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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 26, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

FROM: Dan Burnfield

COPIES: Board Members

SUBJECT: Draft Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Environmental Impact Statement (DEIS) DNFSB Staff Comments

1. **Purpose:** This report provides comment on the subject document in response to Department of Energy letter to the Board dated June 24, 1994, providing the DEIS to the Board and requesting comments pursuant to 40 CFR 1503.2. Staff reviewers were D. Burnfield, M. Helfrich, S. Stokes, J. Preston, J. McConnell, D. Owen, D. Ogg, M. Merritt and Mark Sautman.

2. **Summary:**

   a. The Draft Environmental Impact Statement (DEIS) was prepared and issued for comment in June 1994. The Board was sent a letter on June 24, 1994, requesting comment pursuant to 40 CFR 1503.2. Much of the work that was expended in the preparation of the DEIS was completed prior to the issuance of DNFSB Recommendation 94-1, which contains recommendations regarding the health and safety aspects of the management of the spent nuclear fuel. The staff believes that the alternatives section of the DEIS as it relates to spent nuclear fuel does not consider the Board's recommendations contained in Recommendation 94-1. The staff notes that in order for the Final Environmental Impact Statement to be complete, it will need to take into account actions to comply with the Recommendation 94-1 Implementation Plan once it is accepted by the Board.

   b. The "No Action" alternative of Volume 1 basically calls for the suspension of all shipments of non-Naval fuel throughout the complex. However, since the issuance of the DEIS, Department of Energy (DOE) has continued to ship non-Naval fuel to the complex. The analysis of the "No Action" alternative, therefore, appears to be based on inaccurate assumptions. Additionally, the staff notes that it would be appropriate to modify the "No Action" alternative to reflect more accurately DOE's spent nuclear fuel (SNF) management strategy.

c. There does not appear to be a sound systems engineering based technical analysis presented in the DEIS nor is any real quantification of environmental impacts presented. Additionally, the use of trade off studies with the objective of reaching a defensibly sound conclusion is not apparent.

3. **Background:** DOE has issued a DEIS to cover the programmatic management of spent nuclear fuel and the Idaho National Engineering Laboratory (INEL) Environmental Restoration and Waste Management programs. The DEIS for these activities is composed of two volumes. Volume 1 contains the information examining the ways to safely manage DOE's spent nuclear fuel. Volume 2 examines the best methods for waste management and environmental restoration at INEL. Each volume contains sections detailing the reason the DEIS is being prepared, the alternatives discussed in the DEIS, the affected environment, and the potential environmental consequences.

Each volume has additional appendices which provide key details. For example, Volume 1 has appendices which discuss the spent fuel management at each of the potentially affected sites (Hanford Site, INEL, SRS, Nevada Test Site, Oak Ridge Reservation, and several other sites including Sandia National Laboratory-New Mexico) as well as appendices discussing the management of spent Naval nuclear fuel. This review was restricted to those areas of the DEIS pertaining to non-naval nuclear fuel.

Five alternatives are discussed in Volume 1. These are:

(1) "No Action"

(2) Decentralization

(3) 1992/93 Planning Basis

(4) Regionalization

(5) Centralization

Each of these alternatives is explained further in Attachment 1.

Four alternatives for waste management and environmental restoration at INEL are discussed in Volume 2. These are:

(1) "No Action" - This alternative results in the completion of only those actions designated as near term and a continued operation of existing facilities.

(2) Ten-Year Plan - This alternative results in the completion of planned projects to enhance cleanup, manage INEL waste and spent fuel, prepare waste for disposal, and develop technologies for fuel disposition.

(3) Minimum Treatment, Storage and Disposal (TSD) - This alternative results in minimum cleanup and decommissioning of facilities.

(4) Maximum TSD - This option results in a maximum effort to receive wastes from throughout the complex and to clean up and decommission the site.

