May 17, 2010

Bryan C. Bower, Director
West Valley Demonstration Project
10282 Rock Springs Road
West Valley, NY 14171-9799

SUBJECT: COMMENTS ON PHASE 1 FINAL STATUS SURVEY PLAN AND PHASE 1 CHARACTERIZATION SAMPLING AND ANALYSIS PLAN FOR THE WEST VALLEY DEMONSTRATION PROJECT

Dear Mr. Bower:

By letters dated December 17, 2009, and February 5, 2010, respectively, the U.S. Department of Energy (DOE) submitted the subject documents for the U.S. Nuclear Regulatory Commission (NRC) review and comment. In response to DOE's request, NRC is providing the enclosed comments.

NRC conducted its review in a manner consistent with the West Valley Demonstration Project Act of 1980, which provides authority for NRC to review and consult with DOE informally on matters related to the project. NRC understands that DOE will review and consider NRC comments and provide responses in writing prior to initiating the Phase 1 decommissioning activities.

A copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions, please contact Chad Glenn at (301) 415-6722.

Sincerely,

/RA/

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

Enclosure: NRC Comments

cc: See distribution list

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Comments on Phase 1 Final Status Survey Plan and Characterization Sampling and Analysis Plan for West Valley Demonstration Project

Final Status Survey Plan Comments

1. **Comment:** Section 1.0 (Introduction and Purpose) states that the Phase 1 Decommissioning Plan (DP) includes Derived Concentration Guideline Level (DCGL) requirements for stream sediments and that stream sediments are not expected to be included in Phase 1 Final Status Survey activities. In comparing the Final Status Survey Plan (FSSP) Table 1 with Phase 1 DP, Rev 2 Table 5-14, both tables are the same except for the values in the last column for Streambed Sediment "CG_{emc}" (Cleanup Goals applicable to limited areas of elevated concentrations within a survey unit). It is not clear why these values are different.

   Consistent with NUREG-1757, Chapter 4 (Facility Radiation Surveys), the U.S. Department of Energy (DOE) has included streambed sediments as an integral part of the Phase 1 DP. Therefore, remedial action support surveys and final status surveys for streambed sediments need to be addressed in the FSSP even if stream sediments are not expected to be included in Phase 1 final status survey activities. The U.S. Nuclear Regulatory Commission (NRC) staff recognizes that there may be technical challenges to be addressed in the performance of surveys involving moist sediments.

   NRC staff is also concerned that the soils at the bottom of excavations typically are moisture laden and have a significant impact on the ability to perform quality measurements both in the excavation and streambeds.

   Basis: NUREG-1507 "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Containments and Field Conditions" addresses the impacts such as moisture on survey measurements.

   Path Forward: Address the inconsistency in Table 1 values in the FSSP.

   DOE also needs to develop the survey plans and procedures to ensure that quality measurements can be achieved to demonstrate that the unrestricted release criteria are met. Many of the measurements in the remedial action and final status surveys may not be taken under optimal conditions, and the survey program needs to establish the limitations for the performance of the measurements based on the instrumentation and field conditions. NRC staff recommends that these issues be considered during the Characterization Sampling and Analysis Plan (CSAP) implementation.

2. **Comment**: Section 2.3 (Key Assumptions), the assumption titled "CG Definitions" describes a potential issue, that in part, states "(3) the presence of thin, highly elevated zones overlain by clean surface soils will be evaluated by the CSAP data collection. In the last instance, if near surface contaminated layers are encountered by CSAP data collection that result in potential dose concerns, but that would not have been identified by the proposed FSS [Final Status Survey] data collection, then the FSS process will be modified to meet the specific needs of those areas." The assumption titled "Subsurface

Soil Contamination" states that the Phase 1 FSS process is not applicable to areas outside the Waste Management Area (WMA) 1 and 2 excavations where subsurface soil contamination exists greater than one meter in depth. Section 5.1.2 of the DP states the subsurface DCGLs "apply only to the bottoms and lower sides" of the two large excavations in WMA 1 and WMA 2. Clarify the meaning of the term "near surface" relative to the meaning of the terms for surface soil and subsurface soil.

