

RECEIVED

047194

JUN 17 1997

DON'T SAY IT --- Write It!

DATE: June 16, 1997

DOE-RL/DIS

TO: Robert Stewart

FROM: Gene Higgins

Telephone: 376-2536

cc: L. Bauer, AME
S. Hwang, PID

SUBJECT: Comments on " Screening Assessment and Requirements for a
Comprehensive Assessment " Dated April, 1997

Attached are our comments on the subject report. General comments are followed by specific comments as an attachment.

General comments:

The report generally follows the EPA's CERCLA risk assessment process, and the procedure as recommended in the Hanford Site Baseline Risk Assessment Methodology (HSBRAM) which was specifically tailored to meet the Hanford situation.

The results show that contaminants of most concern from the human health and ecological risk standpoint are

Human health:

Chromium, Strontium-90, Tritium (H-3), Uranium-234, Uranium-238, and Lead

Ecological:

Chromium, Zinc

As further discussed below, toxicity data for contaminants identified for human health risk evaluation are those generally not supported by the regulatory agencies. For example:

Human Health:

Chromium: carcinogenicity inhalation data can not be used for the ingestion route. There is no data supporting that chromium is carcinogenic through the ingestion route. At this point, EPA does not recommend the application of inhalation toxicity data to the ingestion route.

Strontium-90, Tritium, Uranium-234, Uranium-238: Data concerning the dose conversion factors used in the report differ from those recommended by the EPA in the Health Effects Assessment Summary Tables (HEAST) by a factor of 2 (strontium-90) to 4 (uranium-234 and -238). Until this discrepancy is explained, the risk results are questionable.

Lead: Evaluation for HI is based on old data which are no longer supported by the EPA. This requires further evaluation. The value of the HI evaluated for lead is uncertain.

047194

Ecological:

Chromium, Zinc

It is difficult to review the results of evaluations without information on LOELs or LD₅₀ used in the EHQ calculation and the results of estimated body burdens to ecological species. The sources of the LOEL information and biological effects need to be addressed for the results to go through peer review. The results presented in Table S.1, Table 4.27, and Table 4.28 are not very comprehensive to complete peer-review.

Also indicate the types of ecological effects that could result from these contaminants. For example, since chromium is considered a significant factor in the ecological risk assessment, the source of information regarding the effect of chromium on salmon eggs (if this is the effect) should be clearly stated. (Refer to Pages I-2.25 - I-2.42)

1. Several methods used in the document are explained without specific details. Some data base has not been adequately presented to help understand the results. For example, no toxicity data regarding LOELs or other effects used in estimating EHQ is presented. Example calculations for screening and risk assessment will help readers understand the nature of the results. As it is presented now, there are a lot of reading materials but not much details to understand the results. For example, how body concentrations were calculated as compared to the daily exposures. Where are tabulations of these results? Could it be possible to tabulate some representative results? Could they be used interchangeably in calculating the EHQs?
2. The procedure recommended by the regulatory agencies is that the contaminant screening can be performed using the maximum contaminant concentrations but the screening assessment should be based on the 95% upper confidence limit (UCL) on the arithmetic average values of concentrations as well as the parameters for the risk assessment. Average cases can be estimated based on the average values of concentrations and parameters.
3. There appears to be some conflicting statement in the report regarding the scope of this study. The current study should be limited to the Columbia river and its immediate vicinity rather than covering all of the ground water data on the site. The monitoring data from the Columbia River should provide some indication as to which contaminants are impacted from the ground water. If there are reasons why some contaminants found in the groundwater should be included in the river study based on the contaminant concentrations and travel times, these should be related to the river monitoring data to reflect the current condition.
4. The calculation of risk was based on the two methods - one deterministic and stochastic methods. EPA Region 10 supplemental guidance recommends risk values based on the 95 % UCL on the arithmetic average and the average of the data values. EPA HQ's recommendation is to conduct an uncertainty analysis of the deterministic information using statistical approaches such as Monte Carlo simulation or the stochastic method. The Executive Summary in the document does not provide how one representative value is derived from the data base for use in conducting deterministic calculations. It is confusing to note

047194

that in some places it was stated that a "single conservatively high" value was used for a deterministic analysis (i.e., P. I-3.22) while in other places it was stated that the maximum representative concentrations was used for the deterministic analysis (P. I-3.29). For the deterministic analysis, it is suggested that analyses present two risk values - one based on the average value, and another one based on the 95 % UCL. Showing the risk values based on only maximum concentrations will bias the results and is not believed to be consistent with the approach recommended by the regulatory agencies.