4. **Discussion:** The following general comments discuss the adequacy of the DEIS from the perspective of the DNFSB staff. Attachment 2 to this report contains the detailed comments regarding the DEIS.

a. As a result of the timing of DOE's preparation of the DEIS and the Board's issuance of Recommendation 94-1, none of the alternatives currently presented in Volume 1 adequately discusses recommendations contained in Recommendation 94-1. For example, the "No Action" Alternative, includes only minimal remediation of Spent Nuclear Fuel (SNF) at any of the sites discussed in the Recommendation. The discussion concerning INEL remediation activities is primarily limited to those activities already planned for the removal of degrading fuel from the CPP-603 Underwater Fuel Storage Facility. The "No Action" alternative does not provide additional remediation of spent fuel stored in other areas at INEL; nor does this alternative allow for installing increased rack capacity in the CPP-666 Fuel Storage Area, which will be necessary within the next five to eight years. Recommendation 94-1 identified as a major safety vulnerability the continued storage of N-Reactor fuel in the K-Basins. This fuel represents about 80 percent of the DOE spent nuclear fuel inventory. The DEIS does not accommodate remediation of spent fuel on an accelerated basis as called for in Recommendation 94-1; hence, this alternative is not adequately assessed. In general, it would be appropriate to modify the alternatives to reflect activities necessary to meet Recommedation 94-1, with regard to spent nuclear fuel, once the Implementation Plan is accepted by the Board.

b. An assumption, in Volume 1, page 3-15 and 3-16, states that, "Under the No Action alternative, the SNF generated or stored at DOE research and non-DOE research reactors and other locations would not be shipped off-site. For the purposes of this analysis, it is assumed that SNF from foreign research reactors would not be shipped to the United States under this alternative."

However, DOE has recently approved the shipment of SNF from European research reactors to the United States and has announced that DOE intends to continue to receive foreign spent fuel through 1995. This activity is not consistent with the assumptions of the "No Action" alternative. Additionally, domestic university research reactors continue to ship SNF to the SRS. The "No Action" alternative does not specify when these shipments are to cease or how much SNF will be transferred to the SRS before shipments are stopped. Therefore, it appears that the assumptions used to formulate the "No Action" alternative are no longer valid. Additionally, the staff notes that it would be appropriate to modify the "No Action" alternative to accurately reflect DOE's SNF management strategy.

c. The staff conducted this review with the broad objective of determining if the DEIS fully discloses environmental impacts to interested agencies and the public and provides the decision-maker with support for making a well-considered selection of a course of action. The staff finds that in many of the areas reviewed this is not the case. There does not appear to be a sound systems engineering based technical analysis presented or in some cases little real quantification of the environmental impacts associated with the alternatives. The use of trade off studies with the objective of reaching a defensibly sound conclusion is not apparent. The comments in Attachment 2 highlight this problem. The DNFSB staff believes that DOE needs to review its technical bases and more clearly discuss the environmental impacts before completing this major study.

5. **Future Staff Actions:** The staff will continue to follow the National Environmental Policy Act process through the completion of the final DEIS.

Summary of the Draft DEIS Alternatives as Expressed in Volume 1

"No Action" Alternative

Take minimum actions required for safe and secure management of spent nuclear fuel at or close to the generation site or current storage location.

- After an approximate three-year transition period, no shipment of spent nuclear fuel to or from DOE facilities would occur.
- Stabilization activities would be limited to the minimum actions required to safely store spent nuclear fuel.
- Facility upgrade/replacement and onsite fuel transfers would be limited to those necessary for safe interim storage.
- Existing research and development activities would continue.

Decentralization Alternative

Store most spent nuclear fuel at or close to the generation site or current storage location with limited shipments to DOE facilities.

- Spent nuclear fuel shipments would be limited to the following:
  - Spent nuclear fuel stored or generated at universities and non-DOE facilities
  - Foreign research reactor fuel.
- Stabilization would be conducted to improve management capability.
- Some facilities would be upgraded/replaced and additional storage capacity required by the alternative would be constructed.
- Onsite fuel transfers would occur for improved safe storage.
- Research and development activities would be undertaken for spent nuclear fuel management, including stabilization technology.

1992/1993 Planning Basis

Transport and store newly generated spent nuclear fuel at the Idaho National Engineering Laboratory or Savannah River Site. Consolidate some existing fuels at the Idaho National Engineering Laboratory.

- Fuel would be transported
  - TRIGA fuel from the Hanford Site to the Idaho National Engineering Laboratory; Hanford Site receives limited fuel of research of storage and dispositioning technologies
  - West Valley Demonstration Project and Fort St. Vrain fuel to Idaho National Engineering Laboratory
  - Oak Ridge Reservation fuel to the Savannah River Site

- Domestic research fuel, and foreign research reactor fuel as may yet be determined, divided between the Savannah River Site and the Idaho National Engineering Laboratory.

