



January 16, 1992

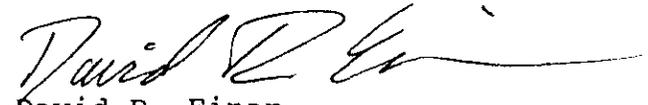
Robert K. Stewart
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Re: 1100-EM-1 Risk Assessment

Enclosed please find the additional clarifications requested by the U.S. Department of Energy in regards to the above subject. These clarifications were also informally transmitted to you by cc:Mail. Also transmitted informally was a copy of a Groundwater Risk Assessment for Hanford 1100-EM-1 Operable Unit, Richland, Washington prepared for the U.S. Environmental Protection Agency (EPA) by PRC Environmental Management, Inc. This document is provided to you for information, especially as an example for formatting the revised baseline risk assessment for 1100-EM-1.

If you have any questions, please call me at (509) 376-3883.

Sincerely


David R. Einan
Unit Manager

cc: D. Lacombe, PRC
R. Hibbard, Ecology (w/ Risk Assessment)
W. Greenwald, USACE
Administrative Record, 1100-EM-1



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1100-EM-1 ON-SITE RESIDENTIAL BASELINE RISK ASSESSMENT ISSUES

What is the role of the Hanford Site Baseline Risk Assessment Methodology (DOE-RL-91-45)? If the residential scenario from DOE-RL-91-45 is used, we should have EPA specify which pathways will be evaluated at each operable subunit.

EPA RESPONSE

The 1100-EM-1 residential risk assessment should use the residential scenario and associated pathways presented in the Hanford Site Baseline Risk Assessment Methodology (DOE 1991).

The residential scenario should be used for the 1100-EM-1 operable unit. The residential scenario was originally chosen because 1) it is the most conservative, 2) residences are in close proximity, and 3) industrial zoning is not a permanent remedial solution. In addition, an agricultural worker scenario was not requested because the remedial investigation report (DOE 1990) dealt sufficiently with that type of risk.

Although the agricultural scenario as defined in DOE (1991) is the most conservative, an agricultural scenario does not need to be considered at this time because farm dwellings are not the typical residences in the immediate area.

1. GROUNDWATER QUESTIONS:

According to the May 30, 1991, EPA letter, the only groundwater contaminant to be evaluated under an on-site residential scenario is trichloroethene (TCE) at the Horn Rapids Landfill with a residence and water supply well located at MW-12.

a. Will we be considering other potential groundwater contaminants at the Horn Rapids Landfill? At least two additional rounds of groundwater monitoring data are now available. When this information is evaluated it may identify other contaminants of potential concern or may confirm that TCE is not a contaminant of potential concern attributable to the landfill.

b. Do we consider groundwater contaminants related to Siemens/ANF activities? This would be especially important for radionuclides, nitrates, and TCE. If specific radioactive isotopes are not yet available from the sampling, it may be prudent to defer evaluation of such substances until the Phase II

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RI rather than make too many conservative assumptions at this time.

c. Do we assume groundwater use despite the fact that city service exists to industrial, commercial, and residential areas in the vicinity of 1100-EM-1?

d. There is a conflict between State law and the suggested location of the residence with respect to the Horn Rapids Landfill. Do we assume the presence of a drinking water well even though WAC 173-160-205(2) does not permit location of such a well within 1000 feet of solid waste landfills? A possibility may be that the site of the potential residence is moved at least 1000 feet from the landfill thus limiting the potential contact with Horn Rapids Landfill contamination by other pathways.

EPA RESPONSE TO ITEM 1

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- a. The additional rounds of groundwater data should be evaluated. If the data indicate that contaminants other than trichloroethene are of concern (e.g. nitrate), those contaminants should be included in the risk assessment.
 - b. The risk assessment should consider contaminants related to Siemens/ANF activities because the issue is to understand the potential human health and environmental risks posed by the 1100-EM-1 operable unit irrespective of the original contaminant source. The risk assessment should focus only on chemical contaminants until adequate data is available for radionuclides.
 - c. The risk assessment should assume groundwater use.
 - d. The risk assessment should assume a drinking water well is located adjacent to the Horn Rapids Landfill. For an intrusion scenario, 1000 feet will not make much of a difference.

2. EXPOSURE PATHWAYS:

a. Are the residential exposure pathways only those outlined in Section 2, p. 1 of the May 30 letter? Should potential contamination of City of Richland water from groundwater reaching the Columbia River be considered? Where are the activities occurring for the pathways? (e.g., see 4a. and 5a. below)

b. Given the size of the landfill, the restricted area, and the distribution of the potential contaminants, what specific

assumptions should be made regarding access to the landfill by the assumed family located in the residence near the landfill (e.g., if the residence is located at MW-12)?

EPA RESPONSE TO ITEM 2

- a. The risk assessment should include the exposure pathways as outlined in EPA (1991a), Section 2, page 1. In addition, the risk assessment should include additional contaminants or exposure pathways if new data indicate the need to do so.

The risk assessment should consider the impact of groundwater on the Columbia River and the city of Richland well field.

- b. Unrestricted access to the landfill should be assumed in the risk assessment because closure cannot be assumed at this time.

3. TOXICITY VALUES:

- a. Should we assume that all toxicity values be updated to current values?
- b. What RFD and slope factor should be used for lead?

