0069385

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99352 • (509) 372-7950

April 18, 2006

RECEIVED
APR 27 2006
EDMC

Mr. Larry Romine
Richland Operations Office
United States Department of Energy
P.O. Box 550, MSIN: A6-33
Richland, Washington 99352

Re: Ecology Comments on the "Central Plateau Terrestrial Ecological Sampling and Analysis Plan – Phase III," DOE/RL-2006-27, Preliminary Review Draft

Dear Mr. Romine:

Enclosed are comments from the Department of Ecology on the Central Plateau Terrestrial Ecological Sampling and Analysis Plan, Preliminary Review Draft. We request written responses to our comments as outlined in the Hanford Federal Facility Agreement and Consent Order, Section 9.2.1. Ecology's approval of the Sampling and Analysis Plan is contingent upon adequate resolution of our comments.

Sincerely,

John B. Price
Environmental Restoration Project Manager
Nuclear Waste Program

BR:lkd
Enclosure

cc: Dennis Faulk, EPA
Larry Gadbois, EPA
Rodney Lobos, EPA
Bryon Foley, USDOE
John Morse, USDOE
Dana Ward, USDOE
Roy Bauer, FH
Don Steffeck, USFWS
Mary Baker, NOAA
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Todd Martin, HAB
Ken Niles, ODOE
Administrative Record: 200 Area
Environmental Portal

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Beth Rochette)

Index	Section/Page/ Paragraph	Comment
1.	Global	The locations of all samples taken should be recorded so that it is possible to identify the locations where effects are observed.
2.	Exec. Summary, page iii, 1st paragraph	Revise the third sentence as follows: "The activities described in this document will result in ~~the~~ contaminant and biotic data ~~needed for~~ <u>that will assist in</u> waste site decision making." The ecological risk data are just some of the data needed for waste site decision making.
3.	Exec. Summary, page iv, 2nd full paragraph	It is mentioned that tiers are types of data collected. However, this term is not used elsewhere in the document and examples of tiers are not provided. Give the tiers in this paragraph or refer to tiers in the document where they are discussed.
4.	Exec. Summary, Table ES-1, page vii and Table 1-1, page 1-25	For non-waste site soil radiological sampling, explain the multi-increment sampling along transects near Phase I and Phase II reference sites.
5.	Exec. Summary, Table ES-1, page vii and Table 1-1, page 1-25 and 1-26	Include replicates for the West Lake multi-increment samples. Ecology has not approved of multi-increment sampling without replication. Change the text to: "Collect multi-increment surface water samples ...." Make this change for pore water, sediment, and salt crust as well.
6.	Exec. Summary, Table ES-1, page vii and Table 1-1, page 1-25 and 1-26	For the West Lake surface water and sediment samples add TBP and normal paraffin hydrocarbons to the list of analytes. TBP is both toxic and carcinogenic.
7.	Exec. Summary, page xi, 2nd paragraph	Delete the 2nd sentence, which states that organic chemicals were not associated with the processes at PUREX and B-Plant. This statement is not correct. The PUREX process involved solvent extraction with tributyl phosphate (TBP) and normal paraffin hydrocarbon (NPH) (Jones, T., 1993, *Process chemistry at Hanford (Genesis of Hanford Wastes)*, Hanford Technical Exchange Program, PNL-SA-23121 S). Also, a fission product recovery process was used at B-plant; the process used TBP, NPH, organic complexing agents such as HEDTA, and tartaric acid. All are organics. Samples from West Lake should be analyzed for TBP and normal paraffin hydrocarbons.
8.	Table 2-2, page 2-9	Delete the 5th column – notice that it cites WAC 173-340-745, which is not appropriate for direct exposure to radionuclides and not appropriate for ecological receptors.
9.	Table 2-2, page 2-9	Delete the 6th column. This risk assessment is for ecological receptors only.

