



Oregon

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March 25, 1999

Mr. Richard Holten
U.S. Department of Energy - Richland
P.O. Box 550
Richland WA 99352

Dear Mr. Holten:

The Oregon Office of Energy (Oregon Energy) has completed an evaluation of the U.S. Department of Energy's (DOE-RL) Groundwater/Vadose Zone Integration Project Specification (DOE/RL-98-48), Draft C.

Oregon Energy continues to be a strong supporter of the Columbia River Comprehensive Impact Assessment (CRCIA). We also support site wide integration of Hanford activities that impact the groundwater, vadose zone and the Columbia River. However, our view is that the current effort described in the Project Specification is not providing the needed integration.

Our evaluation of the project specification included a review and analysis of the document in the context of ongoing meetings and discussions with the project staff over the last year. The number of meetings became simply overwhelming, which minimized Oregon Energy's participation in most of the meetings. Participation by phone was less than adequate. In October 1998, we cut back even further on meeting participation and awaited the issuance of the project specification.

As this effort began, DOE-RL committed to use the CRCIA Part II Requirements Document as a template for an impact assessment to determine the effects of Hanford-derived materials and contaminants on the Columbia River ecosystem. Such an assessment would provide the needed data needed to move forward on an integrated approach to the cleanup of the Hanford Site.

However, there seems to be a lack of commitment from DOE-RL to move ahead with an actual assessment. It appears that DOE-RL's technical staff believes they have analyzed this problem in depth and, based on their experience, they have limited the possible approaches and solutions. These restraints do not allow for the approach required to perform an assessment as outlined by CRCIA.

Oregon Energy does not agree with the approach being taken to perform the impact assessment. We believe that the proposed approach will not produce credible, defensible or meaningful assessments of the future risk and may only mislead the public and decision-makers.

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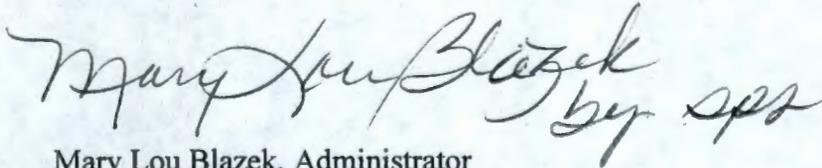
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At this point we see no benefit in DOE continuing with the Systems Assessment Capability. The need still exists to continue with the integration project to ensure that the various programs and projects are integrated and make effective use of resources. A comprehensive impact assessment is still needed, using the CRCIA Part II as a template. In addition, the credibility of such an assessment requires some level of independent oversight.

Oregon Energy is committed to working with DOE-RL to ensure an effective process is created to accomplish this assessment. It is our goal to help DOE-RL better meet the needs of offsite agencies responsible for protecting public health and safety.

Attached are additional findings, comments, concerns, and recommended corrective actions. We look forward to working with you and your staff to restructure this process using CRCIA Part II as a template. If you have any questions or comments about Oregon Energy's evaluation, please call me at (503) 378-5544 or Dirk Dunning of my staff at (503) 378-3187.

Sincerely,

A handwritten signature in cursive script that reads "Mary Lou Blazek" followed by a flourish and the initials "by sps".

Mary Lou Blazek, Administrator
Nuclear Safety Division

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Attachment
Oregon Office of Energy comments on
U.S. DOE's Groundwater/Vadose Zone Integrated Project Specification
DOE/RL-98-48, Draft C

1. The project specification appears to be a partial compilation of existing data. To be useful, it needs to be expanded to include a complete historical base of waste releases and disposals at Hanford. It needs to identify which information is actually known and what is conjectured.
 - To resolve this, it may be necessary to scan in the Hanford historical documents and compile the data to support cleanup. This is needed to support laws on historical records and to foster openness as well. Battelle Pacific Northwest National Labs developed a software package called SPIRE, which is perfectly suited to this task. This project should be implemented immediately with a completion goal of not more than five years.
2. The science and technology basis for the project is not well supported. In 1998, the project held a series of four meetings to allow national laboratory scientists to gather their impression of what is needed for science and technology. It appears that a lack of preparation for these meetings provided little or no Hanford background to allow for good analysis and input.
 - The science and technology list must include extensive input from people outside the Hanford and national lab science communities. This input must include the expert panels, the regulators, the stakeholders and the Tribes.
3. Integration of the project is still poor. The Groundwater/Vadose Zone integration project continues to use a laissez-faire approach to integration. This will almost certainly result in failure of the project.
 - This problem requires senior management action to correct. The project needs to be given written direction providing the necessary authority, responsibility and accountability to perform the integration. It is essential that the other site projects, including the Office of River Protection, actively participate in the project and support it in its efforts.
4. The project has done a good job of incorporating normal construction engineering tools, such as critical path methodology to the project. These tools begin to show the need for data from and interface with site projects and programs. However, they need to also be used to allow management to clearly see the impacts of the very real funding limitations in various program and project areas. These tools will clearly identify the impacts of cost cutting. It will in many cases identify where cost cutting on characterization and data gathering now will result in a lack of needed information to make decisions in later years. This in turn could result in missed milestones and failure of other program elements. This is a powerful tool and should be used more heavily.

