STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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Dirk Kempthorne, Governor
C. Stephen Allred, Director

April 21, 2002

Ms. Kathleen Hain, Team Leader
Environmental Restoration Program
U.S. Department of Energy
Idaho Operations Office
1955 Fremont Ave.
Idaho Falls, Idaho 83401-1216

Methodology for Developing Preliminary Remediation Goals for the OU 7-13/14 Subsurface Disposal Area (DRAFT)

Dear Ms. Hain:

The Idaho Department of Environmental Quality (DEQ) has completed its review of the above-referenced document and provides the enclosed general and specific comments. DEQ received the *Methodology for Developing Preliminary Remediation Goals for the OU 7-13/14 Subsurface Disposal Area (DRAFT)* on March 24, 2004.

We look forward to working with your staff to address these concerns during the comment resolution period. If you have any questions regarding these comments, please contact Ted Livieratos at (208) 373-0217.

Sincerely,

Ted Livieratos
WAG 7-13/14 Project Manager
IDEQ Technical Services Group

TL/jc

Jeff Perry, U.S. DOE
Dennis Faulk, US EPA Region 10
Daryl Koch, DEQ-WMRD

COMMENTS

1) The methodology provided in the report should examine whether the preliminary remediation goals (PRGs) selected for the individual contaminants and the individual source areas will continue to be protective of human health when all contaminants and source areas are taken as a whole. There is a logical process for the development of preliminary remediation goals, however the document does not present a clear argument that cumulative risk is being adequately addressed. The objective is to address cumulative risk and to seek a level of risk consistent with previous actions (a carcinogenic risk greater than1E-04 or a cumulative hazard index (HI) of 1 or greater). The assumptions tied to this process must be clearly stated and agreed to by the agencies. It is logical to assume the spatial distribution of the contaminants should not be a factor in assessing cumulative risk to the aquifer. An argument could be made that contaminants with a significant temporal displacement can be separated from the overall cumulative risk but this concept must be presented and accepted by the agencies.

2) There should be a logical explanation to each of the methodologies selected in the document. For example there are several numbers used regarding risk (i.e. carcinogenic risks of 1E-04, 1E-05, 1E-06, HI of 1, and cumulative HI of 2). A reasonable justification of how and why different numbers were selected should be included. Another example is the selection of solubility limits. *The Ancillary Basis for Risk Analysis of the Subsurface Disposal Area* (ABRA) uses a uranium solubility limit of approximately 5.98E-04 g/cm^3. The PRG methodology states a revised solubility limit of 1.0E-06 g/cc was selected and represents the best estimate for the pH and redox conditions in the waste. Please include the assumptions and calculations that were used for pH and redox. Details regarding how release rates and dissolution numbers were arrived at should also be added.

SPECIFIC COMMENTS

1. Section 1, last paragraph, second bullet on page 1

To meet remedial action objectives (RAOs), remediation goals are established. Remediation goals establish acceptable exposure levels that are protective of human health and the environment. These goals generally are quantitative cleanup levels based upon human health and the environment and are based upon the results of a baseline risk assessment and evaluation of anticipated exposures and risks for selected remedial alternatives. A 1E-04 cumulative carcinogenic risk or cumulative hazard index (HI) of 1 for noncarcinogenic contaminants, whichever is more restrictive, is the primary basis for determining remediation goals for release sites.

The selection of a cumulative hazard index of less than 2 requires an explanation and further discussion.

2. **Section 2.2, first paragraph, first bullet on page 8**

   The risk criteria for evaluating RAOs should be based on a cumulative hazard index greater than or equal to 1.

3. **Section 2.3, Table 2 on page 9**

   General comment regarding the table and should be noted throughout the document: The technically correct heading for the table should be Human Exposure Route(s) of Concern.

4. **Section 2.4, Table 4 on page 10**

   It is assumed from the text on the previous page that this table is supposed to contain information on the mass of the source terms but the headings do not appear to convey that message. Please explain or revise the text or table as needed.

