



Confederated Tribes and Bands  
of the Yakama Nation ERWM

Established by the  
Treaty of June 9, 1855

May8, 2013

Dennis Faulk, Hanford Project Manager  
U.S. Environmental Protection Agency  
309 Bradley Blvd., Suite 115  
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Review comments on the Proposed Plan for Remediation of the 100-FR-1, 100-FR-1, 100-IU-2, 100-FR-3, and 100-IU-6 DOE/RL-2012-41 Draft A and the Remedial Investigation/Feasibility Study for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2 and 100-IU-6 Operable Units, DOE/RL-2010-98, DRAFT A December 2012

Dear Mr. Faulk:

The U.S. Environmental Protection Agency (EPA) anticipates issuing the Record of Decision (ROD) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for the 100-FR-1, 100-FR-1, 100-IU-2, 100-FR-3, and 100-IU-6 Operable Unit this year. The Confederated Tribes and Bands of the Yakama Nation appreciate the opportunity to review and provide comments on these documents.

Note these comments do not reflex a detailed description of all our concerns. We look forward to discussing our concerns regarding current cleanup plans for Hanford with you further.

Sincerely,

Russell Jim  
Yakama Nation ERWM Program Manager

cc:

Jane Hedges, Washington State Department of Ecology  
Jonathan A Dowell, Assistant Manager for the River and Plateau, US Department of Energy  
Ken Niles, Oregon Department of Energy  
Stuart Harris, CTUIR  
Gab Bohnee, Nez Perce  
Wade Riggsbee

Administrative Record

Attachment:

100-FR-1

100-IU-2

100-FR-2

100-IU-6

100-FR-3

Attachment #1:

**YN ERWM high-level comments on the 100-F Area Proposed Plan & RI/FS:**

**Evaluation of Alternatives: General Comments:**

Soil contamination should be documented in both vertical and horizontal directions from all potential sources (*EPA/540/G-89/004-Guidance for Conduction Remedial Investigations and Feasibility Studies Under CERCLA*). None of the Alternatives fulfill this requirement.

It is unclear whether consideration of the adequacy and reliability of controls factor during the evaluation of the Long-term Effectiveness and Permanence of the alternatives. Was there an assessment of the reliability of management controls for providing continued protection from residuals? If done, did the evaluation include the assessment of the potential need to replace technical components of the alternatives, such as a cap, a slurry wall, or treatment systems (e.g., Sr-90 barrier, groundwater wells/treatment systems) and the potential exposure pathway and risks posed should the remedial action need replacement?

We believe the weight applied to ranking of the effectiveness of the alternatives to be incorrect. Alternative 4 far better meets this definition than the other alternatives (i.e., The NCP (40 CFR 300) defines effectiveness as the "degree to which an alternative reduces toxicity, mobility, or volume through treatment; minimizes residual risk; affords long-term protection; complies with ARARs; minimizes short-term impacts; and how quickly it achieves protection.")

It is unclear if any of the Alternatives were evaluated against the nine balancing criteria based on what happens with transition to Long-term Stewardship prior to completion of remediation under the Record of Decision (e.g., Was a cost benefit analysis of remedy costs including long-term stewardship costs done? ) The environmental consequences of doing this action or not doing it have not been evaluated. It is unclear how any of the Alternatives can ensure compliance with the balancing criteria with transition into Long-term Stewardship. These analyses should be done as this action will clearly need to be reflected and integrated into the final ROD.

We do not believe the Preferred Alternative of MNA as a remedy for the groundwater meets the selection criteria, in particular in its ability to demonstrate no adverse impacts to drinking water supplies, other groundwaters, surface waters, ecosystems, sediments, air, or other environmental resources. We believe Preferred Alternative is not protective does not meet ARARs; is inconsistent with anticipated (*and feasible*) future land and groundwater use; and does not represent the maximum extent possible a permanent solution in a cost effective manner.

Land Use & Protection of Yakama Nation treaty rights, including full access to cultural resources on the Hanford Site by the Yakama Nation. Ensuring Treaty compliance is a critical intergovernmental concern. By and through this document, USDOE supports the participation of Yakama Nation in activities related to remediation and restoration of resources affected by Hanford and implements its trust responsibility and enforceable obligations to the Yakama Nation.

The Proposed Alternatives do not fully comply with the Treaty of 1855 between the

Yakama Nation and the United States of America.

- Language in the Proposed Plan and selected Preferred Alternatives indicates that DOE is not considering cleanup to unrestricted use and is striving toward a less stringent cleanup based on the Comprehensive Land-Use Plan. While cleanup decisions may ultimately be defined by management boundaries, the risk assessment should be based upon actual human behaviors. The final CLUP did not include any suggestions, or address any concerns provided by the Yakama Nation.

The Treaty, which reserves specific rights and resources for the Yakama Nation, should be acknowledged as an ARAR or a "must comply" standard for cleanup decisions. This includes the right to practice in full subsistence activities in Yakama usual and accustomed use areas. All future Interim and Final Record(s) of Decision(s) should be in harmony with treaty rights of the Yakama Nation under the Treaty of 1855 including upland treaty rights.

- All statements included in the Proposed Plan and RI/FS documents that convey the USDOE's "beliefs" or "positions" regarding the extent of tribal treaty rights, including statements that it is the USDOE's position that Hanford is not "open and unclaimed land," should be removed from the documents. All potential impacts to treaty-reserved rights and resources should be thoroughly evaluated and considered in a revised RI/FS and Proposed Plan and supporting documents. The preferred alternative should be consistent with the USDOE's American Indian Policy, with the federal trust responsibility, and with the terms of the Treaty of 1855.

