

# Summary Notes from 1 – 3 September 2009 Office of River Protection Waste Management Area C Tank Farm Performance Assessment Input Meeting

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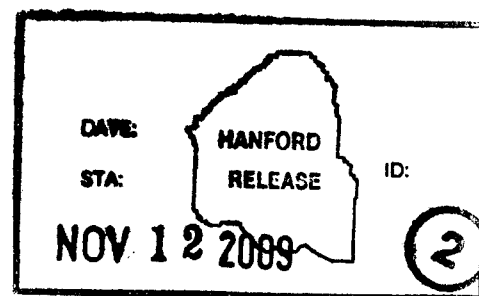
Summary of meeting between DOE-ORP and Hanford Site regulators/stakeholders regarding  
Waste Management Area C performance assessment

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**SUMMARY NOTES FROM 1 – 3 SEPTEMBER 2009 OFFICE OF RIVER  
PROTECTION WASTE MANAGEMENT AREA C TANK FARM PERFORMANCE  
ASSESSMENT INPUT MEETING**

**LIST OF TERMS**

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
D&D	decommissioning and decontamination
DOE-HQ	Department of Energy-Headquarters
DOE-ORP	DOE-Office of River Protection
DOE-RL	DOE Richland Operations Office
Ecology/WDOE	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
MCL	maximum contaminant level
NRC	U.S. Nuclear Regulatory Commission
PA	Performance Assessment
TOC	Tank Operations Contractor
WMA-C	Waste Management Area C

**Attendees:** Representatives from Department of Energy-Office of River Protection (DOE-ORP), DOE Richland Operations Office (DOE-RL), DOE-Headquarters (DOE-HQ), the Washington State Department of Ecology (Ecology), the U.S. Nuclear Regulatory Commission (NRC), U. S. Environmental Protection Agency (EPA), Region X, State of Oregon, and representatives of the Nez Perce Tribe and Confederated Tribes of the Umatilla met at the Ecology offices in Richland, Washington on September 1 through 3, 2009.

**Discussion:** DOE is pursuing closure of Waste Management Area C (WMA-C) located at the Hanford Site. At some point in the future, DOE and NRC will consult on waste determinations for these tank closures; additionally these tanks will be closed in coordination with EPA and Ecology in accordance with the Tri-Party Agreement and State-approved closure plans. The DOE, NRC, EPA, Ecology and other interested parties met for the second of a series of technical exchanges on the proposed inputs for a WMA-C Performance Assessment (PA). The technical exchanges are intended to capitalize on early interactions between the agencies with a goal of developing DOE's WMA-C PA. Technical discussions during the meeting are intended to allow for the clarification of general modeling approaches and for the identification of other specific questions.

**Topics:** The following specific topical areas were discussed during the meeting:

1. Scope of the WMA C Performance Assessment
2. Goals and Objectives of Assessment Context Working Session
3. Central Plateau Strategy
4. Ecology on Central Plateau Strategy
5. Description of WMA C Sites and Facilities
6. Anticipated Closure Activities for WMA C Performance Assessment
7. Major Elements of WMA C Performance Assessment
8. Performance Measures
9. Exposure Pathways
10. Time Frame of Analysis and Points of Assessment
11. Conceptual Model Discussions
12. Features, Events, & Processes Methodology
13. Importance of Characterization to Conceptual Model Development
14. Characterization of Tank T-106 and T-103 Leaks
15. Characterization Data from WMA C
16. High-Level Conceptual Models
17. Closure Conceptual Model Discussions and Closeout
18. High-Level Closure Conceptual Model
19. Review of Consensuses
20. Review of Notes
21. Working Session Feedback
22. Look Forward to Soil Inventory Working Session

**Summary:** The following summarizes the discussion during the meeting, by topical area.

***Scope of the WMA C Performance Assessment***

- The meeting facilitator provided an overview of the process and ground rules.
- DOE-ORP Staff provided an overview of the meeting purpose to discuss input parameters for a C Tank Farm performance assessment, with a goal of developing a common set of parameters and assumptions that will be used in the WMA C performance assessment.

### ***Goals and Objectives of Assessment Context Working Session***

- Tank Operations Contractor (TOC) Staff presented the goals of this technical session regarding establishing the assessment context, including regulatory context as defined in Appendix I of the Hanford Federal Facility Agreement and Consent Order, the Central Plateau Strategy, and requirements of both the Washington State Department of Ecology and U.S. Environmental Protection Agency, Region X.
- TOC Staff identified that the scope of the major elements that embody the planned WMA C Closure Performance Assessment includes baseline risk assessment information to support corrective measure selection and an iterative process of preparing performance assessments that will ultimately support final decision making.
- TOC Staff identified that the purpose of the assessment context discussion in this technical session is to provide a high-level overview of the WMA C performance assessment, including defining risk assessment/performance assessment, discussing the anticipated overall scope, Discussing performance metrics, exposure points, high-level features, events, and processes, and the site conceptual model of WMA C.
- TOC Staff presented a conceptual high-level pictorial depiction of the final closure configuration of WMA C and the Central Plateau regarding the assessment context information to be discussed in this technical meeting.

