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Mr. Cliff Clark
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, Mailstop A5-15
Richland, WA 99352

Dear Mr. Clark:

Thank you for the opportunity to review the U.S. Department of Energy's (DOE) draft Hanford Site Third CERCLA Five Year Review. We recognize and applaud the enormous effort that has gone into cleanup of the Hanford Site during the past five years. We also note the work that has gone into development of this review. Oregon believes that the Five Year Review process could be an invaluable component of a successful cleanup of the Hanford Site, as it provides a regular opportunity to assess, at site-wide scale, the status and effectiveness of cleanup actions. In that context, we are disappointed in the current draft Five Year Review, for several reasons.

As we have stated in the past (i.e., comments on the 2006 Five Year Review, January 27, 2010 letter to Dave Brockman outlining expectations for the current Five Year Review), we believe a Five Year Review should be a tool used for critical technical review of remedies. Our 2010 letter commented that *"Though it may be acceptable from a narrow regulatory perspective to claim protectiveness of a remedy on the basis of institutional controls, or on consideration that work is still in progress in a particular OU with the expectation that it will be effective upon completion, such a claim says little about the actual protectiveness of the remedy and can be misleading in evaluating actual protectiveness. It is far more important to critically evaluate whether the remedy is truly working (are concentrations of contaminants decreasing or have they dropped below the remedial objective) and if there is additional information that calls for a reassessment of whether the remedy might not continue to function in the future, or might not achieve Remedial Action Objectives (RAOs).*

As DOE nears completion of cleanup in the river corridor and moves toward final Records of Decision (RODs), it is increasingly important to assess the actual effectiveness of remedial actions – without consideration of institutional controls and without the presumption that work in progress will be effective when completed. We believe the sentiments we have expressed in the past remain pertinent, and are disappointed that DOE has again chosen a narrowly-focused, limited evaluation of cleanup in this review.

EPA guidance (OSWER # 9355.7-03B-P, June 2001) for conducting a Five Year Review recommends a more thorough analysis to assess the performance of the remedy:

> "The purpose of a five-year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. Protectiveness is generally defined in the National Contingency Plan (NCP) by the risk range and the hazard index (HI). *Evaluation of the remedy and the determination of protectiveness should be based on and sufficiently supported by data and observations"* (emphasis added).

In evaluating the effectiveness of interim actions, this review routinely falls short of the criteria laid out in the OSWER guidance – that evaluation needs to consider both implementation and performance, and conclusions be sufficiently supported by data and observations. In many cases, the approach in the review seems to consider only implementation, with the implicit assumption that by simply having completed the actions identified in an interim action ROD (e.g. excavate a waste site to 15 ft, establish a pump and treat system), performance can be presumed. Based on confirmation of project implementation, the report says repeatedly that the remedy is "functioning," and implicitly is protective. As examples:

- For the 100-F, 100-KR-1 and 100-NR-1 operable units (OUs), the report states "The interim remedy is functioning within the specified RAOs. The remove, treat, and dispose (RTD) action has proven to be functioning at a depth of 15 ft . . . and has also been demonstrated to be protective of groundwater and the river throughout the soil column." No monitoring or other observational data are provided to document the effectiveness of remedies.
- For the 200-ZP-1 OU, the report states "The interim remedy is functioning within the specified RAOs. The pump and treat systems have remediated the carbon tetrachloride in the groundwater." This claim is made in spite of the reality that the pump and treat has removed less than two percent of carbon tetrachloride released to the soil at 200-ZP-1, despite the fact that the carbon tet plume is growing in size and concentration, and perhaps most importantly, that the most concentrated portion of the plume has migrated to the northeast, directly through and past the network of extraction wells (Figure 31).
- We also note that in several cases, model outputs are cited as evidence that remedies are effective and protective. Given the failures of model forecasts acknowledged in the report (e.g., the ISRM barrier (p. 46), 300-FF-5 (p168)) and the associated ineffectiveness of remedies based on model projections, use of model forecasts to "demonstrate" protectiveness is inappropriate and should not be done.

Assertions of protectiveness are in almost all cases made without supporting information. The text acknowledges as much - statements of protectiveness are routinely made, then immediately qualified by text saying that risk assessments are protective "until a risk assessment is completed . . ." In other words, assertions of protectiveness are not based on any substantive information, but are stated as an article of faith. Until risk assessments are

completed and demonstrate protectiveness for human health and the environment, evaluations of protectiveness must be deferred. This issue was raised during the 2006 review. DOE ultimately deferred most determinations of protectiveness in that review, pending completion of risk assessments. Five years later, most of those risk assessments are still not complete - for the River Corridor, for the River Component, or for the Central Plateau – so determinations again need to be deferred.

The repeated assertion with protectiveness statements that that there is "No outward evidence of ecological harm" is baseless. These statements reflect flawed logic and are misleading. Just as there are not yet results from risk assessments to determine protectiveness of interim remedies, there is no evidence to support a claim of "no ecological harm." More to the point, this assertion is contradicted by extensive information that is indicative, or at least strongly suggestive, of ecological harm – long-term, widespread requirements for institutional controls because of residual contamination of soils, the vadose zone, and groundwater; widespread and persistent violation of water quality standards for radionuclides and hazardous chemicals, often by orders of magnitude; extensive disturbance of habitat by response actions; and routine reporting of contaminated plants and vegetation in quarterly legacy waste reports.

