Department of Energy
West Valley Demonstration Project
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June 3, 2010

Dr. Keith I. McConnell, Deputy Director,
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Submission of U.S. Department of Energy (DOE) Responses to U.S. Nuclear Regulatory Commission (NRC) Comments on the NRC Technical Evaluation Report (TER) for the Phase 1 Decommissioning Plan for the West Valley Demonstration Project (WVDP)

REFERENCE: Letter (102648), K. J. McConnell to B. C. Bower, "U.S. Nuclear Regulatory Commission Technical Evaluation Report on the U.S. Department of Energy Phase 1 Decommissioning Plan for the West Valley Demonstration Project," dated February 25, 2010

Dear Dr. McConnell:

This letter transmits DOE responses to the NRC comments identified in the NRC "Technical Evaluation Report for the Phase 1 Decommissioning Plan for the West Valley Demonstration Project" (Reference 1).

Enclosed is a comment response matrix documenting DOE responses to the 15 major NRC comments identified in bold text in the TER and an additional 8 comments in the supporting text of the TER that DOE decided required responses for completeness. The responses to the TER comments will be discussed during the DOE/NRC public meeting to be held in the NRC offices in Rockville, MD on June 10, 2010.

For Further Information

Please let us know if NRC needs any additional information concerning its responses to the comments in the TER for the Phase 1 Decommissioning Plan for the WVDP. Please refer any questions about this submittal to Moira Maloney of the West Valley Demonstration Project staff at 716-942-4255.

Sincerely,

Bryan C. Bower, Director
West Valley Demonstration Project

Enclosure: DOE Responses to the NRC Comments and Observations in the 2/25/2010 Technical Evaluation Report

cc: See Page 2

MNM:103116 - 450.5

cc: P. Giardina, EPA, w/enc.
E. E. Dassatti, NYSDEC, Albany, Region 2, w/enc.
A. Salame-Alfie, NYSDOH, w/enc.
P. J. Bembia, NYSERDA, AC-NYS, w/enc.

MNM:103116 - 450.5

DOE Responses to the NRC Comments and Observations in the 2/25/2010 Technical Evaluation Report

NRC comments in the Technical Evaluation Report (TER) identified in bold type with the heading "Comment", were numbered sequentially as **NRC Comment #** in the comment column to facilitate comment responses.

Other comments or questions in the TER that were not in bold type were identified and responses prepared as appropriate.

Cmt #	Page	Comment	DOE Response
1	Page 2, Last Paragraph	**NRC Comment #1** ***"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 and NYSERDA are currently working on a process to identify and implement 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.
2	Page 5, Last Paragraph	**NRC Comment #2:** ***"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 will consider the cumulative impacts of all source areas within the project premises, including previously remediated Phase 1 areas that may have been 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.

Cmt #	Page	Comment	DOE Response
3	Page 11, Paragraph 1	The screening approach for the 18 radionuclides was provided. However, the basis for eliminating some of the similar radionuclides is not clear.	The technical approach applied for screening of radionuclides for the West Valley FEIS entailed development of an initial list of candidate radionuclides and estimation of relative doses for drinking water and direct intrusion scenarios. The approach presumes that the contamination occupies a known volume of source material and that the constituent distributes between the solid and liquid phases. For the groundwater release scenario, contamination moves through the vadose zone or a portion of the waste form, moves through the saturated zone, and is recovered from a well for use as a source of drinking water. The primary differences between radionuclides are decay constant (to reflect time in the waste form and groundwater transport), inventory, distribution coefficients in the waste form and aquifer, and ingestion dose conversion factor. For the direct intrusion scenario, waste mobilized by mechanical intrusion is distributed into a garden and an individual is exposed through residential farming pathways. The primary differences between radionuclides are decay constant to reflect delay prior to intrusion, inventory, and unit dose factor for the residential garden pathways. For North Plateau facilities, the source for the list of candidate radionuclides is the result of the Tank 8D-2 sampling program (Rykken 1986) while for South Plateau facilities the list was developed from waste characterization reports for the NDA (URS 2000) and SDA (URS 2002). As an example, for North Plateau facilities the initial set of radionuclides comprises approximately 90 radionuclides identified in characterization of Tank 8D-2 [Rykken 1986, Tables 6 (supernatant) and 22 (sludge)]. In the screening documented in EIS Calculation Package EIS-SAIC-JDP-001, some radionuclides were eliminated from the initial list prior to execution of the screening calculation. The eliminations were based on consideration of radionuclide decay, concentration at the source reflecting magnitudes of inventories and waste form distribution coefficients, and relative magnitudes of dose conversion coefficients. To clarify the suitability of the preliminary eliminations, screening of the list for the drinking water pathway