5. The concentrations are assumed to be distributed log normally for the stochastic analyses. How valid is this assumption? What is uncertainty of results associated with this assumption? How different is this from risk calculated from the 95 % UCL?

6. It is not clear who the intended audience is. This creates a question about the necessity of such insertions as the one Page I-1.7 regarding the use of decimal points.

7. Many documents that were written in relation to the operable unit risk assessments are listed as documents. This includes ground water investigation documents, limited field investigation documents which are not applicable to surface water or sediment sampling, risk assessment conducted for OU's as part of the CERCLA process (i.e., I-2.2), documents that have to do with the potential future releases of contaminants, RI/FS studies, etc. If travel times or other criteria are applied for elimination of these documents, the results of the evaluation can be presented in an orderly manner.

8. Toxicity information used for ecological risk assessment has not been adequately documented. This information important is for the screening assessment to estimate human health as well as ecological risks. For example, Table S.1 in the Executive Summary shows that chromium is a contaminant of concern showing very high lifetime risk of cancer. Chromium is found to be carcinogenic only through the inhalation route. EPA has taken the position all along that it is not a carcinogen through the ingestion route. The exposure routes shown for the results of the lifetime risk include ingestion of surface water, sediment, and seep water. No inhalation of dust is indicated in this table. In this case, the application of the cancer potency factor for the inhalation route is not recommend for the ingestion route according to the EPA guideline. The indication that "the ingestion factor is assumed to be the same as inhalation factor" (Page I-5.57 and Table 5.16) can not be supported and could be wrong. The risk for chromium needs to be reevaluated.

If data for one exposure route is not available, the toxicity data can not be quoted from other exposure route. For example, if RfD for zinc for the inhalation route is not available, the data for the ingestion route should not be used. The risk assessment for contaminants without toxicity information should not be performed. Estimation of RfD using LD₅₀ or TLV should not be used because EPA has attempted this method but was accepted neither by the scientific community nor by the EPA (Page I-5.59, Eq. 5.21). Secondary drinking water standards should not be used because they are not health based. If data is lacking, calculations should not be performed. When toxicity information is presented as shown in Table 6.16, EPA recommends presenting the target organs associated with the adverse effects. EPA has rescinded

047194

reference doses cited in older references such as (EPA 1984b, EPA 1986) for lead.

Also it is not clear what toxicity values are used in estimating ecological risks as shown in tables such as Tables 4.27. It is not clear what LOEL values were used in calculating EHQs. For example, EPA documents do not indicate LOEL values for zinc while this document must have used some value for this purpose. The source of information, and the target organ where the effects occur along with the LOEL must be referenced in the document.

9. EPA Regional 10 supplemental guidance recommends the use of a range of values for deterministic risk assessment. One suggestion is to obtain the range from the use of the 95 % UCL and the average value. It is not clear whether the removal of outliers can be justified if there is any hot spot in the media (Page I-3.32). If it is not a hot spot, it needs be explained.

In this connection, it would enhance the understanding of risk values if exposures for lifetime cancer risk are presented for each exposure route considered a representative exposure scenario for a typical contaminant.

10. In presenting contaminants of potential concern in tables such as Table 2.4 - Table 2.11 after the screening process, it is not clear what concentration levels of the contaminants were used. Did the screening values (P. I-2.43) represent the maximum concentrations as shown in Table 2.2 or some other concentrations?

Also in presenting Tables 2.12 and 2.13, Table 2.3 was mentioned where the maximum concentrations of contaminants in the ground water were listed. Hence, it appears that the maximum concentrations in ground water were used in the screening process, but it is not clear. This point needs to be clearly indicated some place up front.

11. The screening methodologies require information about the cancer potency factors and the reference doses. It is important to show these values used for the screening process. It is not clear what RfD value was used in screening chemicals, toxicity of which has not been published by the EPA yet. If it is a derived value, the nature of the derivation should be clearly shown along with its uncertainty. Without such information, picking a chemical as a contaminant of major concern is questionable. Zinc is a good example. Also the form of zinc in term of whether it is found in the environmental media in elemental form or compound form as well as the form of zinc used in characterizing toxicity should be stated.

