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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10 HANFORD PROJECT OFFICE  
712 SWIFT BOULEVARD, SUITE 5  
RICHLAND, WASHINGTON 99352

December 12, 1994

K. Mike Thompson  
U.S. Department of Energy  
P.O. Box 550, H4-83  
Richland, Washington 99352

Subject: EPA Expedited Review Comments on "Preliminary  
Determination of Chromium Concentration Within Pore  
Water, Periphyton, and Chinook Salmon Eggs at Hanford  
Reach Spawning Area in Proximity to 100-HR-3 Operable  
Unit", BHI-00156, Rev. 0A, November 1994

Dear Mr Thompson:

The U.S. Environmental Protection Agency (EPA) received a copy of the above identified document for an expedited review on December 7, 1994. We have had several discussions with the U.S. Department of Energy and it's contractor staff on this project in recent weeks, and have portrayed our primary concerns for this effort. Under the time crunch of an expedited review, our efforts are cursory at best. As a result, they tend to be general in nature, portraying our overall concerns. Most of the implementation specifics DOE might deploy to satisfy our concerns will primarily be left up to DOE.

If you have any questions regarding these comments, please contact me at (509) 376-9884.

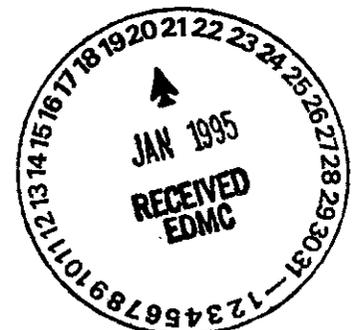
Sincerely,

*Laurence E Gadbois*

Laurence E. Gadbois  
Environmental Scientist

Enclosure

cc: Steve Hope, CH<sub>2</sub>M Hill  
Randy Brich, DOE  
Dave Holland, Ecology  
Jerry Yokel, Ecology  
Wayne Soper, Ecology  
Paul Eslinger, PNL  
Dave Geist, PNL  
Administrative Record (100 Area Generic)



K. Mike Thompson

Enclosure: EPA Comments

December 12, 1994

**General Comments**

## 1. Water Sampling:

A method to accurately sample the water in the hyporeic zone has been of longstanding concern. This has led to each of the Tri-Parties concluding that near-river wells will be used to evaluate exposure risk (100-BC-5, 100-KR-4, and 100-HR-3 qualitative risk assessments) and for points of compliance for remedial actions (100-BC-5, 100-KR-4 and 100-HR-3 proposed plans). The document under review (BHI-00156) identifies a plan to attempt sampling of the hyporeic zone. This deviates from the "near-river-well" approach that has been in place for several years. This is the most high interest aspect of this proposed investigation.

For water data from this sampling to be useful, there are several key aspects to its credibility that must be defensible: (A) That the water samples represent the water environment in which both salmon eggs develop, and the young salmon are exposed to during their first few months of life within the cobble on the river bottom.

(B) If salmon are able to sense the localized contaminated groundwater upwelling areas, and avoid use of those areas for their redds, then contaminated groundwater could be reducing their spawning habitat but not appear to show any impacts in the results of this study.

In response to item (A), the document appears to represent a valid attempt to collect water from the hyporeic zone in the near proximity of salmon eggs. The salmon alevin are considerably more sensitive than the eggs to hexavalent chromium, and the assessment will not provide specific information as to whether or not the alevin have a selectivity regarding groundwater upwelling areas. Selectivity by adult salmon (item "B" above) may be different than selectivity by the alevin.

## 2. River Stage:

Related to item A in comment 1, river stage, both on a seasonal and daily pattern affects the rate of groundwater discharge into the Columbia River. Salmon eggs and larva are exposed to months of groundwater discharge, yet this sampling is a single "snap-shot" in time of this dynamic process. For groundwater sampling in the operable units (a probably much more stable regime relative to the inter-cobble regions of the river bottom) the Tri-Parties have conducted multiple rounds of sampling spanning the annual cycle in addition to considerable historical data, to form a cleanup decision basis for the groundwater operable units. The single sampling identified in the document for review, if successful, should be viewed as a potential starting point for a monitoring program that can then start to feed into the cleanup decision process.