Cmt #	Page	Comment	DOE Response
			was repeated with prior elimination only of radionuclides with half-life less than five years. The results of the screening analysis for the drinking water pathway are summarized in Table 1. Radionuclides contributing fractions of dose greater than approximately 0.0002 are carbon-14, strontium-90, technetium-99, iodine-129, uranium-233, uranium-234, uranium-238, neptunium-237, plutonium-239, and plutonium-240. The combined total of the contribution of relative dose of these radionuclides is 0.9998 and no radionuclides were identified in addition to those identified in prior EIS analysis. Calculation package EIS-SAIC-JDP-001 has been revised to include the requested information and will be provided to the NRC. Rykken, L.E., 1986, *High-Level Waste Characterization at West Valley*, DOE/NE/44139-14, West Valley Nuclear Services Company, Inc., West Valley, NY, June 2. URS 2000, *Estimated Radionuclide Inventory for the NRC-Licensed Disposal Area at the West Valley Demonstration Project*, Orchard Park, NY, August. URS 2002, *SDA Radiological Characterization Report*, Orchard Park, NY, September 20.

Cmt #	Page	Comment	DOE Response
4	Page 12, Paragraph 3	**NRC Comment #3:** ***"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".***	Soil and stream sediment characterization will be performed within the project premises before the start of Phase 1 decommissioning as described in the Phase 1 Characterization Sampling and Analysis Plan (CSAP), which was submitted to the NRC for review on 2/5/2010. The evaluation of the lateral and vertical extent of soil and sediment contamination within the project premises is one of the goals of this sampling program. As discussed in Section 5 of the DP, the results of this soil sampling program 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 accordingly and the DCGLs recalculated. There are no plans to recalculate the surface soil DCGLs as the assumed 1 meter source thickness is considered to be conservative. A similar re-evaluation will be performed if the Phase 1 studies or in-process surveys identify that the dose modeling assumptions are invalid. The Phase 1 DP will be revised if changes to the DCGLs and cleanup goals are found to be necessary. The surface soil, subsurface soil, and streambed sediment DCGLs in the DP have specific applications. Surface soil DCGLs apply to areas within the project premises without subsurface soil contamination at depths greater than 1 m (3 ft), subsurface soil DCGLs only apply to the WMA 1 and WMA 2 excavations, streambed sediment DCGLs apply to the deep steep-sided portions of Franks Creek and Erdman Brook within the project premises as shown in Figure 5-12 of the DP.
5	Page 12, Paragraph 4	**NRC Comment #4:** ***"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***	One of the goals of the Phase 1 CSAP is to identify the potential existence of a surrogate radionuclide at the site. Although the CSAP does not identify a specific sampling effort to address this goal, almost all of the CSAP samples will be analyzed for all 18 radionuclides of interest. This means that a surrogate analysis is fully supported if the data evaluated identify a potential surrogate

Cmt #	Page	Comment	DOE Response
		underestimation of the potential dose associated with residual contamination at the site".	radionuclide. If a surrogate radionuclide is proposed for FSS purposes, DOE will provide the NRC sufficient characterization data to support its use. This would occur after all of the CSAP soil data has been evaluated. The use of surrogates is expected to be continuously verified by use of ongoing data analyses.
6	Page 15, Last Paragraph	**NRC Comment #5:** ***"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."***	In the system under consideration, contamination is postulated for a rectangular prism at the top of the Lavery till below WMA 1. The source has horizontal dimension of 100 meters in the south-to-north and west-to-east directions and a vertical thickness of 1 meter. A well is postulated to be screened in the uncontaminated backfill above the till with the bottom of the screened interval located at the interface between the contaminated till and uncontaminated backfill at the north-center edge of the contaminated zone. The screened interval has dimensions of 1 meter in the horizontal directions and 3 meters in the vertical direction and has production rate of 5,700 cubic meters per year. Flow balance for the screened volume calculated with a three-dimensional STOMP simulation is presented in Table 2. The results indicated that water enters the screened interval from the top, south, north, west, and east and exits through the bottom and to well production. Further information from this same simulation includes rate of downward flow at the backfill-till interface through the bottom of the screened interval and through U-shaped flow areas around the well extending to the west and east and south over the contaminated volume. These results are presented in Table 3. Although presence of the well reduces downward movement in the vicinity of the screened interval, the predicted direction of water flow is downward for all flow areas. This supports the model concept that upward movement of contamination would be due to diffusion. Calculation package DPLAN-SAIC-JDP-003 has been revised to include the requested information and will be provided to the NRC.