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Beth Rochette)

Index	Section/Page/ Paragraph	Comment
10.	Tables 2-6, 2-7, and 2-8, page 2-14-2-18,	Detection limits for several analytes are given as TBD. Replace the TBDs with values.
11.	Tables 2-6 and 2-7, page 2-14 – 2-17,	Add TBP and normal paraffin hydrocarbons to the analyte tables.
12.	Table 2-7, page 2-16	The As detection limit for water, 10 μg/L, is too high relative to the WAC 173-340 groundwater cleanup level. Use AAS with hydride generation to achieve lower detection limits.
13.	Table 2-7, page 2-17	Reduce the detection limit for uranium detection limit to $\leq$ 30 μg/L (the MCL).
14.	Section 3.5, page 3-10, 1st paragraph	Provide a figure showing where the MIS plots will be located on the transects. Revise the figure to indicate the transects given on Table 3-4. Also, provide text in the document giving the rationale for choosing the plot locations.
15.	Section 3.5.2, page 3-11 – 3-12, Bullets	The SAP should contain more detail. Provide text to cover the first bullet, "Identify the investigation area …" – how will this be done? For the 5th bullet, use a subheading on p.3-13 to show the reader which of the steps includes the soil preparation.
16.	Section 3.5.3, page 3-13, #9	The formula for d appears to have an extraneous period before the cubed root symbol. Please correct.
17.	Table 3-4, page 3-14	Field replication does not appear to be sufficient (only 2) and it is not clear where the replicates will be taken. Increase the replicates to 4 and explain what is meant by North area.
18.	Figure 3-4, page 3-15	Mark the Hanford facilities on this map or give building and parking lot outlines.
19.	Section 3.7.3, page 3-22, 1st paragraph	Since the lake perimeter will be sampled systematically, the open water portion of the lake should also be sampled systematically.
20.	Table 3-7, page 3-23	Add tributyl phosphate and normal paraffin hydrocarbon to the analyte list for sediment and surface water.
21.	Table 3-7, page 3-23	The number of multi-increment samples for each sample type will need to be increased. In addition to a need to compensate for field variability, if there are any analytical errors for the single samples (such as spillage, contamination, low spike recovery, exceedence of holding times, etc) the site will have to be re-sampled. It would be more cost effective to get more samples during the upcoming sampling effort than to re-sample later. Ecology is currently evaluating the performance evaluation done for the 100/300 area component of the River Corridor Baseline Risk Assessment, and will recommend a number of samples based on those results.
22.	Table 3-7, page 3-23	The number of increments in for MIS, set at 20, does not appear to have a basis. Why was 20 chosen?

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Damon Delistraty)

Index	Page, Paragraph	Comment
1.	Page viii, paragraph 3	Regarding PCB congener analysis, thanks for including the 12 dioxin-like PCBs with toxicity equivalent factors (TEFs) from the World Health Organization (WHO, http://www.epa.gov/toxteam/pcbid/tefs.htm). Although cost is higher, PQLs for dioxin-like PCBs are much lower with EPA Method 1668A than EPA Method 8082 (see p. 13 in: http://www.ecy.wa.gov/pubs/0203003.pdf). In addition to "total PCBs," dioxin "total equivalents" (i.e., TEQ or 2,3,7,8-TCDD equivalents) should be calculated as the sum of products of the 12 WHO PCBs and TEFs. (In theory, it would be informative to measure the entire suite of dioxin-like compounds [7 dioxins, 10 furans, 12 PCBs], rather than only the PCB component, although cost is high.) Both total PCBs and PCB TEQ in lizards and mice can be used in exposure modeling. Also, consider measuring total PCBs and PCB TEQ in invertebrates for exposure modeling (if sufficient invertebrate tissue can be collected). Mammalian or avian TEFs (Van den Berg et al, 1998; http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=55669) should be used for calculating dietary TEQ concentration (mg TEQ/kg prey) for higher trophic level mammalian or avian receptors (respectively) ingesting mice, lizards, or invertebrates. Dietary TEQ concentrations could then be converted into a dose (mg TEQ/kg BW-d), via an ingestion rate (kg prey/kg BW-d), and compared to a TRV (mg TEQ/kg BW-d).
2.	Page ix, paragraph 3	Note that in addition to CCl4 (including its transformation products) and other VOCs (e.g., TCE, see Carlson. 1996. Risk Anal 16:211-219), burrowing mammals may be exposed to metals (e.g., Mn, Cd) via inhalation (olfactory uptake) of contaminated subsurface air (Bench et al. 2001. ES&T 35:270-277). There is also evidence that PCBs can enter the olfactory system via inhalation (e.g., Apfelbach et al, 1998. Arch Toxicol 72:314-317, http://www.tat.physik.uni-tuebingen.de/~pcb-info/literatur/r.apfelbach.pdf). This may be relevant to burrowing mammals that inhabit soils contaminated with PCBs. Please cite these references in the CCl4/burrow discussion, and consider measuring several key metals and PCB congeners (along with CCl4 and transformation products) in burrow soils and possibly in burrowing mammal tissues (e.g., olfactory bulbs).

