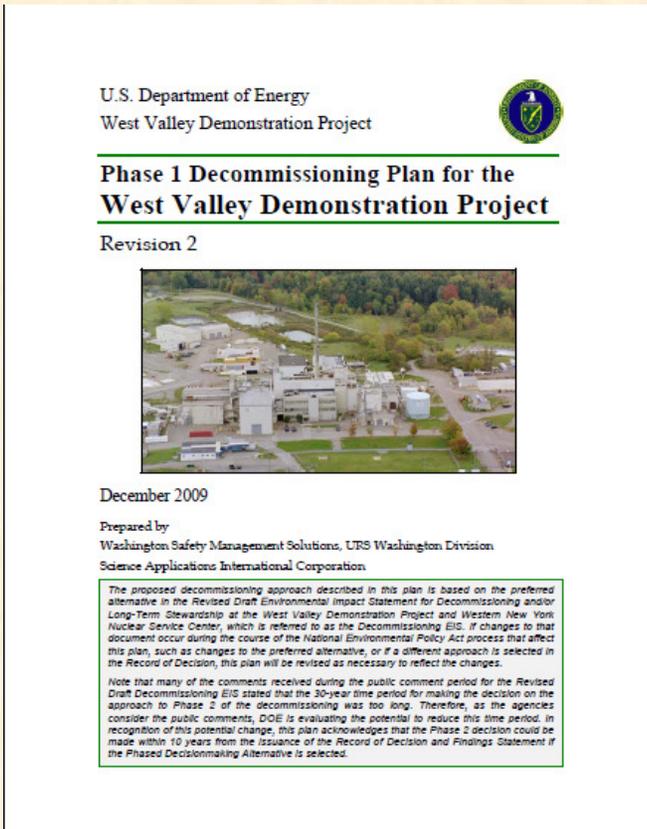


# West Valley Demonstration Project

## DOE Briefing on the Phase 1 Decommissioning Plan DOE Responses to NRC Technical Evaluation Report Comments



**DOE-NRC Meeting  
June 10, 2010**

**SAIC and URS  
for the U.S. Department of  
Energy**



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## Objectives

- 1) Discuss DOE responses to the NRC comments in the February 25, 2010 NRC Technical Evaluation Report (TER) for the Phase 1 Decommissioning Plan (DP) for the West Valley Demonstration Project (WVDP).
- 2) Obtain feedback from the NRC on the responses to the TER comments.
- 3) Determine any further actions to be taken.



## Phase 1 Decommissioning Plan for the WVDP - History

- DOE/NRC Public Meetings – May 2008, July 2008, and October 2008
- DP Revision 0 Submitted - December 2008
- DP Revision 1 Incorporating 2008 Soil Data Submitted - March 2009
- NRC Completes Technical Review and Issues Requests for Additional Information (RAI) - May 2009
- DOE/NRC Public Meetings – June 2009 and September 2009
- DOE Submits Responses to NRC RAIs - August 2009, September 2009, and November 2009
- DP Revision 2 with RAI Responses Submitted – December 2009
- NRC Issues Technical Evaluation Report (TER) - February 2010
- DOE Publishes Availability of TER in Federal Register – March 2010



## Presentation Format

- Summary of the NRC TER
- Responses to the major NRC TER comments
- Responses to other NRC TER comments
- Summary and Path forward



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## NRC TER Summary (1 of 2)

- TER documents NRC review of the Phase 1 DP for the WVDP:
  - DP Revisions 0 and 1
  - RAI Responses submitted August/September/November 2009
  - DP Revision 2
- DP was reviewed to determine whether the proposed action meets the decommissioning criteria for unrestricted use in 10 CFR 20.1402

### Conclusions:

- NRC staff determined the Phase 1 DP provides reasonable assurance that the proposed action will meet the decommissioning criteria
- NRC staff identified no objection to any provision of the plan



## NRC TER Summary (2 of 2)

### Conclusions (cont.):

- NRC concluded that the DP provides a reasonable approach for guiding decommissioning activities using the Derived Concentration Guideline Level (DCGLs) presented
- NRC provided comments for DOE to address during Phase 1 activities
- NRC requested for technical review information such as monitoring or in-process survey data that will be collected during Phase 1 activities
- NRC requested for technical review engineering designs that will be developed during Phase 1 activities
- NRC proposed a meeting to address any questions or clarification related to the TER and the Phase 1 DP



## DOE Responses to NRC TER Comments

- DOE prepared responses to two types of comments in the NRC TER:
  - Major comments identified in bold text (15)
  - Other comments identified in the supporting text (8)
- DOE responses were submitted to NRC for review
- DOE will discuss responses to the 15 major TER comments followed by the other 8 comments during this meeting.



