



# Oregon

Theodore R. Kulongoski, Governor



## OREGON DEPARTMENT OF ENERGY

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August 22, 2008

Mr. Jose R. Franco, Assistant Manager  
Richland Operations Office  
U.S. Department of Energy  
P.O. Box 550, MSIN A3-04  
Richland, WA 99352

**RECEIVED**  
SEP 03 2008  
**EDMC**

Re: Review comments on *Remedial Investigation Work Plan for Hanford Releases to the Columbia River*, DOE/RL-2008/11, Revised Draft A

Dear Mr. Franco:

Oregon appreciates the opportunity to review the revised draft work plan for DOE's proposed effort to assess risks from Hanford releases to the Columbia River, traditionally referred to as the Columbia River Component or CRC. The success of the CRC is of vital interest to Oregon because the river is the ultimate receptor of water-borne releases from the Hanford Site and thus integrates many Hanford releases and the potential ecological and human health impacts of those releases. The CRC is also vitally important to Oregon because more than a million Oregonians live, work, and play in or near the river, and are thus vulnerable to contaminant releases from the Hanford Site.

In our May 2008 letter to you, we expressed optimism regarding the plan, while also noting some questions and concerns regarding what we expected to see in the plan, based on conversations at the April 17 workshop. Regrettably, the revised draft plan falls well short of our hopes for a sound work plan, and has design and methodological problems that we believe make the plan untenable as an effective work plan for the CRC. Our comments are attached. Because of the serious nature of these concerns, we do not believe it is timely to comment on technical details of the proposed plan, given the major issues that must first be resolved. We encourage DOE to defer field sampling for the CRC until significant issues in study design and sample analysis have been addressed. We would, however, support a limited 2008 field effort to develop and refine methods (e.g., for identification and characterization of groundwater upwellings and to refine sampling and tissue analysis of sturgeon).

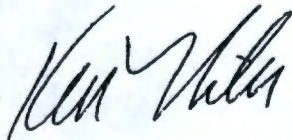
In making our comments, we understand that representatives of EPA and the Washington Department of Ecology met at length last week with staff from DOE and your contractors. We have no way of knowing the substance of those discussions or how the plan might have changed as a result, so our comments consider only the July draft work plan.

Oregon has been consistently engaged in development of work for the CRC, because of its significant implications for Hanford, for the Columbia River ecosystem, and for citizens of Oregon. We look forward to working with DOE, its regulators, and with other Hanford

stakeholders to develop a study plan that will provide a reliable risk assessment for the Columbia River.

Thank you for your consideration of our comments; 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,

A handwritten signature in black ink, appearing to read "Ken Niles". The signature is fluid and cursive, with the first name "Ken" being more prominent than the last name "Niles".

Ken Niles  
Assistant Director

Cc: Jane Hedges, Washington Department of Ecology  
Nick Ceto, U.S. Environmental Protection Agency  
Hanford Natural Resource Trustee Council

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## Review comments

1. The DQO lacks specificity, so the sampling design described in this work plan lacks necessary detail. The DQO for the study provides only one overly broad study question (Have Hanford-related contaminants in river media been characterized (e.g., nature and extent) enough to quantify risk?) and as such does not focus or guide study design. The result is not unlike trying to build a house without any plans or blueprints. Because specific study goals and questions were never articulated, sampling points have been subjectively assigned without really knowing whether additional data are needed, or what kind, or how much, or where, to support a rigorous, statistically-defensible evaluation of exposure and risk. We raised this concern in our May 23, 2008 letter to you about the CRC, but the plan does not substantively address this concern. Section 4.4 does provide several lists of contaminant sources and contaminants and lists of pathways and receptors, but these come across as laundry lists and they lack the focused conceptual models that prioritize links from releases through pathways and to receptors. By letting everything be of apparently equal priority, nothing is really a priority, so the section never truly provides real guidance. We urge DOE to develop a specific, focused set of problem statements that can shape a targeted sampling design.

We note also that vague sampling design complicates data analysis and interpretation of data. If study questions are clearly defined, sampling design logically follows, and in turn data analysis should be straightforward. One of the comments that has been made in reviews of past DOE risk assessments has been that data analyses are not clear or transparent, and that the purpose of analyses is often not clear. We suspect that fuzzy analyses are an inevitable consequence of having ill-defined goals and of a poorly-focused study design.

