



Confederate Tribes and Bands
of the Yakama Indian Nation

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Established by the
Treaty of June 9, 1855



January 4, 1995

Mr. John Wagoner, Manager
Richland Field Office
Department of Energy
P.O. Box 550 A7-50
Richland, WA 99352

Dear Mr. Wagoner:

Subject: DRAFT HANFORD SITE RISK ASSESSMENT METHODOLOGY (HSRAM);
COMMENTS ON--

This letter provides a review of the Draft Hanford Site Risk Assessment Methodology (HSRAM) document proposed for use during Hanford cleanup activities. The overall objective of this evaluation is to provide recommendations regarding the adequacy of HSRAM in addressing potential impacts to long-term human and ecological health, and cultural and religious resources of the Yakama Nation. 39312

The HSRAM is an important document because it will be used regularly as a tool in the decision process when defining Department of Energy (DOE) remediation and restoration actions at Hanford. Risk calculation procedures and assumptions stipulated in HSRAM will be the basis for soil, air and water cleanup goals and cleanup standards at Hanford. Accordingly, it is imperative that these risks-based cleanup goals and standards be protective of future Yakama Nation cultural and religious uses of impacted lands, since use of the lands and water is expected to occur, consistent with the assurances of the Treaty of 1855, which recognizes a religious culture, including a mode of subsistence that relies on the land, the water and other biological resources.

Impacts on the Yakama Nation cultural and religious values and resources have not been adequately addressed in the current version of the HSRAM document. Since HSRAM is considered to be a living document by DOE, the Yakama Nation has the following recommendations for modification of the document in future revisions:

- 1) *Develop Native American Exposure Scenario*
- 2) *Independently Review Validity of Radionuclide Risk Assessment Assumptions and Procedures*
- 3) *Develop Successive Generation Risk Assessment Procedures*

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4) *Develop Ecological Evaluation Procedure Based on Background Conditions*

5) *Develop Pre-1943 Background Soil and Water Cleanup Standard Baseline*

6) *Perform Objective Re-evaluation of the Qualitative Risk Assessment*

The following paragraphs describe the above recommendations in more detail. In addition, specific, detailed comments on the HSRAM listed by page are included as ATTACHMENT A to this letter.

1) Develop Native American Exposure Scenario

There is no specific exposure scenario in the HSRAM which adequately addresses protection of Yakama Nation cultural and religious resources and other future site uses. A Native American exposure scenario must be included in the HSRAM which specifically addresses cultural, religious and unrestricted future site use concerns of the Yakama Nation. The Yakama Nation must approve of the scenario.

On page 31 of the HSRAM document, a "Native American" scenario is discussed as a possibility, but no further information is provided regarding how soon it will be developed, who are the participants in its development, and if the scenario will definitely be incorporated into the HSRAM. There are four exposure scenarios involving a range of activities from industrial to residential property uses that are described in detail in the document, particularly in Appendix A. The Yakama Nation recommends that a Native American exposure scenario be developed and propagated through the risk assessment process in the same level of detail as the four exposure scenarios already present in the document.

The exposure scenario should include all Yakama Nation contamination exposure concerns regarding agricultural, cultural and religious land uses including hunting/fishing, collection of medicinal herbs and native plants, non-Indian farming, unrestricted land use and/or development, aqua culture, and religious uses. Specific exposure routes, pathways and receptors will need to be identified and potential intake rates and related parameter assumptions modified for Yakama Nation citizen activities. This exposure scenario should be the model for any land areas that may be accessed by the Yakama Nation now or in the future. Such access should be assumed for all areas at approximately 130 years hence (100 years past closure of disposal areas or completion of remediation activities.)

2) Review Radionuclide Risk Assessment Procedures

Radiological risk characterization procedures described in the HSRAM may not adequately assess potential human health risks to the Yakama Nation or any future land users. After reviewing the human

health evaluation methodology, the Yakama Nation concludes that a more thorough review of assumptions and justifications of procedures used in assessment of risks from radionuclides is required. Some examples of concerns raised by the HSRAM regarding radionuclide risk assessment include the following:

HSRAM states (p. 28 and 29) that "soil contaminated by photo-emitters (gamma) is the only exposure media that should be routinely evaluated for the external exposure pathway." As partial justification for this approach, the document states that a cover of uncontaminated soils may act as a shield to radiation exposure.

This approach to exposure assessment of radionuclides is not conservative and does not account for unrestrictive site use and actually presumes a corrective action. Standard risk assessment procedures require that exposure risks from soil contaminants be evaluated regardless of depth of occurrence of contamination. The shielding argument also does not address potential leaching and completion of the groundwater exposure pathway.

HSRAM cites (p.42) as appropriate EPA (1989a) risk assessment protocols which exclude acute toxicity of radionuclides from consideration stating that levels of radioactive contaminants are not high enough at superfund sites for them to be a concern. •

The Yakama Nation believes that exposure to high level wastes in underground storage tanks at Hanford could be characterized as acutely toxic and that Hanford is not a typical superfund site.

The HSRAM document cites (p. 42) recent references on radioactive toxicity which state that limiting exposure to reduce cancer risks also limits genetically significant exposure. Accordingly, HSRAM stipulates only significant cancer-risk from radioactive components need be considered.

