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MEMORANDUM FOR: Regis R. Boyle
Repository Projects Branch, WM

FROM: John T. Greeves, Chief
Engineering Branch, WM

SUBJECT: HANFORD DRAFT EIS REVIEW COMMENTS

The enclosed comments on the Draft Environmental Impact Statement for Disposal of Hanford Defense Wastes were prepared by John Voglewede and Gary Roles of the Waste Management Engineering Branch. Informal comments on EIS were also provided by John Buckley through the Basalt Waste Isolation Project Team.

ORIGINAL SIGNED BY

John T. Greeves, Chief
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Enclosure: As stated

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COMMENTS ON
DRAFT ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL OF HANFORD DEFENSE HIGH-LEVEL, TRANSURANIC AND TANK WASTES

The following comments apply to the Draft Environmental Impact Statement (DEIS), Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes (Ref. 1). For the benefit of those on distribution of this memorandum, it should be pointed out that the NRC's licensing jurisdiction over the disposal of the Hanford defense wastes has not yet been resolved (Ref. 2). However, the National Environmental Policy Act (Ref. 3) indicates that the NRC has an obligation to comment on the Environmental Impact Statement:

> "Federal agencies with jurisdiction by law or special expertise with respect to any environmental impact involved and agencies authorized to develop and enforce environmental standards shall comment on statements within their jurisdiction, expertise, or authority."
> Federal Register, Vol. 43, No. 230, p. 55998

1. We are concerned with both technical and procedural aspects of the Draft Environmental Impact Statement. However, we are also aware of the historical basis for the waste disposal situation at the Hanford site and the magnitude of the wastes involved. The Commission should recognize the Department's efforts to resolve this problem.

2. One of our primary concerns is that the report allegedly considers all disposal options for all waste types. This may be a laudable approach for the Environmental Impact Statement. However, it diverts attention from the central issue: Disposal of certain particularly troublesome waste forms at the Hanford site - not disposal of all waste forms at the site.

   Essentially, the DEIS aggregates defense wastes at the Hanford site into six groups based on the manner in which they are stored rather than on their radiological hazard or other characteristics. These groups consist of:

   ° Existing tank wastes:
   - 149 single-shell tanks, some of which have been known to leak and contain wastes that have been converted to highly leachable wet solids.
   - 14 double-shell tanks, containing mostly liquids.

   ° Newly generated and future tank wastes:
   - 14 double-shell tanks containing mostly liquids.

   ° Encapsulated Sr-90 and Cs-137 wastes (removed from wastes in existing single-shell tanks).

   ° Retrievably stored and newly generated transuranic (TRU) waste.

   ° Pre-1970 buried solid waste sites.

° TRU-contaminated soil sites, consisting of cribs, ditches, trenches, settling tanks, french drains, and reverse wells.

Although this classification is complete, it obscures long-standing DOE commitments and NRC assumptions regarding placement of TRU wastes in retrievable storage at the Hanford facility pending future geologic disposal. It also suggests that placement of high-level waste (HLW) in a geologic repository is optional, which may not be the case.

Rather than considering all waste classifications at the Hanford site, the EIS should have begun with, as a starting point, the concept that there exist wastes that must be considered too toxic for near-surface disposal. Those wastes must be (or should have been) kept in retrievably stored form, must be recovered, and must ultimately be disposed of in a geologic repository (civilian or defense). This should be the case for (1) the HLW in the existing double-shell tanks, (2) the newly generated and future HLW, (3) the retrievably stored TRU waste, and (4) the Cs/Sr capsules. Incidentally, each of these capsules contain 25,000 Ci to 52,000 Ci of activity in a 0.001 m^3 volume. That is, 10 Megacuries per cubic meter!

This leaves the following wastes: (1) the wastes in the single-shell tanks, (2) the pre-1970 TRU contaminated solid wastes, and (3) the TRU contaminated soil sites. These particularly troublesome wastes should have been the principal focus of the DEIS. The Statement could have then focused on various options for handling these wastes, with the object of arriving at criteria for residual activity. The options analyzed could range from complete removal to in-place stabilization of these particular waste forms depending on the residual activity criteria.

3. The Final Environmental Impact Statement should consider the residual activity (quantity and concentration) of the individual single shell waste tanks, cribs, ditches, and other disposal methods used. The report should then consider recovery of essentially all material from those locations having the highest activity levels or greatest concentrations of toxic material. Selective recovery would reduce the overall activity or concentrations at the site to levels which are comparable to those given in 10 CFR Part 61 (Ref. 4). A reasonable argument could be made that the residual activity is comparable to waste disposed of in some existing, near-surface, low-level waste facilities. Action could then proceed in stabilizing the remaining wastes and otherwise preparing the material for ultimate disposal. Requirements of 40 CFR Part 191 (Ref. 5) could potentially be avoided by demonstrating that the material remaining on site conforms with 10 CFR Part 61 limits.