It is stated that cleanup actions will support reasonably anticipated future land uses consistent with the Hanford Reach National Monument and "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (the "CLUP") (HCP EIS) (64 FR 61615). CLUP is designated for 50 years operational and 100 years for institutional controls. Beyond that time period, the site could be used for any and all types of land use; including irrigation.

- The Preferred Alternative for groundwater with ICs for extended time periods is inconsistent with the CLUP.

The CLUP was a Federal undertaking that determined what type of activities could occur within the Hanford landscape, yet traditional cultural properties (TCP) were never addressed.

- Areas designated for industrial use, research and development, and conservation mining could have significant impacts on the landscape, and adversely affect a TCP should one be present.

Currently, there are several projects and major decisions that will be made that effect the entire Hanford site, yet still a comprehensive TCP study has not been performed. Site wide undertakings and decisions such as clean up levels, restoration, vegetation management, land use plans, the use of barriers and institutional controls need to take into consideration the effects on TCPs. It is the obligation of DOE under the National Historic Preservation Act (NHPA), Section 110, to inventory and evaluate properties to determine eligibility under the

agency's jurisdiction. DOE has not been holding up to their Section 110 obligation of identifying cultural properties on the Hanford site. There are known TCP that have not been evaluated such as, White Bluffs, Coyote Rapids, the Columbia River, Wahluke Slope, as well as other potentially unknown TCPs in the Hanford area. Cultural properties are only being addressed through the Section 106 process, on a project by project basis, which is entirely ineffective. This piecemeal method does not allow for a comprehensive landscape study and does not allow for proper consultation with YN.

- None of the Alternatives were evaluated against the nine balancing criteria based on effects on TCP.
- The Proposed Plan does not include discussion of Gable Mt. or Gable Butte TCP or the ongoing deliberations to extend the TCP boundaries. Nor does it discuss implications of final ROD decisions upon these areas or the area known as West Lake. This discussion needs to be included.

It is unclear as to what is in place to ensure compliance with the Antiquities Act of 1906. Under the Antiquities Act of 1906, the Hanford Reach National Monument (HRNM) was created by Proclamation 7319 in 2000. The Proclamation lists the resources that are to be protected including: riparian, aquatic and upland shrub stepped habitats, native plant and animal species as well as archaeological, historic and sacred sites throughout the monument. While the majority of the HRNM is managed by USFWS, the river corridor lands underlying the Hanford reactors and operational areas are managed by DOE, the current land owner. The DOE-managed portions of the HRNM include the 100-K and 300 Areas addressed in the cleanup proposals. These lands contain high levels of contamination and significant cultural resources.

It is recognized in the Proclamation that DOE has the responsibility to clean up hazardous substances and the restoration of natural resources. The Proclamation further states, "As Department of Energy and US Fish and Wildlife Service determine that lands within the monument managed by the Department of Energy become suitable for management by the US Fish and Wildlife Service, the US Fish and Wildlife Service will assume management by agreement with the Department of Energy."

Clearly it was the intent of the President that the HRNM land would be cleaned, restored and then managed by the USFWS. The entire HRNM would then be managed according to the mission of the USFWS guided by the HRNM Comprehensive Conservation Plan (CCP), which states a primary purpose of, "Protect and restore biological, cultural, geological and paleontological resources." Areas in the River Corridor 100 Areas are some of the most contaminated, and it remains the obligation of DOE to clean and restore these areas within the HRNM and areas that could affect the HRNM in consultation with the Department of Interior. Anything other than complete cleanup and restoration of the HRNM would be in direct conflict with the Antiquities Act, Proclamation 7319, and the HRNM CCP.

- Full compliance with government-to-government requirements are not fulfilled by the vague statement found in the Proposed Plan (page 31): *If during design or implementation of the RTD remedy, culturally sensitive sites are identified for which mitigation activities to protect cultural resources would be inadequate, DOE and EPA will work with the Tribal Nations to identify an alternative remediation strategy. This alternative remediation strategy would be implemented through a ROD change.* The YN expects a discussion of the culturally sensitive areas with reference to both

historic and prehistoric Native American use within the Proposed Plan. Implied agreement with implementation of a ROD change rather than an MOA or outlining actions within the ROD is misleading to the public. The YN requests consultation with DOE on this issue.

The use of institutional controls as part of proposed remedial alternatives does not comply with unrestricted access to the site or Yakama Nation Treaty Rights. DOE's use of institutional controls as a means of preventing, without fail, exposure to residual contamination in the subsurface and groundwater remains both troubling and ultimately unproven. The Nuclear Regulatory Commission adamantly favors Institutional Controls for only 100 years.

- Table 9-1 (DOE/RL-2010-98, Draft A; RI/FS) indicate indefinite IC for waste site 116-F-14. This is unacceptable.

Regarding the use of institutional controls at DOE waste sites, the National Research Council pointed out: "While there is typically a tacit recognition that engineered barriers and waste stabilization approaches have limited periods of effectiveness, these technologies are frequently employed with inadequate understanding of, or attention to, the factors that are critical to their success. These include the need for well-conceived plans for performance monitoring that identify and correct potential failures and plans for maintenance and repair, including possible total system replacement." (NRC, 2000).

- This level of planning, both technical and financial, does not appear to have been included in the cleanup planning.

Section 300.430 (CERCLA-Remedial investigation/feasibility study and selection of remedy) states the use of institutional controls shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy.