Selection of cancer-risk as the limiting parameter for radioactive exposures avoids assessment of risk due to mutagenic, teratogenic or lifetime shortening effects.

The HSRAM document states (p. 43) that radionuclide slope factors used in the toxicity assessment may be biased and are highly dependent upon the chemical form of the radionuclide. The document also indicates that slope factors are calculated for single default lung class and that non carcinogenic effects for radionuclides need not be addressed unless chemical toxicity is suspected (p. 49).

These statements indicate that there is a high degree of uncertainty in the toxicity assessment of radionuclides. More rigorous scientific justification needs to be provided in the HSRAM document to support the current default assumptions for radionuclide toxicity. The uncertainty analysis in the toxicity assessment and the risk characterization sections should be more quantitative. Error propagation and/or sensitivity analysis to

- determine which risk assessment parameters affect overall risk the most is warranted.

Based on these examples, the Yakama Nation recommends third party, independent, scientific review of radionuclide risk characterization procedures and assumptions developed by DOE, the EPA, the National Council on Radiation Protection (NCRP) and the National Research Council (NRC). Members of the review group should include at least two scientific reviewers acceptable to the Yakama Nation.

The validity of these procedures and assumptions must be evaluated with respect to Hanford cleanup issues and the Yakama Nation future site use concerns or concerns developed under the Native American exposure scenario. At a minimum, the Yakama Nation recommends that the documents listed under Radionuclides in ATTACHMENT B be reviewed in more detail by the independent review group.

3) Develop Successive Generation Risk Assessment Procedures

Risk characterization procedures must be developed to estimate health risks beyond lifetime or partial lifetime exposures to the individual. These are the only HSRAM exposure scenarios used in all intake rate calculations. Additive impacts of mixed chemicals or effects to succeeding generations, and overall risks to the population are not addressed.

Overall exposure to the population (or subsets of the population), genetic effects and/or other health effects which may be propagated through several generations must be quantitatively estimated. HSRAM must provide acceptable, scientifically defensible procedures for such calculations. The Yakama Nation recommends that such risks be evaluated quantitatively through statistics including simple multiplicative or additive probability calculations or other cumulative risk probability curve estimation techniques. The Yakama Nation must approve of the calculation procedures developed.

4) Develop Ecological Evaluation Procedures based on Background Contamination

The Yakama Nation considers that an alternate procedure for evaluation of ecological risks be developed which allows comparison of risks to background levels for soil and water contamination.

The HSRAM ecological evaluation methodology is overly complex. Problem formulation and evaluations are susceptible to multiple or conflicting assumptions and/or interpretations. The alternate procedure proposed by the Yakama Nation is one that would use background cleanup standards developed for soil and water contamination. Bio-accumulation of contaminants in biota should be assessed and compared to normal or non-impacted communities. Any impacts above background would require corrective action. The Yakama Nation should concur with the "background" ecological evaluation methodology developed.

5) Develop Pre-1943 Background Soil and Water Cleanup Standards

The Yakama Nation requests that all determinations of background soil and water contamination be based on pre-1943 site conditions and/or conditions that pre-date acquisition of Yakama Nation lands by the federal government. Such conditions should be estimated if data is not available.

Screening of anthropogenic sources of contamination (e.g. radio-nuclides, organic contaminants) against background concentrations is not acceptable, because such contaminants should have been absent from the environment before Hanford operations.

In addition, determination of background concentrations should be based on collection of adequate and representative sample numbers, unbiased sampling locations, all appropriate analytical testing parameters, best available analytical method detection limits, or valid estimates. Industry standard quality assurance and quality control procedures should be invoked for validation of data whether it is estimated or measured. The Yakama Nation must approve of all background concentration estimation procedures developed or implemented by DOE.

6) Perform Objective Re-evaluation of Qualitative Risk Assessment (QRA)

The QRA is described in HSRAM as a decision tool for implementation of interim remedial measures (IRM) on operable units where there is insufficient data to conduct a full risk assessment. While the HSRAM stipulates that the QRA is not to be used as a substitute for a full risk assessment, the Yakama Nation is concerned that once an IRM is implemented, an independent and objective full risk assessment of cleanup alternatives may not be performed.

Accordingly, the Yakama Nation requests that an objective review be conducted by an unbiased third party of any subsequent full risk assessments prepared for an IRM site. In addition, specific time-frames for reevaluation of the QRA should be stipulated so that the review is performed well in advance of development of final cleanup alternatives. This will allow modification of cleanup plans at any early planning stage. The Yakama Nation must approve of all QRAs and final risk assessments prepared by DOE. Clear schedules for development of final cleanup plans should be identified in the appropriate schedules and included as milestones in project control documents.

- As described earlier, detailed, page-by-page comments regarding the HSRAM are provided as an attachment. The points addressed above reflect Yakama Nation's primary concerns/requirements and other broad issues associated with the HSRAM document which have not been resolved by the DOE. We recommend that a workshop be scheduled to further review questions regarding this letter and to resolve potential disagreements.

Sincerely,



Russell Jim, Manager
Environmental Restoration/Waste Management Program
Yakama Indian Nation

Attachments

cc: K. Clarke, DOE/RL
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