



Confederated Tribes and Bands  
of the Yakama Indian Nation

Mr. Keith Klein, Manager  
U.S. Department of Energy  
Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

072291

0051894

Established by the  
Treaty of June 9, 1855

MANAGER'S ACTION  
D199155366  
DUEDATE: 9/9

July 30, 1999

\*RP  
MGR  
AME  
AMW  
EAP  
ESH  
MET  
OCC  
OEA  
PRO  
RPS  
SAS  
SSD  
WPD

**RECEIVED**

AUG 30 1999

**DOE-RL/DIS**

51204

SUBJECT: 100 Area Burial Grounds Focused Feasibility Study

Dear Mr. Klein,

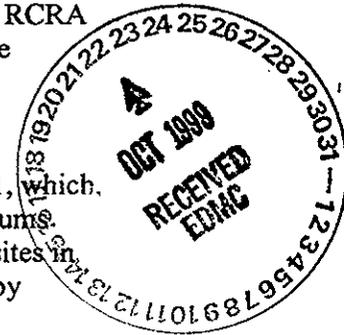
We appreciate the opportunity to comment on this document. We cannot emphasize how important it is to continue with cleanup along the River, how important it is to regain access and safe use of the 100 Area as guaranteed by the Treaty of 1855, and how important it is for DOE to fulfill its obligations, and as natural resource Trustee, for natural and cultural resource protection.

The only acceptable alternative is removal, treatment, and disposal (RTD) of all burial grounds. The containment alternative does not meet tribal health and use needs, especially since only the smallest sites would be excavated while the largest sites would be closed in place near the River. The risks to our people, their health, their resources, and their cultural way of life if burial grounds were left in place cannot be estimated since numerous burial grounds have not been completely characterized. As a general principle, **it is unacceptable to close in place anything that is not fully characterized.**

Compliance with land disposal restrictions cannot be demonstrated without characterization. It is also illegal under RCRA to close landfills without meeting RCRA waste acceptance criteria, TCLP criteria, placement of landfill liners with leachate collection systems, and using RCRA-compliant caps.

We wish to point out that using the analogous site approach would predict that unanticipated wastes are present in some of the burial grounds. We cite 300-FF-1, which, under the analogous sites approach, was not predicted to contain the numerous drums with pyrophoric uranium and PCBs that were found there. Similarly, analogous sites in the 200 Area are subsiding and leaking already. Further, ongoing investigations by scientists and expert panels into the potential for soils and for barriers, as they are currently designed, to create acidic conditions that mobilize transuranic materials suggests that it is extremely unwise to leave any uncharacterized materials buried in the 100 Area.

We also point out Figures 2-6 and 2-7 of the "Groundwater/Vadose Zone Integration Project Specification" (DOE/RL-98-48, Draft C), which shows solid waste burial grounds leaching into the vadose zone, which the Burial Grounds FFS asserts is unlikely. DOE



cannot predict leaching in order to support funding for the Integration Project while simultaneously asserting that leaching would be unlikely as justification for leaving unknown waste near the River. DOE cannot have it both ways..

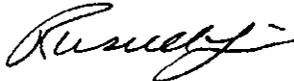
The time frame of disposal is inadequate. It must include half-life calculations for radionuclides, organics and metals, and must include corrosivity and leachability profiles for exotic metals. Risk calculations should be based on radioactive decay and hazardous waste decay, and release profiles. The time frame must also consider barrier performance, surveillance and monitoring requirements, and maintenance of institutional controls. The costs of each of these items must be considered. Barrier replacement costs were not included in the cost estimates, and impacts to groundwater (with monitoring and treatment costs) were not adequately described.

The Treaty of 1855 with the Yakama Nation must be cited as an ARAR. We remind DOE that government-to-government consultation is required before a decision is made, and this means actual participation in the decision process rather than simply allowing us to comment after a preferred alternative has already been selected. DOE is retreating from the open process established by the Groundwater Integration Project and Solid Waste EIS.

Finally, NEPA and Trustee values are fulfilled *tremendously* better by the RTD alternative, not just slightly better, for factors of tribal health, cultural use of natural resources, Treaty-reserved rights of access and safe use, natural resource trusteeship, reasonably foreseeable land use, and environmental justice. If these factors are considered, the containment alternative is considerably less cost-effective than the RTD alternative.

Detailed comments are attached.