Basis: NUREG-1575 "The Multi-Agency Radiation Site Survey and Investigations Manual" (MARSSIM) defines surface soils as 0-15 cm in depth, and depths below 15 cm are considered subsurface soils. In the FSSP, DOE uses the term "near surface" which is not defined, and the potential issue description gives the impression that the thin layers may be subsurface.

Path Forward: Clarify the meaning of the term "near surface" and the application of DCGLs for potential near surface contaminated layers.

3. **Comment:** Section 2.3 (Key Assumptions) "Analytical Methods" states that a field based laboratory may prove advantageous, particularly for those radionuclides that will likely be the primary decision drivers, Cs-137 and Sr-90.

   Basis: The above statement infers that surrogates will be employed to determine the specific activity of hard-to-detect radionuclides such as C-14, Sr-90, and I-129. It is not clear in either the CSAP or FSSP how surrogate relationships will be determined and how quality assurance procedures will be employed to ensure surrogate ratios remain valid.

   Path Forward: Develop the technical basis for determining the surrogate relationships and quality assurance procedures to ensure the surrogate relationships remain valid during the remedial action surveys and final status survey program. The basis for the surrogate relationships and quality assurance requirements need to be in the revised FSSP.

4. **Comment:** NRC staff is concerned that while it is appropriate to identify a reference area that has not been radiologically impacted by site activities, it is also important to be able to distinguish site radioactivity from natural background. Soils may have naturally occurring radioactivity, including uranium and thorium, and may contain cesium and strontium from fallout.

   Basis: Section 4.8 (Reference Area) describes the need to identify a 2000 m^2 reference area prior to FSS data collection, and the selection will be based on CSAP data collection results. The reference area will be chosen such that there is no measureable evidence of impacts from historical site activities. The NRC limit for unrestricted release criteria is 25 mrem per year (plus ALARA) and does not include contribution from natural background.

Path Forward: DOE needs to determine the natural background radioactivity of the soils. NRC staff suggests that DOE conduct a background study outside the West Valley Demonstration Project (WVDP) premises, but in the local area near the site with similar or native soils to determine the background contribution in soils. The results of this study can be used to ensure the onsite reference area is representative of natural background. DOE may want to consider including stakeholder participation in the study as was performed at DOE's Rocky Flats site.

5. **Comment:** Appendix A (Composite Sampling Technical Basis), the composite sampling approach may meet a number of the objectives detailed in the Phase 1 FSSP. However, based on the NRC staff review and Oak Ridge Institute for Science and Education (ORISE) review (ORISE is an NRC independent contractor), the technical basis for the composite sampling plan does not provide adequate detail and sufficient site-specific information that is necessary to evaluate multiple areas of concern. The NRC staff concerns are based on the following factors:

    1. The FSSP needs to provide specific information as to how the presence of multiple radionuclides will be accounted for in the plan and reporting, other than committing to apply the sum-of-ratios (SOR) calculation to the analytical results. The FSSP must include SOR considerations in the planning and should include the following:

        a. Detail as to how the presence of multiple radionuclides of interest (ROI) will impact the necessary samples to account for hot spots in Class 1 survey units, when the actual scan minimum detection concentration (MDC) is greater than required scan MDC for many of the radionuclides. The plan mistakenly compares the Table 5 scan MDC to the CG_{emc}s listed in Table 1. The CG_{emc}s listed in Table 1 are for a 1 m^2 area. Therefore, unless sample spacing will be no more than that, many of the listed MDCs are not adequate.

        b. There is no accounting for the impact of the proposed composite sampling approach on any of the ROIs except for Sr-90. Of particular concern are those hard-to-detect ROIs with low DCGLs, such as I-129 and Np-237. The combination of the analytical limitations on detection together with low DCGLs may result in lost information as to when an action level has been exceeded.

        c. There is no discussion on the possible reduction in the dose criteria that should be included in adjusted DCGLs and therefore action levels to account for those radionuclides contributing less than 10% of the dose.

    2. The FSSP does not adequately address accounting for residual hot spots. It appears that the investigation thresholds will not identify potential residual contamination due to unacceptable scan MDCs and the composite sampling approach. These issues are discussed in greater detail in the ORISE Report DCN: 2012-TR-02 (ML101230077).