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Damon Delistraty)

Index	Page, Paragraph	Comment
3.	Page xi, paragraph 2	The statement, "Organic chemicals were not utilized in the processes associated with PUREX and B Plant," is incorrect. Organic solvents, including tributyl phosphate (TBP), are used in the PUREX process (e.g., http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11453010&dopt=Abstract). Because TBP (as well as its degradation products) may be mobile in groundwater, it should be included in the SVOC analysis in West Lake sediments. Please explain in more detail how dose to wildlife will be calculated from salt crust, used as a salt lick (e.g., define ingestion rates of salt crust for receptors).
4.	Page xii, paragraph 1	In addition to generic dose guidelines (e.g., USDOE BCGs) or chemical screening levels (e.g., MTCA Table 749-3 eco soil levels), an uncontaminated reference site provides a data set to compare ecosystem properties (e.g., species diversity, trophic structure, vegetative cover) with those same properties at a contaminated waste site. So, it should be noted that in the case of West Lake (where no suitable reference site has been selected), comparisons will be limited primarily to generic dose or contaminant screening levels. In particular, without a reference site, it may be difficult to evaluate reconnaissance survey information (e.g., see Table ES-1 which lists biological surveys and physical/chemical properties) or salt crust and pore water COPEC concentrations.
5.	Page 1-8, bullet 1	If insects contain or produce natural cyanides (as do certain plants, bacteria, fungi, and algae, see http://www.atsdr.cdc.gov/tfacts8.html), why are detections in lizards and small mammals (insectivorous or herbivorous species) unexpected, given potential food chain transfer (assuming cyanide is incompletely metabolized)?
6.	Page 1-9, paragraph 1	Because multiple "outliers" were observed in tissues for both Tl (invertebrates) and U-235 (lizards), these COPECs should be sampled more extensively to better characterize their distribution.
7.	Page 1-10, paragraph 3	To offset an inflated Type I error, note that the P level may need to adjusted downward (e.g., Bonferroni adjustment) in the case of multiple tests.
8.	Page 1-17, paragraph 1	If Phase 3 soil sampling is not coupled with tissue sampling at the same locations, what is the rationale of matching the selected area (625 m2) to the home range of mice? How many MIS soil samples will be collected in order to comply with MTCA requirements?
9.	Page 1-18, paragraph 2	Please describe the derivation of the inhalation ESL for CCl4. Also, there may be additional VOCs (e.g., CCl4 transformation products, including CHCl3, CH2Cl2, CH3Cl) that should be evaluated in burrow air.

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Damon Delistraty)

Index	Page, Paragraph	Comment
10.	Page 1-21, paragraph 4	Although organic chemicals may have been a "minor" component of the processes associated with PUREX and B Plant, organics may not be minor toxicologically (e.g., TBP). Also, this statement appears more accurate than the one on p. xi (paragraph 2) which claims that organic chemicals were not used in these processes. Please correct this inconsistency.
11.	Page 1-24, paragraph 1, bullet 4	How will radiological screening levels be defined for salt crust?
12.	Page 2-5, paragraph 4	Please clarify the distinction between field replicate for quality control vs. multiple field samples for statistical estimation.
13.	Page 2-9, Table 2-2	It is unclear why the two columns which refer to human health CULs , i.e., "Direct Exposure, Industrial (WAC 173-340-745)" and "Soil Concentration Protective of Groundwater (WAC 173-340-747)" are included, since the Phase 3 SAP is for an ERA.
14.	Page 2-11, Table 2-3	Please clarify that "BZ" numbers for PCB congeners are also "IUPAC" numbers (assuming this is the case, see http://www.epa.gov/toxteam/pcbid/bzviupac.htm). Note that "Total PCBs" may be a misnomer, since not all 209 congeners are quantified. Also, please label the 12 WHO dioxin-like congeners. Please provide a footnote explaining the derivation of the 0.1 mg/kg (FW) target quantitation limit for vertebrates.
15.	Page 2-12, Table 2-4	The target quantitation limit for cyanide is <PQL, so will there be a problem with food chain modeling?
16.	Page 2-12, Table 2-5	Please add a footnote to the column, "Matrix Specific Target Quantitation Limits, Invertebrates," to identify the source of these limits. Many of these limits appear to be soil radiological BCGs and nonradiological MTCA Table 749-3 soil concentrations.
17.	Page 2-14, Table 2-6	There may be a problem with Hg, since SQuiRT TEL<PQL. Please explain how this will be addressed.
18.	Page 2-16, Table 2-7	Regardning the ORNL reference, I could not locate values attributed to this reference. Also, this reference lists sediment benchmarks (not surface water benchmarks).
19.	Page 2-18, Table 2-8	Please explain the derivation and identify the source of the target quantitation limit for CCl4 in burrow air (0.91 ppmv). Why are the two columns with WAC references included when this is an SAP for an ERA (not human health).