- The YN disagrees with footnote 'a' (see footnote-Table: Summary of 100-F/IU Proposed Soil Cleanup Levels Based on Ground water and Surface Water PRGs) which states "In instances where verification sampling exceeds irrigated PRGs but achieves non-irrigated PRGs, the Tri-Party Agencies may elect to apply ICs to ensure protectiveness rather than continue excavation". The purpose of verification sampling is to determine if cleanup levels have been met or if further excavation is required. The PRGs listed are the proposed cleanup levels to be met are they not?

Text within the document discussing "residual contamination" at depths below remediation actions is misleading to the public. Contamination is occurring; the 'deep zone' [vadose zone] has not been demonstrated to meet cleanup levels. Again, there is the assumption of and over-reliance on use of Institutional Controls to ensure protectiveness rather the primary objective which is protectiveness of the environment and human health through preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants as a principal element.

- Furthermore, we remain concerned that any remedy reviews (i.e. 5 year ROD review) will not include actual sampling actions or technological systems review to confirm performance of these IC.

Protection of the health of Yakama Nation tribal members and ensuring sustainable habitability of Hanford for Yakama Nation Tribal members including their safety and welfare or trust resources is a major concern of the Yakama Nation Environmental Restoration and Waste Management Program.

Accumulated scientific evidence demonstrates that Native Americans are, as a statistical cohort, subject to the highest risk of disease and cancer from exposure to environmental contaminants. The Columbia River Basin Fish Contaminant Survey is a technical report that assesses the amount of chemical pollution in certain species of fish, and the potential health risks from eating fish those fish. The study is based on fish samples collected between 1996 and 1998 from tribal fishing waters in Washington, Oregon and Idaho. EPA funded the study which was coordinated by the four member tribes of the Columbia River Intertribal Fish Commission (CRITFC).

- Official recognition that Native Americans living near the Hanford site are the most vulnerable people to environmental contaminants, as underscored by EPA's Columbia River Fish Contaminant Survey. Adults in CRITFC's member tribes who eat fish frequently (48 meals per month) over a period of 70 years may have cancer risks that are up to 50 times higher than those in the general public who consume fish about once a month.

We remain concerned the health of Yakama Nation tribal members with the needed extensive remediation of the groundwater as there will be continued effects and potential new COCs from the Tank Farms and the 100-F Area Reactor which are not considered in this Proposed Plan. CERCLA asks that all *primary sources* of contamination be included in RI/FS evaluations. Groundwater is not generally considered a primary source.

- As these upland plumes enter the river, we are concerned that any remedy reviews will not include actual sampling actions or technological systems review to confirm performance or to consider these missing source area contaminants.
- We do not believe the Preferred Alternative of MNA as a remedy for the groundwater meets the selection criteria, in particular in its ability to demonstrate no adverse impacts to drinking water supplies, other groundwaters, surface waters, ecosystems, sediments, air, or other environmental resources.
- The 100-F Area site boundaries include the Columbia River and its shorelines. Portions of the site are within the boundaries of the National Monument. Interactions among media (i.e., soils and groundwater) at the 100-F Area are important. As such, the effect of source control actions on the remediation levels or time frames for other media should be evaluated. Data should *not* be selective (e.g., excluding waste sites or contaminants) but should include all data sources applicable to evaluating current and future conditions at all upland, riparian, and nearshore operational and non-operational areas. A holistic approach would ensure that protective decisions are made for the site in its entirety.

- It is the belief of the YN that a Federal interagency committee composed of the Department of Interior, the EPA, and USDOE convene to define mutually the terms and conditions of habitability for native people of the Columbia River Basin (including residual contamination standards) and to establish an agreement with the Yakama Nation.

The cleanup and restoration of the River Corridor 100 Areas within the Hanford Reach National Monument (HRNM) remains DOE's obligation. Plans to transition F-Area out of its cleanup contract with Washington Closure Hanford and into a long-term stewardship contract under Mission Support Alliance are underway. This transition would happen before the final Record of Decision is approved and does not require public involvement.

- F-Area will not be "cleaned-up" until groundwater standards have been met and the Reactor site dealt with.
- Declaring that F-Area clean-up is complete and transitioning the site to long-term stewardship before the final cleanup plan has been reviewed by the public and the final decision has been made about what needs to be done to complete the cleanup, begs the question, where any of the Alternatives were evaluated against the nine balancing criteria based on what happens with transition to Long-term Stewardship prior to completion of remediation under the Record of Decision?
- The environmental consequences of doing this action or not doing it have not been evaluated. It is unclear how any of the Alternatives can ensure compliance with the balancing criteria with transition into Long-term Stewardship. This evaluation should be done as this action will clearly need to be reflected and integrated into the final ROD.

**Groundwater: General Comments:**

The description of Groundwater contamination on page 17 of the Proposed Plan is confusing to the reader. There is a mix of standards, some which are not appropriate (Method A values along the river corridor/shoreline). Rather than try to dismiss the frequency of exceedances or their concentrations or compare them to risk thresholds or the, simply state the facts that XYZ contaminants have exceeded their applicable cleanup standard.