3. The decision logic presented in the FSSP is not appropriate for investigations of Class 2 and 3 survey units. The FSSP compares results to the CG_w (Cleanup Goals applicable to the average concentration over a survey unit) times an appropriate area factor. Class 2 and 3 results must be compared to a fraction of the CG_w to prevent missing contamination in Class 2 or 3 areas due to dilution of the individual samples. This may cause under classification of a survey unit. This issue is also a concern with the CSAP.

   The primary focus of the technical basis also appears to be on providing a means for reducing the probability of a Type II error or failing to reject the null hypothesis (H_0) which states that the survey unit exceeds the release criteria (a false positive). However, the plan does not clearly account for ensuring that a Type I error does not occur, that is rejecting the null hypothesis (H_0) when it is true.

   Basis: The basic premise, hypotheses, or position of the regulating agency is that the survey unit/site is contaminated. In this premise, there are two types of errors that the regulating agency must be concerned with. The first type of error is the Type I error. A Type I error implies that a sample may be identified as not being contaminated (below the DCGL) when in fact the sample is contaminated (above the DCGL). The second type of error is the Type II error. A Type II error implies that a sample may be identified as being contaminated (above the DCGL) when in fact the sample is not contaminated (below the DCGL).

   The guidance in NUREG-1757 and NUREG-1575 is focused on ensuring that Type I errors do not occur (releasing an area as clean and below the DCGL when in fact it is still above the release criteria) and is critical to decision making in the final status survey process. From a regulatory perspective, the Type I error is considered more serious than the Type II error. The Type I error is the more serious error because of the possibility of leaving contamination behind (above the DCGL) and determining the site as not being contaminated. In order to ensure that not too many Type I errors occur, the regulatory agency establishes a low probability of a Type I error occurring (i.e., 5%, 10% etc.). In other words, if someone was to make repeated sampling (n=100) in an area where the concentration is known to exceed the DCGL, there is a chance that five of those samples would be identified as not being contaminated (below the DCGL) when in fact they did exceed the DCGL. The regulatory agency is establishing a tolerance to allow only five chances out of a possible 100 chances for a sample to be identified as not contaminated when in fact it is contaminated. Establishing such a tolerance provides an incentive to collect sufficient samples (burden of proof) to demonstrate that the site is not contaminated.

   Path Forward: DOE should address above concerns and consider employing established industry computer codes, such as the Pacific Northwest National Laboratory – Visual Sample Plan (VSP). This code is intended for use in the development of survey plans where the principle ROIs are hard-to-detect. The FSSP will require revision at the completion of the CSAP. The revision to the FSSP should be provided to NRC for consultancy review and comment.

CSAP Comments

1. **Comment:** It does not appear that an evaluation of surrogates will be a major characterization goal of the CSAP. NRC staff believes that a well defined set of surrogate DCGL ratios will be vital to the efficacy of FSSs, as it has been stated that DOE may use characterization data for FSS purposes. NRC staff believes that additional surrogate analyses are necessary to determine the applicability of surrogates at the site.

   Basis: Section XIV.b. (Characterization Surveys) of the Decommissioning Plan Annotated Checklist gives the expectation "For sites, areas, or buildings with multiple radionuclides, a discussion justifying the ratios of radionuclides that will be assumed in the final status survey or an indication that no fixed ratio exists and each radionuclide will be measured separately."

   Section 9.4.1 (Characterization Sample and Analysis Plan Content) of the Phase 1 DP states that the CSAP "will identify the radionuclides of interest," and that "it will also address the variability of radionuclide ratios across the site and identify areas where the ratios need to be confirmed for use in the Phase 1 final status survey analysis."

   The CSAP states in Section 2.1 (Pre-Remediation Data Collection Objectives) that "there is a question as to whether ROI ratios are consistent enough to allow for the use of surrogates in future data collection efforts (e.g., remedial support and FSS)," and "data collection is required to determine area-specific radionuclide ratios and determine their consistency."