7	Page 20 First Paragraph Page 19, Paragraph 1 Page 21, Last Paragraph Page 21, Last Paragraph	NRC offered a few comments that should be considered if the DP is revised to support remediation of streambed sediments. - Although the underlying conceptual model implemented in RESRAD differs fundamentally from the conceptual model developed specifically for streambed contamination, 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. - NRC cautioned DOE that if the risk associated with seepage, discharge, or erosion of multiple sources in downgradient receptor locations is potentially greater than the onsite risk for individual sources, then the DCGLs for individual source areas may need to be adjusted to ensure that LTR criteria are met at these downgradient locations. DOE thinks this risk is low and has provided compelling arguments to support its assumption that the "onsite" or on-source receptor DCGLs derived will bound the impacts associated with any "offsite" or down-source receptors. - 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.	Comment noted. As part of its RAI responses, DOE evaluated potential doses to offsite receptors. These RAI evaluations indicated that the onsite receptor DCGLs were more conservative and bound the impacts associated with the "offsite" or downstream receptors. The Phase 1 DP will be revised if DOE decides to remediate streambed sediments during Phase 1 decommissioning.

8	Page 22, First Paragraph	**<u>NRC Comment #6:</u>** ***"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."***	The final designs of the engineered barriers will be prepared after Phase 1 decommissioning activities begin in 2011. DOE will evaluate the impacts the engineered barrier designs have on groundwater flow in the north plateau of the project premises as they are being developed. DOE made a commitment in the DP that the engineered barriers will be designed to result in minimal changes to groundwater flow patterns in WMA 3. DOE also committed to provide NRC the final designs of the engineered barriers for technical review before installation.
9	Page 22, Second Paragraph	**<u>NRC Comment #7:</u>** ***"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."***	The calculation of area factors presented in Section 9.1 of the West Valley Decommissioning Plan followed the approach of the example described in Section 5.5.2.4 of the MARSSIM (EPA et al. 1997). In this approach, DCGLs are calculated for a source covering the entire area of expected contamination and for sources of contamination covering areas of reduced size. The area factor for a contaminated area of reduced size was then calculated as the quotient of the DCGL for the source area of reduced size divided by the DCGL for the entire source area. The details of the implementation of the approach differed for the case of the surface and subsurface sources. In the case of the surface source, the contamination and the residence and garden have the same physical location. In calculation of area factors for the surface source, the size of the contaminated portion of the farm is reduced while the total size of the farm remained constant and utilization or exposure rates to contamination are reduced in the ratio of the sizes of the contaminated and total areas. In the case of a subsurface source, the primary contamination is at a physical location different from the residence and garden. In the multi-source case, the size of the garden or farm is not necessarily related to or dependent upon the size of the subsurface source eventually subject to sampling. In calculation of area factors for the subsurface source, the multi-source concept was applied and the size of the garden or farm and the associated

			utilization and exposure rates for the four alternate cases were not varied but the size of the primary source in the multi-source model was varied. Reduction of 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. 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 submitted to the NRC for review on 4/8/2010. U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, U.S. Department of Defense, and U.S. Department of Energy (EPA et al. 1997), 1997, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, NUREG-1575, U.S. Environmental Protection Agency, Washington, DC, December.
10	Page 23, Paragraph 4	**NRC Comment #8:** ***"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".***	Parameter distributions and correlations, as described in the DOE response to RAI 5C15, were included in the uncertainty analysis to provide an indication of the model inputs that account for significant amounts of variability in the calculated dose. Including more probabilistic parameters (and more correlations between parameters) increased the amount of model variability attributable to specific inputs, and also increased the computation times and data requirements (i.e. additional correlation coefficients needed to be estimated). For the surface soil model, inclusion of a large number of probabilistic parameters and correlations was feasible, since the non-dispersion groundwater model was utilized. The mass balance model, used for the subsurface soil and sediment model, incorporates numerous continuity checks which require increased computation times. For radionuclides with a large number of daughter products, the execution time of the model became problematic. As a result the evaluation of uncertainty associated with distribution coefficients for the subsurface DCGL calculations did not follow the approach in Table E-7. In lieu of a full analysis, subsurface probabilistic simulations (with all correlations included) were conducted for selected radionuclides with doses primarily due to groundwater pathways