- Figure 10, page 18, PP: The shape of the Nitrate plume appears inconsistent with the flow directions of the other identified plumes. One is lead to think Nitrate contamination is from other sources than stated. Clarification needed.
- Clarification is needed on footnote 'a' of Table 1: This is a final ROD, so why are there still COPCs and not just COCs. Boron, Selenium, and Vanadium should be retained as COCs for F-Area. Provide reference for agreement of Tri-Parties to Uranium Kd value used; consider retention of Uranium as a COC.
- Explanations of Groundwater risks on pages 27-28of the PP indicate exceedence of the HI yet seemingly tries to dismiss it by individually segregating them. Clarification is requested on why these individual COPCs were not then reduced such that the aggregate would be less than one.
- Statements on page 29 of PP are confusing to reader. It is stated that Cr(VI) has not be determined to be an ongoing risk for aquatic communities within the area of discharge of the 100-F/IU OUs yet the plume has been and is noted to have moved to groundwater and been identified in some porewater samples and within the river channel. More sampling is needed to make a clear determination.

The Preferred Alternative (GW-2, ICs and Monitored Natural Attenuation [MNA]) for remediation of the 100-F Area Groundwater plumes fails several of the specific statutory requirements for remedial actions that must be addressed in the ROD as supported by the FS. Among these statutory requirements, the remedial actions must attain ARARs, utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent possible, and satisfy the preference for treatment that CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants as a principal element.

MNA does not treat or remove, or reduce the toxicity and mobility.

- Rather than employ technologies to do so, there is an apparent preference to rely on the daily and seasonal Columbia River stage fluctuations which result in a groundwater/surface water mixing and the “significant reduction in contaminant concentrations before groundwater enters the river (DOE-RL-2010-98 DRAFT, pg. 861, line 24[ Chapter 8-98]). We do not believe the Preferred Alternative of MNA as a remedy for the groundwater meets the selection criteria, in particular in its ability to demonstrate no adverse impacts to drinking water supplies, other groundwaters, surface waters, ecosystems, sediments, air, or other environmental resources.

The Tri-Party Agencies’ goal for Hanford groundwater should be to restore it to its highest beneficial use (per MTCA) to protect human health, the environment, and the Columbia River as stated in the MTCA regulations (see the Proposed Plan, page 24 and reference to CERCLA - The NCP (40 CFR 300)). The groundwater beneath Hanford is a valuable resource that will likely be much-needed in the future. It should be cleaned up and restored to the highest beneficial use – as drinking water, for irrigating crops, and for all other uses.

- Restoration should be within a reasonable time frame. Indefinite ICs is not reasonable.
- Contamination sources within the vadose zone that will likely contribute to future groundwater contamination must be removed, treated as necessary, and disposed in an appropriate disposal facility.
- Since contaminants in the groundwater eventually reach the river, groundwater cleanup is necessary to help protect the river.

The Preferred Alternative GW-2, ICs and Monitored Natural Attenuation (MNA), does nothing to reduce toxicity mobility or volume of the hazardous substances or reduce the associated risks.

- The use of an Apatite Barrier (Permeable Reactive Barrier [as tested and used at 100-N]) is a successful technology currently employed in the 100-N to capture/remove Sr-90 from the groundwater. None of the Preferred Alternatives included this option. Simply stating that “*the in situ treatment for Alternative GW-3 would require specialized biological reagents and, although it is a proven technology, it would require design testing for this site*” does not relieve DOE from the obligation to develop and consider all reasonable alternatives. As stated, this is a proven

technology and should have been identified in an Alternative. (see "EPA expects to consider using innovative technology when such technology offers the potential for comparable or superior treatment performance or implementability, fewer or lesser adverse impacts than other available approaches, or lower costs for similar levels of performance than demonstrated technologies" Section 300.430 (CERCLA-Remedial investigation/feasibility study and selection of remedy).

- The Preferred Alternative puts at risk the TPA groundwater cleanup requirements in Milestone M-016-110-T02. Exceedence is known. (e.g., Statements pages 17 & 43, PP: Groundwater contaminants at levels that exceed federal and state standards in the 100-FR-3 OU are nitrate, Cr(VI), trichloroethene, and strontium-90; While the plume exceeds the 10 µg/L water quality standard in the groundwater, aquifer tubes and pore water sampling indicate infrequent exceedances of this level near the surface water interface.).

The 100-F Area site boundaries include the Columbia River and its shorelines. Portions of the site are within the boundaries of the National Monument. Interactions among media (i.e., soils and groundwater) at the 100-F Area are important. As such, the effect of source control actions on the remediation levels or time frames for other media should be evaluated. Data should *not* be selective (e.g., excluding waste sites or contaminants) but should include all data sources applicable to evaluating current and future conditions at all upland, riparian, and nearshore operational and non-operational areas.

- A holistic approach would ensure that protective decisions are made for the site in its entirety. The Preferred Alternative does not include an evaluation of contribution from other sources (i.e. the F Reactor plume) nor does it include upgradient contaminant sources from the Central Plateau (i.e., TC & WM EIS).

The Proposed Plan and the RI/FS both state there is no groundwater contaminant source from within the 100-IU-2 and 100-IU-6 OUs and that groundwater contamination underlying the 100-IU-2 and 100-IU-6 OUs will be addressed by River Corridor and Central Plateau groundwater OUs.

- Conflicting statements; trichloroethene (TCE) identified as *potentially* originating from a source within these OUs in the Executive Summary).
- Additionally, the presence of hexavalent chromium was noted in pore water at locations with corresponding concentrations in bulk sediment samples and implications for possible sediment transport. Additionally hexavalent chromium was found in pore water at locations within the Hanford Townsite study area where previously unknown as well. (*Field Summary Report for Remedial Investigation of Hanford Site Releases to the Columbia River, Hanford Site, Washington: Collection of Surface Water, Pore Water, and Sediment Samples for Characterization of Groundwater Upwelling* November 2010 4-2 (WCH-380 Rev. 1).
- There is no discussion of what actions DOE intends to take to resolve the issue of Hexavalent Chromium transport.