   However, there appears to be a lack of commitment to surrogate determination as the CSAP states in Section 6.3 (Explore the Possibility of Surrogate ROI) "The data presented in Section 6.1 suggest that it is unlikely that a surrogate ROI can be found that would be applicable across the WVDP premises. CSAP data collection is expected to confirm that this is the case. There will be no CSAP data collection specific to this goal; instead CSAP data collected to support the other goals will be used to explore the possibility of a surrogate ROI." The data presented in Section 6.1, Table 2 (ROI Sample Results from Three Locations) do not appear to be conclusive enough to determine the utility of surrogates at the WVDP site, as most of the data are either below detection limits and/or estimated.

   In reviewing the characterization goals for each WMA (as listed in the CSAP Appendices) it was also noted that the following areas do not list "Explore the Possibility of Surrogate ROI" as a goal: WMA 1, WMA 2, WMA 3, WMA 4, WMA 6, WMA 12, and WMA 12 North. There was no discussion of why surrogates were only considered in some areas.

Path Forward: NRC staff agrees that it will be difficult to define site-wide surrogate DCGL ratios and believes there needs to be a commitment to explore surrogate ratios throughout all areas of the WVDP site. NRC staff has addressed this issue in Appendix O.3 (Lessons Learned During Decommissioning Final Status Survey In-Process Inspections and Confirmatory Surveys) of NUREG-1757, Vol. 2, Rev. 1. Section O.3.4.1 (Contaminant Variability Ratio: Difference Across a Site) addresses site-wide ratio variability as follows:

> This issue can be readily avoided provided representative samples are collected in such a manner that the ratio developed accurately represents both spatial, and in some cases, depth variability. Furthermore, it may not be reasonable to select a single ratio for application across a site. Rather, it may be necessary to develop multiple ratios and specifically identify sites areas where each ratio will apply. In other cases, the ratio may vary to the extent that no consistent ratio can be inferred, meaning the surrogate approach would not be an option and radionuclide specific measurements are then required. Additionally, the ratio is typically verified for a percentage of the FSS samples. This is especially true in remediated areas where the decontamination may alter the ratio through either physical or chemical processes.

If the usage of surrogate ratios is viable, it will potentially allow for optimization of future characterization and final status surveys. However, if surrogates cannot be used, alternative survey/sampling methods may need to be expanded (e.g. additional soil sampling). NRC staff suggests placing a stronger emphasis on surrogate determination during characterization as the results of such analyses may affect future survey/sampling requirements.

2. **Comment:** DOE has indicted that detection of Cs-137 and Sr-90 will be used to establish areas of contamination across the site. DOE has also acknowledged that Sr-90 will not be detectable by a gamma walkover survey (GWS) and that some site areas have Sr-90 contamination in isolation. NRC staff has some concerns that areas of contamination may be missed in this scenario. It is also not clear what path forward will be taken as a result of GWS conclusions.

   Basis: Section 11.2 (Detector Technologies) of the CSAP states the following: “Two radionuclides are known to have relatively widespread environmental impacts onsite: Cs-137 and Sr-90. Cs-137 is readily detectable at its CG levels but Sr-90 is not. There are areas of the WVDP premises where one or the other of these radionuclides exists in isolation. Examples include the northern border of the premises where surface contamination is likely only Cs-137 and its progeny (associated with the Cs-137 prong that extends to the north), and the north plateau groundwater plume extending underneath WMA 4, where subsurface contamination is likely only Sr-90 and its progeny.”

Section 6.5 (Determine Extent of Surface Soil Contamination) of the CSAP presents a plan for GWS data utilization, and states "Based on process knowledge and the limited surface soil samples available, it is expected that surface soil contamination above surface soil CG_w levels will always be accompanied by Cs-137 elevated at levels detectable for a GWS. The GWS data will be used to further refine WMA-specific initial conceptual site models. In particular, GWS data will be used to identify areas where GWS results indicate surface contamination likely exceeds CG_w requirements, areas where it is very unlikely surface contamination exceeds CG_w requirements and areas where the GWS data are inconclusive." The basis for determining that Cs-137 will always accompany areas with surface soil contamination above CG_w levels is not clear, and it seems to contradict other statements pertaining to areas of Cs-137 and Sr-90 in isolation. It is also not clear what path forward will be taken for each of the three possible GWS conclusions.