			and with few daughter products (e.g. I-129 and U-233). For these isotopes, the DCGLs would have increased (100% for I-129, 40% for U-233) with all correlations included. The overall impact of additional correlations for the nuclides evaluated was to narrow the range of calculated doses and generally eliminate some of the parameter combinations that result in higher calculated doses. Therefore, the model simplifications used to expedite revisions to the subsurface DCGLs are not likely to undermine the conservatism in the calculations. Table E-7 will be modified in a future DP revision to correctly identify the uncertainty analysis that was performed for distribution coefficients for the subsurface soil DCGL calculation.
11	Page 23, Paragraph 5	**<u>NRC Comment #9:</u>** ***"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".***	The recommended analysis has not yet been performed although a sensitivity analysis for the multi-source model directed towards identification of risk significant parameters is a reasonable extension of the current single parameter value deterministic analysis. Given the uncertainties of the dimensions and concentrations of the subsurface contaminant source the recommended sensitivity analysis is best done after additional characterization data has been collected during Phase 1 activities. The multi-source model comprises three compartments representing the upper contaminated portion of the Lavery till, the backfilled sand and gravel aquifer above the contaminated zone, and the surface soil contaminated by material re-located from the subsurface source or groundwater contaminated by release from the subsurface source. The site conceptual model forming the basis for the multi-source analysis is based upon extensive hydrologic investigation of the site and the current preferred alternative. Alternate conceptual models appear less likely. For the contaminated till portion of the model, the primary sensitive variables are the hydraulic conductivity of the till, lateral and vertical extent of the contamination, the level of contamination, and distribution coefficients affecting pore water concentration of contaminants. For the aquifer portion of the model, the sensitive variables are the hydraulic conductivities of

			the backfill, French drain, slurry wall and aquifer soils; distribution coefficients of contaminants, primarily in the backfill and the degree of mixing within the capture zone of the well. The current model adopts a conservative approach, assuming that all contamination moving upward from the subsurface source is captured by the well. Sensitive variables for the surface soil compartment of the model are those identified in RESRAD sensitivity analysis.
12	Page 23, Paragraph 6	<u>**NRC Comment #10:**</u> ***"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 use in a future DP revision".***	The use of Buttermilk Creek as the point of exposure for recreational fishing is based on consistency with the EIS, which concluded that a receptor in Frank's Creek or Erdman Brook is unlikely to be exposed via the fish consumption pathway. A sustainable fish population for long term ingestion (i.e. sufficient size and number of fish) would require a less intermittent, steady flow rate represented by a larger drainage area. The potential for construction of a pond that could be stocked with fish of edible size or quantity to support fish consumption rates is not considered feasible in the area of Frank's Creek or Erdman Brook, due to a combination of topography, flow variability, and erosion processes. Section 3.8.3 of the FEIS observed edible fish species in Cattaraugus Creek (trout, bass, perch), however only darter were found in Buttermilk Creek or Quarry Creek. The conclusion is that under current conditions, recreational fishing is primarily occurring along the lower reaches of Cattaraugus Creek. Future construction of a pond that could be stocked with fish of edible size is considered highly unlikely. Excavation of a pond is not feasible in the area of Frank's Creek or Erdman Brook, due to the topography. A pond created through damming the creek is not practical due to the erosion control measures necessary to prevent restrictions in the flow structures, and large flow variability in the creek requiring spillways or other overflow devices. Using trout as an example, the recreational fisherman ingests 9 kg/yr of fish (~20lb). Assuming each fish caught weighs 0.34 kg (0.75 lb) and that only 50% is edible, requires that 53 fish be consumed each year. Further assuming that only half of the total