## NRC TER Comment 1 – Phase 1 Evaluations and Studies

- ❑ ***“Subject to the EIS ROD, DOE expects Phase 1 decommissioning activities to begin in 2011 and to last approximately 8-10 years. To meet this aggressive schedule, Phase 1 evaluations and studies need to be identified, scoped and implemented early in Phase 1 to ensure that results are available in a time frame that supports making a technically sound Phase 2 decision. NRC expects to be able to provide recommendations on the scope of the evaluations and studies and to be kept abreast of the results of the analyses as they become available”.***

### DOE Response:

- ❑ DOE and NYSERDA are currently working on a process to identify and implement the Phase 1 studies.
- ❑ NRC will be able to make recommendations on the scope of the Phase 1 evaluations and studies and review these studies when they are completed.



## NRC TER Comment 2 – Future Re-evaluation of the Sites Ability to Meet the LTR Criteria

- ❑ ***“If previously cleaned areas become re-contaminated, the collection of additional information during the ongoing assessment period reveals that risks are significantly underestimated, or modeling assumptions otherwise become invalid, NRC expects that the impact of these events on the ability of the site to meet LTR criteria will need to be re-evaluated at the time of final decommissioning”.***

### DOE Response:

- ❑ DOE will consider the cumulative impacts of all source areas within the project premises, including any previously remediated Phase 1 areas in the unlikely event that they become re-contaminated, to demonstrate compliance with the LTR criteria at final decommissioning.
- ❑ DOE will re-evaluate the ability of the site to meet the LTR criteria at final decommissioning and assess whether Phase 1 soil characterization, Phase 1 studies during the ongoing assessment period, or in-process surveys invalidate modeling assumptions or underestimate risk.



## NRC TER Comment 3 – Dose Modeling Assumptions

- ❑ ***“Dose modeling assumptions regarding the lateral and vertical extent of contamination needs to be verified in the field. If significant deviations exist, DOE needs to: 1) evaluate the risk significance of these deviations; and if necessary: 2) revise the DCGLs; or 3) apply the DCGLs to just those areas of the site where the dose modeling assumptions are valid. This comment applies to surface, subsurface, and streambed sediment soils”.***

### DOE Response:

- ❑ DOE will evaluate the lateral and vertical extent of contamination in soil and stream sediment within the project premises as described in the Phase 1 Characterization Sampling and Analysis Plan (CSAP).
- ❑ The sampling results will be used to evaluate whether the subsurface soil and streambed sediment conceptual models are valid. If the source geometries are found to be substantially different from the assumed conceptual models, the conceptual models will be revised and the DCGLs recalculated.
- ❑ The surface soil, subsurface soil, and streambed sediment DCGLs have specific applications within the project premises where the modeling assumptions are valid.



## NRC TER Comment 4 – Use of Surrogate Radionuclides

- ❑ ***“If DOE chooses to use surrogate radionuclides for the FSS, sufficient information (characterization data) needs to be provided to ensure that use of surrogate radionuclides will not lead to a significant underestimation of the potential dose associated with residual contamination at the site”.***

### **DOE Response:**

- ❑ One of the goals of the Phase 1 CSAP is to identify the potential existence of a surrogate radionuclide at the site.
- ❑ Soil data collected during CSAP sampling activities will be evaluated to identify the presence of a surrogate radionuclide.
- ❑ If a surrogate radionuclide is proposed for FSS purposes, DOE will provide the NRC sufficient characterization data to support its use after all CSAP soil data has been evaluated.



