste and for the activated metals categories. The conservative case uses the ambient infiltration of 5 mm/yr. 40% of the infiltration is assumed at the top of the waste. Uranium K_d is 0.06 mL/g in both, unsaturated and saturated zones. Irrigation rate of the fruits, grains, and non-leafy vegetables is 0.3 m/yr. The fraction of food from contaminated areas is 75%. The distance to the well is 200 m (next to the fence). Note that some of these parameters are below the potential maximum values.

Figure 16 compares the base case to the conservative case for the other waste RH category. Figure 17 compares the base case to the conservative case for the activated metals category. The total dose (activated metal and other waste RH) is plotted in both figures as well. In both cases, the peak doses in conservative case are more than 4 times higher.

L293-199 (Cont.)

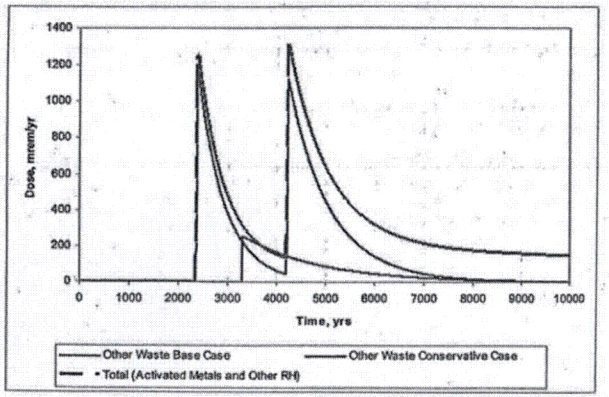

Figure 16. Base Case and Conservative Case for the Other Waste RH Category

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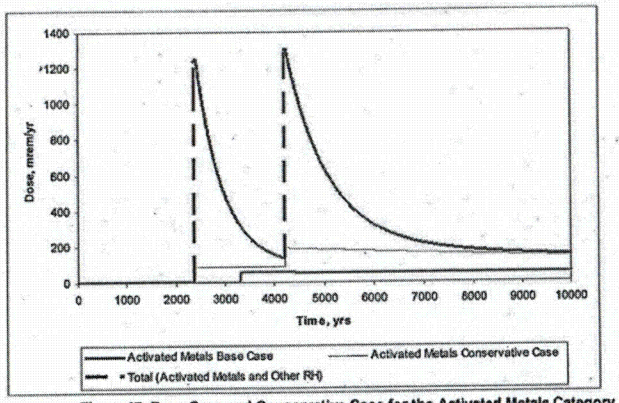

Figure 17. Base Case and Conservative Case for the Activated Metals Category

L293-199 (Cont.)

The contributions of the major exposure pathways for the base case and the conservative case for the other waste RH category are shown in Figures 18 and 19.

In both cases, the major contributors are drinking water ingestion and plant food (contaminated with irrigated water) pathways. Ingestion of milk and meat plays less significant role. The significance of drinking water and plant food changes with time as shown in Figure 19 when uranium isotopes reach the groundwater well around the simulation year 4,200.

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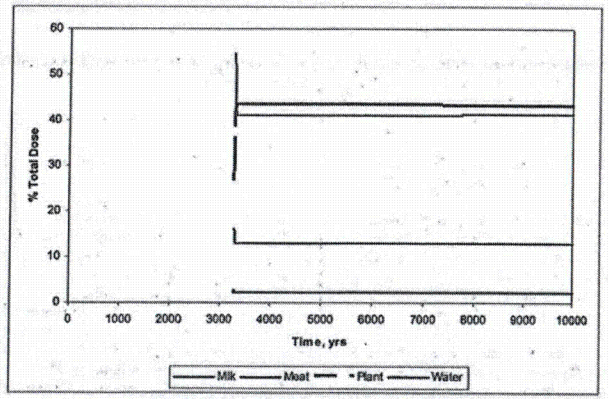

Figure 18. Major Pathway Contributions for the Base Case

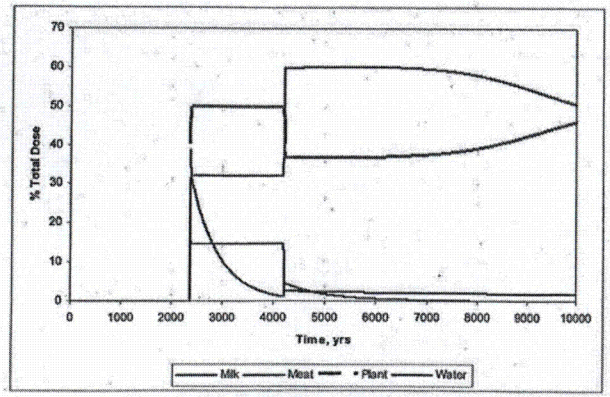

Figure 19. Major Pathway Contributions for the Conservative Case

L293-199 (Cont.)

