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Revised Draft Environmental Impact Statement for

Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center

The West Valley Site

Volume 1

(Chapters 1 through 11)

NYSERDA

AVAILABILITY OF THE
REVISED DRAFT EIS FOR DECOMMISSIONING AND/OR
LONG-TERM STEWARDSHIP AT THE WEST VALLEY
DEMONSTRATION PROJECT AND WESTERN NEW YORK
NUCLEAR SERVICE CENTER

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Abstract: The Western New York Nuclear Service Center (WNYNSC) is a 1,352-hectare (3,340-acre) site located 48 kilometers (30 miles) south of Buffalo, New York and owned by NYSERDA. In 1982, DOE assumed control but not ownership of the 66.4-hectare (164-acre) Project Premises portion of the site in order to conduct the West Valley Demonstration Project (WVDP), as required under the 1980 West Valley Demonstration Project Act. In 1990, DOE and NYSERDA entered into a supplemental agreement to prepare a

joint EIS to address both the completion of WVDP and closure or long-term management of WNYNSC. A Draft EIS was issued for public comment in 1996: the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center*, also referred to as the 1996 *Cleanup and Closure Draft EIS*, DOE/EIS-0226D, January 1996. The 1996 Draft EIS did not identify a Preferred Alternative.

Based on decommissioning criteria for the WVDP issued by NRC since the publication of the 1996 Draft EIS and public comments on the Draft EIS, DOE and NYSERDA prepared this *Revised Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (also referred to as the *Decommissioning and/or Long-Term Stewardship* EIS), revising the 1996 Draft EIS. This EIS has been prepared in accordance with NEPA and SEQR to examine the potential environmental impacts of the range of reasonable alternatives to decommission and/or maintain long-term stewardship at WNYNSC. The alternatives analyzed in this Draft EIS include the Sitewide Removal Alternative, the Sitewide Close-In-Place Alternative, the Phased Decisionmaking Alternative (Preferred Alternative), and the No Action Alternative. The analysis and information contained in this EIS is intended to assist DOE and NYSERDA with the consideration of environmental impacts prior to making decommissioning or long-term management decisions.

Phased Decisionmaking Alternative (Preferred Alternative): Under the Preferred Alternative, decommissioning would be accomplished in two phases: Phase 1 decisions would include removal of all Waste Management Area (WMA) 1 facilities, the source area of the North Plateau Groundwater Plume, and the lagoons in WMA 2. Phase 1 activities would also include additional characterization of site contamination and studies to provide additional technical information in support of the technical approach to be used to complete site decommissioning. Phase 2 would support the completion of decommissioning actions or long-term management. In general, the Phased Decisionmaking Alternative involves near-term decommissioning and removal actions where there is agency consensus and undertakes characterization work and studies that could facilitate future decisionmaking for the remaining facilities or areas.

Public Comments: On March 13, 2003, DOE issued a Notice of Intent (NOI) in the *Federal Register* soliciting public input on development of this Draft EIS. Public comments received during the scoping period (March 13 through April 28, 2003) and comments received on the 1996 Draft EIS have been considered in the preparation of this Draft EIS. Comments on this Draft EIS will be accepted for a period of 6 months following publication of EPA's Notice of Availability (NOA) in the *Federal Register*, and will be considered in the preparation of the Final EIS. Any comments received after the comment period closes will be considered to the extent practicable. The locations and times of public hearings on the Draft EIS will be identified in the *Federal Register* and through other media such as local press notices. In addition to the public hearings, multiple mechanisms for submitting comments on the Draft EIS are available:

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Foreword

The View of the New York State Energy Research and Development Authority on the Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center

Introduction

The New York State Energy Research and Development Authority (NYSERDA) would like to thank you for participating in this very important Environmental Impact Statement (EIS) process. This Draft EIS presents alternatives for the critical next steps of the West Valley Demonstration Project (WVDP) cleanup, and assesses the environmental impacts from those alternatives. It is important for the agencies and the public to be properly informed of potential environmental impacts associated with these alternatives, and it is just as important for members of the public to provide their input to the agencies on the alternatives.

Because of the importance of the decisions that will soon be made regarding the next steps in the cleanup, NYSERDA requested the opportunity to present our agency's view on the analyses and results that are included in this Draft EIS.

NYSERDA's Role in the West Valley EIS

NYSERDA owns the Western New York Nuclear Service Center on behalf of New York State, and is a joint lead agency with the U.S. Department of Energy (DOE) in this EIS process. NYSERDA and DOE are joint lead agencies because both agencies are planning to make decisions on the future of the West Valley site. Federal and State regulations require these decisions to be assessed through an EIS.

In terms of the preparation of the EIS, DOE manages and directs the EIS contractor (Science Applications International Corporation), and NYSERDA

provides its input on the EIS content, analyses, and results through consultations with DOE.