Sincerely



Russell Jim, Manager  
Yakama Nation ER/WM Program

Cc: Glenn Goldberg, ER Project Manager  
Doug Sherwood, EPA  
Jack Donnelly, WA Dept. Ecology  
Jay McConnaughey, Chairman, NRTC  
Kevin Clarke, DOE/RL  
J.R. Wilkinson, CTUIR  
Pat Sobotta, NPT  
ERWM Richland Office  
Marilyn Reeves, HAB

**RL COMMITMENT  
CONTROL**

AUG 26 1999

**RICHLAND  
OPERATIONS OFFICE**

**Detailed Comments**  
**100 Area Burial Ground Focused Feasibility Study, DOE/RL-98-18**

Page 1-2, 4<sup>th</sup> paragraph, starting with "In addition to integrating..." Please add a sentence stating that in addition to RCRA, CERCLA, and NEPA, this FFS also integrates values expressed in the Treaty of 1855 between the Yakama Indian Nation and the United States of America (12 Stat. 951).

Page 1-5, 3<sup>rd</sup> paragraph, starting with "Based on input from the..." Please add a sentence to the effect that information contained in the Treaty of 1855 is also considered, and therefore a Native American subsistence exposure scenario is used that reflects tribal land uses in the 100 Area.

Page 1-5, 4<sup>th</sup> paragraph, starting with "In November 1997,..." Please add a sentence to the effect that DOE recognizes that not all affected parties, especially the Yakama Nation, consider natural attenuation to be an acceptable remedy unless additional measures are taken to mitigate lost use of the area during the period during which radioactive decay occurs.

Page 2-3, Section 2.1.5, Ecology. Please add a short paragraph on Trusteeship and the protection of Trust resources. It could contain the following language: "Additionally, DOE recognizes that the 100 Area contains Trust resources (soil, groundwater, biota), and that protecting or restoring human use of those natural resources, including cultural use, is part of the federal trusteeship obligations. DOE also is including revegetation costs in all remedial actions and requires a restoration plan as part of the decision process. DOE recognizes the unique character of the Hanford Reach, and places a high value on complete restoration of the 100 Area."

Page 2-4, Section 2.1.6. change "prehistoric" to "pre-contact."

Page 2-4, Add a Section between 2.1.6 and 2.1.7 on Resource-Based Historical Cultural Use. Suggested language is as follows:

"Indigenous peoples have used, and continue to use, the 100 Area for subsistence living, religious practices, and nutritional and medicinal resources for over 13,000 years before contact with Europeans. The Yakama Nation, in the Treaty of 1855, ceded the land on which Hanford sits to the United States, expressly reserving rights to hunt, fish, gather natural foods and medicines throughout the year, practice their traditional religion, and care for the cultural resources located throughout the 100 Area." The river corridor is of utmost importance for cultural, nutritional, religious, social, educational, and other reasons. The riverine, riparian, and upland ecological zones and microhabitats are interlinked with the native peoples into a single system of life and culture. The Hanford Reach is part of a single Columbia Basin fabric that includes human livelihood, many cultures, environmental functions and services, and tangible resources and goods can be thought of as a single ethno-habitat Natural and cultural resources, as well as the lives of

the native peoples, are linked within a single web has grown into a holistic environmental management science over many millennia of systematic observation and inductive reasoning.

Page 2-5, Section 2.1.7, Future Land Use. Please add a bullet that states "Resumption of the exercise of Treaty-reserved rights to hunt, gather, fish, follow religious practices, care for cultural and natural resources, and follow a subsistence way of life. Use of a subsistence exposure scenario would allow the widest range of future use options for future generations."

Page 2-11. Section 2.3.2.1. Why is the Horn Rapids Landfill mentioned? If the materials in the landfill were tested as a way to identify the types of materials sent there from the 100 Area as representative of what was also left in the 100 Area, it would help to explain this. DOE should also cite 300-FF-1 with the uranium-PCB drums an analogous waste.

*Note: there is a 1999 report by Diederker (Reactors) that should be consulted.*

Page 2-13, Section 2.4. The statement that "extensive characterization data are not required to support EPA's presumptive remedy guidance for landfills (containment)" is false. In fact, the opposite is true: extensive characterization is not required for excavation following the observational approach, but it is certainly required for closure in place as a landfill. Considering the sensitive nature of the 100 Area, the EPA citation for closure of municipal landfills, even if they contain some LLW, does not apply here. Instead, RCRA closure requirements relating to TCLP, land disposal restrictions, subsidence, leachate collection systems, groundwater impacts, and long-term barrier performance should be cited.