Migration of elevated concentrations of contaminants is not only occurring today, but has been estimated to be even greater in the future. The Preferred Alternative overly relies upon

institutional controls that cannot be confidently relied on during the extended time period long-lived radionuclides (including those in the soils and the GW plume beneath the F-Reactor) will remain toxic.

- The decision to address groundwater contamination only from where the contamination is considered to have originated begs the question of whether the treatment process (the final ROD remedy) at a waste site disassociated from 100-F or 100-IU will adequately address current 100-F or 100-IU groundwater contamination issues.
- The question remains as to whether all *local* vadose zone contaminants (i.e., 100-F & 100-IU-2 & -6) will continue to be removed in the future should the remedy for groundwater OU at the *originating source* be discontinued or determined not to be protective of human health and the environment.

There are areas of uncertainty within the groundwater modeling approach (STOMP-1D), and its application is inappropriate until all issues are resolved. The graded approach to evaluating groundwater protection and STOMP-1D modeling has many uncertainties (e.g., what criteria will be used to assess the validity of the Preliminary Remediation Goals [PRGs] as they apply to site conditions).

- Application of this model for making cleanup decisions is inappropriate until all issues are resolved.

We believe there are some noted incorrect applications of regulations which need correction and re-evaluation of risks to the groundwater (e.g. as noted in Ecology comment: The text states "It is noted that aquatic water quality criteria are only directly applicable where groundwater discharges to surface water." WAC 173-340-720(4)(b)(ii) (2007) indicates that WAC 173-340 Method B for potable groundwater applies for the protection of surface water beneficial uses, and references WAC 173-340-730; in this way, water quality standards are incorporated in WAC 173-340-720. WAC 173-340-730(3)(b)(i) also gives the relationship of water quality standards and WAC 173-340.)

- We support Ecology's position and believe the aquatic water quality criteria do apply to the ground water because the property abuts the surface water.

**Risk Assessment: General comments:**

The Resident Monument Worker Scenario does not represent a reasonable scenario. Anyone 'in residence' *would be reasonably* assumed to be drinking water from an onsite source.

- This scenario needs to be revised and recalculated to include drinking water from an onsite source (i.e. groundwater well).

The YN has outstanding issues with the use of River Corridor Baseline Risk Assessment and its 'sub-documents' [i.e. Tier 1 document for wildlife or the Tier 2 document for plants and invertebrates] as a major supporting document in cleanup decisions for the River Corridor

Areas. These documents are not finalized or approved nor have our comments and concerns been addressed.<sup>1</sup>

- Many PRGs have been inappropriately developed and uncertainties remain as these documents still require revision. Our concerns remain regarding the methodology used to calculate the EPCs. EPA's ProUCL methods were identified yet in some instances a 95UCL was not calculated (a maximum value used instead). Use of the max ignores most of the information in the data set.
- When the number of measurements is small (e.g.,  $n < 5$ ) or the detection frequency is low ( $< 5\%$ ), ProUCL ultimately recommends collection of more samples to compute defensible statistics.<sup>2</sup> Collection of additional samples was not done. Some unremediated waste sites may have exceedances of PRGs, which would provide the basis for remedial action or further evaluation. These comments are in reference to text in the RI/FS document [DOE/RL-2010-98, Draft A] Section 6.3.2.36/37 & 6.3.8.2. Clarification of the entire chapter is warranted.

These documents are basically 'cookie-cutter' documents, similar to the 100 D/H Area RI/FS/PP. As such, YN supports similar applicable Ecology comments on the risk assessment process (e.g., determination of EPCs, comparison of EPC to PRGs for elimination, etc) as indicated in Ecology's comments (beginning on *Item 400* (approximately) on 100 D/H. EPA review of YN comments on these issues in our earlier correspondence on the RCBRA, etc would provide further clarification if needed.

- Risks to the YN Tribal members should be calculated and included in the Alternative selection decision-making process using the YN risk scenario post 175 years of remedy selection.

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<sup>1</sup> See our February 28, 2011 letter to the Tri-Party Agencies (DOE-Matt McCormick, EPA-Dennis Faulk, and Ecology- Jane Hedges

<sup>2</sup> quotes from EPA sources, supporting use of the 95% UCL:

1) Dec 2002 OSWER 9285.6-10 (<http://www.hanford.gov/dqo/training/ucl.pdf>)

"It is important to note that defaulting to the maximum observed concentration may not be protective when sample sizes are small, because the observed maximum may be smaller than the population mean.... The use of the maximum as the default EPC is reasonable only when data samples have been collected at random from the exposure unit and sample size is large" (p. 20).

2) ProUCL Ver. 3.0 (Singh et al, 2004)

(<http://www.epa.gov/nerlesd1/tsc/images/proucl3apr04.pdf>)

"It is recommended that the maximum observed value NOT be used as an estimate of EPC....It should be noted that for highly skewed data sets, the sample mean indeed can even exceed the upper percentiles (e.g., 90%, 95%), and consequently, a 95% UCL of the mean can exceed the maximum. This is especially true when dealing with log normally distributed data sets of small sizes" (p. 55).