The Preferred Alternative – An Approach to Allow Important Near-Term Work to Proceed

An interagency working group[1] was established by DOE in late 2006 to resolve a number of outstanding technical issues that were identified during agency reviews of early versions of the Draft EIS. The working group was tasked with finding ways to come to concurrence on almost 1,700 comments on the EIS, many of which were related to the long-term analysis of the site. The comments also included input from an independent Peer Review Group that was convened by DOE and NYSERDA in early 2006[2]. Although the interagency working group did not resolve all issues to the satisfaction of all participating agencies, the group did identify a preferred cleanup alternative that would allow the near-term removal of several very significant site facilities and areas of contamination (the Main Plant Process Building, the Low-Level Waste Treatment System Lagoons, and the source area of the North Plateau groundwater plume). This alternative also includes deferring, for up to 30 years, decisions for certain key facilities (e.g., the High-Level Waste [HLW] Tanks[3] and the NRC-Licensed Disposal Area) to allow for improvements in the technical basis of the long-term performance analysis. Under the preferred alternative, the State-Licensed Disposal Area (SDA) would be managed in place, under regulatory controls, for up to an additional 30 years.

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[1] This interagency working group, called the Core Team, is composed of representatives from DOE, NYSERDA, U.S. Nuclear Regulatory Commission (NRC), New York State Department of Environmental Conservation (NYSDEC), U.S. Environmental Protection Agency (EPA) and New York State Department of Health (NYSDOH).

[2] This 2006 independent review group, known as the Peer Review Group, documented its findings in a report presented to NYSERDA and DOE dated April 25, 2006 (PRG, 2006). This report is available on the internet at http://www.nyserda.org/publications/westvalleypeerreviewgroup.pdf. Paper copies can be requested from NYSERDA at END@nyserda.org , or by calling Elaine DeGiglio at (716) 942-9960, extension 2423.

[3] The HLW Tanks are referred to in the EIS as "the Waste Tank Farm."

NYSERDA supports the phased decisionmaking alternative because it allows substantial facilities and contamination to be removed from the site in the near term. This removal work represents very important progress in the cleanup of the Western New York Nuclear Service Center and completion of the WVDP. The alternative also provides the opportunity to improve EIS long-term technical analyses so the agencies can consider the decision with respect to the remaining facilities in light of better information. NYSERDA believes that due to the very large costs associated with removing these facilities and the potential for significant long-term risk from leaving them in place, the long-term decision with respect to these facilities must be supported by a thorough and scientifically defensible long-term analysis. We believe that this scientifically defensible long-term analysis does not exist today.

Independent Expert Review of the Draft EIS

In the spring of 2008, NYSERDA convened a group of nationally and internationally recognized scientists to review a Preliminary Draft of the DEIS. These distinguished scientists, collectively called the Independent Expert Review Team (IERT), are experts in the disciplines of geology, erosion, groundwater hydrology, nuclear science and engineering, health physics, risk assessment, and environmental science and engineering (see the second-to-last section of this Foreword for a list of the members and their affiliations). The scope of their review was to assess the technical basis and scientific defensibility of the analyses presented in the PDEIS. The review was initiated in May 2008, and was completed in September 2008[4]. The final report was submitted to NYSERDA on September 23, 2008 (IERT, 2008).

The Independent Expert Review Team identified significant technical issues with the Preliminary Draft of the DEIS, and the results of the Independent Expert Review Team's review, along with NYSERDA staff's own review of this Draft EIS,

[4] The report from the Independent Expert Review Team is available on the internet at: http://www.nyserda.org/publications/westvalleyindependentreview.pdf. Paper copies can be requested at END@nyserda.org, or by calling Elaine DeGiglio at (716) 942-9960, extension 2423.

allowed NYSERDA to develop an overall "view" on the Draft EIS analyses and results. The NYSERDA "View" is presented below.

NYSERDA's View on the Draft EIS Analyses and Results

NYSERDA's view on the Draft EIS analyses and results is as follows:

1. **<u>The Draft EIS Analysis of Soil Erosion Over the Long Term is Not Scientifically Defensible and Should not be used for Long-term Decisionmaking</u>**

   The Draft EIS long-term soil erosion analysis, which is intended to show how soil erosion by streams, creeks, and gullies will impact the site and site facilities over tens of thousands of years, is not scientifically defensible and should not be used for long-term decision making.

   The Draft EIS presents the results from a computer program (also called a computer model) that is used to calculate changes to the existing land surface from soil erosion over tens of thousands of years. The computer model provides predictions of how the topography of the land would change, given certain parameter values (e.g., rainfall, soil type, vegetation, and the slope of the land surface), and timeframes (thousands of years). These computer-predicted changes in the land surface were then combined with the conceptual designs for facilities that are proposed to be closed in place to see how the conceptual designs would be impacted by the computer-predicted erosion impacts.

   We recognize that it is a very difficult technical task to predict the location of streams, creeks, gullies, slumps and landslides, tens of thousands of years into the future, and to determine how the deepening and development of these creeks, gullies, landslides and other features might impact facilities and waste that remain at the site. We also recognize that DOE has expended considerable time and resources in attempting to develop a defensible erosion model that could be used to make these predictions. Unfortunately, we do not believe that these efforts have been successful at producing a scientifically defensible prediction of erosion or erosion impacts to facilities that may be closed in place for thousands of years.