Section 6.5 continues to note that "Areas where GWS data clearly indicate surface contamination is highly unlikely to exceed CG_w requirements and there are no subsurface contamination concerns will be flagged as potentially ready for Phase 1 FSS data collection. It is likely that no additional surface soil samples will be collected from these areas as part of CSAP efforts unless there is a specific need identified; sampling for FSS purposes may take place separate from CSAP activities during Phase 1, or FSS sampling may be deferred until Phase 2." NRC staff is concerned that the proposed GWS methodology could result in areas of contamination being missed when Sr-90 exists in isolation from Cs-137.

Path Forward: NRC staff suggests that DOE develop a flow chart to clarify the steps that will be taken as a result of each possible GWS conclusion, which were stated as:

1. Areas where surface contamination likely exceeds CG_w requirements,
2. Areas where it is very unlikely surface contamination exceeds CG_w requirements, and
3. Areas where the GWS data are inconclusive.

NRC staff suggests that the flow chart additionally clarify how such conclusions can be reached for areas of isolated Sr-90 contamination, and DOE may need to augment the GWS to ensure that these areas are not mischaracterized. As stated in CSAP Comment #1, the establishment of accurate radionuclide ratios across the site may play an important role in performing a comprehensive site characterization. In this respect, it would be useful to correlate the ROIs to Cs-137 or Sr-90 throughout the site.

3. **Comment:** One of the CSAP objectives is to establish background data sets. It is not clear in the CSAP whether DOE intends to use an on-site or off-site location for the background reference area. It is also not clear what background levels will be used for comparison to various characterization scans.

Basis: It was stated in Section 9.3 (Background Surveys) of the Phase 1 DP that "the surveys and sampling in non-impacted offsite areas to establish a basis for background radioactivity levels will be described in detail in the Characterization Sample and Analysis Plan." The CSAP states the following in Section 8 (Reference Area): "A surface soil reference area will be established and maintained for the duration of Phase 1 activities. The reference area will be approximately 2,000 m^2 in size and will encompass surface soil types and conditions similar to those expected within the WVDP premises. The reference area will have no historical evidence of contamination from NFS or WVDP activities and there will be no reason to believe such impacts might exist." It is not clear where the reference area will be chosen, on-site or off-site.

Section 6.11.2 (Down-Hole and Ex Situ Core Scans) of the CSAP indicates that "Average background values and background variability for down-hole gamma scans and ex situ soil core scans will be determined based on data from CSAP soil cores where no contamination is found present above background levels. This variability will, in turn, allow the development of field investigation levels that can be applied to down-hole and ex situ surveys to flag results that are inconsistent with background and potentially indicative of the presence of radionuclides above background levels." It is not clear where the "CSAP soil cores where no contamination is found present above background levels" will be taken.

Section 7.1 (WMA 1 and WMA 2 Excavation Support) of the CSAP states that "Since a deep subsurface background reference area will not be available prior to the initiation of WMA 1 and WMA 2 excavations, the initial round of scanning results will also be used to identify a portion of the excavation surface that appears to be at background conditions," and that "Assuming the analyses confirmed background conditions for these soils, the scan data from this area would be used as a point of comparison for scan data collected as part of remedial action support elsewhere in the excavations." It is not clear why a deep subsurface reference area will not be available prior to the initiation of WMA 1 and WMA 2 excavations, and it is not clear what comparison will be used to establish that background conditions exist in these soils. It also appears that DOE may be using a portion of an impacted area as a background reference area, which is not consistent with MARSSIM guidance.

Path Forward: NRC staff suggests that MARSSIM (NUREG-1575) guidance be used to determine an appropriate background reference area. According to MARSSIM, an area should be selected "that has similar physical, chemical, radiological, and biological characteristics as the survey unit(s) being investigated but has not been contaminated by site activities (i.e., non-impacted)." MARSSIM Section 4.5 and NUREG-1505 provide additional details on the selection of a background reference area.

NRC suggests that a clear justification be provided for the selection of background reference areas and that clarification be provided on the background levels used for comparison to various characterization scans. Clarification should also be provided on why a suitable deep subsurface background reference area will not be available prior to the initiation of WMA 1 and WMA 2 excavations.