Page 2-14, Section 2.4.1. The COPC list is incomplete because it is based on screening for human dose, not ecological or cultural concerns, the risk screening level is too lenient, and subsistence exposure factors were not used. The COPC lists in supporting documents are longer. The real list is everything that has been detected or could reasonably be expected to be present. ResRad is a screening tool that omits some pathways important in Native American exposures.

Page 2-15, Section 2.5. If natural attenuation is used for materials with half-lives less than 30 years, there is still a long period of lost use that must be costed as part of the remedy selection. Lost use is prima facie evidence of natural resource injury and damage as defined under NRDA, and there are EPA and DOE policies requiring the integration of NRDA into CERLCA. Therefore, the institutional control period has costs associated with it that must be taken into account.

Page 2-18, last sentence. We are not convinced that the statement that the 100 Area burial grounds do not pose a leachability threat to groundwater is true. Without better characterization data and barrier performance data, including characterization of the soil currently under the burial grounds, this statement cannot be defended. Secondly, even if this statement turns out to be true, the presence of bulk materials impairs future uses such

as subsistence activities, and also impairs the cultural quality and utility of the area, all of which must be mitigated.

The process for developing Remedial Action Objectives and Preliminary Remedial Goals is not described completely. It omits the consideration of Trusteeship and, in the case of Hanford, compliance with Treaty-reserved rights. The process is more than merely reducing human dose through individual exposure pathways. In complex sites such as the 100 Area, it also must be directed toward final closure. Because the criteria for closure of multi-source sites (such as Reactor areas) with buildings, buried rubble, buried radioactive and chemical waste, residual soil contamination from liquid disposal sites, and underlying groundwater contamination, it should be obvious that addressing burial grounds is only one piece of a larger closure issue. Burial grounds cannot be considered in isolation of surrounding sites because risk accumulates spatially as well as via concentrations at discrete point locations.

Page 3-2, 4<sup>th</sup> paragraph, and Section 3-2. Contrary to the statement that PRGs reflect all assumed land uses, this section did not include tribal subsistence use with access to groundwater, which we regard as the most reasonably foreseeable land use of all. Neither the recreational nor the agricultural residential scenarios reflect tribal subsistence activities. The Yakama Nation completely and strenuously disagrees with the statement that "land use planning ... has evolved toward non-residential scenarios." This statement flagrantly dismisses Treaty-reserved rights, and must be removed.

Page 3-3, Section 3.3. DOE misunderstands what "unrestricted use" means. Unrestricted use means full use of a site, including groundwater. Multipathway exposure scenarios must be used (per RAGS and HSRAM and MTCA). If any potentially complete pathway is excluded, then this reflects an assumption that use of one or more media has, in fact, been restricted, therefore use of the site as a whole has been restricted. It is a circular fallacy to assume that groundwater would not be used for however long it remains risky or contaminated, therefore there is no risk through groundwater pathways. To the contrary, the proper way to apply exposure scenarios is to examine the risks that would occur if all media and pathways were used.

Furthermore, the EPA dose limit of 15 mrem must be allocated among all pathways, including groundwater. It is incorrect to distribute the 15 mrem among only the soil pathways and ignore the groundwater pathways. DOE must also be aware that, since 15 mrem is equivalent to  $2.3E-4$  cancer *fatality* risk, that even this dose level may be too high. The total cancer *incidence* from 15 mrem is even higher, and is higher yet if genetic effects are included. Because subsistence lifestyles would multiply that risk by at least twofold, the risks to Native Americans would be unacceptably high.

An even more important point is that dose cannot be reliably calculated at all without complete and validated characterization data.

Section 3.3. DOE must recognize that deep soil is clearly a Trust resource as defined by NRDA. NRDA does not distinguish between surface soil (15') and deep soil with respect

- No institutional controls on any medium or pathway or area without a mitigation plan
- Protect, restore, and enhance long-term ecosystem quality, functionality, and integrity
- Protect, restore, and enhance cultural resources, cultural landscapes, and the cultural use of natural resources
- Evaluation of areawide cumulative ecosystem contaminant burdens and risks
- Preservation of future use options through the removal of all chemical, radiological and physical materials while it is still feasible

Page 3-9, bullet at top of page. We appreciate that DOE recognizes that it must minimize the disruption of cultural resources and wildlife habitat. However, since the burial grounds have already destroyed whatever cultural and natural resources were there originally, this bullet should say that there will be no further degradation or disruption of cultural and natural resources in areas adjacent to the burial grounds during the removal of the buried material itself.