- One scenario utilized to calculate risk to YN Tribal members is incorrectly identified as non-resident use. Even as such, there remains unacceptable risk to the YN tribal members from both chemical and radiological contaminants. Much of the risk assessments are based on the RCBRA and other supporting documents (unapproved or has unresolved comments by the Tri-Party Agencies). See following excerpts (and risk values) from the RCBRA (River Corridor Baseline Risk Assessment Volume II, Part 1: Human Health Risk Assessment August 2011), the Proposed Plan, and 100-F & UI 2/6 RI/FS.
- Volume II, Part 1: Human Health Risk Assessment August 2011pg 7-34: For the Nonresident Tribal scenarios, the total cancer risk estimates exceed  $10^{-4}$  and HIs exceed 1.0 for all ROD areas, mostly due to exposures that are associated with ingestion of plants assumed to be gathered from the Hanford Site. A large proportion of Nonresident Tribal cancer risk and HI is related to arsenic soil concentrations that are approximately equivalent to levels in areas unaffected by Hanford Site activities. When cancer risk estimates are calculated without the contribution of arsenic, the total cancer risk estimates still exceed  $10^{-4}$  for all six ROD areas. The key risk drivers other than arsenic are technetium-99, carbon-14, strontium-90, benzo(a)pyrene, and Aroclor-1254, predominantly by the plant and game ingestion pathways.
- Because the Native American resident scenarios include very high food ingestion rates, strontium-90 continues to play a significant role in food-related exposures at year 2075. By year 2150, however, Native American resident cancer risks above  $1 \times 10^{-4}$  are also dominated by arsenic exposure from ingestion of garden produce. Average arsenic concentrations at remediated waste sites range between 1.1 and 17.3 parts per million. Some of these arsenic concentrations exceed the Hanford Site background value of 6.5 parts per million (DOE/RL-92-24). However, all of the RME values for arsenic are less than the IAROD cleanup value of 20 parts per million, which is based on the MTCA Method A unrestricted cleanup level. YN does not support the proposed cleanup value for arsenic.
- GA2.5.1 100-FR-3 Groundwater OU: The total cumulative ELCRs for the CTUIR and Yakama Nation exposure scenarios are  $9.1 \times 10^{-4}$  and  $9.8 \times 10^{-4}$ , respectively. The total cumulative ELCR for the EPA tap water scenario is  $2.3 \times 10^{-4}$ .
- All scenarios are greater than the EPA upper target risk threshold of  $1 \times 10^{-4}$  (see Table GA2-6). Major contributors to risk for the Native American scenarios and the EPA tap water scenario are trichloroethene, strontium-90, and tritium. The total HI is 5.1 for both the CTUIR and Yakama Nation exposure scenarios. The HI for the EPA tap water scenario is 2.4. Lithium is the primary contributor to the non-cancer HI for the Native American scenarios.

Risk scenarios are incorrectly discussed in Chapter 1 of the 100-F/TU RI/FS document (see Page 1-54, lines31-44: Discussions of risk).

- Occasional and frequent-use [equated to equal industrial-use and unrestricted-use] should not be terms used to define risk scenarios, please correct statements. Additionally, use of the words medium and low to categorize risk is incorrect. Risk

that is not between the ranges of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$  simply exceeds the regulatory standards for cleanup. As stated, this last paragraph is misleading the public. (Clearly under 'frequent-use' [understood to be equated to unrestricted] risk exceeds cleanup standards.)

The Preferred Alternative does not actively address Strontium- 90 or Nitrate and should.

- Caution is appropriate if young children might be exposed, such as in the Nonresident Tribal scenario, because they are particularly at risk for methemoglobinemia, the critical effect for nitrate exposure (IRIS 2009).

It is incorrect and very misleading to the public to state *where toxicity and mobility of source material combine to pose a potential human health excess lifetime cancer risk (ELCR) greater than one in a thousand ( $1 \times 10^{-3}$ ) then treatment alternatives should be identified* (Proposed Plan, Principle Threat Wastes, pg. 20). The point of departure for CERCLA remediation is stated as  $1 \times 10^{-6}$ . Every effort should be made to meet this standard. (USEPA, 1997; see bullets below).

- Edit paragraph for accuracy.
- Alternatives should be identified to establish remedies which meet or exceed the combined excess lifetime cancer risk level of  $1 \times 10^{-5}$ . PRGs for individual radionuclides based on a  $1 \times 10^{-4}$  target cancer risk are not supported by EPA guidance as outlined in bullets below.
  - EPA's Regulatory risk 'Point of Departure' (target risk cleanup value) is  $1 \times 10^{-6}$ . Although a risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  is permissible, to state that the 'regulatory risk target threshold of  $1 \times 10^{-4}$ ' has met is misleading to the public. Edit language throughout document to clearly clarify that the preferred risk target is  $1 \times 10^{-6}$ . Based on the requirements of MTCA and CERCLA regulations the radiological and nonradiological cancer risks should be combined and compared to the standard that Washington State has determined is protective of human health. This standard has an upper limit of lifetime risk for combined carcinogens of  $1 \times 10^{-5}$ .
  - While the USDOE's practice has been to apply MTCA risk requirements only to nonradiological contaminants, MTCA defines radionuclides as hazardous substances. Although MTCA does not include cleanup levels for individually named radionuclides, it clearly states that "radionuclides are hazardous substances under the act." [Washington Administrative Code (WAC) 173-340-200]. Radionuclides are carcinogens, and MTCA defines the maximum allowable incremental cancer risk level for individual carcinogens as  $1 \times 10^{-6}$ . It defines the maximum allowable incremental lifetime cancer risk level for multiple carcinogens and multiple exposure pathways as  $1 \times 10^{-5}$ .
  - MTCA's inclusion of both chemicals and radionuclides in assessing cancer risks is consistent with U.S. Environmental Protection Agency (USEPA) guidance on establishing cleanup levels for CERCLA sites with radioactive contamination (USEPA, 1997). That guidance states that:
    - i. The USEPA is aware of "no technical, policy, or legal rationale for treating radiation risks differently from other risks addressed under CERCLA."