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Damon Delistraty)

Index	Page, Paragraph	Comment
20.	Page 2-21, paragraph 2 and 3	Provide rationale for not validating physical property data and field screening analytical results.
21.	Page 2-22, paragraph 4	The exposure model presented is similar but not equivalent to the model in MTCA Table 749-4. The MTCA model does not include AUF, but does include other terms to potentially lower COPEC intake (e.g., P, RGAF). P may include AUF but may also include other factors which reduce intake of contaminated food (e.g., TUF).
22.	Page 2-23, paragraph 2	Please describe the uncertainty analysis for exposure and toxicity parameters, as described in LA-UR-04-8246 (LANL, 2004, Screening Level ERA Methods, Rev 2).
23.	Page 2-23, paragraph 2	Regarding total PCB TRVs in WAC 173-340-900 (Table 749-5), clarify which TRVs (i.e., shrew, vole, robin) will be used to represent Hanford receptors to compare with modeled intake. In addition to total PCBs, calculate PCB TEQ in mammals and lizards, using WHO mammalian and avian TEFs. Intake (mg TEQ/kg BW-d) can be modeled for higher trophic level mammalian and avian receptors (respectively), ingesting these prey. This intake, in turn, can be ratioed to the dioxin TRV in Table 749-5 to assess potential effects to a receptor ingesting PCB contaminated prey.
24.	Page 2-24, paragraph 4	"Tables 2-9 through 2-13" should read "Tables 2-9 through 2-14." Also a typo – "insect" (not inset).
25.	Page 2-27, Table 2-11	EPA Method 1668A may be needed for dioxin-like PCB analysis.
26.	Page 2-28, Table 2-14	In addition to CCl4, please consider measuring CCl4 transformation products in soil gas (e.g., CHCl3, CH2Cl2, CH3Cl).
27.	Page 3-2, bullet 2	If an MIS sample is designed with a random start, this type of sample is better characterized as a systematic sample with a random component. It is not a completely randomized sample, since all members of the population do not have an equal probability of selection. That is, after the initial location is randomly selected in the first cell, subsequent increment locations are fixed. Therefore, MIS should be discussed under "Systematic Grid Surveys" (rather than under "Random Sampling").
28.	Page 3-7, paragraph 1	Does the Blaustein and Johnson (2003) reference on amphibians apply similarly to reptiles (e.g., lizards)?
29.	Page 3-10, paragraph 1	Please provide a brief rationale for only analyzing Cs-137, Sr-90, and isotopic Pu for evaluating air stack deposition in surface soils.

Ecology Comments on Central Plateau Terrestrial Ecological Sampling and Analysis Plan - Phase III, DOE/RL-2006-27 (Damon Delistraty)

Index	Page, Paragraph	Comment
30.	Page 3-12, paragraph 2, step 1	Note that the random offset will be the same in each grid cell for locating each increment of a single MIS sample (if this is the case). Please provide rationale for 25 increments/MIS sample.
31.	Page 3-14, paragraph 1	Please describe the derivation and identify the source of the inhalation ESL for CCl4.
32.	Page 3-18, Table 3-5	Please provide a basis for the number of samples specified for passive and active gas sampling.
33.	Page 3-20, paragraph 5 and Page 3-22, paragraph 2	Specify that surface water samples will be collected around the lake perimeter (assuming this is the case). However, why not collect surface water samples (as well as sediment samples) with a more representative spatial design for the entire lake (i.e., not limited to shoreline locations)?
34.	Page 3-22, paragraph 5	Regarding sampling abiotic media at West Lake, provide rationale for random sampling pore water vs. systematic sampling other media (i.e., surface water, sediment, salt crust).
35.	Page 3-23, paragraph 3	Detection limits higher than those listed in Tables 2-2 through 2-8 (not just Table 2-2) should be regarded as significant deviations. Also, PQLs higher than target required quantitation limits are problematic (e.g., cyanide in Table 2-4; Se and V in Table 2-5; Hg in Table 2-6; Cu, Ni, and Ag in Table 2-7).