Page 3-9, Section 3.6. Our Preliminary Remedial Goals are based on:

- Inclusion of all pathways rather than artificially separating them so total dose becomes fragmented.
- Use of a subsistence exposure scenario.
- A *maximum* of 15 mrem through all pathways, with ALARA, and with the understanding that the Yakama Nation may require greater protection of its members than the 15 mrem ceiling.
- The radiation drinking water dose limit of 4 mrem is part of the 15 mrem total, not in addition to it.
- Additivity of chemical and radiological risks.
- Spatial integration of risks over entire Reactor areas and temporal integration of risks for as long as the materials remain intrinsically hazardous.

Page 3-9, last paragraph. Meeting these PRGs may NOT be accomplished by using institutional controls to break an exposure pathway unless a mitigation plan is negotiated with the affected peoples, i.e., the Yakama Nation.

Page 3-10, Section 3.6.1. We reiterate the following points:

- The radioactive dose limit is based on all pathways present in a subsistence lifestyle and is additive with chemical risk;
- The dose limit applies for as long as the material remains intrinsically hazardous or radioactive, which may extend beyond 1000 years;
- Drinking water risk is part of both radioactive dose limits, chemical risk limits, and the combination of both radiological and chemical risks.
- Ecological exposures must also protect human exposure received during their gathering, preparation, and ingestion, and must also evaluate the impairment of cultural quality if they contain any amount of contamination, no matter how small;
- Cultural use and cultural quality of all resources, including groundwater must be part of the assessment and remedy selection process.

Page 4-4, first paragraph. This paragraph basically says that the only removal alternative considered is complete removal. This all-or-nothing approach also has the effect of maximizing apparent costs and thus further biases the decision against removal. It would be better to provide a validated inventory for each burial ground (which is unavailable), re-calculate risks including subsistence and cultural risk (which cannot be done without a better inventory estimates), and re-evaluate the removal volumes. Criteria for what constitutes a valid inventory need to be developed.

Page 4-5, Section 4.6. The containment alternative means basically closing each burial ground in place as a landfill with a barrier on top but no liner underneath. Under WAC-303-665, the term "landfill" applies to engineered facilities with liners and leachate collection systems, not to unlined holes in the ground where who knows what was dumped. Low level radioactive burial grounds have roughly the same requirements. Dumps with caps do not meet either definition.

Landfill closure requires the operation of a leachate collection system that must be operated for as long as leachate is detected (i.e. thousands of years) as well as groundwater monitoring. Under WAC-303-610, the post closure care period can be extended for as long as necessary to protect human health and the environment. Post closure uses "must never be allowed to disturb the integrity of the cover." In other words, the Reactor areas would be perpetually restricted. This requires a written post closure plan (WAC-303-610), which is not mentioned.

Page 5-1, Section 5.1, last paragraph. The statement that burial ground alternatives were "developed with an understanding and acknowledgment of human health and environmental protection goals considering future 100 Area land uses" is false. In fact, since the sites are not fully characterized and tribal subsistence uses were not considered, the risks are not known. We also remind DOE that the HRA has no bearing on cleanup goals, and in fact there were explicit statements that the HRA would not be used in an attempt to relax cleanup goals. Further, DOE cannot assume that future uses will only occur around but not on the burial grounds. Nationally, we know that this happens all too frequently even with good institutional memory.

Page 5-2, 1<sup>st</sup> paragraph. The fact that municipal and military landfills do not always require extensive waste characterization is irrelevant to radioactive burial grounds that are not characterized and have no leachate collection system. This statement presumes that groundwater monitoring will continue indefinitely (well beyond 1000 years), as will the enforcement of institutional controls. The HRA should perhaps say that the most reasonably foreseeable use of the 100 Area is "monitoring and surveillance" if DOE wants to leave waste there.

Page 5-2, Section 5.3. Again, the worker risks during excavation seem to be inflated while the public and environmental risks of not excavating are understated. How much PPE is currently required for the 100 Area excavations (as opposed to the 300 Area as stated in the text)?

Page 5-4, Section 5.4. Containment would not meet human health or environmental protection goals. There is no such thing as "restricted residential" use. Mobility would not necessarily be eliminated. Radioactive decay would not necessarily reduce risks to acceptable levels within 100 years; in fact, since the burial grounds are not characterized, this statement cannot be supported.