- ii. The USEPA uses a consistent methodology for assessing cancer risks at CERCLA sites no matter the type of contamination.
- iii. The USEPA classifies radionuclides as known carcinogens.
- iv. Cancer risks for radionuclides should generally be estimated using the slope factor approach.
- v. Cancer risks from radiological and non-radiological contaminants should be summed to provide risk estimates for persons exposed to both types of carcinogenic contaminants.

Note: Radiation exposure risk from the National Academy of Sciences (BEIR VII Report, 2005), from which acceptable risk levels are supposed to be updated, indicates 15 millirem of annual exposure is projected to cause a lifetime cancer risk of 8 fatal cancers in adults for every 10,000 exposed – this is 8 times the CERCLA maximum risk level and 80 times the state MTCA level.

- Annual exposure values would be more representative if reduced to approximately 5millirem.

The Proposed Plan discussion of Ecological Risks at Riparian and Near-Shore Areas indicates is a risk for exceedances of hexavalent chromium to discharge to surface waters. Values used to determine estimated porewater concentration to surface water screening values (cited in Appendix L; Table L-73 used incorrect Kd) values. Once corrected it was evident that maximum concentration values were greater than surface water screening values in all categories (i.e. for metals near waste site; metals in slough areas, metals in northern shore, metals in the 128-F-2 Area C).

- It is unclear why this change did not result in identification of risks at these sites. Clarification requested.

**Soil Remediation:** Conservation land use is the basis for the preliminary remediation goals (PRGs). YN disagrees with this land use designation to develop PRGs. Our Treaty rights guarantee (at a minimum) unrestricted land-use. All PRGs should be calculated based on unrestricted land-use (at the very minimum.)

Text within the document discussing “residual contamination” at depths below remediation actions is misleading to the public. Contamination is occurring; the ‘deep zone’ [vadose zone] has not been demonstrated to meet cleanup levels. Rewrite discussion.

Text within the document identifying 20mg/kg for arsenic as an unrestricted land use clean up value is misleading. It implies Washington State Department of Ecology concurrence with use of this value on the Hanford site as background. The 20mg/kg cleanup level is the WAC 173-340 (1996) Method A value.

- The YN believes it is inappropriate to apply Method A on the complex Hanford site as it is used for sites which contain a small number of hazardous substances.
  - Its application has resulted in residual levels for arsenic which do not reflect the Unrestricted Land Use Soil Cleanup Standards WAC 173-340-740(3)] 2007 Method B value (0.67 mg/kg) and the MTCA (“Deriving Soil Concentrations for Groundwater Protection” [WAC 173-340-747(3)(a)]), groundwater protection value (0.00737 mg/kg) cleanup values (which would

default to site background levels of 6.5mg/kg). This 20 mg/kg value for arsenic exceeds the  $1 \times 10^{-6}$  individual cancer risk based on the MTCA.

- In simple terms, the risk analysis showed that casual users of the River Corridor as it is have low enough risk to be safe. However, all of the residential user scenarios have unacceptably high risk. Some of the risk was associated with uranium, mercury, chromium, cadmium, and radiological contaminants. But a major part of the high risk levels found in the residential scenarios is from consumption of arsenic contaminated plants, animals and water.
- While much of the arsenic is assumed to be from pre-Hanford agricultural practices, there was a portion that could be attributed to Hanford operations. That amount of the Hanford process arsenic load should be determined, and the cleanup of that arsenic should be a part of the Hanford cleanup plan.
- The arsenic contamination and related risk issue is not incorporated in the proposed RI/FS studies. The YN believes there should be a more global evaluation of arsenic contamination on the Hanford site.
- The Proposed Soil cleanup levels for Hexavalent Chromium to ensure protection of groundwater should be set at 0.2 mg/kg. This value is found using a Kd value of 0 mL/g and more accurately depicts movement of this contaminant through soils. Furthermore, fate and transport simulations presented in DOE/RL-2010-98 should be recalculated using 0.0 Kd value. Concentrations in the groundwater and along the shoreline and the subsequent timeline for decline in concentration re-evaluated.

The Proposed Plan lists only 16 waste sites which will require use of IC to prevent exposure to contaminated groundwater. Of these 16 sites, only 4 were evaluated in the RCBRA.

- Clarification is requested as to whether the remaining sites had risk assessments performed.

A review of CVP documents (most dating 2001-2008) for a number of waste sites raised concerns.

- Several indicate the use of outdated standards or as of yet agreed to (by the Tri-Parties) values (i.e. the 100 Area Analogous Sites RESRAD Calculations (BHI 2005a) to calculate non-radiological COCs, [e.g. copper, lead, selenium, TPH; Aroclor-1254].
- Many state use of MTCA 1996 values or soil RAGs based on "100 time groundwater cleanup rules and 100 times dilution attenuation factor times surface water quality criteria.
- Cross-contamination of asphalt from nearby roadways is given as a reason for elimination of PAHs from waste sites RAO determinations and it is unclear why this was allowed.
- Some CVPs (e.g. 116-F-5crib & 100-F-2/-11/15/16, 116-F-10 French drains) indicated need to prevent deep zone soil intrusion and are not listed as such in Table 8-6, DOE/RL-2010-98, DRAFT A.