5. **Section 2.6, first paragraph on page 12**

   There could be a problem comparing individual contaminant concentrations to the maximum contaminant levels (MCLs) and RAOs. It may be argued when the number of contaminants increases (or the risk levels increase, i.e. 1E-06 to 1E-05 to1E-04 or higher) the usefulness of the MCL decreases.

6. **Section 2.6, first paragraph on page 12**

   Please provide additional information indicating the assumed infiltration of 1 cm/year is a number obtained from a single location, outside the SDA and may not be representative of the current infiltration rates inside the SDA.

7. **Section 2.6, first paragraph on page 12**

   Please expand the explanation of the process in this paragraph. Specifically, clarify whether or not ground water concentrations are viewed independently in space and/or time or whether the concentrations are viewed as being cumulative in the ground water regardless of the location and temporal aspects of the release. It can be logically argued all contaminants should be viewed as spatially co-located at the point of contact with the aquifer because of the dominant effect of the interpreted surface of the CD (240-ft.) Interbed. Temporal displacement of the impacts to the aquifer from the various contaminants of concern is presented in subsequent tables, however this aspect is not addressed and should be included.

8. Section 2.9, first paragraph on page, fourth sentence, page 16

According to the *Preliminary Design Criteria and Cover Evaluation for the INEEL Subsurface Disposal Area (DRAFT):*
"Infiltration estimates for CERCLA modeling activities throughout the SDA suggests that the infiltration rate may be almost an order of magnitude greater inside the SDA compared to diffuse recharge outside the SDA (Martian, 1995). At the SDA, McElroy (1990, 1993) and Bishop (1996) measured a wide variety of infiltration rates using neutron moisture measurements from the neutron access tubes. This monitoring network was enhanced in the early-1990s to a total of 27 measuring location located throughout the SDA. Net infiltration was calculated from changes in the measured moisture content profile below a depth of approximate 1 m (3 ft), assuming changes from land surface to 1 m were due to evapotranspiration. During five years, (1989, 1993-1996) sufficient data were available to estimate the net infiltration. These estimates ranged from 0.3 to 55.9 cm/yr (8.2×10^{-6} to 1.5×10^{-3} m/d) depending on the year and location of measurement. They attributed these highly variable estimates to snow drifting and plowing, presence or absence of frozen soil, soil disturbance, topographic variations, and local drainage patterns."
In order to place a proper bound on the expected performance of the remedial alternatives, it is recommended the range be increased to include the highest infiltration rate.

9. Section 2.10, second paragraph on page 17

Please clarify this paragraph to explain how this approach (scaling to 1E-6 or a hazard quotient of 1 for each source area) will be protective from a cumulative risk standpoint from all source areas and temporally across the whole of the SDA. It is not obvious this approach is protective for cumulative risk.

10. Section 2.10, fourth paragraph first sentence on page 17

Please reword sentence to state: "Additionally, if it is deemed appropriate by the agencies, the methodology includes two inadvertent intrusion-based PRGs for each contaminant and each source area." There is also an alternate intruder scenario being considered as proposed by the U.S. EPA. That scenario involves a trenching scenario across the SDA in lieu of the drilling scenario. Please advise as to the status of the alternate scenario.

11. Section 2.10, last full paragraph on page 17

The assumption that human health PRGs will be sufficiently protective of the ecological receptors is not an accurate general assumption.

12. Section 2.11, first paragraph, last sentence on page 35

For proper bounding purposes, it is recommended the highest recorded SDA infiltration rate is used instead of the average annual precipitation (see comment number 4).

13. Section 3.3, last paragraph on page 35

Please present additional information on how the best estimate for pH and redox conditions in the SDA were determined. It is understood the Type B redox probes were not installed in the SDA.

14. Section 4, pages 25-52

As noted in previous comments, it is not clear how cumulative risk is being evaluated. This aspect of the development of the PRGs must be clarified and agreed to by the agencies. Please add information that would account for the combined effect of all the source areas.

15. Section 4.2, first paragraph third sentence on page 38

Please indicate if the nonlinear processes in the biotic uptake model would significantly alter the scaling methodology.