2. The sampling design for water and sediment seems more likely to obscure than to identify risk As we understand the work plan, sampling and data analyses for the project are organized around "sub-areas," with the Hanford reach divided into two sub-areas, including the 100 Area sub-area (Vernita Bridge to river mile 365, upriver of Hanford townsite) and the 300 Area sub-area (river mile 365 to 339, about one mile downstream of the Richland pump house). Data will be aggregated to the sub-area level for analysis (e.g., analyses will use the average concentration of all samples taken in the 100 sub-area, and will compare that average to a benchmark to identify occurrence of risk). Because contaminant plumes and impacts in the Columbia River at Hanford are mostly local in scale (e.g., plumes of chromium and strontium at individual reactor areas), analyses done at the sub-area scale virtually insure that any data that might be collected at hot spots (small areas with relatively high contamination) will be obscured by the low values for samples from the rest of the sub-area. High numbers will be diluted into an average that implies the sub-area is not contaminated in comparison to a benchmark, or that the average concentration is not higher than the average for a different sub-area. If hot spots exist, they will likely be missed, and risk will be underestimated or missed altogether.
3. A critical pathway for contaminant release and exposure is virtually ignored Groundwater upwellings are a potentially critical, but poorly known, source of human and ecological exposure to Hanford contaminants. Upwellings were discussed at length at the April DQO workshop for the CRC and we thought we heard a commitment from DOE to characterize the

presence of and risk associated with upwellings. This plan notes the potential importance of upwellings, including deep upwelling "through the river bottom" and asserts that characterization of groundwater plumes is a focus of the work (pp. ES-13, 14). The actual effort to characterize groundwater upwellings, however, has been reduced to an ill-defined reconnaissance survey. The Sampling and Analysis Plan (SAP) in Appendix A doesn't even provide a plan for a plan for this work; it doesn't indicate the extent of possible sampling, doesn't identify target areas for reconnaissance, doesn't provide a work schedule, and the description of methods is limited to a statement that sampling "will be conducted using a Trident probe, aquifer tube sampling device, or Asiatic clams." We can't imagine any regulator viewing this as an acceptable "work plan" in making a decision to approve field work.

Moreover, to the extent that groundwater upwellings are discussed, study design is couched in terms indicating the focus will be on known upwellings in shallow, near-shore areas, such as the seeps and shallow plumes in reactor areas and in the 300 Area. The planned use of aquifer tubes and Asiatic clams strongly implies that characterization of "upwellings" will be focused on, or even limited to, shallow areas already known to be areas of groundwater release; Section 2.5.1 reinforces this concern. This limited focus completely misses the point that what is needed is a project to identify, characterize, and quantify upwelling of groundwater and contaminants throughout the river, especially in deep-water areas of the river and in near-shore areas where existence of plumes has not previously been well-defined. By continuing to ignore deep upwellings and associated exposure, DOE (and regulators) will remain unaware of actual risks. Overall, this plan seems to have backed almost completely away from the commitments made at the April workshop regarding groundwater.

4. Proposed analytical methods are inappropriate. Using water as an example, proposed methods for more than half the "target analytes" for the assessment as listed in Table 3.1 of Appendix A have required detection limits higher than human health and/or ecological benchmark concentrations. For almost 40 percent of target analytes, required detection limits are more than 10 times higher than a benchmark and in extreme cases are more than a thousand times higher. Similar problems exist with detection limits for analyses of soil and sediment and for fish tissue. It makes no sense to waste money and effort collecting or analyzing samples for these analytes, since resulting data can't/won't inform risk assessment. At best, we will have no idea whether benchmark concentrations have been exceeded; to the extent that benchmark concentrations are exceeded (occasionally or routinely), associated risk will be completely missed.
5. DOE's proposed approach will improperly eliminate contaminants from risk analysis High detection limits are exacerbated by DOE's approach for identifying contaminants of potential ecological concern (COPECs) for the assessment. Figure 4.9 of the draft plan indicates that any contaminant not detected by laboratory analyses will be dropped from further consideration as a COPEC. Under this procedure, a contaminant could be present in some (or even in all) water, soil, sediment or biota samples at a concentration equal to or greater than a benchmark concentration, but it would not be identified or considered in the risk assessment. In extreme cases, contaminant concentrations could be tens or hundreds of times higher than a benchmark, yet the contaminant would be dropped from consideration as a

COPEC and risk would wrongly be presumed not to exist. When we noted concerns about detection limits listed in the draft plan during the July 14-15 meeting of the Hanford Natural Resource Trustee Council, Jamie Zeisloft of DOE commented that DOE shared our concern about detection limits, but there have not been changes to detection limits in the revised plan.

6. The proposed design for fish sampling needs to be revised, for several reasons. Our first concern is that the proposed design focuses on human health effects and ignores ecological risk to fish. No explanation is given.