- Facilities upgrades and replacements that were planed would proceed, including increased storage capacity.
- Research and development for spent nuclear fuel management would be undertaken, including stabilization technology.

Regionalization

Regionalization Subalternative A: Distribute existing and projected spent nuclear fuel among DOE sites based primarily on fuel type.

- Aluminum-clad fuel shipped to the Savannah River Site; TRIGA and non-aluminum fuel to the Idaho National Engineering Laboratory; retain defense production fuel at the Hanford Site.
- Stabilization would be performed at the shipping site where required before transportation. Additional stabilization would be performed at the regional site.
- Facilities required to support spent nuclear fuel management would be upgraded or built as necessary.
- Research and development for spent nuclear fuel management would be undertaken, including stabilization technology.

Regionalization Subalternative B: Distribute existing and projected spent nuclear fuel between an Eastern Regional Site (either Oak Ridge Reservation or Savannah River Site) and a Western Regional Site (either Hanford Site, Idaho National Engineering Laboratory, or Nevada Test Site).

- The Eastern Regional Site would receive fuel from east of the Mississippi River and the Western Regional Site would receive fuel from west of the Mississippi River.
- Stabilization would be performed at the shipping site where required for transportation. Additional stabilization would be performed at the regional site.
- Facilities required to support spent nuclear fuel management would be upgraded or built as necessary.
- Research and development would be undertaken for spent nuclear fuel management, including stabilization technology.

Centralization

Manage all existing and projected spent nuclear fuel inventories at one site until ultimate disposition.

- Existing spent nuclear fuel would be shipped to the centralized site.
- Projected spent nuclear fuel receipts would be shipped to the centralized site.
- Fuels at existing DOE sites would be stabilized as needed before shipment. Other spent nuclear fuel would be stabilized as required for storage at the centralized site.
- Facility upgrade/replacement and new storage capacity would be provided at the centralized site; stabilization facilities would be provided at the shipping sites.
- Research and development would be undertaken for spent nuclear fuel management, including stabilization technology.

Detailed Comments on the Draft DEIS

A. Volume 1, Appendix A, Hanford Site Spent Nuclear Fuel Management Program

1. Table 3-7 lists the traffic and transportation impact for the "centralization elsewhere" alternative as equivalent to the "No-Action" alternative. This is unlikely since one alternative does not involve transportation of spent nuclear fuel, while the other alternative transports all spent nuclear fuel from Hanford to an offsite location. It is not obvious how the technical analysis, if any, was performed since no reference or detail is presented to support the equivalency conclusion.

2. Table 3-7 Materials and waste management values are labeled as cubic meters generated over a 10 year period. The values reported in this table appear to actually be cubic meters generated per year.

3. Table 3-7 lists TRU waste produced over a 10 year period for the "No Action" alternative as zero. Past operations of the K-Basins have generated substantial amounts of TRU waste. A more reasonable characterization of TRU waste generation for this alternative would be closer to 0-50 m^3/yr. One ion exchange module, if inadvertently overloaded, would provide 20-30 cubic meters of TRU waste. Potential TRU waste generation from cartridge filters and ion exchange columns is ignored. It does not appear that a sound technical analysis supports the data presented.

B. Volume 1, Appendix B, Idaho National Engineering Laboratory Spent Nuclear Fuel Management Program

1. Section 5.15.3.2 (p. 5.15-18) states:

   "This analysis did not quantify the magnitude of a radionuclide release and resulting health effects of multiple-facility accidents initiated by a single highly energetic seismic event for two reasons. First, it is extremely difficult to postulate an estimated frequency for a seismic event that would be of sufficient magnitude to damage two or more facilities to the point where the quantities of radioactive or toxic material releases would exceed those quantities already considered for the postulated accidents presented in this EIS."