- Furthermore, there were inconsistent values given for some Columbia River Protection RAGs (e.g., Sr-90) between some CVPs and clarification is requested.
- YN requests a review of the determination made for waste sites 100-F-59/128-F-2. We have concerns as this area also known to have an identified cultural site.
- Review of the determination made for waste sites 100-F-42/-43 and 116-F-16 is requested as well. Both sites were not remediated below the OLWM and they clearly entered the River.
  - Furthermore, chromium concentrations were evaluated using RESRAD at the 100-F-45 site. The vadose zone is ~7ft. It seems improbable that this will not migrate to groundwater/river within 1000 years. Recalculate.

Section 6.5.2 of the RI/FS discusses the 'ARCL' sites. It appears these sites were only evaluated using the casual recreational user exposure scenario. We request the risk associated with these sites be recalculated using the unrestricted scenario.

Additionally, the statement is made on several CVP (e.g. 100-F-45) " All exceedances will be evaluated in the context of additional lines of evidence for ecological effects as a part of the final closeout decision for the Columbia River corridor portion of the Hanford Site.

- It is unclear where this information is to be found. Clarification is requested.
- Furthermore, the YN disagrees with many of the scientific management decision point (SMDP) reasons given for elimination of a waste site from the being carried forward into the FS. A review of this process is requested.
- YN requests all sites with the status of 'no further action' and requiring IC for deep soil zones be evaluated against current MTCA 2007 standards while not backsliding from previously more stringent IROD cleanup values.

Although DOE states they have evaluated these sites using a slightly different risk approach, how the determination that these sites require no further action is unclear.

- YN requests DOE include this evaluation in the Proposed Plan and tables that list the interim cleanup values and the final cleanup values for each contaminant.

Soil contamination should be documented in both vertical and horizontal directions from all potential sources (*EPA/540/G-89/004-Guidance for Conduction Remedial Investigations and Feasibility Studies Under CERCLA*).

- None of the Alternatives fulfill this requirement.

**Orchard Lands:** The Proposed Plan makes no mention of waste sites to be addresses under a separate CERCLA decision as a part of the Orchard Lands OU. The only clear language for discussing the relationship between the 100-F/IU/FS scope and the Orchard Lands is found on pages 4-3 to 4-4 in the RI/FS.

- Similar language needs to be included in the PP to discuss the overlap between these two projects.

The RI/FS makes the statement "An RI of the 100-OL-1 OU will be conducted to determine if actions are needed to mitigate potential environmental or human health impacts. If results from the RI indicate a need for action, an FS will be conducted to identify and evaluate a range of remedial alternatives."

- Clarifying text needs to be inserted regarding the evaluation of impacts to known/unknown cultural resources within the Orchards Lands OU.

**NEPA:** The relationship of NEPA and NEPA values to related information is not clearly presented. There are run-on sentences and sentences with seemingly unrelated activities jammed into one sentence/paragraph. The statement "The net anticipated effect from implementation of groundwater alternatives (GW-2, GW-3, or GW-4) could be an overall positive contribution to cumulative environmental effects at the Hanford Site" contradicts the very need for action—there should be an overall positive contribution for doing the remedial actions. The CERCLA law requires long-term positive impacts of remediating the applicable waste sites; otherwise there would be no need to remediate.

- Rewrite for clarity and include discussion that some of the required assessments supporting NEPA values are not yet made until after the RI/FS is approved. The statement, "NEPA values were incorporated into the assessment conducted as part of the FS" gives the impression that NEPA values were done in the FS, and that is the end of NEPA values. This is totally incorrect. Many of NEPA values are incorporated and enforce implementation of applicable laws and regulations into later phases of the CERCLA documentation process, including the ROD and RD/RAWP. For example, applicable cultural, historic, and ecological resources are evaluated for, and implemented through *Hanford Cultural Resources Management Plan* (DOE/RL-98-10) and *Hanford Site Biological Resources Management Plan* (DOE/RL-96-32) at a time closer to the actual remediation activities.

**Corrective Action:** Text throughout the Section (an elsewhere in document) poorly communicates closure requirements for RCRA TSD units and the proper integration of corrective action for past practice units. Corrective action (WAC-173-303-64620) is for past practice units and not for Treatment, Storage, and Disposal units (TSDs). TSDs use WAC 173-303-610 for closure not corrective action (-64620).

- Rewrite text to more clearly state 1) closure plans for TSDs are necessary for integration. This authority comes from the Site-wide permit not the RI/FS, and 2) the intent of the Tri Parties' CERCLA remediation at the Hanford Site is to fulfill the corrective action requirements at the Site for past practice units remediated under CERCLA authority. Include citation referencing Sitewide Permit II.Y.1 corrective regulatory citations in text discussions.

**Future Interim ROD changes:** Incorrect statement made: "There will be a period of time between when the final action ROD is approved and the required RD/RAWP is prepared and issued. During this period, DOE-RL plans to continue remedial activities, such as waste site RTD. In order for these actions to be consistent with the final action remedy selection, the current interim action RD/RAWPs will be modified using the TPA (Ecology et al., 1989a) change notice process to include the final cleanup levels specified in the final action ROD when it is issued."

- The CERCLA process for changes in cleanup values in a ROD requires, at a minimum, an Explanation of Significant Difference (ESD) and maybe a ROD amendment. The TPA cannot circumvent the required CERCLA process. We expect review opportunities.