Our second concern is with the proposed low number of samples. DOE is proposing to collect and analyze five fish samples per species per river sub-area. The plan proposes a sample size of one from pre-selected locales in each sub-area. From a statistical perspective, a sample size of one is not workable- it precludes any statistical consideration of spatial variability, and forces the data analyst to assume spatial variability does not exist as a prelude to testing or stating any other inferences that might be made. A sample size of five fish per sub-area, especially when sub-apportioned to a size of one, is simply not sufficient to characterize the variability in contaminant concentrations among fish, let alone to identify or characterize spatial variability that occurs (e.g., for fish that do/don't spend time in a contaminant plume), or to characterize variability in contaminant levels among fish as a function of fish age, weight, length, gender, spawning status, or other factors. To the extent that differences in contaminant concentrations occur in fish, for whatever reason, the proposed sampling design will not be able to meaningfully identify or explain them.

We are also concerned about how different fish tissues will be analyzed. No discrete analysis is planned for the fatty tissue associated with skin and fillets, for a tissue widely recognized as having high concentrations of some kinds of contaminants. Also, the proposed design, which would combine "organs" into a single subsample, is inappropriate. Contaminants partition differently into different tissues, and adverse biochemical, physiological, and/or reproductive effects will occur at different concentrations in different tissues. By lumping all "organs" and treating them as one kind of tissue, useful information will be lost, as will the opportunity to meaningfully assess risk in specific organs (e.g., liver, kidney, and gonads).

Based on discussions at the August 7 workshop organized by the Washington Department of Fish and Wildlife, proposed protocols for sturgeon need to be redesigned. Available life history data for the Hanford Reach indicates that some fish move freely from Priest Rapids Dam downstream into the Lake Wallula pool, so as discussed at the workshop, sampling by sub-area won't be effective in terms of characterizing body burdens of contaminants in relation to contaminant releases. Also, it was pretty obvious from the discussion that basic physiology and toxicology data for sturgeon are poorly known, so effective risk assessment will require an extensive amount of supporting basic research. The planned approach of sampling only slot fish (i.e., 48-60 inch length) might be acceptable for a human health risk assessment, but is not a credible approach for ecological risk assessment. This approach misses any opportunity to assess risk to fish at different life stages and sexual maturity, misses eggs in gravid females, etc. Also, it appears from workshop discussion that sturgeon population density in the Hanford Reach/Wallula pool is substantially lower than in the reaches defined by downriver or upriver (at least in the Snake River) dams. Unless/until the reason(s) for the low population density at Hanford/Lake Wallula are understood, any risk

assessment will carry huge uncertainty. Finally, the planned risk assessment for sturgeon appears to rest on a presumption that the benchmarks developed for other fish species are relevant to sturgeon. We do not believe there are data to support this presumption. The life history, life span, and size of sturgeon are vastly different from those of other fish species that live in the Columbia River, so similarity of toxicological thresholds is unlikely (just as they differ between, for example, rodents and humans). We note also that data from recent toxicity studies conducted as part of risk/injury assessment for white sturgeon on the Kootenai River indicate greater sensitivity in sturgeon – acute toxicity of copper and herbicides in juvenile white sturgeon was appreciably lower than in a common test species (rainbow trout).

7. Oregon and other stakeholders have repeatedly encouraged DOE to incorporate periphyton sampling in its risk assessment work. We most recently repeated this recommendation in our May 23 letter and noted several good reasons for doing so. Once again this recommendation has not been incorporated into the study plan.
8. We note with discouragement that there has been no effort in this plan to embrace natural resource injury assessment, or to collect samples/data that might integrate this study with injury assessment efforts.
9. Finally, we take exception to the statement in Section 4.1 of the plan, “The result of the DQO process was a consensus path forward for data collection, which is detailed in the SAP.” This assertion conveys a distorted impression of workshop results. There was never anything close to a stakeholder consensus on the DQOs for this project.

DOE recently revised the Draft A work plan for this project, based on comments from the U.S. EPA and Washington Department of Ecology. As we review the revised draft, it is apparent that changes to the original plan are largely cosmetic – rearranging text and tables, without substantive changes to address the fundamental flaws of the first draft. In a July 30 e-mail from Larry Hulstrom (Washington Closure) to John Gear (ODOE), Larry stated that “In general, the changes that were made did not affect the planned number or locations of samples or affect the quality control planned for the work. Much of the revision included moving text...” Moving snippets of text and adding a few maps cannot fix the underlying problems of this work plan.

The bottom line is that this plan lacks clear objectives, and so lacks a coherent sampling design to address those (unstated) objectives and measure risk. The fundamental design (built around river sub-areas) is flawed, it proposes collection of too few samples, and it relies on analytical methods that can't meet programmatic needs. It ignores critical sources/pathways for contaminants (i.e., groundwater upwellings). It is designed around sample units (river sub-areas) that are completely inappropriate for identifying and quantifying risks that will occur on a much more localized spatial scale. In short, to the extent that there is exposure and risk to humans and the environment in the Hanford Reach of the Columbia, we do not believe the plans described in this document can provide a credible assessment of human health or ecological risk.