   In each of the major areas of the INEL site, such as the Test Reactor Area (TRA), Idaho Chemical Processing Plant (ICPP), Test Area North (TAN), and Argonne National Laboratory-West (ANL-W), where spent nuclear fuel is stored, there are several facilities in close proximity, and contrary to the statement made in the DEIS, it is extremely difficult to postulate a seismic event affecting only one facility but not the others. For example, at the ICPP, there are five facilities which store spent fuel, all located within a 500 meter radius. Section 5.15 of Appendix B considers one accident associated with the storage of SNF at the ICPP that may have a seismic event as one of its initiators. This accident is an inadvertent criticality at the CPP-603 Underwater Fuel Storage Facility (inadvertent criticality is considered at CPP-666, but only during fuel reprocessing). The material at risk during this postulated accident consists of SNF containing 1.96 metric tons (MT) of heavy metal. As shown below, this is less than 2% of the total material at risk at the ICPP. The staff does not understand how DOE can assume that the consequences of a criticality event at CPP-603 would bound those of concurrent criticalities or other releases from all ICPP facilities during a seismic event. The table that follows lists the assumed inventory in metric tons of heavy metal (MTHM) for the facilities at the chemical processing plant:

Facility	MTHM
Underwater Fuel Storage Facility (CPP-603)	1.96
Irradiated Fuel Storage Facility (CPP-603)	.5
Fuel Element Cutting Facility (CPP-603)	(2 fuel elements)
Underwater Fuel Storage Area (CPP-666)	5.62
Underground Storage Facility (CPP-749)	92.94

This situation is similar at TRA, TAN, and ANL-W. The technical bases and rationale used do not appear adequate.

2. The DEIS Summary document lists (on pages 18-22) the number of spent fuel shipments to INEL as follows: Alternative 4a, 1800 shipments; Alternative 4b(1), 2980 shipments, and; Alternative 5b, 5080 shipments. The term "shipment" is not sufficiently well defined in the Summary or in Appendix B and since the volume of spent fuel or the number of spent fuel elements is not specified, the adequacy of existing or planned fuel storage capacity cannot be evaluated nor can any environmental impacts be fully analyzed.

   For example, the DEIS states, in Appendix B, Section 3.1.3.3, that a Dry Fuels Storage Facility containing 1500 fuel storage positions would be built at INEL and additional rack capacity would be added to the CPP-666 facility. However, it is unclear whether this would be adequate storage capacity since the actual number of spent fuel *elements* to be received is not specified.

   Additionally, the DEIS states that, for Alternatives 4b(1) and 5b, "DOE would review the need for additional rack capacity in the Fuel Storage Area beyond that proposed under the Increased Rack Capacity for Fuel Storage Area project." The "need for additional rack capacity" is a piece of information needed, prior to the Record of Decision, as this activity will result in quantifiable impacts. Obtaining information regarding needed storage capacity at INEL cannot be delayed too long because much of the SNF that would be shipped to INEL is in degraded condition and should not be stored in its current location for an extended period of time (beyond 8-10 years).

C. Volume 1, Appendix C, Savannah River Site Spent Nuclear Fuel Management Program

1. This volume does not contain sufficient detailed information to evaluate the five options as they affect SRS. In fact, the report states that "... the level of analysis in this EIS is insufficient to allow selection of a particular option."

2. This appendix does not contain pertinent information regarding the distribution of SNF currently being stored at the eight SRS SNF storage locations and does not address problems with the condition of the SNF or the ability of the facility to contain the material. Based on available site SNF storage, the current amount of material stored (approximate) at SRS facilities is as follows:

Facility	MTHM
Receiving Basin for Offsite Fuel	46.4
L Reactor Disassembly Basin	125.2
K Reactor Disassembly Basin	4.6
P Reactor Disassembly Basin	1.4
F-Canyon	22.7
H-Canyon	0.07
321-M* [1]	0
773-A* [2]	0
Total	200.37

* Not included in this DEIS analysis.
[1] The DEIS inadvertently cited 331-M (instead of 321-M) which does not store material.
[2] 72 cobalt control rods are stored in this facility.

Any option which would result in extended storage in these locations needs to address facility specific issues.

3. About 184 MTHM of the 202 MTHM of SNF presently stored at SRS is HEU, aluminum clad fuel. The fact that SRS has the capability to process this type of SNF is not clearly factored into the alternatives, in other words, the consolidation options do not seem to consider this factor.