   As an example of our concerns with the erosion modeling presented in this Draft EIS, the computer model result shows that the only places where any serious erosion would be expected would be in the vicinity of the Low Level

Waste Treatment Facility Lagoons, the SDA and the NDA. While this result suggests that most of the facilities and contamination remaining on the North Plateau would not be disturbed by erosion, real world observations of the North Plateau suggest otherwise. In contrast to the computer-generated result, the real North Plateau has very large, deeply incised gullies that are actively downcutting and widening in the North Plateau's unconsolidated sand, gravel, and clay soils. New gullies are forming along the North Plateau perimeter. In addition to gully growth and formation, significant slump features are evident on the slopes of Frank's Creek and Quarry Creek, showing the instability of the creek banks and the plateau edge. The modeling results appear to be inconsistent with observations of the real world, and there is no information presented in the Draft EIS that provides confidence that the computer modeling results are meaningful and reliable.

The Independent Expert Review Team provided the following observations in regard to the erosion modeling:

> "DOE and its cooperators [contractors] present the simulation results of various models used to predict current and future erosion at the West Valley Site, specifically rill and sheet erosion, gully erosion, and landscape evolution. While efforts have been made to model these various surface-erosion components, the predictions from these models cannot be accepted or ratified at this time. This opinion is based on the following four assessment criteria: First, there remains a serious disconnect between model parameterization and the hydrologic and geomorphic characteristics of the site, which has resulted in dubious, highly questionable, and physically unjustifiable assumptions in the treatment and assignment of model variables. Second, no verification or validation of any models was presented in the context of comparing model output to actual field data[5]. Third, many of the model components, especially with regard to gully erosion and landscape evolution, are unjustifiable and unsupported by current scientific evidence. Fourth, no rigorous

[5] No demonstration has been made that the model output for surface runoff or infiltration, soil erosion, water flow, sediment transport, or stream channel widths at the West Valley Site, as predicted by SIBERIA or CHILD, have been verified or validated on the basis of actual field data. Field data can be obtained through measurements of stream channel cross-sections, collection of grab samples (to determine sediment loads), watershed characterization, measurements of stream flow velocities using a gauging weir, etc. Even though computer models can be physically-based, the models may report erroneous or aberrant results, the nature of which remains undetected, ignored, or overlooked because of this lack of field data verification.

uncertainty analysis in any model predictions was provided. The uncertainty bounds in model predictions for the gully erosion and landscape evolution are expected to be very large (orders of magnitude) considering the conceptualization, construction, parameterization, discretization, application, and interpretation of the models employed.

Most importantly, any predictions made using any gully erosion or landscape evolution model with regard to future releases of radionuclides due to the surface erosion of the West Valley Site as presented herein are scientifically indefensible. It was the opinion of the 2006 Peer Review Group that the science behind landscape evolution models is not mature enough to justify relying on these models to provide long-term predictions of erosional processes, and that the associated uncertainty bounds of these predictions should be quantified. The current Independent Expert Review Team (IERT), based on the revisions presented, recapitulates this previous opinion. "

Based on the Independent Expert Review Team review of the erosion modeling work, and based on NYSERDA staff's review of the Draft EIS, NYSERDA believes that the erosion modeling results presented in the Draft EIS should not be used for long-term decision making. Accordingly, predictions of radiation doses to the public and all other site impacts that were calculated using the erosion computer models presented in this Draft EIS should not be used to support long-term decisionmaking for the West Valley site cleanup. Until both lead agencies and the scientific community conclude that a defensible erosion analysis for the site is achievable and has been prepared, decisions will need to focus on actions that are not dependent on having scientifically defensible estimates of erosion impacts over thousands of years.

2. The Draft EIS Analysis of Contaminant Transport by Groundwater Needs Improvement

The analysis of the potential for transport of contaminants by groundwater, as presented in Appendix E and Appendix G of the Draft EIS, needs improvement.

The groundwater transport analyses are presented in the Draft EIS in two appendices. Appendix E presents a description of three-dimensional groundwater flow and contaminant transport models that were used to estimate the flow of groundwater through the soils and bedrock beneath the site and to assess the release and transport of contaminants by groundwater

from any facilities and contamination that might be closed in place. Appendix G describes simpler, one-dimensional groundwater flow and contaminant transport models that were used in the calculations of impacts to the public that are presented in other sections in the DEIS.

While the approach to groundwater flow and contaminant transport described in Appendix E is sound, there are a number of areas where these three-dimensional models could be improved (a detailed discussion of suggested improvements to the three-dimensional groundwater models is presented in the Independent Expert Review Team [2008] report). NYSERDA recognizes the significant effort that was employed by DOE and its consultants to develop and run a three-dimensional flow and transport model for this site, and we note that this work represents a significant improvement over earlier groundwater modeling efforts that were conducted as part of preparing the Draft EIS. It is unclear, however, why the improved, three-dimensional models described in Appendix E were not actually used in the radiation dose and impact calculations. Simplified, one-dimensional flow and transport models (described in Appendix G) were used instead. In regard to this issue, the Independent Expert Review Team stated that they could identify no clear rationale for replacing the improved, three-dimensional models with one-dimensional models for the purpose of conducting the long-term dose calculations.

As was the case with the erosion modeling, the manner in which the Draft EIS identifies, analyzes, and presents uncertainty in the groundwater transport calculations is not adequate. The Draft EIS uses a deterministic approach (which means that single values are used for model inputs and model parameters), and asserts that these values are conservative[6]. NYSERDA shares the belief of the Independent Expert Review Team that additional documentation is needed to substantiate the assertion that the deterministic treatment of groundwater flow and transport is truly conservative. According to the Independent Expert Review Team, the sensitivity analyses presented are a very small subset of the potentially important analyses, and do not provide a comprehensive evaluation of uncertainty in groundwater flow and transport.