### ***Central Plateau Strategy***

- DOE-RL Staff provided a presentation on the proposed Central Plateau cleanup completion strategy that is being worked by DOE-RL with the State of Washington and EPA Region X.
- DOE-RL Staff identified that the Central Plateau cleanup completion strategy is focused on shrinking the active Hanford Site cleanup footprint from the whole Hanford Site footprint to a much smaller area comprised by the Central Plateau.
- DOE-RL Staff noted that cleanup of the River Corridor sites is well under way, and completion of River Corridor sites in the 2012 timeframe is key to focusing future cleanup efforts on the Central Plateau.
- DOE-RL Staff noted that the Central Plateau Strategy recognizes that there is a need for permanent waste disposal capability in the Central Plateau area. The Central Plateau strategy provides a comprehensive picture of the costs and schedule for cleanup activities.
- DOE-RL Staff identified that the overall Central Plateau strategy includes minimizing the area used for waste disposal and containment of residual contamination to result in the smallest practical footprint remaining at the site. The Central Plateau strategy focuses on three key areas: (1) the Inner Area; (2) the Outer Area; and (3) Groundwater.

- DOE-RL Staff provided an overview of the Inner Area approach, which includes minimizing the size of the final footprint, including ensure safe waste disposal, comprehensive and consistent cleanup decisions, and implementing cleanup decisions using a geographical approach.
- DOE-RL Staff provided an overview of the major facilities and actions expected to be addressed in the Inner Area cleanup and decision making activities. Inner Area cleanup principles that need to be consistently defined and applied include: exposure scenarios, ecological protection parameters, decision logic, foundation for institutional controls, soil levels protective of groundwater, dose standards, a master set of contaminants of concern, and the appropriate Applicable and Appropriate Requirements to be applied.
- DOE-RL Staff provided an overview of the Outer Area approach, which includes cleanup of waste sites comparable to the River Corridor sites, D&D of excess facilities, making final cleanup decisions with a Record of Decision, and starting cleanup with interim actions using ARRA funds.
- DOE-RL Staff provided an Overview of the Central Plateau Groundwater approach, which includes containing key contaminants to the Central Plateau and remediating to meet drinking water standards, completing groundwater remediation on the Central Plateau as a model decision making process, and implementing pump and treat systems in the next few years to continue to remove and contain key contaminants.

#### ***WDOE/EPA on Central Plateau Strategy***

- Washington State Department of Ecology (WDOE) Staff noted that the plan is to publish this strategy by the end of September and that this is important for stakeholders to be able to understand the decision making processes for the Central Plateau cleanup.
- WDOE Staff indicated that the cleanup principles have been close to agreement among the three agencies, but that the details of how the principles get implemented are important.
- WDOE Staff noted that they are committed to the regulatory process articulated in Appendix I of the Tri-Party Agreement.
- EPA Staff reiterated that the TPA articulates that the areas of the site that are cleaned up under one regulatory regime should be sufficient to meet the other regulatory regimes.

#### ***Description of WMA C Sites and Facilities***

- DOE-ORP Staff provided an overview of the WMA C tanks, infrastructure, and other facilities that will be included in the WMA C Performance Assessment. Waste that is retrieved from single-shell tanks in the tank farms is transferred to compliant double-shell tanks.
- DOE-ORP Staff provided a history of the WMA C operations and previous transfers and nuclide harvesting campaigns. Fourteen unplanned releases (spills) are documented to have occurred in WMA C over its history of operations.

- DOE-ORP Staff provided an overview of the subsurface beneath WMA C. Three major stratigraphic units comprise the subsurface beneath WMA C, including: (1) the Columbia River Basalt Group; (2) an undifferentiated (H3) unit composed of the Hanford formation, Cold Creek unit, and Ringold Formation; and (3) Hanford formation gravels and sands.