Page 5-5, Section 5.4.1. Is the modified RCRA barrier good for only 100 years? The barrier alternative is a non-starter if this is true. Barriers must perform for at least 1000 years. Use of the Modified RCRA barrier does not comply with RCRA design requirements because it is not designed to prevent human or biological intrusion, nor is it designed to prevent infiltration. The barrier liner material has a design life of 30 years (much shorter than the 100 years asserted in the document), which means that the barrier would have to be replaced every 30 years for a minimum of 1000 years.

The second paragraph of section 5.4.1 says that GPR will be used to delineate burial ground boundaries. This means that DOE does not even know exactly where the burial grounds are located, much less what is in them or whether they were packed to prevent subsidence.

The source of the barrier material must be included as a consequence of choosing this alternative.

Page 5-5, Section 5.4.2. The difficulties associated with enforcement of institutional controls for the lifespan of the hazardous or radioactive material has not been solved nationally. It is unreasonable to merely assert that DOE or subsequent land managers would be able to enforce land use restrictions as long as risks were above acceptable levels. If we don't know what the risks are now, since we don't know exactly what is in the burial grounds, future managers will not know, either. Finally, the costs associated with the implementation of institutional controls, the costs associated with perpetual monitoring and cap replacement, and the cost of lost use all need to be included in the costs of this alternative.

Page 5-6, Section 5.4.3. The use of monitoring wells to detect leakage is not appropriate, since this means that leakage would not be detected until it has already contaminated the groundwater at which point it is almost impossible to remediate. This is the reason why landfills must have leachate collection systems so as to detect leachate before it enters the soil, much less the groundwater.

The containment alternative is not acceptable because the waste could contain hazardous metals that exceed TCLP criteria. Leaching and mobilization could occur in as little as 25-30 years, if it hasn't already. Analogous sites in the 200 Area are subsiding and leaching after the same time interval, 25-30 years.

Existing information is NOT adequate to predict the reduction of radiation. This statement cannot be made without better characterization data.

Page 6-8, Section 6.2.1.2 and parallel sections for other alternatives. The text recognizes that Native Americans “would be expected to use the 100 Area disproportionately more than other groups because of their traditional use, and thus would be more exposed to contaminants.” Why is there no exposure scenario that reflects this use?

Page 6-13, Section 6.2.3.1.3. This section is internally contradictory. On the one hand containment is said to be protective, yet it also states that detailed records were not kept about the wastes buried there. It says that mobile constituents are not anticipated, yet also recognizes that mobile constituents might be present (although characterization to confirm or deny this is not proposed), and in fact says (these landfills contain many constituents that are undefined, mobile, and could present (or have been found to present) a threat...)” The categorical statement that “barriers prevent migration of contaminants” needs to be rephrased as “barriers *may* prevent migration of contaminants.”

Page 6-17, Section 6.2.3.1.7. The costs of containment leave out many costs. This section needs to be rewritten.

Page 6-17, Section 6.2.3.2. The impacts of closure in place on NEPA values are greatly understated. Leaving uncharacterized radioactive and hazardous waste near the river is simply unacceptable. The lost use during decay needs to be mitigated, and the Tribal Nations need to be consulted on this issue. The statement that “no future use for the 100 Area considered by the DOE would be affected by the Containment alternative” is completely untrue. Quite the opposite is true, and it should be so stated. Finally, containment does not comply with Treaties or Trusteeship.

Page 8-2. Given the shrinking budget, it would be better to excavate the largest and most contaminated burial grounds first rather than last (or more likely not at all). The performance measure for progress in risk reduction is not the number of sites “remediated,” but number of curies permanently moved away from the river.

Page 8-3. The section on Public Involvement does not mention consultation with Tribal Nations or the Natural Resource Trustee Council. DOE must abide by its commitment to consult with the Yakama Nation before and more intensively than with the public.

Page 9-1, References. there are better references for the cultural importance of the 100 Area than a 1991 Chatters report.

#### Appendix B.

- Containment will probably NOT provide compliance.
- Treaties must be included as an ARAR. Please contact us for applicable, relevant, and appropriate language.

#### Appendix C.

- Please consult with us on the appropriate input parameters for subsistence exposure.
- Risk is the sum of radiological and chemical risk.
- Only 9 nuclides and no chemicals were included.