[6] "Conservative" means that the values chosen would not likely lead to an underestimate of impacts.

Based on the Independent Expert Review Team's review of the groundwater modeling work, and on NYSERDA staff's review of the same information, NYSERDA opposes using the groundwater modeling results presented in the Draft EIS for long-term decision making. Accordingly, predictions of radiation doses to the public and all other site impacts that were calculated using the groundwater modeling approach presented in the Draft EIS should not be used to support long-term decisionmaking for the West Valley site cleanup.

3. The Draft EIS Assumptions used for the Performance of Engineered Barriers have not been Substantiated and may be Overly Optimistic

The assumptions used in the Draft EIS analysis to predict the performance of engineered features such as caps, slurry walls, reducing grout, and other engineered materials intended to keep contamination physically and chemically bound in place for tens of thousands of years, have not been substantiated and may be overly optimistic. Additional analysis and verification is required for the performance of engineered barriers that are used in the Draft EIS site closure alternatives.

In the Draft EIS analysis, the physical properties of engineered barriers are assigned a level of performance that is said to represent a degraded condition to account for barrier subsidence, cracking, and clogging. The engineered barriers are then assumed to perform at that level, without further reduction in performance, for the duration of the analysis (100,000 years). An important factor for the physical performance of engineered barriers in the Draft EIS is the assumption that the barriers used to protect North Plateau facilities will not be physically disturbed by natural processes, like erosion. Given the presence of significant erosion features (gullies and slumps) that are actively changing and impacting the North Plateau today, this assumption seems implausible, and if this assumption is going to be used in the Draft EIS, it must be supported by convincing evidence. Our review of Appendix H shows that this assumption is based solely on the results of the Draft EIS erosion modeling, and as we stated above, we believe that this modeling is not scientifically defensible. Consequently, the assumption used in the Draft EIS that the engineered barriers would be physically stable for 100,000 years on the North Plateau is not adequately supported.

The chemical properties of engineered barriers (which are intended to chemically bind contaminants and prevent their migration) are also said to be assigned degraded values, and are then assumed to remain at that level

for the 100,000 year analysis period without further reduction in performance. The assumption that chemical properties of man-made engineered barriers will remain constant over tens of thousands of years is implausible. Even though a "natural" material may be stable and retain certain properties in one geologic and hydrologic setting, that same natural material may not be stable or retain those same chemical properties indefinitely in another setting, particularly when combined with other natural and man-made materials, and over timeframes as long as 100,000 years. If the Draft EIS is going to use this assumption, the Draft EIS must also provide adequate references to properly support and defend this assumption.

The Independent Expert Review Team found the information on engineered barriers to be poorly supported. The team said that the details of the barrier design were not clearly identified, and they found it difficult to understand several aspects of how the engineered barriers would be constructed. The IERT also identified several specific concerns, including the lack of support for the assumption that North Plateau barriers would not be impacted by erosion, a lack of support for the parameter values used for chemical retention of contaminants and for the permeability of shallow soils under slurry walls, and a lack of a consideration of the performance history of erosion control structures in southwestern New York.

The sensitivity analysis information presented in Appendix H in the Draft EIS shows that the assumptions used for engineered barriers in the long-term performance calculations, even in the "degraded" state, are critical to the outcome of performance for facilities that are closed in place. As such, it is very important that the Draft EIS provide clear support for all assumptions used for engineered barriers, and provide additional information on the impacts from complete and partial barrier failure and on the importance of engineered barriers in each alternative's ability to meet the decommissioning criteria[7].

Based on the Independent Expert Review Team's review of the engineered barrier assumptions, and based on NYSERDA staff's review of the Draft EIS, NYSERDA has concluded that the assumptions used for engineered barriers in this Draft EIS are not adequately supported and may lead to underestimates

[7] Under the WVDP Act, the U.S. Congress required the U.S. Nuclear Regulatory Commission to prescribe decommissioning criteria for the WVDP. Those criteria were issued by NRC in a "Policy Statement" that was published in the Federal Register on February 1, 2002.

of dose and other impacts. Accordingly, predictions of long-term radiation doses to the public and all other site impacts that were calculated based on the engineered barrier assumptions presented in this Draft EIS should not be used to support long-term decisionmaking for the West Valley cleanup.

4. <u>The Uncertainties in the Draft EIS Long-Term Performance Analyses are not Adequately Presented or Discussed</u>

The Draft EIS does not address uncertainty in a manner that provides decisionmakers with information on the critical contributors to uncertainty, or the importance of uncertainty in site cleanup decisions.

All long-term analyses in the Draft EIS are deterministic, which means that they use single models and single values for model input parameters. The Independent Expert Review Team noted that the multiple sources of uncertainty inherent in this analysis are largely unacknowledged, and there is no systematic discussion of how uncertainty has been characterized. Impacts of uncertainties on decisionmaking are supposed to be accounted for by conservative choices in scenario selection and modeling and by limited deterministic sensitivity analyses. In practice, however, the Draft EIS does not demonstrate that the deterministic analysis is either conservative, or that it has appropriately incorporated or bounded uncertainty.