***Anticipated Closure Activities for WMA C Performance Assessment***

- DOE-ORP Staff provided an overview of the site conceptual model for after closure of WMA C. The conceptual model is based on the anticipated closure activities for WMA C.
- DOE-ORP Staff noted that the anticipated WMA C closure activities include: single-shell tank and component closure activities; soil corrective action activities; building decommissioning and decontamination; engineered surface barrier activities; and post-closure activities. WMA C tanks are to be retrieved by 2014 per the Tri-Party Agreement.
- DOE-ORP Staff provided an overview of the single-shell tank and component closure activities, including retrieval and sampling activities, regulatory documentation, and approvals that will be required. It was explained that the Tier I and II closure plans addressed in the Tri-Party Agreement are different than the Tier I and II closure plans in DOE Order 435.1. The WMA C performance assessment is intended to meet the requirement for a baseline risk assessment, which will not be issued until after a record of decision is made for the Tank Closure and Waste Management Environmental Impact Statement. It was noted that natural resource damage concerns under CERCLA need to be incorporated into the analyses and decision making processes, but actual natural resources damages assessments will not be completed until the cleanup decisions have been made.
- DOE-ORP Staff provided an overview of the WMA C soil corrective action activities, including soil characterization activities, remediation activities, regulatory documentation, and approvals that will be required.
- DOE-ORP Staff provided an overview of the WMA C anticipated building decommissioning and decontamination (D&D) activities, including characterization activities, regulatory documentation, and approvals that will be required. It was noted that there are not a lot of buildings in WMA C that will require D&D.
- DOE-ORP Staff provided an overview of the WMA C anticipated engineered surface barrier activities, including characterization activities, physical engineered surface barrier activities, regulatory documentation, and approvals that will be required. An engineered surface barrier would be required, both under the Washington State Administrative Code and DOE Order 435.1, unless clean closure is achieved.
- DOE-ORP Staff provided an overview of the WMA C anticipated post-closure activities, including physical post-closure activities, regulatory documentation, and approvals that will be required.

### ***Major Elements of WMA C Performance Assessment***

- TOC Staff presented an overview of performance assessment as a type of systematic risk analysis that addresses what can happen, how likely it is to happen, what the resulting impacts are, and how these impacts compare to regulatory standards. For this process, comparison to regulatory standards will occur in regulatory decision documents (corrective measures studies and closure plans).
- TOC Staff noted that the essential elements of a performance assessment include: a description of the site and engineered system; and understanding of the key events that are likely to affect long-term performance; a description of process controlling the movement of radionuclides into the general environment; a computation of doses to the general population; and an evaluation of uncertainties in the computational results.
- TOC Staff discussed how the Tri-Party Agreement, Appendix I, contributes additional understanding to the scope of what a performance assessment needs to include in this context, including closure conditions, contaminants of concern, performance requirements, and regulatory drivers.
- TOC Staff presented the major elements of the WMA C performance assessment. A baseline risk assessment presenting the risks from releases of hazardous substances must be included in the performance assessment. Performance of a closed facility containing radionuclide residuals is also included.
- TOC Staff presented the human-health, ecological risk, and other risk assessment regulations and guidance from Washington State Department of Ecology, EPA, and DOE sources.
- TOC Staff presented an overview of the baseline risk assessment process, including development of data quality objectives, work plans, sampling and analysis plans, and review, uses, and interpretation of the data.
- TOC Staff provided a status overview of the WMA C characterization in support of the baseline risk assessment, including sampling activities and associated work.

### ***Performance Measures***

- TOC Staff presented an overview of types for performance metrics that can be compared against a regulatory standard. As discussed previously, it was noted that the results of this PA will be presented; however, the interpretation of the results will be done in regulatory decision document (closure plan, corrective measures studies).

### ***Exposure Pathways***

- TOC Staff presented an overview of conceptual exposure models. In order to maintain consistency, the WMA C performance assessment will be using the same exposure scenarios used in the Tank Closure and Waste Management EIS and in the Central Plateau strategy. Exposure scenarios will also be consistent with DOE Order 435.1 guidance and the Washington State Administrative Code. Exposure scenarios will include both radionuclides and hazardous chemicals, and will address past and current sources of contamination, release mechanisms, environmental transport media, potential exposure points, and potential exposure routes.
- Meeting participants raised questions and made suggestions concerning both the presentation of the exposure scenario information and the source of some assumptions, e.g., EPA guidance.

### ***Time Frame of Analysis and Points of Assessment***

- TOC Staff presented regulatory information supporting where exposure scenarios should calculate dose, i.e., the point of assessment or the point of compliance.
- TOC Staff presented regulatory information supporting when exposure scenarios should calculate dose, i.e., time of assessment or time of compliance.
- Because of the differences in point of compliance and timeframe of analysis among the different regulatory bodies, and to provide DOE and the regulators a range of options on which to make their decision, TOC Staff proposed a range of options for both time of compliance and point of assessment. Meeting participants discussed the various options and what additional points of assessment may be needed.

### ***Conceptual Model Discussions***

- The meeting facilitator reviewed the discussions of the previous day and introduced the topic areas for today's meeting.