The conservative case was developed as a demonstration that reasonably conservative parameters below the potential upper bounds still result in a large increase in estimated dose. We note specifically that Figure 16 to 19 show that the drinking water dose in the base case, using DOE parameters, is on the order

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of 100 mrem per year at the peak, with a similar dose from plants. In the sensitivity test, the peak drinking water is about seven times higher, at about 700 mrem/year, and the plant peak dose is about six times higher at about 600 mrem/year. The peak drinking water and plant doses occur at different times. Nonetheless, the total peak dose in the conservative case developed above is almost six times higher than the base case estimate, which uses the parameters selected by the DOE.

Additional Scenario

An additional scenario was developed to evaluate the significance of the cover erosion and aquatic food consumption that were not addressed in the base case.

As it was discussed earlier (under the modeling parameters), the cover erosion rate is calculated internally in RESRAD-OFFSITE based on the rainfall and runoff factor, soil erodibility factor, slope length-steepness factor, crop/cover management factor, supporting practice factor, and soil bulk density. These coefficients were specified the same as in Table E-5 in the draft EIS. The only exception was the crop/cover management factor that was adjusted to get the cover erosion rate of $1x10^{-3}$ m/yr, compared to an erosion rate of 10^{-5} m/yr used by DOE. This erosion rate results in the total cover disappearance in 5,000 years.

The aquatic food pathway was activated with the default RESRAD-OFFSITE parameters.
The other modeling parameters were the same as in the base case, except the default runoff coefficient of 0.2 was used. The evaporation coefficient was adjusted accordingly to maintain the ambient infiltration rate of 3.5 mm/yr.

The results of this scenario are shown in Figures 20 and 21 for the other waste RH category and activated metals category respectively. The total dose (the sum of activated metals and other waste RH doses) are also plotted in these figures.

L293-199 (Cont.)

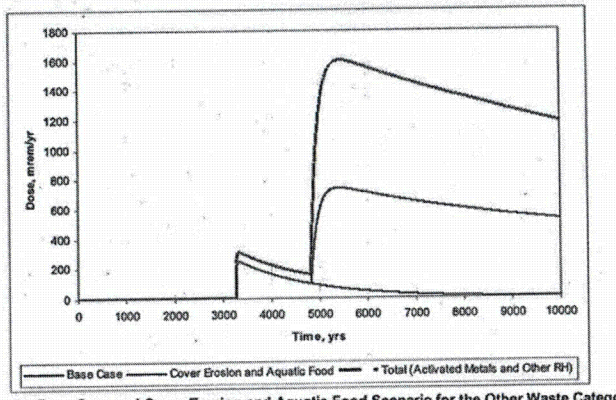

Figure 20. Base Case and Cover Erosion and Aquatic Food Scenario for the Other Waste Category (red line). The green line shows dose for the total source term (other waste plus activated metals)

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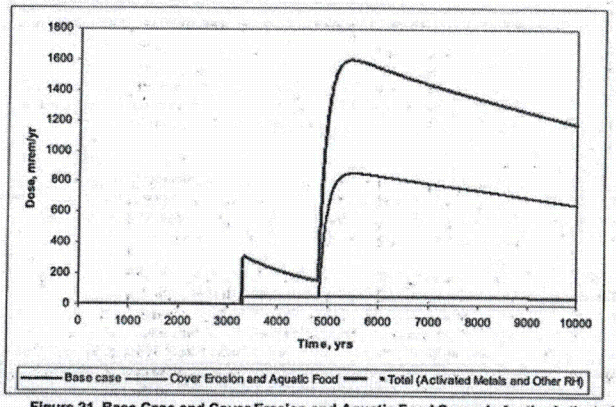

Figure 21. Base Case and Cover Erosion and Aquatic Food Scenario for the Activated Metals Category (red line). The green line shows dose for the total source term (other waste plus activated metals)

L293-199 (Cont.)