The Independent Expert Review Team concluded that some potentially significant uncertainties have not been evaluated. In addition, assertions that other uncertainties have been conservatively bounded are not justified. Transparency of the long-term analysis is poor, and it is not possible to independently replicate the analyses or to otherwise understand how the results were derived. Given these observations, the Independent Expert Review Team stated that the quantitative results of the long-term analysis presented should not be used to support decisionmaking associated with the Draft EIS.

Based on the Independent Expert Review Team's review of the treatment of uncertainty, and based on NYSERDA staff's review of the Draft EIS, NYSERDA has concluded that the approach used to identify, analyze, and present uncertainty in the Draft EIS is not adequate. The sensitivity analyses in Appendix H show that varying the values of certain important parameters could make the difference between whether an alternative meets the decommissioning criteria or fails to meet the criteria. Consequently, a more

comprehensive and transparent analysis and presentation of uncertainty is needed to support long-term decisionmaking for the West Valley site cleanup.

5. The Connection between the Draft EIS Analyses and the Applicable Regulatory Framework Must be Strengthened

The long-term analysis for the site, as described in Appendix D of the Draft EIS, should be closely structured and clearly tied to the NRC's License Termination Rule (LTR). The LTR is the applicable regulatory framework for decommissioning the WVDP and for the termination of the 10 CFR 50 License.

The Draft EIS identifies several regulations that were used to develop the framework for the long-term performance assessment analysis. One of these regulations is the License Termination Rule, which is the applicable regulatory framework for the West Valley Demonstration Project cleanup. Another regulation that was relied upon extensively in the development of the Draft EIS analytical approach is 10 CFR 61, the NRC's Low Level Waste disposal regulations. We are concerned that using portions of the Part 61 guidance, absent other critical parts of the Part 61 regulations (such as the facility siting requirements), may result in a nonconservative performance assessment.

10 CFR 61 requires a disposal site to be located in a geologic setting that is essentially stable, or alternatively, in an area where active features, events, and processes (such as erosion) will not significantly affect the ability of the site and design to meet the Part 61 performance objectives. The Part 61 performance assessment guidance is intended to be applied to a facility that is sited in accordance with the site suitability requirements. In such a setting, an engineered cap might not be substantially disturbed by natural processes, and it may be reasonable to assume that the cap would provide adequate protection to an intruder for the needed period of time. At the West Valley site, however, the facilities were not sited in accordance with the Part 61 site suitability requirements, and as such, the Draft EIS analysis should not take credit for site stability and the passive functioning of engineered barriers in perpetuity unless this assumption can be justified.

Although DOE has a standard approach for preparing National Environmental Policy Act (NEPA) documents, the LTR (and its implementing guidance, NUREG-1757), are directly applicable to the West Valley Demonstration Project decommissioning activities and alternatives, and the

LTR requirements and guidance should form the framework for the Draft EIS analysis. The NRC's West Valley Policy Statement prescribes the LTR as the decommissioning criteria for the WVDP, and says:

> "The environmental impacts from the application of the criteria will need to be evaluated for the various alternative approaches being considered in the process before NRC decides whether to accept the preferred alternative for meeting the criteria of the LTR. NRC intends to rely on the DOE/NYSERDA EIS for this purpose."

While DOE has stated that the Decommissioning Plan, not the EIS, is the proper document to conduct the LTR compliance analysis, it does not seem logical to prepare an EIS to assess the impacts from decommissioning actions that must meet the requirements of the NRC's LTR, and use regulations and guidance that are not part of the LTR regulatory framework to structure the analyses. As such, NYSERDA believes that the Draft EIS analyses should be reframed to reflect the requirements of the NRC's analytical requirements for decommissioning. The Part 61 guidance should not be used as part of the analytical framework for the Draft EIS unless there is a specific reason under the requirements of the LTR or WVDP Act to do so.

6. The Draft EIS Approach for Exhumation may be Overly Conservative

The approach described in the Draft EIS and its supporting documents for exhumation of the SDA, the NDA and the Waste Tank Farm appears to be overly conservative, and based on extreme conditions, rather than on conditions that are more likely to be encountered during exhumation. As a result, there is significant uncertainty in the cost estimates in the Draft EIS for the exhumation of the Waste Tank Farm and the disposal areas.

The SDA and NDA exhumation processes are conducted using very large, hard-walled concrete secondary containment structures. Primary containment structures are located within the larger secondary containment structures. While this may be an effective approach to provide containment, it may also be much more containment than what is needed to safely exhume some or all of the wastes. Further, the Draft EIS assumes that 100% of the waste resulting from demolition of these massive containment structures must be disposed of as radioactive waste. We believe this assumption to be unnecessarily conservative.

An alternative approach to the use of hard-walled containment structures would be the use of Sprung Structures™, which consist of UV-resistant fabric and PVC membrane over an aluminum support system. Sprung Structures™ have lasted 15-20 years through harsh winters, and they can be fitted with the ventilation and air filtering systems that would be needed to contain contamination within the structure. Similar structures were used at the WVDP in the 1980s during the excavation of the solvent tanks from the NDA.