## NRC TER Comment 5 – Support for Diffusive Transport

- ❑ ***“DOE did not demonstrate that diffusive transport is the dominant transport mechanism of contamination from the Lavery till into the overlying aquifer. DOE needs to more formally document its conclusion that advective flow from the Lavery till to the backfill sediments is not the dominant transport mechanism for the groundwater transport (or multi-source) scenario”.***

### DOE Response:

- ❑ Calculation packages DPlan-SAIC-JDP-003 and DPlan-SAIC-JME-001 were provided for NRC review in November 2009 and April 2010 which identified diffusive transport as the dominant contaminant transport mechanism from the Lavery till to the backfilled sediments.
- ❑ Three-dimensional STOMP modeling of groundwater flow associated with a water supply well screened in the backfilled WMA 1 excavation predicts downward advective groundwater flow at the backfill-Lavery till interface including the immediate vicinity of the well.
- ❑ Calculation package DPlan-SAIC-JDP-003 has been revised to provide flow balances for the screened interval of the well and horizontal flow area at the base of the well to provide additional support for upward flux of contamination due solely to diffusion.



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## NRC TER Comment 6 – Impacts of Engineered Barriers

- ❑ ***“Potential adverse impacts of final engineered barrier designs have not been evaluated at this time. DOE needs to evaluate any potential adverse impacts of final engineered barrier designs that may affect risk calculations to support Phase 2 decision making”.***

### **DOE Response:**

- ❑ DOE will evaluate the impacts the final engineered barrier designs have on groundwater flow in the north plateau and Phase 2 decommissioning as they are being developed.
- ❑ The engineered barriers will be designed to result in minimal changes to groundwater flow patterns in WMA 3.
- ❑ DOE will provide NRC for technical review the final designs of the engineered barriers and associated monitoring systems before their installation as stated in DP Revision 2.



## NRC TER Comment 7 – Derivation of Area Factors (1 of 2)

- ❑ ***“It is not clear that alternative conceptual models (e.g., multi-source and gardener) were appropriately considered when deriving area factors provided in Chapter 9. NRC expects DOE to provide a basis for the number and size of the areas evaluated and the model selected to derive a particular set of area factors prior to remediation”.***

### DOE Response:

- ❑ The calculation of area factors in Section 9.1 of the Phase 1 DP followed the approach described in Section 5.5.2.4 of MARSSIM (EPA et al. 1997).
- ❑ Details of the calculation of area factors for the multi-source model are described in Decommissioning Plan Calculation Package DPlan-SAIC-JME-001 which was provided for NRC review in April 2010
- ❑ The multi-source model concept was applied to the calculation of area factors for the subsurface source.



## NRC TER Comment 7 – Derivation of Area Factors (2 of 2)

### DOE Response (cont.):

- ❑ The size of the primary source in the multi-source model was varied and the size of the garden or farm and the associated utilization and exposure rates was kept constant.
- ❑ Reducing the size of the subsurface (primary) source decreased the amount of upward diffusion of contamination to groundwater and the related secondary contamination of the surface soil.
- ❑ NRC review of the calculation package clarified the dose modeling aspects of the area factor development.



## NRC TER Comment 8 – Treatment of Uncertainty (1 of 2)

- ❑ ***“DOE did not provide adequate justification for its treatment of uncertainty of distribution coefficients for subsurface soil DCGL calculations. NRC recommends that DOE consider or provide justification for lack of consideration of uncertainty in distribution coefficients for subsurface materials in the subsurface soil DCGL calculations. DOE needs to properly consider parameter correlations consistent with the approach laid out in Appendix E, Table E-7 of Revision 2 to the DP”.***

### DOE Response:

- ❑ The treatment of uncertainty of distribution coefficients for subsurface soil was inconsistent with the approach in Appendix E of the DP due to the complexities of the probabilistic analysis associated with the mass balance groundwater model used for subsurface soils compared to the non-dispersion groundwater model used for surface soils.
- ❑ The mass balance groundwater model, used to develop subsurface soil and sediment DCGLs, required prolonged computation times especially for radionuclides with a large number of daughter products with a large number of probabilistic parameters and parameter correlations.