As can be seen from these figures, the cover erosion and aquatic food scenario significantly affects the total dose. In both cases, there is a second dose peak, which is 6.5 times higher than the 1st peak. The differences begin to surface when the cover starts to disappear (around year 5,000). At this moment the waste becomes exposed at the surface and is a subject of the surface water transport. The major contributors to the second peak are Cm-245, Pu-239, and Pu-240. The major pathway is the aquatic pathway.

Summary

One of the goals of this report was to attempt to reproduce the major results for the Hanford Site reported by DOE in the draft EIS. Two cases for the trench land disposal alternatives with the highest peak doses (Group 1 GTCC-like Stored Other Waste RH and Group 1 Projected GTCC Activated Metals) were selected for this purpose. An extensive review of the draft EIS and its major supporting reference (ANL 2010) was conducted to identify all the data required to do the simulations with the RESRAD-OFFSITE computer code and to clarify the modeling approach used in the draft EIS. Not all the data were found in these two documents and some of the statements in the draft EIS made regarding the modeling approach remain unclear.

The peak doses calculated for the selected two cases are different (higher for the peak dose within the 10,000 year period and lower for the peak dose within 10,000 to 100,000 year period) than the once estimated in the draft EIS. The major contributors and the timing of the peak doses are very similar to the ones in the draft EIS. The only way to resolve these differences would be to directly compare the RESRAD-

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OFFSITE input files used in the draft EIS for these 2 cases with the input files developed as a part of this independent modeling.

Under the base case conditions assumed in the draft EIS for the Hanford Site the only radionuclides that reach the groundwater well within 10,000 years are I-129 and Tc-99, which are non-sorbing radionuclides with K_d equal to 0 (retardation factor equal to 1). The only radionuclides that reach the groundwater well within 100,000 years are isotopes of uranium and Np-237 with relatively low K_ds (retardation factor ranging from 1.5 to 23.5). Because these radionuclides are long-lived, the only effect of the engineered barriers under the Hanford specific conditions is in delaying the timing of the peak dose, the dose magnitude remains the same.

Another goal of this work was to conduct a sensitivity analysis in addition to the one included in the draft EIS. A number of parameters was considered in this additional study. The parameters that had small impact on the peak dose (within the parameter ranges considered) were: irrigation rate of grazing area and pasture area, well pumping rate, and the depth of aquifer contributing to pumping.

The infiltration rate and partition coefficients (K_ds) have the highest impact on the total dose. The radionuclide-specific dose is directly proportional to the ratio of the infiltration on the top of the waste and radionuclide specific retardation factor. The peak total dose within 10,00 year period is directly proportional to the infiltration rate on the top of the waste because in Hanford specific conditions the only contributors to the total dose during this period are non-sorbing radionuclides (I-129 and Tc-99). Because the infiltration on the top of the waste is defined as a percentage (20% in the base case considered in the draft EIS) of the ambient infiltration, the ambient infiltration has great impacts on the total dose as well. L293-199 (Cont.)

The other parameters that have pronounced impacts on the total dose are: distance to the well; irrigation rate of fruits, grains, and non-leafy vegetables; and consumption fraction. Using more conservative than in the base case values for the sensitive parameters result in 5 time increase in the peak total dose.

Finally, one additional scenario was developed to evaluate the significance of the cover erosion and aquatic food consumption that were not addressed in the base case considered in the draft EIS. The cover erosion resulted in the surface water transport of highly sorbing radionuclides that were immobile in the base case scenario. These radionuclides (Cm-245, Pu-239, and Pu-240) were accumulated in the surface water body and resulted in the high total dose within the 10,000 year period related to the aquatic food consumption.

Conclusions

The ambient infiltration rate and the percentage of the ambient infiltration rate applied to the waste top are the most important parameters affecting the performance of all land disposal alternatives. These parameters should be re-evaluated for the Hanford Site. The possibility of a colder and wetter future climate should be considered when defining the ambient infiltration as well as a possible irrigation within the facility limits. A better justification should be provided for using 20% of ambient infiltration rate at the top of the waste.

The radionuclide partition coefficients (and corresponding retardation factors) are the other parameters of a great importance. These parameters were not studied in the sensitivity analysis included in the draft EIS. For the Hanford specific conditions, the partition coefficients of uranium and neptunium are of major concern.

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The consumption fraction of 0.5 used in the draft EIS needs to be justified. The higher consumption fraction leads to a higher total dose because the food injection contributes 50% or more to the total dose.