In regard to the disposal costs for exhumed waste, it is projected that approximately 150,000 cubic feet of waste exhumed from the SDA and NDA will be classified as "Greater than Class C" (GTCC). This type of waste currently has no disposal path. Although this waste is not high-level waste, the Draft EIS assumes, for costing purposes, that this waste would be disposed of at Yucca Mountain, and assigns a disposal cost of $20,000 per cubic foot for this waste. Consequently, the total cost for disposing of this 150,000 cubic feet of exhumed GTCC waste is $3 billion, which represents about 40% of the total exhumation cost for the two disposal facilities. While we recognize that the Draft EIS had to assume some disposal cost for this waste, the approach selected appears to be the most expensive possible option.

In July of 2007, DOE issued a Notice of Intent for an EIS that will examine options for the disposal of GTCC waste. In this Notice of Intent, Yucca Mountain was identified as only one of several possible options for this waste. Another option being considered for this waste is disposal at the Waste Isolation Pilot Plant (WIPP). If the West Valley GTCC waste was assumed to be disposed of at $2,300 per cubic foot[8], the disposal cost for the West Valley GTCC waste would be lowered by almost a factor of ten. We also note that the GTCC Notice of Intent identified disposal options that could be even less expensive than WIPP.

For the Waste Tank Farm, the Independent Expert Review Team concluded that the cost of exhuming the Waste Tank Farm, using the exhumation approach presented in the Draft EIS, is probably underestimated. They also state, however, that by using alternative exhumation approaches for the tanks, cost savings could be realized, and the exhumation cost for the Waste Tank Farm could actually be lower than the estimate presented in the Draft EIS.

[8] $2,300 is the "derived" cost for the disposal of WVDP waste at WIPP, as presented in the Facilities Description and Methodologies Technical Report, WSMS-WV-08-0001.

Based on the Independent Expert Review Team's review of the exhumation approach, and based on NYSERDA staff's review of the Draft EIS, we believe that the exhumation approaches in the Draft EIS could be successful, but they don't use current industry practices and innovations, and don't attempt to minimize waste volumes. Furthermore, there is significant uncertainty in the costs used in the Draft EIS for disposing of exhumed waste from the SDA and NDA.

NYSERDA believes that the approach identified in the Draft EIS for exhuming the disposal areas and Waste Tank Farm should be reassessed to determine whether less conservative, but still protective, methods of exhumation could be identified that would significantly reduce the cost of exhumation. Disposal costs should also be reevaluated, and where great uncertainty exists, ranges of costs, rather than just the upper end, should be provided in the Draft EIS to better inform and support decisionmaking.

7. <u>Nonradiological Fatalities from Waste Transportation Rail Accidents Appear to be Over- Estimated</u>

In evaluating impacts from transportation, the predicted rail transportation fatalities in the Draft EIS are too high and are not supported by current transportation accident data.

In its evaluation of nonradiological risk from rail transportation, the EIS uses "railcar-kilometers" to assess the number of expected traffic accident fatalities. The main purpose for using this approach is that published data exists for State-specific accident rates, and the predicted number of accidents can be estimated using the cumulative shipment distance and the accident rate per mile.

In calculating impacts from rail shipping, the Draft EIS makes the assumption that there will be only <u>one</u> waste-carrying railcar per train. In other words, even though the average train can carry 68 railcars (Saricks and Tompkins, 1999), the Draft EIS assumes that each and every railcar is an individual shipment. A better measure for impacts from rail transportation would be "train-kilometers" which would assume that a single shipment is made up of multiple railcars. The accident risk would then be assigned to the entire train, rather than each individual railcar on the train.

In regard to this issue, the Independent Review Team offered the following observation:

> "The railcar-kilometer metric implies that one or a few waste laden railcars are part of a larger variable construct train. (See Saricks and Tompkins, 1999 cited in Appendix J of the 2008 DEIS for a discussion of variable-construct versus dedicated trains.) If these waste-laden railcars are a small part of a much larger train (Saricks and Tompkins estimate 68 cars in an average train), then the non-radiological risk is already inherently included in the train that would run whether the few additional waste-laden railcars were present or not. This is another difference between variable-construct train and truck risks – the truck would not travel if not for the waste cargo; the same is not true for variable-construct trains. One could argue that the incremental non-radiological rail transportation risk due to an additional waste-laden railcar is negligible."

The Draft EIS shows that the expected number of shipments by truck will be twice the number of shipments by rail; yet the expected fatalities from rail transportation are predicted to be four times higher. The EIS is predicting 30 fatalities as a result of rail transportation under the Nevada Test Site option or 29 fatalities from rail transportation under the commercial landfill disposal option for the Sitewide Removal Alternative. These values appear excessive, and the conclusion that rail shipping is considerably more dangerous than highway truck transportation is not supported by government-published accident rates[9].

Considering the issues identified above, NYSERDA has concluded that the nonradiological transportation risk estimates presented in the EIS overestimate the risk from rail transportation. We believe that the predicted number of fatalities from traffic accidents identified under the two removal alternatives (Sitewide Total Removal and Phased Decisionmaking) will be substantially decreased once the analysis of rail transportation is corrected.

8. <u>The Existing Long-Term Performance Assessment is not Adequate to Support the In-Place Closure of the Waste Tank Farm or any Other Facilities</u>

The Draft EIS includes an analysis that attempts to quantify and present the impacts from the in-place closure of all major facilities on the site. Much of the discussion in this "View" presents NYSERDA's concerns with that long-term, in-place closure analysis. As discussed above, NYSERDA believes that the Draft EIS long-term performance assessment for the in-place closure

[9] Accident Rate Information is from the U.S. Department of Transportation Motor Carrier Management Information System.

alternative is seriously flawed and scientifically indefensible. As such, the Draft EIS long-term performance assessment should not be used to support a decision to close the Waste Tank Farm, or any other facilities, in place.

