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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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August 13, 2015

15-NWP-158

Mr. Chris Kemp, Deputy Federal Project Director
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Re: *Hanford Waste Management Area C Soil Contamination Inventory Estimates*, RPP-RPT-42294,
Revision 2

Dear Mr. Kemp:

The Department of Ecology (Ecology) has completed our review of the referenced document and enclosed are our comments.

Ecology has several concerns, some of the comments emphasize the uncertainty in all aspects of the soil inventory estimation process, and the following:

- 216-C-8 French drain release as a significant concern
- Incomplete presentation of hazardous waste constituent inventories
- Definition of boundaries for Waste Management Area C (WMA C)
- Value of characterization tools for defining the source of the increasing activities of technetium-99 in the groundwater below WMA C

We request that the United States Department of Energy give our comments consideration and discuss resolutions with us.

If you have questions, please contact me at jeff.lyon@ecy.wa.gov or (509) 372-7914, or Beth Rochette, Toxicologist, at beth.rochette@ecy.wa.gov or (509) 372-7922.

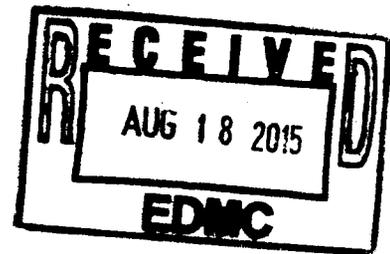
Sincerely,

Jeff Lyon
Tank Systems Operation and Closure Project Manager
Nuclear Waste Program

br/aa
Enclosure

cc: See Page 2

WMA C



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cc electronic w/enc:

Dennis Faulk, EPA
Ryan Beach, USDOE
Marcel Bergeron, WRPS
Susan Eberlein, WRPS
Jim Field, WRPS
Ken Niles, ODOE
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Cheryl Whalen, Ecology
Environmental Portal
Hanford Facility Operating Record
USDOE-ORP Correspondence Control
WRPS Correspondence Control

cc w/enc:

Steve Hudson, HAB
Administrative Record
NWP Central File

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Rod Skeen, CTUIR
Gabriel Bohnee, NPT
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NWP Reader File

REVIEW COMMENT RECORD (RCR)			1. Date 8-12-15	2. Review No.	
			3. Project:TSOC	4. Page	
5. Document Number(s)/Title(s) Hanford Waste Management Area C Soil Contamination Inventory Estimates, RPP-RPT-42294, Rev. 2		6. Project Manager Name Jeff Lyon	7. Reviewer Name Jim Alzheimer, Mike Barnes, Joe Caggiano, Jeff Lyon, Beth Rochette, Maria Skorska, Mign Walmsley	8.	9.
12. Project Manager	10. Agreement with indicated comment disposition(s)		11. Second review		
_____	_____		_____		
13. Project manager (second review)	Date		Date		
_____	Author/Originator		Author/Originator		
_____	_____		_____		
12. Item	Location	13. Review criteria # (basis), Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.) See task assignment sheet and RCR procedure for review guidance.			
1.	p. ii, Figure ES-1	The document should have a summary map that indicates the locations of the releases, to replace either Figure ES-1 or Figure 2-2, since these figures are the same. BR			
2.	p.iii, last sentence	The last sentence states that "Investigations are ongoing to search for the source or sources of groundwater activity below WMA C". There are no current investigations to search for the source or sources of groundwater contamination below WMA C, and Ecology was recently informed that none are planned. Please remove this statement. MS			
3.	p. 2-1, Sect. 2.1, para 1.	A clear definition of WMA C is needed here. It includes the area within the perimeter fence, but a larger areal and vertical extent is being investigated for closure. The ensuing description describes mostly facilities within the C Farm perimeter fence. For closure purposes, what is WMA C? Please define clearly and establish the areal extent that constitutes WMA C. For example, are the groundwater monitoring wells located outside the fence part of WMA C? They will have to be closed in accordance with WAC 173-160 as part of WMA C closure unless they are needed for post-closure groundwater monitoring. What about French drains located outside the perimeter fence? Diversion box 241-B-154? The soil volume contaminated by releases from WMA C tanks and ancillary equipment which has spread laterally outside the footprint of the C Tank Farm? This clearly affects the			