In earlier discussions with DOE, we have pointed out the importance of coordinating this sampling with concurrent measurements in the near-river wells for the 100-H area. In

discussions since, we are told that this coordination is planned, but this is not indicated or detailed in the document. Thus, we have no opportunity to provide specific comments on this coordination.

3. Egg Age:

The female salmon that lay the eggs are new arrivals to the Hanford Reach, and have not had much opportunity to accumulate any Hanford contaminants. Presumably the eggs are relatively "pristine" in regard to Hanford contaminants. As they age in the Hanford Reach gravels, they may begin to accumulate contaminants. The age of the egg (since being laid) is important in the evaluation of egg contaminant-burden information.

In a brief presentation to the Hanford Natural Resource Trustees on December 8, it was indicated that the sampling was now planned for early January. This appears to represent a best attempt to allow the eggs to equilibrate with their surroundings.

4. Analytical Detection Limit (Water):

Chromium is the high-interest contaminant. It's most toxic form,  $Cr^{+6}$ , has a chronic water criteria value of 11 ppb. The analytical detection limit must be well below that, so that values slightly less than 11 ppb have a small uncertainty associated with them.

5. Analytical Detection Limit (Salmon Egg and Periphyton Tissue):

There is no indication of the tissue burdens that are toxic to either of these two organisms. There is also no indication of what contaminant levels in these tissues means to other organisms up their food chain. Both those types of information are needed to evaluate the appropriateness of the 150-200 ppb MDL (minimum detection limit).

6. Station Location:

A method is needed to identify station locations relative to groundwater plume discharge areas. The document indicates that stations will be selected adjacent to 100-HR-3 in the general area of the groundwater plume. We support that approach. Within this stretch of river, there may be areas of greater and or lesser discharge, and these areas of discharge may or may not be correlated with the location of salmon redds. Work done according to this document will not resolve this issue.

### Specific Comments

7. Page 2, Section 1.3, 2nd paragraph

The document states that: "It is anticipated that a draft report will be developed for submittal to DOE by April 1, 1995. a subsequent draft for review by the EPA and Ecology is anticipated by May 1, 1995." We would encourage DOE to do a concurrent review on this technical report.

8. Page 3, Section 2.3, 5th-6th lines.

The document states that: "polyethylene tube insert will ensure that the syringe only extracts pore water and excludes water from the water column above the substrate". This is our #1 technical concern with the field work. Specifically:

(A) Our understanding is that a stiff teflon tube is to be attached to the syringe and inserted into the gravel/cobble, but this is not stated in the document. The specifics of this are important for a number of reasons: the tube may be deflected from a cobble and thus not be sampling from the correct depth, the insertion of the tube may dilute the hyporeic zone with the intrusion of river water, if water is withdrawn rapidly it may suck down river water (especially if there is little pore volume in that area), etc.

(B) A redd is a depression in the bottom of the river bottom. The downstream edge is in a sense a ridge that projects into the flow of the river. This ridge will intercept a relatively high river energy that is apt to help drive river water into the bottom cobble. This will act to dilute upwelling groundwater. Thus the downstream edge of the redd may not represent the same ground-water/river-water mix as is present in the central portion of the redd.

9. Page 3, Section 2.3, 2nd paragraph

We support the attempt to do some field screening (if feasible) for conductivity in an attempt to identify groundwater upwelling areas.

10. Page 6, Water Cr<sup>+6</sup> MDL

See general comment #4 for more detail. Adverse effects occur at very low concentrations, and a "solid" detection limit near the 1.2 ug/l is needed.

11. Page 7, top few paragraphs

This document, especially this section provides a very sketchy description of the analytical specifics that are crucial to support future use of this data. In other forums (not expedited reviews of a sampling and analysis plan such as this) we have worked extensively with DOE to develop the detail needed to defend our field work. It is incumbent on DOE to ensure that those steps for defensibility are built into this sampling and analysis plan. The plan does not provide the detail, nor is an expedited regulator review adequate to ensure the credibility of this work effort. Of particular concern is the citation of the BHI Quality Management Plan as the basis for the QA/QC. We have not seen nor reviewed this document. It is incumbent on DOE to compare this BHI Plan with the EII manuals to which we have devoted considerable effort. We do not intend to start all over again with the BHI Quality Management Plan and redo what we went through with the EII manuals.