CW-5

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Theodore R. Kulongoski, Governor

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August 21, 2008

Matt McCormick,
Assistant Manager for the Central Plateau
U.S. Department of Energy
P.O. Box 550 MS A5-11
Richland, WA 99352

Re: Review comments on the "Feasibility Study for the 200-CW-5 Cooling Water Operable Unit DOE/RL-2004-24, Draft B, and Proposed Plan for the 200-CW-5 Cooling Water Operable Unit, DOE/RL-2004-26, Draft B"

Dear Mr. McCormick:

We appreciate the opportunity to review and comment on the draft Feasibility Study and Proposed Plan for the 200-CW-5 Cooling Water Operable Unit, hereafter "the plan."

The plan reflects priorities that differ significantly from those established by Hanford's regulators and supported by the public. We urge DOE to reconsider the plan and preferred alternative using the regulator priorities and stakeholder values.

We recommend DOE pursue, as the preferred alternative:

- an exploratory exhumation similar to that used in burial grounds, recognizing the highly non-uniform distribution of plutonium in the site;
- removing, treating and disposing the most contaminated soils and transuranic wastes extracted from them to WIPP;
- removing, treating, and disposing of lesser contaminated soils to ERDF;
- using remote-operated heavy equipment to minimize worker exposure;
- placing little or no reliance on barriers and institutional controls for long term protection.

We explain the basis for our recommendations in the sections that follow.

The current plan fails to consider regulatory guidance

Hanford cleanup is governed by many laws, which are embodied in the Tri-Party Agreement. To help provide further guidance for cleanup decisions, Ecology and EPA prepared a white paper in 2007 titled "Considerations for Cleanup of the Hanford 200 Area National Priorities List Site."

Although this paper imposes no requirements, it does reflect extensive dialogue with Hanford stakeholders and should be considered to define minimum practices as a starting point. Pages 7 through 13 of the white paper cover the most pertinent principles that should inform the present plan. These include:

- Presuming the use of Remove-Treat-Dispose (RTD) as the preferred action for remedy for shallow, long-lived contaminants. Caps without RTD are not appropriate for these cases.

- Considering excavations deeper than 15 feet. Site conditions and uncertainty may warrant excavation to 40 - 60 feet.

- Recognizing that containment is an inappropriate remedy for wastes posing a high, long-term risk or where removal and/or treatment is practical, both of which apply to these wastes.

- Precluding disposal of Class C wastes shallower than 5 meters, and incorporating intruder barriers designed to protect against inadvertent intrusion for at least 500 years.

- Limiting periods of reliance on institutional controls to less than 100 years.

- Recognizing ecological risk and tribal uses as important aspects in setting cleanup requirements for shallow soils (ground surface to 15 foot depth).

- Dealing with pre- and post-1970 transuranic materials in the same way and burying such wastes in WIPP.

- For Model Group 3 waste sites, recognizing that the cribs have minimal contamination below 20 feet. Therefore, RTD followed by capping with a robust engineered barrier that minimizes long-term migration of liquids into the concentrated contamination zone may be an acceptable alternative.

The current plan fails to observe stakeholder advice

In July 2005, the Oregon Hanford Cleanup Board considered caps thoroughly and prepared a "Position Paper on Capping Waste Sites located on the Hanford Nuclear Site." The Board recommends minimizing the use of caps and barriers beyond engineered disposal sites.

The Hanford Advisory Board (HAB) also spoke directly to these issues:

- HAB Advice #163, February 1997 – Institutional Controls: *"Physical and administrative institutional controls should not be substituted for cleanup activities or become end states. Cleanup emphasis should be placed on permanent remedies, to avoid reliance on institutional controls. Institutional controls are not to substitute meeting the applicable cleanup standard or practical available treatment requirements under CERCLA, RCRA, Model Toxic Control Act (MTCA) and NRC regulations. Containment which is an institutional control, should be used when technology is not available."*

- HAB Advice #173, April 2005 – Central Plateau Remedial Action Values Flowchart: Generally advises to use removal, treatment and disposal as the default action and encourages the use of new technology development where appropriate, and the use of barriers only as a last resort.

- HAB Advice #197, June 2007 – Groundwater Values Flowchart: Identifies nine key values and generally advises remediation of groundwater, removing sources, pursuing new technologies and restoring the resource to the highest beneficial use.

Thus, the white paper and the stakeholder advice share several core principles:

- Bias for removal, treatment and proper disposal of wastes;
- Minimizing use of capping and barriers;
- Minimizing use or reliance on institutional controls;
- Protecting groundwater now and in the future for the highest beneficial use.

Applying the cleanup principles to the 200-CW-5 plan

These waste sites are shallow (less than 15-20 feet deep) and they contain long–lived radionuclides. Therefore, the plan should focus on removing, treating, and properly disposing of these wastes. Because the wastes may exceed Class C criteria, any barriers used to contain residual waste that is not removed must (to comply with the Ecology-EPA White Paper and 10 CFR 61.52) be (a) more than 15 feet thick, (b) designed to prevent intrusion for more than 500 years, and (c) capable of limiting infiltration to keep the waste from being mobilized. Further, because the layered soils cause extensive lateral water movement, any barriers must include vertical cutoff walls that extend around and well below the wastes.

Soils exhumed and treated for disposal in ERDF must be treated in such a way to assure that plutonium and other contaminants cannot leach from the site to contaminate groundwater in the future.