## NRC TER Comment 8 – Treatment of Uncertainty (2 of 2)

### DOE Response (cont.):

- ❑ Probabilistic subsurface soil simulations, which included all parameter correlations, were conducted for selected radionuclides (I-129 and U-233) with doses primarily due to groundwater pathways and with few daughter products, as examples.
- ❑ For these isotopes the probabilistic subsurface soil DCGLs increased 100% for I-129 and 40% for U-233 with all correlations included.
- ❑ The overall impact of the additional correlations for the nuclides evaluated, was to narrow the range of calculated doses and eliminate some of the parameter combinations that result in higher calculated doses.
- ❑ The model simplifications used to expedite revisions to the subsurface DCGLs are not likely to undermine the conservatism in the calculations.



## NRC TER Comment 9 – Multi-Source Scenario Risk Significant Parameters

- ❑ ***“DOE did not consider the uncertainty in potentially risk-significant parameters when deriving subsurface soil DCGLs based on the multi-source scenario. NRC recommends that DOE perform a sensitivity analysis to evaluate the risk significance of important parameters (e.g., distribution coefficients) on the results of the multi-source scenario, which drives many of the subsurface soil DCGLs, and adjust parameters as necessary to ensure DCGLs are sufficiently protective at the unrestricted use level”.***

### DOE Response:

- ❑ DOE agrees that a sensitivity analysis would be of value but considers the analysis is best done after additional data on the nature and extent of the subsurface source is collected during Phase 1 remedial activities.
- ❑ The sensitive variables for the contaminated Lavery till are the hydraulic conductivity, the magnitude and lateral and vertical extent of the contamination, and distribution coefficients affecting pore water concentration of contaminants.
- ❑ The sensitive variables for the aquifer are the hydraulic conductivities of the backfill, French drain, and slurry wall; distribution coefficients of contaminants in the backfill, and the degree of mixing within the capture zone of the well.



## NRC TER Comment 10 – Justification of Buttermilk Creek Watershed Area

- ❑ ***“DOE did not provide a rationale for using Buttermilk Creek watershed area when deriving streambed sediment DCGLs. NRC recommends that DOE justify use of the Buttermilk Creek watershed area to calculate surface water concentrations in the streambed sediment DCGLs prior to their future use in a future DP revision”.***

### DOE Response:

- ❑ Exposure via fish consumption from Franks Creek or Erdman Brook is inconsistent with current stream conditions which lack a sustainable fish population for long term ingestion (i.e. sufficient size and number of fish).
- ❑ Franks Creek and Erdman Brook are intermittent streams with low flow rates located within a small drainage area.
- ❑ The use of Buttermilk Creek for recreational fishing is consistent with the EIS.
- ❑ Future revisions of the DP will incorporate a discussion of these assumptions.



## NRC TER Comment 11 – Clarification of Modeling

- ❑ ***“Clarity of Phase 1 DP modeling assumptions and parameters could be enhanced. NRC seeks clarification on a few modeling assumptions and parameter values to help improve clarity of the Phase 1 DP and/or ensure all remaining risk significant technical issues are adequately addressed”.***

### **DOE Response:**

- ❑ DOE has provided NRC additional information for review, including detailed calculation packages, to clarify its modeling assumptions and parameter values used in its dose and groundwater modeling.
- ❑ DOE has provided additional detailed discussion of its modeling assumptions in its responses to the NRC TER comments.



## NRC TER Comment 12 – Phase 2 Radon Consideration

- ❑ ***“Although final decommissioning decisions have not been made, DOE needs to be aware that if it selects sitewide close-in-place for Phase 2 decommissioning with institutional controls to meet criteria for restricted use, DOE may need to consider radon impacts as part of the demonstration of compliance with §20.1403(a) even for Phase 1 source areas”.***

### DOE Response:

- ❑ The Phase 1 soil and streambed sediment characterization program will evaluate the presence of 12 additional radionuclides of interest (ROI) that may be present within the project premises including Ra-226, which decays to radon.
- ❑ Potential radon impacts will be considered if a close-in-place scenario is selected for Phase 2 decommissioning.
- ❑ DOE will consider the practicality of incorporating radon mitigation techniques into structures as part of the Phase 2 controls proposed for the project premises.