### ***Features, Events, & Processes Methodology***

- TOC Staff provided an overview of the features, events, and processes methodology being used at the site to develop the general site conceptual model. The features, events, and processes methodology is a systematic approach to developing conceptual models that is intended to help promote consistency and completeness in this application. Features include any relevant characteristics of the engineered systems or the natural system associated with a waste site or disposal system. Events include things that may or will occur in the future, including failure of engineered systems or natural system changes. Processes are things that are ongoing that could include corrosion and degradation of the engineered system or weathering of a natural system.



- TOC staff noted that the features, events, and processes methodology is being considered for potential application to the development of the WMA C performance assessment conceptual model.

### ***Importance of Characterization to Conceptual Model Development***

- TOC Staff presented an overview of the development of the site conceptual model, particularly with regard to the leaching/groundwater pathway. It was noted that the leaching/groundwater pathway is the most complex pathway at the Hanford Site and usually leads to the most stringent soil cleanup criteria under the Washington Administrative Code. Meeting participants discussed the need for a formal application of the features, events, and processes methodology.

### ***Characterization of Tank T-106 and T-103 Leaks***

- Technical Support Staff provided an overview of the information learned by the site from two tank leak situations (T-106 and T-103), what data was collected, how it was interpreted, and how that information is being used to support the development of the site conceptual model. DOE-ORP staff emphasized the importance of leak volumes as a driving force to contaminant movement.
- Meeting participants discussed the data and interpretations presented on the T-106 and T-103 leak characterization data and other observations that may need to be accounted for in the WMA C PA.

### ***Characterization Data from WMA C***

- Technical Support Staff provided an overview of the characterization data at WMA C, including groundwater data and phase I characterization of the vadose zone. It was noted that there is a discrepancy between the observed data in the groundwater and observed data in the vadose zone in that there is contamination that has not been fully explained. Groundwater contamination is above MCLs for technetium-99, iodine-129, nitrate, antimony, uranium, and nickel.
- Technical Support Staff provided an overview of the historical data that the site has for WMA C, including gross gamma logging, historical sampling, and spectral gamma logging. Historical data shows contamination in the vadose zone and groundwater. Methods and approaches to collecting characterization data in WMA C were discussed.

### ***High-Level Conceptual Models***

- Nez Perce Staff presented an alternative high-level conceptual model of the stratigraphy at WMA C. Nez Perce staff have been involved in tank farm vadose zone activities and have commented on and participated in the development of numerous modeling efforts.

- The Nez Perce technical approach is to use stratigraphic and lithologic correlations between well data to develop an understanding of the underlying stratigraphy. The Nez Perce data shows uranium moving southwest to northeast in the vadose zone and then to the southwest in the groundwater (Cold Creek formation). Supporting information can be found in Appendix D of the B-BX field investigation report.
- Meeting participants discussed the similarities and differences between the DOE high-level conceptual model and the Nez Perce high-level conceptual model. Meeting participants agreed that there are still issues with both conceptual models and relationship to observed data.
- TOC staff presented an overview of their high-level conceptual model. The model also was based on a compilation of observed data. The model is presented as a three-dimensional graphic interface that can be used to depict features, events, and processes in the WMA C, including tanks, infrastructure, unplanned releases, and stratigraphy. The graphical model will be used in the performance assessment to assign properties and develop parameters for the fate and transport modeling.
- TOC staff postulated alternative conceptual models that could be considered based on other events such as leaking water lines, flooding of tank farms from snow melt, or other sources of liquid.

#### ***Closure Conceptual Model Discussions and Closeout***

- Meeting participants discussed the need to have more discussions concerning the development of exposure scenarios before deciding on what points of assessment and times of assessment will need to be included in the performance assessment.
- DOE Staff committed to include scenarios and points of assessment in the performance assessment that would address regulator and stakeholder needs.

#### ***High-Level Closure Conceptual Model***

- TOC Staff presented an overview of the high-level conceptual model for the post-closure state of WMA C. Anticipated closure conditions will be incorporated into the site conceptual model. Post-closure assumptions include: 99% of waste is removed from tanks in the retrieval process; initially, model results will be used, to be replaced with actual inventories from post-cleaning residual samples; remedial actions from the CMS process will have been implemented; operations of man-made water sources will have ceased; water tables will return to pre-Hanford conditions; and a barrier will be installed over the WMA C.

#### ***Working Session Feedback***

- TOC Staff presented the goals that had been established for the assessment context working session and discussed the degree to which each of those goals was or was not met. Meeting participants discussed the summary of points that were addressed during the working session.

**ATTACHMENT – ATTENDANCE ROSTER**

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