4. Although 10 CFR Part 61 does not apply to defense wastes, it would be useful to apply the 10 CFR 61.55 waste classification limits to the residual waste types mentioned in Comment 2. The comparison would indicate the practicality of the approach described in Comment 3.

   Because of the limited data presented in the DEIS, direct application of the 10 CFR 61.55 waste classification limits is difficult. However, some estimates can be made. For example, the existing waste tanks are

projected to contain approximately 70,000 Ci of transuranic waste in a volume of 190,000 m^3 (DEIS, Section 3.2.1). At a density of 1.5 g/cm^2, these figures indicate an average TRU concentration of approximately 250 nanocuries per gram, two and one-half times the 10 CFR 61.55 limit for near-surface disposal of transuranic materials. In addition, the TRU concentration appears to be significantly higher in specific tanks (DEIS, Table A.5).

This suggests that most of the activity in the single-shell tanks may be concentrated in only a few tanks. By removing the activity from these tanks, it is possible that the overall concentrations of TRU in the remaining tanks would be less than 100 nCi/g. The argument for leaving the remaining tank waste in place would thereby be greatly improved. Similarly, a significant reduction in the activity in the contaminated soils could be achieved by mining only a few cribs.

5. The Draft Environmental Impact Statement is not consistent in the manner that wastes are classified. The title of the DEIS, "Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes," suggests that the tanks do not contain high-level waste. However, the tanks are reported to contain high-level waste elsewhere in the DEIS (Section 3.2.2).

   It is reasonable to identify wastes according to source of the material, the manner in which it is currently stored (or disposed of), and the activity level of the wastes involved. However, it is not appropriate to obscure the distinction between the current storage location of the waste and its activity level. Either the waste in a tank is high-level or it is not. If it is HLW, it must be disposed of in an NRC-licensed geologic repository and the issue of onsite stabilization is moot. At best, the question of what physically exists in the tanks, and whether or not those wastes should be considered high-level waste, has not yet be resolved. The report should resolve these issues prior to estimating environmental impact of the available options.

5. It is obvious from the report that the level of data on wastes historically stored and disposed of at the Hanford site is very limited. The lack of information reflects on the calculations and conclusions presented in the DEIS. It should be clear that the DOE needs to implement a major sampling and waste characterization program at the site.

6. The Forward (DEIS, p. vi) makes a comparison of the Hanford waste inventory resulting from chemical processing of about 100,000 tonnes of nuclear reactor fuel with that of a commercial repository containing 70,000 tonnes of spent fuel elements. This comparison is misleading unless geologic disposal is the option of choice. Other comparisons can be made which are more relevant. For example, the existing waste tanks (to be stabilized in place under one DEIS option) will contain about 70 MCi of activity in a total volume of 190,000 m^3. The projected accumulation for similar commercial, near-surface disposal sites over the same period of time is only 8 MCi in a volume of 2,500,000 m^3 (Table 4.2 of Reference 6).

Because in-place stabilization of tank waste more closely approximates disposal in a near-surface facility than disposal in a high-level geologic repository, a comparison of the DEIS proposal with commercial low-level waste practice has greater validity. In addition, it is significant to note the impact of the Hanford proposal in terms of both total activity and types of activity relative to commercial LLW inventories. The action is clearly precedent-setting on the basis of magnitude alone!

7. Regulatory considerations involved in the environmental assessment of the Hanford defense wastes were noted in the DOE presentation to the NRC staff (Ref. 7). However, these considerations were not included in the DEIS. The issues will include:

   (a) Resolution of jurisdictional responsibilities [see Ref. 2] including the issue of mixed waste (i.e., waste containing chemically and radiologically hazardous materials).

   (b) Promulgation of modified regulations, if required. This would probably involve redefinition of the term "byproduct material" in the Atomic Energy Act [10 CFR 30.4(d) - Ref. 4] or the Resource Conservation and Recovery Act [40 CFR 261.4(a)(4) - Ref. 5].

   (c) Effects of statutory limits on funding for licensing of defense activities activities [see Ref. 2].

   (d) Effects of the NRC licensing schedule on project costs and other projections in the DEIS.

Clearly, some impact of regulatory issues should be noted in the Environmental Impact Statement.