Although DOE has publicly stated that decisions on certain facilities, such as the Waste Tank Farm, would be deferred and would not be made as part of a Phase 1 decommissioning decision, DOE has not clearly outlined a path for how, and when, the Phase 2 decisions would be made. If DOE were to decide to move forward with a decision to close the Waste Tank Farm in place, NYSERDA would expect DOE to prepare, and make available for public and agency comment, an EIS with a revised and scientifically defensible long-term performance assessment that would fully analyze, identify, and disclose, the impacts from the in-place closure of the Waste Tank Farm.

NYSERDA's Quantitative Risk Assessment for the State-Licensed Disposal Area

NYSERDA's preferred alternative for the SDA is to manage the facility in place for up to 30 more years. As such, NYSERDA is required under the State Environmental Quality Review Act (SEQR) to identify and mitigate potential environmental impacts from that action. Through early discussions with DOE regarding the content of the EIS, it was determined that the EIS would not include a quantitative analysis of impacts from the in-place management of the SDA for 30 years under the Draft EIS preferred alternative. To meet its requirements under SEQR, NYSERDA tasked Dr. B. John Garrick to provide the analysis needed to assess NYSERDA's preferred alternative for the SDA. Dr. Garrick, who is the current Chairperson of the U.S. Nuclear Waste Technical Review Board, and a former President of the Society for Risk Analysis, recommended that the SDA short-term analysis should consist of a quantitative risk assessment (QRA).

The Quantitative Risk Assessment for the State Licensed Disposal Area (QRA 2008) evaluates the risk from continued operation of the SDA for the next 30 years with its current physical and administrative controls. The scope of this risk assessment is limited to quantification of the radiation dose received by a member of the public, represented by two potential receptors - a permanent resident farmer located near the confluence of Buttermilk Creek and

Cattaraugus Creek, and a transient recreational hiker / hunter who traverses areas along Buttermilk Creek and the lower reaches of Frank's Creek.

The study evaluates potential releases of liquid, solid, and gaseous radioactive materials from the 14 waste disposal trenches at the SDA site. It examines a broad spectrum of potential natural and human-caused conditions that may directly cause or contribute to these releases.

The QRA includes detailed models for the mobilization, transport, distribution, dilution, and deposition of released radioactive materials throughout the environment surrounding the SDA site, including the integrated watershed formed by Erdman Brook, Frank's Creek, and Buttermilk Creek.

Appendix P of this Draft EIS contains a summary of the QRA for the SDA, and the supporting models, data, and analyses for the QRA are available as a separate document from NYSERDA[10].

The Composition of the Independent Expert Review Team

The New York State Research and Development Authority selected a distinguished group of nationally and internationally recognized scientists and engineers to conduct an independent review of the Draft EIS for the West Valley Demonstration Project and the Western New York Nuclear Service Center. The basis of their selection was to select individuals who have distinguished themselves in the disciplines believed important to the scope of the review. The disciplines included on the IERT are geology, erosion, groundwater hydrology, nuclear science and engineering, health physics, risk assessment, and environmental science and engineering.

Dr. B. John Garrick, Chairman, U.S. Nuclear Waste Technical Review Board and an independent consultant in the nuclear and risk sciences was named as the initial member and chairman of the Independent Expert Review Team. Dr. Garrick assisted NYSERDA in selecting the review team, and he had the

[10] The complete QRA report is available on the internet at http://www.nyserda.org/publications/sdaquantitativeriskassessment.pdf. Paper copies can be requested from NYSERDA at END@nyserda.org, or by calling Elaine DeGiglio at (716) 942-9960, extension 2423.

responsibility for integrating the reviews and leading the preparation of the team's report. The full membership and their affiliations are listed below.

James T. Bell, Ph.D., Retired, Oak Ridge National Laboratory, Oak Ridge, Tennessee

Sean J. Bennett, Ph.D., Professor, State University of New York at Buffalo. Buffalo, New York

Robert H. Fakundiny, Ph.D., New York State Geologist Emeritus, Rensselaer, New York

B. John Garrick, PhD., Chairman, U.S. Nuclear Waste Technical Review Board, Laguna Beach, California

Shlomo P. Neuman, Ph.D., Regents' Professor, University of Arizona, Tucson, Arizona

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Chris G. Whipple, Ph.D., Principal, ENVIRON International Corporation, Emeryville, California

Michael P. Wilson, Ph.D., Professor, State University of New York at Fredonia, Fredonia, New York

References

IERT 2008, Independent Review of the Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center, Independent Expert Review Team, September 23, 2008.

PRG 2006, Peer Review of Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center, Peer Review Group, April 25, 2006.

QRA 2008, Quantitative Risk Assessment for the State-Licensed Disposal Area, QRA Team, September 25, 2008.

Saricks and Tompkins, 1999, State-Level Accident Rates for Surface Freight Transportation, A Reexamination, ANL/ESD/TM-150, Center for Transportation Research, Argonne National Laboratory, U.S. Department of Energy, Argonne, Illinois, April 1999.