Currently, the project is using the tool based on an unconstrained budget scenario. This fails to provide decision-makers with the critical information they need as they adjust budget priorities.

5. The project specification continues to use the faulty identification of program elements first used a year ago (Figure 1-2). At that time, Oregon Energy identified at least two missing major program elements. These were the "waste form release" element to analyze the mechanisms and rates of release of wastes from the various waste forms into the vadose zone; and the "impact assessment" element to assess not just the risk, but also the other impacts of Hanford's wastes.
 - This can be easily corrected by inserting these two major program elements.
6. Oregon Energy does not agree with the project team and staff on the meaning uncertainty and the structure/function of the Columbia River Comprehensive Impact Assessment (CRCIA) upon which the integration project is supposed to be based. For the project to produce defensible and credible answers, it must be based on "good" science – science that is rigorous and based on known conditions. Good science is not based on unproven speculation and belief.

It is apparent that both the Groundwater/Vadose Zone expert panel and the Groundwater Modeling expert panel clearly understand these issues.

 - One way to correct this problem is have the project team and staff accept the meaning of the term uncertainty as understood and used by the CRCIA team. With this basis, they should use CRCIA Part II as the template for a credible impact assessment.
7. The integration project staff and other Hanford staff seem extremely reluctant to implement the recommendations of USDOE's own expert panels, stakeholders, or regulators. The prime example of this is the SX-Tank Farm expert panel's recommendation over two years ago to drill a slant well in the SX tank farm. This recommendation has still not been implemented despite its obvious value. Rather, DOE has a hold on drilling in its tank farm Basis for Interim Operation (BIO). New drilling required by the regulators will likely be forced to use existing boreholes or drill far from the tanks. Neither of these will address the problem needed of obtaining samples from the soil column under the tanks without drilling through the highly contaminated regions immediately under the tanks.
 - Oregon Energy urges the project staff to follow the expert panel's recommendations and expedite work to resolve the safety issues in the BIOs and drill the wells.
8. We endorse the recommendations and comments of both the Groundwater/ Vadose Zone expert panel and the Groundwater Modeling expert Panel. However, we fear that the project staff may misread the Groundwater Modeling Panels recommendations on Monte Carlo modeling.

Monte Carlo or other stochastic modeling is only valid if the conceptual and numerical models are valid and closely match reality. Neither of these is true of the existing Hanford models.

9. Peer review is essential, but does not provide assurance that the approaches taken are valid. If the peer reviewers do not identify miscalculations or hidden assumptions made by the project staff, they may fail to separately identify these problems. As a result, the project may pass peer review and still not adequately protect the environment or public health and safety.
 - Use peer review cautiously and judiciously. Do not attempt to portray peer review as providing scientific credibility or defensibility to the project. Thoroughly evaluate the potential impacts from the analysis of anyone who comments, without regard to their education or background.

10. The project has attempted on a couple of occasions to use "baseline assumptions". These "assumptions" included DOE's current funding baseline of decisions as a basis. These prejudice the outcome of five or more major Environmental Impact Assessments. These assessments need the input of the data and tools gathered by this project. They must also assess the full, reasonable range of alternatives. To a large degree, these tools will likely aid in identifying what these alternatives may be. By potentially using these assumptions in developing the models and assessment, a circular loop could be created, making the entire assessment useless.
 - Do not use baseline assumptions in the development of the assessment or its tools.

11. The current groundwater modeling work is proceeding in advance and mostly independent of the integration project. It lumps together numerous soil layers based solely on their hydraulic conductivity. It ignores the chemical nature of the wastes and their interaction with the soil and water. It ignores colloidal transport and all chemical interactions. It ignores groundwater and vadose zone interaction. It relies on using the model itself to set the input parameters for flow from the Cold Creek and Dry Creek basin, which creates a circular argument. It disregards conflicting data on the flow input from the creeks, because the measured flows don't support the model. And worst of all, it is highly calibrated. The Groundwater model uses extensively adjusted transmissivities. It claims to be based on the actual measured transmissivities, but a direct comparison of the transmissivities used with those actually measured shows that the model is not based on actual field conditions. Compare the data in Figures G-40 and G-41. Areas of high and low transmissivity in the actual data frequently do not show up in the model transmissivity data.
 - Abandon the existing groundwater modeling. It is not and will not be useable in the integration effort. Stop all funding of the groundwater modeling work until the integration project can catch up. Transfer these funds instead to support actual data gathering and characterization

work. Require that calibration of models be used only very sparingly and that each time it is used that this be identified clearly as a major assumption requiring field verification.