12. The way the report is written, it is difficult to check exposure values and risk values. Values used in the calculations are not presented. No example calculations are presented. Only computer codes are mentioned with results, especially for ecological risks.

If you have questions regarding these comments, you may contact Steve Hwang at 376-7796.

047194

Attachment

1. Page xix, third paragraph and Table S.1

Two scenarios are indicated to present a summary of the screening assessment. It would help readers to understand the implications of the risk values presented if the two scenarios are briefly explained in the "Executive Summary." Since the values in the table do not show the range as indicated in the text, it would be proper to indicate in the table the nature of the risk values presented. Table S.1 shows "River Segment" and "Medium" only under the heading, "Ecological Risk," without presenting ecological risks, although human health risks are presented for the two exposure scenarios in terms of Hazard Index and Lifetime Cancer Risk. The reasons for this discrepancy are not clearly indicated in the text of the table.

2. Page xviii, Figure S.1

There is a symbol "Cr/Car" in this table. Clarification is needed because it appears that this symbol is used to indicate more than just "Cr" meaning chromium.

3. Page I-1.4, last paragraph

The EPA defines "acute toxicity" differently from "noncarcinogenic effects" which becomes the basis for deriving reference doses (RfD). Unless the term is clearly defined, "acute toxicity" does not encompass all of the toxic effects besides carcinogenicity that was treated separately in the report.

4. Page I-2.39, Section 2.3.4.2

It is not clear why the concentration of radionuclides in water (more likely surface water for drinking) can not be used for the scoring as was done for the chemicals. Why should the C_{soil} be converted to the water concentration using K_d ?

5. Page I-2.25, Section 2.3.1.7 through Page I-2.42, Section 2.3.4.7

Please cite the literature showing a few connections between research on fish egg survival and contaminant concentrations. This is an important issue in connection with the chromium concentration along the 100 river reach.

6. Page I.3.32, paragraph 3

It states that "the goal is to produce a conservative estimate of potential risk." First of all, to be consistent with the guidelines recommended by the regulatory agencies, a representative maximum should not be used for estimating risk. Second of all, the goal should be to estimate a representative risk or reasonably maximum exposure (RME) and risk with bounding cases of the concentrations and the contact rates. The use of maximum values only indicated on Page I-3.32 is not realistic. Some averages of monitoring data should be used for average cases. The maximum values might be used to estimate the bounding case, but caution should be addressed as to how realistic the value would be. (see Page I-3.42, paragraph 3).

047194

Also the procedure for removing outliers is not clear. Is it possible that these outliers could represent hot spots in the contaminant transport process and these outliers represent true data?

7. Page I-3.44, paragraph 4

Here again, is it possible that the outlier represents a hot spot and may represent a true data point? An explanation is needed.

8. Page I-4.50, Paragraph 3

It states that the body concentration or its analog, such as a daily exposure was used in calculating the EHQ. It is not clear when the body concentration was used compared to the daily exposure. Also it is not clear what the relationship is between the body concentration and daily exposures. Specific examples of values pertaining to BC, LOEL, and EHQ will help understand the meaning of the conclusions. Also it is not clear what LOEC means in figure 4.14. Also provide an example for estimating whole body concentrations including values of bioavailability used in the calculations as shown in Figure 4.15.

9. Page I-4.66, Table 4.30

The literature used for obtaining uptake and metabolism parameters is not cited.

10. Page I-4.69, 4th paragraph

EPA 1996 is not shown in the reference although EPA 1996a, EPA 1996B, and EPA 1996c have been cited.

11. Page I-5.56, Table 5.15

Radiation dose conversion factors shown in this table are not consistent with the EPA's values shown in the HEAST. How the difference is reconciled? It is not clear how the deterministic values were derived. Were they derived from the minimum and maximum values?

12. Page I-5.74, Table 5.18

It is suggested that the average and RME human health risks be shown possibly with a bounding case as shown in this table. Here again, the inhalation slope factor used for chromium is not applicable to the ingestion route and the risk value should be revised.