NRC staff cautions against using a background reference area that is a part of the same survey unit being evaluated. If such a situation is not avoidable, DOE should provide justification that background is truly being represented. MARSSIM Section 4.5 provides the following guidance on this topic: "In some situations, a reference area may be associated with the survey unit being evaluated, but cannot be potentially contaminated by site activities. For example, background measurements may be taken from core samples of a building or structure surface, pavement, or asphalt. This option should be discussed with the responsible regulatory agency during survey planning. Generally, reference areas should not be part of the survey unit being evaluated."

4. **Comment:** Details on the application of background data during site characterization are not clear. There were statements in the Phase 1 DP indicating that MARSSIM Chapter 8 guidance would be used for this purpose. However, the CSAP provides only limited information on background data application which does not appear to be consistent with MARSSIM guidance.

   Basis: Section 9.3 (Background Surveys) of the Phase 1 DP states: "The application of the background data during assessment and use of the data obtained in the characterization and Phase 1 final status surveys will be based on guidance in Chapter 8 of the MARSSIM (NRC 2000) and will be described in each of the respective plans."

   A limited discussion on the application of background data was provided in Section 8.3 (Radionuclide-Specific Background Activity Concentrations) of the CSAP as follows: "For surface soils, a sample result will be considered inconsistent with background if the activity concentration of one or more radionuclides exceed their respective 95%UTL by more than three times the reported error associated with the reported result. For subsurface soils, the same rule will apply as for surface soils for those radionuclides that are naturally occurring. For those radionuclides that are anthropogenic (and consequently not expected to exist at measurable levels in subsurface soils), a result that is greater than three times its reported uncertainty will be considered inconsistent with background conditions." These statements do not appear to be consistent with MARSSIM guidance on the non-parametric statistical analysis of background data.

   Path Forward: Clarification is needed on the application and statistical analysis of background data during characterization. It should be clear how the proposed analyses relate to MARSSIM Chapter 8 guidance.

5. **Comment:** Estimated scanning MDCs of radionuclides in soils were given in Table 4 of the CSAP, and Table 5 provided radionuclide target sensitivity for laboratory sample analysis. Actual sensitivities were not provided, as was expected in the Decommissioning Plan Annotated Checklist. Field/laboratory instrument sensitivities were also not given for the twelve radionuclides of potential interest listed in Table 6 of the CSAP.

Basis: It is stated under Section 11.2 (Detector Technologies) of the CSAP that "Because of the range of field conditions and data collection requirements that fall under the CSAP, providing details about all potential detectors and their performance characteristics is beyond the scope of this document." NRC staff believes that this should be within the scope of the document and that additional details should be provided on the actual sensitivities of field and laboratory instruments to be used for characterization. The expectation from the Phase 1 DP was given in Section 9.4.1 (Characterization Sample and Analysis Plan Content), and states that: "The Characterization Sample and Analysis Plan will specify the field and laboratory instruments to be used and the sensitivity of these instruments and methods." Section XIV.b. (Characterization Surveys) of the Decommissioning Plan Annotated Checklist provides expectations for "a description of the field instruments and methods that were used for measuring concentrations and the sensitivities of those instruments and methods," and "a description of the laboratory instruments and methods that were used for measuring concentrations and the sensitivities of those instruments and methods."

Path Forward: In accordance with the Decommissioning Plan Annotated Checklist and Section 9.4.1 of the Phase 1 DP, DOE should provide the actual sensitivities and methods for field and laboratory instruments that will be used during site characterization.

6. **Comment:** Generic Soil Screening Values from NUREG-1757 Vol. 2, Appendix H are provided for the twelve radionuclides of potential interest listed in Table 6 of the CSAP. It is not clear why these screening values were provided, as they are intended to be used at non-complex sites and would not be useful at West Valley.

   Basis: Appendix H.2.2 (Qualification of the Site for Screening) of NUREG-1757 Vol. 2 lists the following stipulations on the usage of site screening values:

   > The residual radioactivity on building surfaces (e.g., walls, floors, ceilings) should be surficial and non-volumetric [e.g., #10 mm (0.39 in) of penetration].
   >
   > Residual radioactivity on surfaces is mostly fixed (not loose), with the fraction of loose (removable) residual radioactivity no greater than 10 % of the total surface activity.
   >
   > The screening criteria are not being applied to surfaces such as buried structures (e.g., drainage or sewer pipes) or equipment within the building without adequate justification; such structures, buried surfaces, and clearance of equipment should be treated on a case-by-case basis.
   >
   > The initial residual radioactivity (after decommissioning) is contained in the top layer of the surface soil [e.g., approximately 15 cm (5.9 in)].
   >
   > The unsaturated zone and the ground water are initially free of residual radioactivity.