EPA RESPONSE TO ITEM 3

- a. Current toxicity values from the Integrated Risk Information System (IRIS) or the Health Effects Summary Tables (HEAST) should be used in the risk assessment.
- b. Since no reference dose or slope factor is available for lead, the risk assessment should use the EPA Uptake/Biokinetic Model for determining site-specific risks from exposure to lead (EPA 1991b,c). The model predicts blood lead levels in the most sensitive population (children) via inhalation or ingestion.

4. EXPOSURE PARAMETERS:

What exposure parameters should be used? The May 30, 1991, letter recommends outdated reasonable maximum exposure parameters and does not consider new national standard default exposure parameters recommended in OSWER Directive 9285.6-03, March 25,

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1991. In addition, Region-10 now recommends new parameters in the EPA Region 10 Supplemental Risk Assessment Guidance for Superfund, August 16, 1991.

EPA RESPONSE TO ITEM 4

Current exposure parameters as specified by EPA headquarters or Region 10 should be used in the risk assessment.

5. HOME GROWN FRUITS AND VEGETABLES:

a. Where should gardens be located? Are supposed on-site residences to be placed directly adjacent to the subunits? Are the gardens on the subunits? Since some subunits are small, could all of the subunit be garden thus limiting any regular child exposure to the dirt?

b. What specific fruits and vegetables should be evaluated?

c. What bioaccumulation factors should be used?

EPA RESPONSE TO ITEM 5

a. Dwellings should be located adjacent to the subunit.

The Exposure Factors Handbook (EPA 1990) gives the median size of a vegetable garden as 325 square feet (approximately 18 feet by 18 feet). Therefore, assume gardens are also located adjacent to the subunit.

Even if the entire subunit is garden, a child's exposure would not be limited because a garden is not an impermeable cover.

b,c. The following strategy is presented for the selection of fruits and vegetables:

- Three plant categories should be included in the risk assessment: root, fruit, and leafy vegetable.
- The bioaccumulation factor for the contaminants of concern should be determined for the three categories listed above.
- At least one plant from each category should be included in the risk assessment. Additional

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plants may be included based on information obtained from Pao, et al. (1982) or other informational sources.

The references below may be useful in locating bioaccumulation factors:

- A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides Through Agriculture. C.F. Base, R.D. Sharp, A.L. Sjoreen, and R.W. Shore. ORNL-5786. Oak Ridge National Laboratory. 1984.
- Bioconcentration of Organics in Beef, Milk, and Vegetation. 1988. C.C. Travis and A.D. Arms. Environmental Science and Technology 22: 271-274.

6. CONTAMINANT CONCENTRATIONS:

- a. Will the residential scenario consider Model Toxics Control Act definition of surface soils as a depth of 15 ft?
- b. Additional soil gas data are available for Horn Rapids Landfill, UN-1100-6, and the South Pit. Should these data be incorporated in the on-site residential risk assessment?
- c. Additional soil data are available for Horn Rapids Landfill and the Ephemeral Pool. Should these data be incorporated?

EPA RESPONSE TO ITEM 6

- a. The residential scenario should consider the Model Toxics Control Act (Ecology 1991) definition of surface soils as a depth of 15 feet inasmuch as the risk assessment needs to consider accessible soil contaminant concentrations. If it is determined that the site needs cleanup to residential levels, then the surface soil depth of 15 feet should be used in the calculation of cleanup levels.
- b. Soil gas surveys are used for field screening. Data generated from soil gas surveys should not be used in the risk assessment.
- c. Any available soil data should be evaluated. If the data indicate contaminants are of concern, those contaminants should be included in the risk assessment.

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7. TIME OF FUTURE SCENARIO:

When should the residential scenario be applied, (i.e., now, 30 years in the future, etc.)?

EPA RESPONSE TO ITEM 7

For the purposes of the "residence" located adjacent to the Horn Rapids Landfill, the time period should be now, i.e. use the concentrations found in the well.

REFERENCES

- DOE 1990. Phase 1 Remedial Investigation Report for the Hanford Site 1100-EM-1 Operable Unit. DOE/RL-90-18. August 1990. U.S. Department of Energy.
- DOE 1991. Hanford Site Baseline Risk Assessment Methodology. Decisional Draft. DOE/RL-91-45. September 1991. U.S. Department of Energy.
- Ecology 1991. The Model Toxics Control Act Cleanup Regulations. Chapter 173-340 WAC. Department of Ecology. February 28, 1991.
- EPA 1990. Exposure Factors Handbook. EPA 600/8-89/043. U.S. Environmental Protection Agency. March 1990.
- EPA 1991a. 1100-EM-1 Remedial Investigation. Letter from Dave Einan, U.S. Environmental Protection Agency. May 30, 1991.
- EPA 1991b. Update on OSWER Soil Lead Cleanup Guidance. Office of Solid Waste and Emergency Response. August 29, 1991. U.S. Environmental Protection Agency.
- EPA 1991c. User's Guide for Lead: A PC Software Application of the Uptake/Biokinetic Model Version 0.50, First Draft. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, U.S. Environmental Protection Agency. January 1991.
- Pao, E.M., C.H. Fleming, P.M. Guenther, and S.J. Mickle. 1982. Foods Commonly Eaten by Individuals: Amount Per Day and Per Eating Occasion. Consumer Nutrition Center, Human Nutrition Information Service, U.S. Department of Agriculture, Hyattsville, MD 20782. Home Economics Research Report No. 44. March 1982.

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