4. The calculation of risk associated with storage in SRS basins does not differentiate between the storage locations, quantities of SNF, material conditions or facility conditions. Without this information, it is difficult to conclude how these variables were utilized in determining accident frequencies and consequences.

D. Volume 1, Appendix D, Naval Spent Nuclear Fuel Management Program

The Naval Reactors Program is outside of the jurisdiction of this Board; therefore, we have not provided comments on this area.

E. Volume 1, Appendix E, Spent Nuclear Fuel Management Program at other General Storage Locations

1. Annular Core Research Reactor (ACRR): This appendix does not address the issue of the upcoming decision regarding the ACRR at Sandia National Laboratories-New Mexico (SNL-NM) and its potential future role as a production source of Molybdenum-99 (Mo-99). This is relevant since use of the ACRR for this production mission, in lieu of the current research and development (R&D) mission, could change the ACRR fuel usage situation. As stated in section 4.1.1.3, for the current R&D mission the ACRR fuel would last the life of the reactor, and refueling is not planned. With the Mo-99 production mission, the current fuel would likely be removed and need to be stored at the start of or within a few years of starting operations. These issues are to be resolved in the near future and plans for management of such spent fuel need to be addressed.

2. Sandia Pulse Reactors: SNL-NM currently operates two unmodified pulse reactors, Sandia Pulse Reactor (SPR) II and SPR III. A new pulse reactor, SPR IIIM, an upgrade to the current SPR-III, is being constructed to replace SPR-II. The DEIS does not address the plans for the SPR-IIIM and management of the fuel from the SPR-II.

F. Volume 2, Draft INEL ER&WM DEIS

1. General Comments:

   a. The rationales underlying the development of the alternatives have not been clearly stated. In particular, alternative D seems unrealistically contrived. There is no technical reason why maximum processing and maximum cleanup need to be coupled.

   b. Even with the "Draft User's Guide," DOE has not clearly articulated how the various sections of Volume 2 relate to each other, to the appendices in Part B, or to the draft technical support documents that are cited in the references. For example, DOE does not state the basis for waste generation numbers for transuranic and low-level waste cited in section 3.1.3, Alternatives for Waste Management, and whether these numbers are based on projections from generators or on-site storage capacity, or a combination of both. There are numerous other relationships among key technical factors that could impact the analysis' results that need to be explicitly addressed.

c. Contrary to the concept that an EIS should present reasonably realistic estimates of potential impacts (so that cost/benefit analysis or other tradeoff methods can be used in decision-making), this DEIS uses "conservative" assumptions and maximum cases and combines the conservatisms, without any attempt to estimate the degree of conservatism, uncertainties, or to define lower as well as the upper bounds. The dose assessment model relied on in the DEIS gives results that are more conservative than the EPA model which is usually recognized as conservative. The DEIS, thus, does not provide a clear description of the impacts to expect along with associated uncertainties.

d. The lack of technical detail in this volume makes it difficult to evaluate the validity of analyses performed to determine the potential environmental impacts of the various alternatives. Many of the technical appendices, while they give some information and contain reference lists, do not allow one to follow in detail what was done for each case, or understand why particular assumptions were made.

2. Specific Comments on Volume 2 (Part A):

a. Section 2.2.2, Historic and Current Mission, Page 2.2-3, Para. 2. The statement that the areas of industrial development, disturbances, and contamination (with the exception of groundwater) comprise only 2 percent of the total land area of the INEL site appears to contradict the information from INEL on the acreage of land contamination (DOE-Idaho letter, dated August 19, 1994, subject: Defense Nuclear Facilities Safety Board Staff Requests (OPE-94-32)). This information indicates that 37 percent of the INEL land area is contaminated and not considered suitable for public use.

b. Section 2.2.9, Technology Development, Page 2.2-47, Para 2. This section of the document states that the systems approach is being used for technology development; however, a description of how that approach is used is not provided.

c. Section 3, Alternatives. It is not clear why there are not more combinations of the major activities (spent nuclear fuel, environmental restoration, and waste management) within the alternatives discussed, for example, maximizing of environmental restoration activities (from Alternative D) and minimizing of waste management activities (from Alternative C). If trade off analysis of such mixes were already completed, reference to the supporting studies and selections should be provided.