The assertion of no ecological harm reflects a serious shortcoming of the scope of this Five Year Review. There is no mention of natural resource damage assessment (NRDA) in the report. There is also no attempt to assess how remedial actions relate to DOE's NRDA responsibilities - whether the remedies implemented on the site have been effective in terminating ongoing injury to natural resources and whether remedies are helping to return the Site to ecological baseline condition. The authors of the report should be aware that NRDA assessment and restoration is a non-discretionary responsibility of DOE at the Hanford Site, and the review should make at least some effort to assess whether cleanup is helping manage/minimize DOE's potential NRDA liability. While it is not the responsibility of this review to conduct the NRDA assessment or to plan restoration, the review should at least acknowledge DOE's NRDA responsibilities. Statements such as "no outward evidence of ecological harm" ignore the widespread occurrence of likely injury to natural resources. Consideration of NRDA in these reviews is also important for compliance with DOE guidance that five-year reviews (1) optimize the effectiveness and implementation of remedy requirements, (2) integrate the five-year review with other LTS requirements, and (3) identify opportunities to reduce life-cycle project costs (Memorandum from Jessie Hill Roberson, March 19, 2002).

Finally, on the subject of protectiveness, this report makes frequent use of a new concept – that DOE "deems" a remedy to be protective. Absent an explanation of the quantitative requirements for attaining this status, we have to fall back on the dictionary definition of "deem" - to consider; to think; to have an opinion; to suppose. The decision to "deem" seems contrived; an effort to lend gravitas to what is in reality no more than an opinion.

There are a number of conflicting statements in the document. Perhaps most important, the executive summary states that the remedies in the 300 Area "are protective " whereas Section 4.6 states that "the remedy is not functioning as intended" (p172, line 10) and that " ….the

interim remedy….(has) not been protective of human health and the environment because the groundwater cleanup standards are not predicted to be met. (p 176, line 14). We encourage careful internal review and technical editing to locate and correct such statements.

While not intended as a comment on this particular review, we note our concern about a topic closely related to performance and protectiveness of interim remedial actions. DOE has often expressed a hope, even an expectation, that interim action RODs will morph to final RODs with a minimum of additional cleanup. Based on information and discussion in this review, Oregon has strong concerns about a final cleanup that is based on the cleanup goals and approaches developed for interim RODs, for several reasons:

- Target cleanup levels in interim cleanup standards are typically set as a multiple (2x in the river corridor, 10x in the Central Plateau) of drinking water or aquatic life standards. There is no evidence that the assumed attenuation or dilution of groundwater by these factors is occurring.
- Secondary contaminants (e.g., in the river corridor, anything besides chromium, strontium 90 (100-N only) and uranium (300 Area only)) are typically not addressed in interim cleanup plans or actions. These contaminants persist in groundwater, often with little change in concentration following cleanup actions. Final RODs must address all contaminants identified as risk drivers in risk assessments as well as all contaminants occurring at concentrations that exceed relevant numeric criteria.
- Residual contaminants, especially in the vadose zone below the depth of interim cleanup, are acknowledged in the report as contributing to continued contamination of groundwater plumes. The approach widely used in interim cleanup, of removing only the top portion of contaminated material in waste sites, does not appear to be protective in the long term.
- Interim cleanup decisions have in some instances relied on model simulations that have proven to be inaccurate, notably for chromium retention by the in situ redox manipulation barrier, and uranium mobility at 300-FF-5. Cleanup decisions must be based on good science and good data, not on flawed models.

Finally, we note an additional concern that is not a specific comment on the five year review, but speaks to an issue raised by the review. Over several years, we have seen an ongoing erosion of target cleanup standards for the river corridor at Hanford. For many years, DOE said that cleanup in the river corridor would support, with a few limited exceptions, unrestricted use. Over the past several years, that target has slipped to unsupported surface use, due to widespread presence of residual contaminants below the 15 foot depth. This review notes further degradation of cleanup standards (and corresponding potential future land uses), with cleanup replaced by institutional controls to preclude irrigation of some locations for 140 years to minimize migration of tritium and for an unspecified, probably longer period at 100-N. Oregon does not support the erosion of cleanup goals, primarily because the continued presence of potentially mobile contaminants in the river corridor jeopardizes the long-term health and safety of the Columbia River.

In summary, we strongly recommend this report be extensively revised before it is finalized. Specifically, we encourage DOE to rewrite statements of protectiveness to more fully

characterize the actual protectiveness of remedies, and to defer determinations of protectiveness until reliable risk information is available. We also urge DOE to remove unsupported comments asserting "no outward evidence of ecological harm." We look forward to continuing to work with DOE on Hanford cleanup that will insure long-term protectiveness of human health and the environment.

Should you have any questions or wish to discuss any of our comments, please call Paul Shaffer of my staff at 503-378-4456.

Sincerely,

Ken Niles
Nuclear Safety Division Administrator

cc: Dennis Faulk, U.S. EPA
Jane Hedges, Washington Department of Ecology
Hanford Natural Resource Trustee Council