The vertical saturated hydraulic conductivity at the specific site is greater than the infiltration rate (e.g., there is no ponding or surface run-off).

Path Forward: Clarification is needed on the intended usage of the NUREG-1757 Vol. 2, Appendix H Screening Values.

7. **Comment:** It is not clear how (or if) investigation levels for scanning surveys will be determined during the CSAP. Section 9.5.2 (Scan Surveys and Direct Measurements) and Appendix G (Phase 1 Final Status Survey Conceptual Framework) of the Phase 1 DP indicate that investigation levels for gamma scans will be developed during the implementation of the CSAP. However, information in Section 11.3 (Background) of the CSAP appears to contradict this statement, and suggests that "spatial trends or localized anomalies" will be used to indicate the presence of contamination.

   Basis: Appendix G (Phase 1 Final Status Survey Conceptual Framework) of the Phase 1 DP states:

   > As part of Characterization Sample and Analysis Plan data collection, a background reference area will be identified that can be used to assess the background response of the detector used and that can serve as a source of background samples if a WRS test is required to demonstrate $DCGL_W$ compliance. One outcome of reference area gross gamma data collection will be the identification of appropriate field investigation levels to be applied to gross gamma data during routine use of detectors for pre-design characterization, remediation support, and final status survey data collection.

   Section 11.3 (Background) of the CSAP states:

   > Because of varying background conditions and because areas where contamination is present in surface soils may have more than one gamma-emitting radionuclide above background conditions, it will not be possible to establish a unique field investigation level for determining when contamination is present that potentially exceeds surface soil CG levels. Instead, gamma walkover data will be mapped and reviewed to identify spatial trends or localized anomalies that are indicative of the potential presence of contamination.

   Path Forward: Clarification is needed on how the data from gamma walkover scans will be analyzed and interpreted and if the data will be used to develop survey investigation levels for the Final Status Survey. CSAP Comment #2 on gamma walkover surveys expressed the concern that areas of isolated Sr-90 might allow contamination to go undetected, and similar concerns are raised for "spatial trends or localized anomalies" analyses. DOE should consider the expectations given in Section XIV.b. (Characterization Surveys) of the Decommissioning Plan Annotated Checklist for "A discussion of why the licensee considers the characterization survey to be adequate to demonstrate that it is unlikely that significant quantities of residual radioactivity have gone undetected."

8. **Comment:** A demonstration that field screening should be capable of detecting residual radioactivity at the DCGL was not provided.

   Basis: According to Section XIV.c. (In-Process Surveys) of the Decommissioning Plan Annotated Checklist "A demonstration that field screening should be capable of detecting residual radioactivity at the DCGL" should be provided. A statement is made in Section 7.0 (Remedial Action Surveys) of the CSAP that "The expectation for both Cs-137 and Sr-90 is that rapid turn-around analytical support will be available as part of remedial action survey activities, and that those methods (gamma spectroscopy for Cs-137 and liquid scintillation for Sr-90) will have sufficiently low detection limits to support the required decision making at CG_w activity concentrations," but no additional details are provided on the sensitivity of field screening instrumentation. DOE indicates in a comment to Section XIV.c. of the Annotated Checklist that "methods and instruments for in-process surveys will be similar to those used during characterization and final status surveys. The field instruments suitable for scanning soil will not be able to detect non-gamma emitting radionuclides." As noted in CSAP Comment #5, sensitivities and methods for the actual field and laboratory instruments to be used during characterization were not provided. Therefore, it cannot be concluded that methods and instruments "similar to those used during characterization and final status surveys" will be capable of detecting residual radioactivity at the DCGL during in-process surveys.

   Path Forward: A demonstration that field screening should be capable of detecting residual radioactivity at the DCGL should be provided.