- Water flow from the Priest Rapids aquifer flows to the surface to form Cold and Dry creeks. There is no reason to believe this is not also occurring on the submerged portions of the Rattlesnake, Yakima and Umtanum faults. There may be relatively large quantities of water entering the Hanford unconfined aquifer from the unconfined aquifer along each of these faults. Also, the water mound to the north of Gable Mountain and West Lake provide additional indication and support that some mechanism exists for water flow from the confined to unconfined aquifer. Current models do not reflect this and site investigation is required to determine the degree and extent of such water flow.

13. The groundwater and vadose zone program staff continue to push the use of retardation coefficients (K_d 's) in the models of contaminant transport. These approaches and models have clearly failed to account for the observed movement of wastes in the past and must be discarded except within the narrow range of application where the data exists to show this approach to be valid.

Last year, Sandia National Labs proposed replacing the standard model using K_d 's with a similar model using three zones with different K_d 's. This model included near-field, intermediate-field and far-field zones. This model too will not work. Even under casual analysis, this model will show the waste to move down to the interface between the intermediate- and far-field zones and then stop completely. There is no need to ever run such a model on any computer. Conceptually, models like this have predetermined outcomes. The model fails to represent actual field conditions. Since the modeler does not believe this material can move through the soil, the modeler sets high K_d 's in the far field and the model correspondingly predicts that the waste will not move. This is an invalid approach. Such models have no value. Appendix G shows some of this same faulty reasoning.

14. Figure 2.5 purports to show the areas of contamination. Instead, it displays a map of the proposals DOE-RL has made to consider these various areas. In particular, the 200 Areas are shown to be extensively contaminated not just within the 200 East and 200 West areas, but also throughout the pristine area in between and in a large buffer area around the 200 Areas. The 300 Area is shown as having moderate contamination despite areas of extensive contamination. The Supply System area is shown having minor contamination despite the presence of a major high-level radioactive waste burial ground. And, the entirety of the shoreline of the 100 Areas is shown to be moderately contaminated despite the contamination being limited for the most part to the reactor areas.

- Correct the map to show actual field conditions.

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15. The project specification assumes in several places that only 99 percent retrieval of tank waste will be required and that, at the conclusion of tank waste retrieval, the tanks will be "closed." The document appears to assume this is a simple process involving burial, as there is no process or time allotted for examination and implementation of alternatives. These must include analyses of alternatives that recover the leaked waste and immobilize it in place. Similarly, other sections of the document appear to presume that waste disposal on site will continue or be allowed. This may or may not be true. The outcome of the assessments may show this to be acceptable, or they may equally show the urgent need to retrieve buried waste. It is essential that the integration project make no assumptions about what the outcome of decisions will be. Rather, this project must provide the tools to allow the legal decision processes to fully and fairly assess the potential impacts of various decisions on the environment and the protection of the public health and safety – now and in the future.

This was, in part, the reason that the CRCIA did not include decisions in its process. The CRCIA is intended to provide the assessment tools; the decision process must occur separately. If these are merged, there is a serious risk that the assessment tools will become so hopelessly entangled in the decision processes that they become worthless and misleading.

16. Appendix D is an inadequate description of what is known of the history at Hanford. It seems to downplay the history and avoid any admission of past bad practices, rather than be an informative guide for an assessment. DOE-RL disposed of large quantities of liquid high-level waste directly to the soil. These are referred to as waste discharges or as low-level waste. The flow of cascade waste from the tanks to the soil was disposal of high-level waste. All other intentional disposal of waste in specific retention trenches was also disposal of high-level waste. For the integration project to be successful, DOE-RL must provide a forthright and direct accounting for past disposal processes at Hanford.
- Rewrite Appendix D with much greater specificity and in direct language detailing the past practices on the site and the actual magnitude of the problems to be solved. Appendix G contains some of the data and does a better though still incomplete job of detailing the past practices. Appendix G contains no realistic evaluation of the uncertainty in the estimates of the sizes of the various sources. It also does not address the variation in chemical form and nature of the wastes in the various disposals to any degree.
17. There is minimal reference to the state of Oregon in this document. The Hanford Advisory Board, state and local regulators, Tribal Nations, and other special interest groups are mentioned throughout the document. We do not view the two million residents of Oregon who live, work, and recreate along the Columbia River as a "special interest group."

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