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		contaminated soil volume to have to undergo corrective action and must be included in the closure of WMA C. How far will any barrier need to extend? Will it impinge on WMA A-AX? Please address and clearly justify. JC
4.	p. 2-8, Sect. 2.2.1.	Timelines for each of these single-shell tanks would nicely summarize the C Farm operations very succinctly. Please include. JC
5.	p. 2-12, Table 2-1.	Nice table. It would be helpful to distinguish these various waste types (e.g., how does PSN differ from CW or IX etc.) because the waste type significantly affects the mass released from each tank containing these wastes at different times. Appendix A provides some of this info. Please include. JC
6.	p. 2-20, Sect. 2.2.6	The magnitude and extent of contaminants in WMA C soils need to be established to the extent possible, as this is the "inventory in waiting" to feed groundwater over the coming decades. Where is this information? Please include or reference where it may be found. JC
7.	p. 2-21, para 1, line 10	Please elaborate on the statement "waste surface- level measurements are highly uncertain". Does this mean up to a foot, a few inches or ??? To put this into context, a one inch change equates to about 2,750 gals, so the potential for loss during waste transfers increases because of poor LL measurements. Please elaborate. JC
8.	p. 2-21, Waste type.	Gross gamma logging detects the presence of gamma-emitting radionuclides, but not the isotope or assay. Spectral gamma provides both, but wasn't employed until the 1990s, long after the SSTs stopped operating. Please clarify. JC
9.	p. 2-23, para 1.	Tank leak assessments present an interpretation that not all members of the leak assessment agreed with; i.e., there may be different interpretations in the location and number of egress points and the means of release. Thus, the uncertainty can be as high or higher than 50%. Notable examples are C-105, C-108. There were several tanks where the data is either missing or highly uncertain so as to prevent a reasonable calculation/interpretation of the mass and constituents released. Please clarify. JC
10.	p. 3-1, Table 3-1.	Many constituents are listed as having no estimated inventory in this report. Is there a technical basis for this, or just insufficient information based on the constituent not being detected in any analyses? Please clarify. JC
11.	p. 3-1 to 3-8, Table 3-1.	pH is not a constituent but a property of various waste constituents. Does it really belong here? Please correct as needed. JC
12.	p. 3-7 and 3-8, 2 nd to	The text makes reference to contaminants that were added to the contaminant list from the Phase 2 WMA C RFI DQO, related to ecological risk, IS-1 and BP-5. Please include an extra column on the table that indicates which contaminants were added to

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	last paragraph	address ecological risk, IS-1 and BP-5. MW, BR
13.	p. 4-1, sect. 4.1, bullet 3.	This distinction between River Protection and non-River Protection facilities may be important as a contractual matter, but the key issue is whether any facility meets the definition of Ancillary Equipment in WAC 173-303-040. DOE, as the owner/operator is responsible for <i>all</i> these facilities regardless of how they apportion the work scope. Please correct. JC
14.	p. 4-1, last bullet	There is a possible release during retrieval of C-108. Please modify this statement accordingly. JC
15.	p. 4-2, Sect. 4.2.1	Should one include a brief mention of all possible means of releases; i.e., overfills, pipe releases, spare inlet releases? These contribute to the inventory, but are not necessarily a measure of tank integrity. Please consider. JC
16.	p. 4-4, Sect. 4.2.7	Unless volume estimates are from LL data, volumes are estimated by assuming a geometry of the possible soil volume affected by the release and then calculating an estimate of the inventory based on waste type. Waste types are significant for mass calculations, as activity/concentration varied among the various waste streams. Please add/clarify, as this hints at the uncertainty of the estimate. JC
17.	Sect. 4.2, General	Is it appropriate to include a team recommendation for a full D-42 leak assessment evaluation when the data was either insufficient, conflicting, or of high uncertainty? Please consider. JC
18.	p. 5-1, Figure 5-1	Would it be appropriate to add to the footnote the following: "...so the cumulative uncertainty is <i>caveat emptor</i> ." JC
19.	p. 5-1, Sect. 5.1	It might be appropriate to include a footnote to the effect that the Hanlon reports were prepared for information for operations and were never intended to be a source for leak volume estimates that were added only when available. This document only took on greater significance after the Weiden-inspired tank watch list. Please consider. JC
20.	p. 5-2, 1.b.	Footnote needed to indicate that there is no soil data from directly beneath a tank to indicate whether there was any release from a tank bottom or whether any release migrated beneath a tank. Please add. JC
21.	p. 5-3, Sect. 5.2. line 9	A source of uncertainty in drywell logging data is the transit time from the point of egress to the drywell and whether the drywell data is derived from an adjacent tank or a release from another tank that has migrated. Please add. JC
22.	p. 5-5, Table 5-1	What is Thoria process waste? Please define. Also, a footnote may be needed, as not all these wastes would be present simultaneously in any one tank. Please consider. JC