			population is caught in any one year for sustainability and that fish are stocked to maintain 100/acre, a one acre pond reflects a reasonable minimum size. A pond of this area with a depth of 8-10 feet would require large flow structures within the creek. An indication of the difficulty of this type of impoundment is the current lack of such structures in the local vicinity. Impoundments of this type in the area have typically been observed to contain groundwater seeps and springs. Future revisions of the DP will incorporate a discussion of these assumptions.
13	Page 23, Last Paragraph	- 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.	Comment noted. Soil in the WMA 1 and WMA 2 excavations will be excavated at least one foot into the underlying Lavery till. In-process (remedial action) surveys will be performed along the bottom and sides of the excavations to evaluate residual concentrations of radioactivity in the Lavery till. Characterization surveys will also be performed along selected H-piles within the Lavery till beneath soils impacted by the north plateau plume to evaluate the extent of potential migration of radionuclides from the plume along the H-piles into the underlying Lavery till. The results from the in-process surveys and the characterization surveys along the H-piles will be evaluated and compared to the subsurface soil clean-up goals. The DP provides for additional soil removal if the in-process surveys along the bottom and sides of the excavations or the characterization surveys along the H-piles in the Lavery till indicate elevated activity exceeding the subsurface soil cleanup goals.
14	Page 24, Paragraph 5 Page 24, Paragraph	- 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. - NRC also encourages DOE to calculate potential dose at downgradient locations to provide an indication of the	Comment noted. 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. Calculation of potential doses at downgradient locations will be addressed during the Phase 2 decision process for the project premises.

	5	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).	
15	Page 24, Paragraph 6	<u>**NRC Comment #11:**</u> ***"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 has provided clarification on a number of its modeling assumptions and parameter values as part of its responses to several of the 2/25/2010 NRC TER comments that are addressed in this comment response matrix. These include responses to comments 3, 6, 9, 10, 11, and 12.
16	Page 27, Paragraph 1 Page 27, Paragraph 3 Page 27, Paragraph 4	- 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. - The final design details, performance goals, and supporting technical basis for the hydraulic barriers and French drains will be provided to NRC for technical review prior to their installation. When DOE provides the information to NRC, it needs to address the specific elements stated in RAI DC3. - NRC will review the specific details of the engineered barrier monitoring system design when it becomes available during implementation of Phase 1, as applicable.	Comment noted. 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.

17	Page 28, Last Paragraph	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.	Comment noted. 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 approach, it is understood that Phase 1 areas may need further remediation in the unlikely event they become re-contaminated.
18	Page 30, Paragraph 3	- 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.	Comment noted. 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.
19	Page 30, Paragraph 4	**NRC Comment #12:** ***"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."***	The Phase 1 soil and streambed sediment characterization program described in the Phase 1 CSAP 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 with institutional controls is selected for Phase 2 decommissioning. DOE will consider the practicality of incorporating radon mitigation techniques into structures, if any are included in the close-in-place scenario, as part of the institutional controls proposed for the project premises.

20	Page 31, Last Paragraph	**<u>NRC Comment #13:</u>** ***"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".***	As described in both the Phase 1 CSAP and the Phase 1 Final Status Survey Plan (FSSP), the CSAP and FSSP contractor will be required to prepare a QA Project Plan to support the planned Phase 1 soil and sediment characterization activities and the Phase 1 final status surveys. The QA Project Plans for these sampling activities may or may not be combined into one comprehensive document. The QA Project Plan(s) supporting the Phase 1 CSAP and Final Status Survey activities will be provided to the NRC for technical review. The site decommissioning contractor will also be required to prepare a QA Project Plan for the Phase 1 decommissioning of the project premises. This QA Project Plan will also be provided to the NRC for technical review.
21	Page 33, Paragraph 4	**<u>NRC Comment #14:</u>** ***"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 provided the CSAP to the NRC for review on 2/5/2010. NRC review comments on the CSAP and FSSP were transmitted to the DOE on 5/17/2010. DOE is currently evaluating NRC comments on the CSAP and FSSP and will respond to the NRC comments at a later date.

22	Page 34, Paragraph 3	**<u>NRC Comment #15:</u>** ***"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 provided a technical basis for composite sampling in Appendix A of the Phase 1 Final Status Survey Plan which was submitted to the NRC for technical review on 12/17/2009. DOE provided the CSAP to the NRC for review on 2/5/2010. NRC review comments on the CSAP and FSSP were transmitted to the DOE on 5/17/2010. DOE is currently evaluating NRC comments on the CSAP and FSSP and will respond to the NRC comments at a later date. DOE expects to award a site wide characterization contract within the month and begin initial CSAP characterization work this year. 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.