## NRC TER Comment 13 – QA Project Plan Review

- ❑ ***“The Phase 1 DP provides an overview of the QA program noting that the information is generic because contractual arrangements for the proposed decommissioning have not yet been made. Section 1.6 of the Phase 1 DP states that a QA Project Plan will be developed and forwarded in the future. NRC will review the elements of the QA Project Plan applicable to data and information collected in conjunction with planned characterization and surveys supporting decommissioning activities (e.g., scientific and engineering data, calculations, measurement and test equipment, and dose modeling) when this information becomes available. The QA Project Plan needs to be developed prior to the start of decommissioning activities to ensure the collection of high-quality and defensible information”.***

### DOE Response:

- ❑ The contractor implementing both the soil/sediment characterization sampling and the Phase 1 final status surveys will prepare a QA Project Plan to support these tasks. This plan will be provided to the NRC for technical review.
- ❑ The Phase 1 decommissioning contractor will also prepare a QA Project Plan for Phase 1 decommissioning activities within the project premises. This plan will be provided to the NRC for technical review.



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## NRC TER Comment 14 – NRC Review of Phase 1 CSAP

- ❑ ***“NRC will review and comment on the CSAP when it becomes available. The CSAP implementation will enable the development of the radiation survey plans as defined in NRC guidance”.***

### DOE Response:

- ❑ DOE provided the CSAP to the NRC for review on 2/5/2010 and the Phase 1 FSSP on 12/17/09.
- ❑ NRC review comments on the CSAP and FSSP were transmitted to the DOE on May 17, 2010.
- ❑ DOE is currently evaluating NRC comments on the CSAP/FSSP and will address these comments at a later date.



## NRC TER Comment 15 – Review of Phase 1 CSAP/FSSP

- ❑ ***“The CSAP and the survey plans are necessary to clarify the approach to the Facility Radiation Surveys and the technical bases. As stated above, NRC expects DOE to revise the survey plans following implementation of the CSAP. NRC will review these documents when they become available”.***

### DOE Response:

- ❑ DOE provided the CSAP to the NRC for review on 2/5/2010 and the Phase 1 FSSP on 12/17/09.
- ❑ NRC review comments on the CSAP and FSSP were transmitted to the DOE on May 17, 2010.
- ❑ DOE is currently evaluating NRC comments on the CSAP/FSSP and will address these comments at a later date.
- ❑ If necessary, DOE will revise the Phase 1 FSSP following implementation of the CSAP sampling. The revised Phase 1 FSSP will be provided to NRC for review.



## Other Comments – 18 ROI Screening Approach (1 of 2)

- ❑ ***“The screening approach for the 18 radionuclides was provided. However, the basis for eliminating some of the similar radionuclides is not clear”.***

### DOE Response:

- ❑ Screening approach involved the development of an initial list of radionuclides and estimating their relative doses from drinking water and direct intrusion scenarios
- ❑ Initial set of radionuclides (90) identified from Tank 8D-2 characterization (Rykken 1986)
- ❑ Some radionuclides were eliminated prior to dose estimation based on:
  - Radionuclide decay (half-lives)
  - Concentration at the source and associated waste form distribution coefficients
  - Relative magnitude of dose conversion factors
- ❑ Calculation package EIS-SAIC-JDP-001 has been revised to include sensitivity analyses of a drinking water scenario based on the 1986 Tank 8D-2 sampling campaign inventory and inclusion of Cs-135 in the detailed analysis.



## Other Comments – 18 ROI Screening Approach (2 of 2)

### DOE Response (cont.):

- ❑ The screened list of radionuclides is not changed by the additional sensitivity analysis.
- ❑ C-14, Sr-90, Tc-99, I-129, U-233, U-234, U-238, Np-237, Pu-239, and Pu-240 contributed 99.98% of the relative dose.
- ❑ Soil and streambed sediment sampling data collected as part of the CSAP will be used to verify the ROI for Phase 1 Decommissioning at the WVDP.



## Other Comments – Remediation of Streambed Sediments

- ❑ ***“DOE has elected to postpone remediation of contaminated streambed sediments in Phase 1. A revision to the DP would be needed to support remediation of streambed sediments”.***

### **DOE Response:**

- ❑ DOE decided to postpone remediation of contaminated streambed sediments in Phase 1 as surface water runoff from potentially contaminated surface soils in areas not remediated during Phase 1 has the potential to introduce contamination into Erdman Brook and Frank’s Creek.
- ❑ The Phase 1 DP will be revised if DOE decides to remediate streambed sediments during Phase 1 decommissioning.
- ❑ NRC concluded that “implementing the conceptual model associated with risks from streambed sediments in RESRAD should be adequate for the purposes of guiding clean-up of contaminated streambed sediments”.