The distance from the down-gradient edge of the waste to the facility fence used in the draft EIS was from 175 to 225 m. The well was placed 100 m from the fence. This translates in to the distance to the well of 275 to 325 m. Using of this distance needs to be justified. The actual facility design may result in the distance to the well as small as 50 m if located just outside of the facility fence. The closer location will result in a higher dose. L293-199 (Cont.)

The base case scenario should consider cover erosion and aquatic food pathway because they may greatly affect the land disposal performance.

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SECTION III

DEEP BOREHOLE LAND DISPOSAL ALTERNATIVE

The same approach that was used for simulating the trench land disposal alternative was implemented to simulate the deep borehole alternative. The GTCC-like Group 1 Stored Other Waste RH was considered in the simulation for the same reasons it was used in the trench simulations.

The radionuclide inventory at the beginning of simulation is the same as in the trench case. The radionuclide concentrations are different because the consolidated waste area and waste thickness are different for the borehole alternative – 270 m^2 and 10 m respectively (Table 4-2 in ANL 2010).

The radionuclide release rates in the borehole alternative are different from the trench one due to the different waste thickness (Equation 1). The values from Table 4-7 in ANL 2010 were used.

The thickness of the first unsaturated layer is 20 m smaller in the borehole alternative than in the trench alternative because the borehole waste interval is deeper.

The other parameters were kept the same as in the trench base case with the exception of the well which was placed on the down gradient edge of the waste. A different layout was used for agricultural areas and dwelling site, but their layout does not affect the contaminant concentrations in the well.

Three cases were considered. The first case is called Base Case. This case corresponds to the trench base case, but with the well next to the waste instead of 100 m away from the facility boundary. L293-199 (Cont.)

The second case uses the more conservative ambient infiltration of 5 mm/yr (instead of 3.5 mm/yr) and more conservative percentage of infiltration applied at the waste top (40% instead of 20%). Also, the uranium isotope K_ds are assumed to be 0.06 mL/g in both, unsaturated layers and in the saturated zone. The ingestion fraction is 0.75 for all food types.

The third case uses the same parameters as the second case, except it assumes the irrigation of 0.2 m/yr on the top of the contaminated zone. The irrigation is incorporated by increasing the ambient infiltration rate to 50 mm/yr.

The results of these simulations are shown in Figure 22. The peak dose in the base case is 177 mrem/yr at 2,650 years and it is related to I-129 and Tc-99. The other radionuclides do not reach the ground water well in 10,000 years.

There are two total dose peaks in the second case. The first peak at 1,939 years (550 mrem/yr) is related to I-129 and Tc-99 and the second peak at 3,400 years (647 mrem/yr) is related mainly to the uranium isotopes.

There are 4 peaks in the third case. The first peak at 235 years (5,050 mrem/yr) is related to I-129 and Tc-99. The second peak at 372 years (6,431 mrem/yr) is related mainly to uranium isotopes. The third peak at 3,707 years (62 mrem/yr) is related to Np-237. The fourth peak at 5,897 years (195 mrem/yr) is related to Np-237.

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Note that the infiltration rate and radionuclide specific partition coefficient have the greatest impacts on the total dose. The distance to the well is of less importance because the radionuclide transport in the saturated zone is significantly faster than in the unsaturated zone.

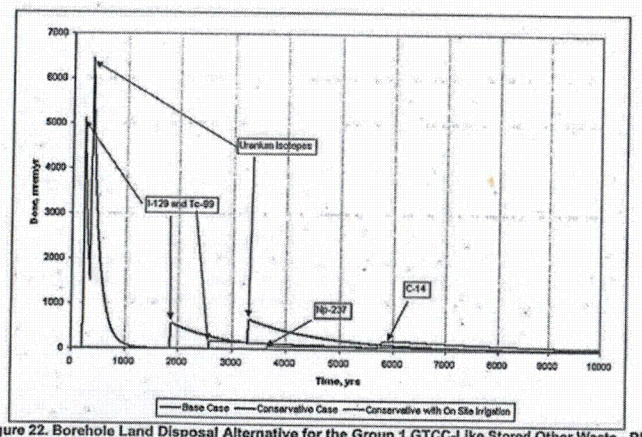

Figure 22. Borehole Land Disposal Alternative for the Group 1 GTCC-Like Stored Other Waste - RH Category

L293-199 (Cont.)