d. Section 3.1.2, Alternative for Environmental Restoration, Table 3.1-3, Summary of proposed management functions and related projects at INEL by alternative, page 3.1-19. It is not clear if there is a difference among the remediation projects being considered for any of the alternatives. It appears that the difference between the environmental restoration activities for each of the alternatives is based on iterations involving D&D activities, which DOE considers to be only a subset of environmental restoration.

e. Section 3.1.3, Alternative for Waste Management, page 3.1-23. It is not clear how this section relates to the sections on spent nuclear fuel management (section 3.1.1) and environmental restoration (section 3.1.2). In particular, it is not possible to determine how the outputs (i.e., waste generated) from spent nuclear fuel management and environmental restoration activities have been factored as inputs into these waste management activities, especially since there are no quantified numbers associated with environmental restoration. It is not apparent how systems engineering techniques were utilized and this fundamental linkage identified.

f. Section 3.1.4, Technology Development, page 3.1-71. Section 3.1.3 (Alternatives for Waste Management) has subsections on technology development and selection relative to specific waste types, and section 3.1.4 also discusses technology development related to waste management. However, neither section 3.1.4 nor sections 3.1.1 and 3.1.2 mention, or give any detail on, any technology alternatives or approaches that are directly related to spent nuclear fuel management (for example, technology development for the preparation of spent nuclear fuel for safe interim storage, which was cited in the second paragraph in section 2.2.9) or to environmental restoration (such as testing remediation technologies, which was cited in the first paragraph in section 2.2.9).

g. Section 3.2, Alternatives Eliminated from Detailed Analysis. The bases (e.g., what analyses have been performed) for rejecting these alternatives is not clear. Specifically:

Section 3.2.2, Restore the INEL Site, page 3.2-1. The basis for making the statement that "restoring this site to pristine conditions would be extremely costly without achieving any of the specific objectives identified." No trade studies or substantive analyses based on technical performance, cost, or schedule criteria are referenced or provided as a basis for these conclusions.

Section 3.2.3, No Cleanup or Controls, page 3.2-2. The basis for making the statement that "leaving the surplused facilities and identified remediation sites without cleanup or institutional controls ... could also pose a threat to the environment and to workers (and possibly the public)" is not clear.

h. Section 5, Environmental Consequences, page 5.1-1, para 3. The basis (i.e., criteria and standards) for the design of analytical approaches to be a "reasonable" projection of the upper bound of the consequences is not clear.

i. Section 5.5.7, Air Resource Impacts from Alternatives Due to Specific Activities, page 5.7-30. The basis for choosing the five selected activities is not clear. No trade study/down selection report is referenced nor is specific analysis presented.

j. Section 5.8, Water Resources, page 5.8-12. None of the sections on other resources (such as 5.7, Air Resources) have a "conclusions" section which summarizes the impacts on the particular resource of the various alternatives considered in this DEIS.

k. Section 5.8.2.2, Subsurface Water. The concentrations of specific radionuclides are all stated to be below the maximum contaminant level. However, the evaluation does not consider whether or not the sum of all the radionuclide concentrations would cause the dose criteria to be exceeded.

l. Section 5.8.6, Conclusions, page 5.8-12. The statement is made that "possible future sources of contamination would be negligible compared to previous practices," which implies that the impact of previous practices has been adequately characterized. The basis for this statement is not apparent from the information presented in this document.

m. Section 5.12.1.3, Impacts to the Public from Specific Activities, page 5.12-14. The basis for choosing the specific activities cited in this section is not clear.

n. Section 5.14.2, Methodology, page 5.14-4, para 3. This section discusses the methodology used for analyzing possible impacts from accidents involving spent nuclear fuel, environmental restoration and waste management at the INEL. The statement is made that "for site-to-site comparisons of the same accident set at different sites using consistent assumptions, see Volume 1, Appendix of this DEIS." The statement seems to imply that this appendix contains a comparison of accidents from environmental restoration and waste management activities, as well as spent nuclear fuel management. However, the appendix only contains comparisons of the impacts of accidents during spent nuclear fuel management.

o. Section 5.14, Facility Accidents, Figures 5.14-4, 5.14-8, 5.14-11 and 5.14-14. All of these figures contain the statement "health effects not reported" for expected fatal cancers from environmental restoration activities. It is not clear if this statement means that the calculations have not been done or just not reported.