## Other Comments – Potential Contamination Along H-Piles

- ❑ ***“If in-process or other characterization surveys of subsurface soils at the bottom of excavations or along H-piles reveal significant levels of contamination not previously identified, the risk significance of this contamination should be evaluated and appropriately managed”.***

### DOE Response:

- ❑ Soil in the WMA 1 excavation will be excavated at least one foot into the underlying Lavery till.
- ❑ In-process surveys will be performed along the bottom and sides of the excavations to evaluate residual concentrations of radioactivity in subsurface soil.
- ❑ Characterization surveys will be performed along selected H-piles within the Lavery till beneath soils impacted by the north plateau plume to evaluate whether radionuclides from the plume migrated downward along the H-piles.
- ❑ The DP provides for additional soil removal if surveys along the excavation bottom and sides or along the H-piles indicate elevated activity exceeding the subsurface soil cleanup goals.



## Other Comments – Final Status Survey Dose Evaluation

- ❑ ***“NRC encourages DOE to follow through on its intent to evaluate the final dose using data collected from the final survey results to provide additional assurance that LTR criteria are met and to provide a more accurate estimate of risk from residual contamination”.***

### DOE Response:

- ❑ The Phase 1 DP has provisions for performing a final dose assessment for the residual radioactivity remaining in the WMA 1 and WMA 2 excavations using the final status survey data.



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## Other Comments – Downgradient Dose Evaluations

- ❑ ***“NRC also encourages DOE to calculate potential dose at downgradient locations to provide an indication of the available safety margin remaining for Phase 2 decommissioning activities (or additional support that the on-source DCGLs will be more limiting when cumulative dose from all sources is considered)”.***

### DOE Response:

- ❑ Calculation of potential doses at downgradient locations will be addressed during the Phase 2 decision process for the project premises.



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## Other Comments – Engineered Barrier Design Review

- ❑ ***“DOE stated if the Phased Decisionmaking Alternative for decommissioning is selected, then a final design for the engineered barriers will be provided to NRC for technical review. NRC will review the specific details of the engineered barrier monitoring system design when it becomes available during implementation of Phase 1, as applicable”.***

### **DOE Response:**

- ❑ DOE will provide the NRC for technical review the final design details, performance goals, and supporting technical basis for the Phase 1 hydraulic barriers, French drain, and associated monitoring system when these designs have been completed by the Phase 1 decommissioning contractor and before their installation.



## Other Comments – Phase 2 LTR Demonstration

- ❑ ***“In the DP for Phase 2, DOE will need to demonstrate that the entire West Valley Site meets the LTR. If the engineered barriers employed to limit recontamination of areas that have been remediated prove not be effective resulting in recontamination of Phase 1 areas that were previously remediated, further remediation of those areas could be required to meet LTR criteria”.***

### **DOE Response:**

- ❑ The Phase 2 DP will consider the cumulative impacts of all source areas within the project premises, including the remediated Phase 1 areas, to demonstrate compliance with the LTR criteria at final decommissioning.
- ❑ Depending on the final Phase 2 decision, it is understood that Phase 1 areas may need further remediation in the unlikely event they become re-contaminated.



## Other Comments – NRC Review of ALARA Analysis

- ❑ ***“DOE plans to perform additional ALARA analyses during implementation of the Phase 1 decommissioning work; and NRC will review the additional ALARA analyses when available during implementation of Phase 1”.***

### **DOE Response:**

- ❑ The DP has provisions for a more detailed ALARA analyses that will be performed during the implementation of Phase 1 decommissioning. This detailed ALARA analysis will be provided to the NRC for review when completed.



## Summary and Path Forward

- DOE provided written responses to NRC TER comments on June 3, 2010
- If necessary, DOE will revise the responses incorporating feedback from this meeting
- Are there any additional actions to be discussed?
- Are there any further questions?