Although the soils contain moderate plutonium contaminant levels when averaged over the entire waste site volume, the feasibility study data show that the cribs' plutonium distribution is highly varied. Thus, there are scattered locations with extremely high concentrations, other areas with lower concentrations, and broad areas with little plutonium contamination. These concentration

differences occur in layers, which likely correlate with trench low spots, areas of coarse rock, and other preferential flow features or settling areas.

This heterogeneity is why simple random sampling and assumed waste distribution models cannot provide a good estimate of the risks to guide remedy selection. For example, the feasibility study notes that the data does not match any known statistical distribution. The authors nonetheless attempt to use common statistical methods to set an upper control limit on the contaminant levels so that these control limits can be used in numerical codes to establish risk estimates. Because of the resulting extreme estimated risk values, the authors then call the highest measured values "outliers," so that they may be discarded. This is both invalid and a misuse of the process. The data are real. They simply don't fit an expected distribution.

At that point, the authors should have recognized that (a) more data was needed to establish a valid statistical distribution, (b) that the site conceptual model is wrong and needs revision, or (c) both. In fact, we suggest that the latter is most appropriate. These sites are more like burial grounds than liquid disposal sites: the plutonium is present in discrete scattered locations at very high concentrations and at lower levels in the balance of the soil.

Using the similarity to burial grounds

With the burial grounds, the agencies recognized that sampling less than the complete volume of the burial grounds would never satisfactorily characterize the waste. As a result, the agencies selected the exploratory method in which the burial grounds are exhumed and the wastes are segregated and then treated according to content and hazard.

A similar approach seems prudent here. However, because this is a liquid waste site and because the primary hazard is plutonium, worker exposure is a large potential issue. DOE should minimize the worker contact with the wastes by using remotely operated bulk earth moving and processing equipment to the greatest degree possible.

One of the remedial alternatives considered is homogenizing much of the waste to meet the ERDF waste acceptance criteria. This may only be acceptable in the least contaminated areas. However, because the locations of high contamination are poorly defined, there is a serious risk that soils containing high levels of plutonium would be included. This could result in serious worker health risks and in generating a large volume of TRU waste that would then require disposal at WIPP. Moreover, in general, dilution should never be pursued as a means of meeting cleanup criteria.

Reminder of previous comments

Many of our previous comments on other waste sites apply here as well, including:

- Invalidity of the subsurface conceptual model used
- Dominance of preferential pathways in the subsurface (lateral and vertical)

- Plutonium chemistry issues and mobility as ions and colloids
- Inadequacy of the numerical code selected to evaluate risk (RESRAD)
- Inadequacy of barriers to prevent infiltration due to lateral water movement
- Inadequacy of barriers to continue protection for as long as needed

Additionally, recent work by Linda Soderholm and others elucidating the structure and behavior of plutonium polymer shows that it is made up of sparingly soluble anionic colloids, which further challenges the assessment of the long-term risk from plutonium left in the soils.

Evaluating the cost analyses

The plan reflects a process that appears to be biased toward minimizing near-term costs. Instead, the process should ensure that the technical merits of the alternatives are evaluated objectively and given priority. Costs should be used only as a balancing factor among those alternatives deemed acceptable (that pass the threshold criteria). Cost calculations must include the full, non-discounted life-cycle cost of each alternative, including the costs for lost land use and for natural resource damages, which are often either ignored or not enumerated.

The reported cost estimates are misleading. Even though the cost evaluation asserts very detailed costs for each alternative, actual barrier design was left for later. Clearly, design assumptions were made for cost estimating purposes. Those design features (including subsurface features) significantly affect barrier construction costs and performance and, therefore, should have been detailed in the plan. The feasibility study screens out all barriers except the Hanford Prototype Barrier (Table 4-1). Despite this, the cost analysis discussion in section D details a four meter thick monofill evapo-transpiration barrier. Similarly, vertical barriers are considered in the feasibility study, then rejected based on a lack of understanding of the subsurface and certainty over whether they will work.

Revising the alternatives comparison table

The plan's Table 2 compares the alternatives against the nine CERCLA criteria. We believe many of the ratings in the table are incorrect. In particular, the ratings overstate the usefulness and protectiveness of caps and barriers. Further, providing detailed costs in the table tends to divert readers from the more important performance criteria. Though the costs should be detailed in the text, the table analysis should evaluate the costs on a low-medium-high basis, just as is the case for the other criteria.

The preferred alternative is not protective and must be rejected

In short, the plan's preferred remedy is capping the most contaminated soils and moving the least contaminated soils to ERDF. But the risk analysis shows that this approach is not protective: in fact, within one thousand years, the risk is as high as if nothing had been done at all.

The plan also includes the possibility of using in-situ vitrification; however, the plan does not assess the risks that this process may fail. Although we encourage DOE to try new approaches and demonstrate innovative techniques that offer a significant potential for improving waste treatment, decision makers, regulators, and the public must still clearly understand the limits and risks of the proposed methods.

We believe that a fair weighing of the CERCLA criteria produces a very different result. When the alternatives are assessed properly, it becomes clear that the preferred alternative should be complete removal, treatment, and appropriate disposal (to WIPP and ERDF).

Please call me or Dirk Dunning at 503-378-3187 if you have questions or would like clarification on these comments.

Sincerely,

Ken Niles
Assistant Director

Cc: Nick Ceto , U.S. Environmental Protection Agency
Jane Hedges, Washington Department of Ecology
Russell Jim, Yakama Indian Nation
Stuart Harris, CTUIR
Gabe Bohnee, Nez Perce
Susan Leckband, Chair, Hanford Advisory Board

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AMCP		Foley, Bryan (Actionee)	OCC		Williamson, Barbara
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