8. The Forward of the DEIS states:

> "This document is not intended to provide the environmental input necessary for siting or constructing a geologic repository. For analysis of environmental impacts of alternatives involving geologic disposal, generic designs for either an offsite or on-site repository are used. Detailed environmental documentation required by the Nuclear Waste Policy Act of 1982 will be prepared before a geologic repository is sited, constructed and operated.
>
> If the Basalt Waste Isolation Project (BWIP) at Hanford were to be selected as a candidate site for repository development, the EIS that would be written to support that site would address the cumulative impacts of that and other reasonably foreseeable activities on the Hanford site." (DEIS, p. vii)

This indicates the impact of the geologic repository (e.g., location) has been considered in the Hanford Defense Waste DEIS. However, it is not clear that the impact of the Hanford Defense Waste has been appropriately considered in the Environmental Assessments for the candidate repository sites. As stated on page 1.7 of the DEIS, "the present Hanford

high-level defense waste differs significantly from spent fuel assemblies that will be disposed in a commercial waste repository." Although the draft Environmental Assessments for the candidate repository sites include waste forms other than spent fuel, it is not clear that those assessments consider the quantities of defense waste proposed in the Hanford DEIS.

9. The Final Environmental Impact Statement on 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," (Ref. 8) indicates intruder pathways dominate the potential health effects from commercial low-level radioactive waste disposal. Appendix R of the DEIS recognizes a similar effect, in that "scenarios involving contact with or intrusion into waste...predict significant adverse or fatal consequences to those ignoring warnings and intruding into the wastes." However, the DEIS puts considerable reliance in the passive institutional controls described in Appendix M to avoid the intruder problem. The arguments supporting reduction in the risk of inadvertent intrusion are very weak:

> "The risk reduction factors presented here are based solely on the author's judgement; at present there are neither empirical nor theoretical models upon which these risk reduction factors can be based." (DEIS, Section M.4)

It would be prudent to assume that the passive intruder protection systems described in the DEIS provide marginal intruder protection.

10. In addition to other requirements, 10 CFR Part 61 regulated wastes are required to have stability. Stability is necessary to inhibit slumping, collapse, or other failure of the disposal site resulting from degraded wastes which could lead to water infiltration, radionuclide migration, and costly remedial care program. Stability is also considered in the intruder pathways where it is assumed that after the active control period, wastes are recognizable and, therefore, continued inadvertent intrusion is unlikely. The stability requirements of 10 CFR Part 61 are substantial, requiring a free-standing monolithic waste form or waste container possessing considerable mechanical strength, leach resistance and other features. It is highly unlikely that the residual single-shell tank wastes alone could be classified as stable under Part 61 guidelines.

Although the in-place stabilization option includes backfilling the tanks with "gravel, sand, grout, or other substances to provide support to the tank walls during subsequent disposal operations and to control subsidence in the long term," the proposal does not consider modification of the highly soluble waste sludge. Nor does it consider the long term integrity of the tanks in any detail:

> "an arbitrary assumption has been made that none of the tanks provides a barrier after the year 2150. This is equivalent to assuming the tanks provide a barrier to significant levels of vapor-phase transport of moisture for another 165 years." (DEIS, Vol. 2, p. xxxiv).

Based on historical difficulties with the single-wall tanks, consideration of these tanks as High Integrity Containers under 10 CFR Part 61 guidelines (Ref. 9) would also be questionable.

REFERENCES

1. Draft Environmental Impact Statement, Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, (Hanford Site, Richland, Washington), U.S. Department of Energy Report DOE/EIS-0113 (Vols. 1-3), March 1986.

2. G.H. Cunningham (NRC) letter to H.K. Garson (DOE) dated February 12, 1986 (with attachments).

3. "National Environmental Policy Act," Federal Register, Vol. 43, No. 230, Wednesday, November 29, 1978.

4. Code of Federal Regulations, Title 10, "Energy", Parts 0 to 199, General Services Administration, January 1, 1985.

5. Code of Federal Regulations, Title 40, "Protection of Environment," Parts 190 to 399, General Services Administration, January 1, 1985.

6. Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics, U.S. Department of Energy Report DOE/RW-0006, Rev. 1, December 1985.

7. "Hanford Defense Waste Environmental Impact Statement," Presentation to Nuclear Regulatory Commission by J.D. White, Director, Waste Management Division, Department of Energy - Richland Operations Office, Washington, D.C., April 1986.

8. Final Environmental Impact Statement on 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," U.S. Nuclear Regulatory Commission Report NUREG-0945, Volumes 1-3, November 1982.

9. L.B. Higginbotham (NRC) letter to Commission Licensees on "Final Waste Classification and Waste Form Technical Position Papers" dated May 11, 1983.