p. Section 5.15.5, Water Resource, page 5.15-10, para 2. The DEIS states that "the INEL's contribution to the cumulative impact on regional water quality is far less than contributions from other commercial, industrial, and agricultural activities (such as pesticides and fertilizer use), which have impacted a number of municipal water supplies in the communities surrounding the INEL site." The basis for this statement (e.g., what analysis was performed) is not clear. The statement is not qualified as to whether it is making a comparison of non-radioactive impacts or it is actually stating that the combined radioactive and non-radioactive impacts from INEL are less than those of surrounding industries.

q. Section 5.15.8, Health and Safety, page 5.15-24, para 2. The DEIS states that "the methodology for health effects calculations as well as the exact numbers calculated are provided in Appendix F, section F-4, Health and Safety." However, the staff could not find the corresponding numbers in the appendix, and it is not clear how the numbers in this section were derived from the relevant section in Appendix F.

r. Section 5.15.8.1, Historical Dose Perspective, Figure 5.15-1, page 5.15-28. It is not clear what radionuclides are represented in this figure and whether this figure is a summation of activity from various isotopes.

s. Section 5.16.3, Air Resources, page 5.16-2. It is not clear why the potential consequences from accidental releases to the air and water resources have not been fully evaluated for all alternatives. It is also not clear that, where not evaluated, what the resulting uncertainties are for releases to the air and water resources.

t. Section 5.19.5, Water Resources, page 5.19-5. This section states that best management practices when included in procedures, environmental monitoring, and remediation activities serve as mitigation methods for water resources. The report does not address the concept that it might be easier to prevent the migration in the first place by using multi-layer caps or other engineered concepts instead of simply monitoring for problems then fixing them after they occur.

3. Comments on Draft INEL ER&WM DEIS (Volume 2, Part B):

a. The format and content of the sections in Appendix F do not appear to be consistent. The sections concerning air resources (Appendix F, section F-3) and health and safety (Appendix F, section F-4) only discuss the methodology used to analyze these impacts and the input parameters used in the analysis; while the sections on geology and water (Appendix F, section F-2) and facility accidents (Appendix F, section F-5) also contain a summary discussion of the results of the analyses.

b. Appendix F, sections F-2.2.2.2.1, Description of Physical Properties and Flow Characteristics, and F-2.2.2.2.5, Data Limitations. These sections discuss the wide uncertainties in hydraulic and geochemical parameters (over 6 orders of magnitude for some). It is hard to determine how conservative the analyses were because they do not state what input parameters were eventually used or where they fell in the possible range of values. In addition, there is not a discussion of any uncertainty or sensitivity analyses being performed to determine the impact of these uncertainties.

c. Appendix F, section F-2.2.2, Subsurface Water. This section does not mention if flow through fractures and faults, "finger" flow, or colloidal transport of Sr-90 was considered in vadose zone models. This flow would all accelerate the migration of contaminants to the water table.

d. Appendix F, section F-2.2.2.2.2, Subsurface Water Quality and Contaminated Distribution (Volume 2, part B) and Section 5.8.2.2, Subsurface Water Quality (Volume 2, part A). Sr-90 was used to model contaminant transport. The reason for the use of Sr-90 rather than Cs-137 was not clear. Cs-137 and Sr-90 have comparable half-lives, MCL's, and fission yields, but cesium should be a weak sorber (like other alkali metals) unlike strontium which is a fairly strong sorber (retardation factor of 100). The models used in the DEIS found that strontium did not migrate very far because it was strongly sorbed in the vadose zone (sorption was ignored for saturated flow). The more mobile cesium would thus be expected to migrate much farther. (This assumes that not too much of cesium had volatilized so that the source term for cesium is comparable to that for strontium.)

e. Appendix F, section F-2.2.2.3.3, Modeling Assumptions and Limitations, page F-2-27. It was assumed that precipitation is insignificant to recharge the water table. This is based on the fact that precipitation (8.7"/yr) is much less than the evaporation rate (49.2"/yr). This argument neglects the fact that most of the precipitation occurs during the winter as snow while most of the evaporation would be expected to occur in the summer. Thus precipitation (or snow melt) may be significant to recharge the water table during the spring when all the accumulated snow melts in a short period of time.