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23.	Section 6, General	This section does not include sufficient information about nonradionuclides, including the hazardous waste components. Remedies are needed for hazardous components in addition to radionuclides, and the PA should include the information needed to evaluate remedies. As the document is written, with the nonradionuclide information contained only in the appendices, remedies for nonradionuclides cannot be evaluated without detailed evaluation of the appendices. Please provide an equivalent level of detail for the nonradionuclides as has been provided for the radionuclides. Alternatively, this data package could be a list of RFI, baseline risk assessment, and reference document sections (and/or tables and/or figures) that contain the soil information needed for the PA. BR
24.	p. 6-1, Tale 6-1	Basis needs to change. 10-E7 Cs-137 at the base of the tank is more likely a tank leak than a gravitational flow down the tank wall from a cascade line leak. Change this to "an assumed cascade line release and/or a tank leak. Remove "possible". Please correct. JC
25.	p. 6-1, C-108	30-08-02 shows significant Co-60 beginning at the base of the tank and extending downward another 20-30 ft. in 1998. It appears separate and unrelated to the cascade line leak. How do you explain this if it's not a leak? Please modify. JC
26.	p. 6-1 – 6-3, Table 6-1	This table is not consistent with Table 4-1 in RPP-ENV-33418, Rev. 3, particularly with regard to the Cs-137 activity. This may be due to the year used for the decay calculations. If so the year of decay should be put in the figure caption, since other readers may compare these two tables and notice this discrepancy. BR
27.	p. 6-1, Table 6-1 and p. 6-3, Section 6	Table 6-1 does not show hazardous contaminants. Also, a number of releases are not discussed in this section and should be. Tables 5-1, 5-2 and 5-3 from RPP-ENV-33418 should be added to this section. Also, include the soil data that were used in the baseline risk assessment and RFI, or reference the specific baseline risk assessment and RFI sections, tables and figures with the soil data (such as Table 3.14 in RPP-RPT-58329, and p. 5-21 through 5-98 in RPP-RPT-58339 Rev. A draft). If the measured results from the RFI are not considered adequate and a case can be made to use the BBI instead as a basis for release inventories, then chromium, nitrite, nitrate, lead, butanol, TBP/DBP, uranium, manganese, nickel and aluminum (based on data in Appendix A) should be added to Table 6-1 or placed in an additional table in Section 6. BR
28.	p. 6-5, 2 nd paragraph	Ecology recognizes that RPP-RPT-42294, Rev. 2 was written a while back, and this paragraph may have been correct at that time. However, the C-Farm RFI has not resulted in a better understanding of the source "to support resolving the growing level of 99Tc observed in groundwater monitoring wells associated with WMA C". Please revise this paragraph to reflect the outcome of the RFI. MS
29.	p.7-2, sub-section 5.	Ecology is concerned that the volume and inventory estimates presented in RPP-RPT-42294, Rev. 2 include large uncertainties which cannot be resolved using existing characterization methods, i.e., the vadose zone characterization methods deployed at the

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		C-Farm are unable to detect beta emitters such as ⁹⁰ Sr, ⁹⁹ Tc or tritium. At the very least, please acknowledge the need for better characterization instrumentation, for example the beta probe, development in order to better understand the sources of groundwater contamination with ⁹⁹ Tc at the C-Farm and elsewhere. MS
30.	Section 8	Will this report be released to the public? If so, are all the references available to the public? Please check and correct as necessary. JC
31.	p. A-5 – A-10	Given the large inventories of nonradionuclide contaminants released into 216-C-8, especially nitrite, nitrate, chromium, nickel and uranium, this contaminant source should be of significant concern. The Leak Assessment document (RPP-ENV-33418) gives an estimate of 32,000 gallons of A Tank farm process condensate ion exchange waste. This inventory document gives the volume as “a minimum of 31,780 gallons”. However, neither document gives an upper limit for this release, so it could be a significant source of uncertainty and underestimation of the releases from C-farm. This release appears to be at least the second largest volume release in C-farm. Please add discussion about the uncertainty associated with this release and the influence of this release on the nonradionuclide and radionuclide contaminant inventories and concentrations in the vadose zone and groundwater, relative to other releases in C-farm. Additionally, the letter that discusses this release, 7G420-MEJ-06-007, is not in the administrative record or IDMS. Please add that letter to the administrative record or include it as an addendum or appendix to this report, since it is the original documentation of this large release. BR, JA
32.	p. A-23 – A-24	The units on the table are given as µg/g. Please indicate if these are soil concentrations [µg/(g soil)?] or concentrations in some other material. BR
33.	General, Prep- aration for the WMA C PA	For the WMA C Performance Assessment, Ecology requests a minimum of 2 sensitivity cases related to C-105 for WMA C: one with the C-105 release inventory based on the larger (Nez Perce) inventory (25 Ci Tc-99) and a second run using a release inventory of roughly 7 Ci Tc-99 for C-105. In both cases, the C-105 inventories should be placed 20 ft below the H2-H3 contact (at approximately 220 ft bgs). Also, identify the location and mass of the other inventories and the uncertainties in each; account for any loss for the periods of time from 1940 - 2010 (or the date you start). MB, JL
34.		