Table1. Drinking Water Pathway Screening of Tank 8D-2 Radionuclides

Nuclide	Inventory (curies)		Fraction of Drinking Water Dose
	Supernatant	Sludge	
H-3	103	7.3	1.5e-4
C-14	137	0.099	4.5e-4
Co-60	0	4.1	0
Ni-59	0	79	3.0e-7
Ni-63	895	5400	4.9e-69
Se-79	37	0	2.2e-5
Sr-90	2956	6.9e6	0.704
Zr-93	0.23	230	5.4e-6
Nb-93m	0.14	140	0
Tc-99	1599	0	0.069
Pd-107	0.012	1.2	2.9e-8
Cd-113m	21	2100	2.3e-100
Sn-121m	0.0015	0.15	2.0e-78
Sn-126	0.4	40	4.9e-5
I-129	0.21	0	4.3e-4
Cs-135	156	0	3.4e-5
Cs-137	7.4e+6	0	2.7e-196
Pm-146	0	15	0
Pm-147	217	3.1e5	0
Sm-151	1.11	2.1e5	2.7e-83
Eu-152	0.045	420	0
Eu-154	14.9	1.3e5	0
Tl-207	0	9.1e-4	0
Tl-208	0	0.043	0
Pb-209	0	6.6e-6	0
Pb-211	0	9.1e-4	0
Pb-212	0	0.12	0
Bi-211	0	9.1e-4	0
Bi-212	0	0.12	0
Bi-213	0	6.6e-6	0
Po-213	0	6.5e-6	0
Po-215	0	9.1e-4	0
Po-216	0	0.12	0
At-217	0	6.6e-6	0
Rn-219	0	9.1e-4	0
Rn-220	0	0.12	0

Table1. Drinking Water Pathway Screening of Tank 8D-2 Radionuclides (continued)

Nuclide	Inventory (curies)		Fraction of Drinking Water Dose
	Supernatant	Sludge	
Fr-221	0	6.6e-6	0
Ra-223	0	9.1e-4	0
Ra-224	0	0.12	0
Ra-225	0	6.6e-6	0
Ra-228	0	4.8e-9	0
Ac-225	0	6.6e-6	0
Ac-227	0	9.1e-4	0
Ac-228	0	4.8e-9	0
Th-227	0	9.0e-4	0
Th-228	0	0.12	0
Th-229	0	6.6e-6	1.6e-20
Th-230	0	0.015	2.7e-9
Th-231	0	0.089	0
Th-232	0	5.9e-9	4.3e-14
Th-234	0	0.8	0
Pa-231	0	2.9e-4	1.6e-8
Pa-233	0	23	0
Pa-234m	0	0.8	0
U-232	0	4.4	1.1e-5
U-233	0.5	6.9	1.8e-3
U-234	0.3	4	1.0e-3
U235	0.0065	0.089	2.2e-5
U-236	0.02	0.27	6.7e-5
U-238	0.058	0.79	1.9e-4
Np-237	0	26	0.191
Pu-238	130	6500	1.5e-136
Pu-239	25	1700	0.031
Pu-240	19	1300	0.001
Pu-241	1580	8.5e+4	0
Pu-242	0.025	1.7	8.5e-5
Am-241	0	6.9e+4	1.9e-79
Am-242m	0	860	3.4e-244
Am-243	0	5000	2.0e-6
Cm-243	0	31	0
Cm-244	0	2.0e+4	0
Cm-245	0	2.4	1.7e-15
Cm-246	0	0.38	3.7e-24

Table 2. Flow Balance for Screened Interval above Contaminated Source

Direction of Inflow	*Inlet Volumetric Flow Rate m^3/yr)*	*Outlet Volumetric Flow Rate (m^3/yr)*
Top	102.74	-
Bottom	-	0.0055
South	1509.69	-
North	1406.22	-
West	1342.08	-
East	1340.75	-
Well Production	-	5700
Total	5701.48	5700

Table 3. Downward Flow Rates for Concentric Areas Above a Contaminated Source

Flow Area Index	*Description of Flow Area*	*Area (m2)*	*Volumetric Flow Rate (m3/yr)*	*Darcy Velocity (cm/yr)*
1	Rectangle at Bottom of Screened Interval	1	0.0055	0.55
2	U shape outside Area 1; 1.5 meters on the west and east, 1 meter on the south	7	0.1654	2.35
3	U shape outside Area 2; 2 meters to the west and east, 1.5 meters to the south	20	0.54	2.70
4	U shape outside Area 3: 3.5 meters on the west and east, 2 meters on the south	54.5	1.53	2.81
5	U shape outside Area 4; 5 meters on the west and east, 3 meters on the south	130	3.7	2.85