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ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ALARA	as low as reasonably achievable
BCG	Biota Concentration Guide
CDDL	Construction and Demolition Debris Landfill
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CMS	Corrective Measures Study
D&D	decommissioning and decontamination
dBA	decibels A-weighted
DCGL	Derived Concentration Guideline Levels
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	Environmental Assessment
ECL	Environmental Conservation Law
EDE	effective dose equivalent
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPRI/SOG	Electric Power Research Institute/Seismic Owners Group
FR	*Federal Register*
GTCC	Greater-Than-Class C waste
HEPA	high-efficiency particulate air
HIC	high-integrity container
LCF	latent cancer fatality
LSA	Lag Storage Area
M&M	monitoring and maintenance
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCL	maximum contaminant level
MEI	maximally exposed individual
MMI	Modified Mercalli Intensity
NAAQS	National Ambient Air Quality Standards
NDA	NRC-licensed Disposal Area
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutant
NFS	Nuclear Fuel Services, Inc.
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NTS	Nevada Test Site
NYCRR	New York Code of Rules and Regulations

NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
NYSERDA	New York State Energy Research and Development Authority
PCB	polychlorinated biphenyl
PM	particulate matter
PMF	probable maximum flood
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RFI	RCRA Facility Investigation
ROD	Record of Decision
ROI	Region of Influence
SDA	State-licensed Disposal Area
SEQR	State Environmental Quality Review Act
SPDES	State Pollutant Discharge Elimination System
STS	Supernatant Treatment System
SWMU	Solid Waste Management Unit
TEDE	total effective dose equivalent
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
VRM	Visual Resource Management
WIPP	Waste Isolation Pilot Plant
WMA	Waste Management Area
WNYNSC	Western New York Nuclear Service Center
WVDP	West Valley Demonstration Project

CONVERSIONS

METRIC TO ENGLISH			ENGLISH TO METRIC		
Multiply	**by**	**To get**	**Multiply**	**by**	**To get**
Area					
Square meters	10.764	Square feet	Square feet	0.092903	Square meters
Square kilometers	247.1	Acres	Acres	0.0040469	Square kilometers
Square kilometers	0.3861	Square miles	Square miles	2.59	Square kilometers
Hectares	2.471	Acres	Acres	0.40469	Hectares
Concentration					
Kilograms/square meter	0.16667	Tons/acre	Tons/acre	0.5999	Kilograms/square meter
Milligrams/liter	1 [a]	Parts/million	Parts/million	1 [a]	Milligrams/liter
Micrograms/liter	1 [a]	Parts/billion	Parts/billion	1 [a]	Micrograms/liter
Micrograms/cubic meter	1 [a]	Parts/trillion	Parts/trillion	1 [a]	Micrograms/cubic meter
Density					
Grams/cubic centimeter	62.428	Pounds/cubic feet	Pounds/cubic feet	0.016018	Grams/cubic centimeter
Grams/cubic meter	0.0000624	Pounds/cubic feet	Pounds/cubic feet	16,025.6	Grams/cubic meter
Length					
Centimeters	0.3937	Inches	Inches	2.54	Centimeters
Meters	3.2808	Feet	Feet	0.3048	Meters
Kilometers	0.62137	Miles	Miles	1.6093	Kilometers
Temperature					
Absolute					
Degrees C + 17.78	1.8	Degrees F	Degrees F - 32	0.55556	Degrees C
Relative					
Degrees C	1.8	Degrees F	Degrees F	0.55556	Degrees C
Velocity/Rate					
Cubic meters/second	2118.9	Cubic feet/minute	Cubic feet/minute	0.00047195	Cubic meters/second
Grams/second	7.9366	Pounds/hour	Pounds/hour	0.126	Grams/second
Meters/second	2.237	Miles/hour	Miles/hour	0.44704	Meters/second
Volume					
Liters	0.26418	Gallons	Gallons	3.78533	Liters
Liters	0.035316	Cubic feet	Cubic feet	28.316	Liters
Liters	0.001308	Cubic yards	Cubic yards	764.54	Liters
Cubic meters	264.17	Gallons	Gallons	0.0037854	Cubic meters
Cubic meters	35.314	Cubic feet	Cubic feet	0.028317	Cubic meters
Cubic meters	1.3079	Cubic yards	Cubic yards	0.76456	Cubic meters
Cubic meters	0.0008107	Acre-feet	Acre-feet	1233.49	Cubic meters
Weight/Mass					
Grams	0.035274	Ounces	Ounces	28.35	Grams
Kilograms	2.2046	Pounds	Pounds	0.45359	Kilograms
Kilograms	0.0011023	Tons (short)	Tons (short)	907.18	Kilograms
Metric tons	1.1023	Tons (short)	Tons (short)	0.90718	Metric tons

ENGLISH TO ENGLISH

Acre-feet	325,850.7	Gallons	Gallons	0.000003046	Acre-feet
Acres	43,560	Square feet	Square feet	0.000022957	Acres
Square miles	640	Acres	Acres	0.0015625	Square miles

a. This conversion is only valid for concentrations of contaminants (or other materials) in water.

METRIC PREFIXES

Prefix	Symbol	Multiplication factor
exa-	E	1,000,000,000,000,000,000 = 10^{18}
peta-	P	1,000,000,000,000,000 = 10^{15}
tera-	T	1,000,000,000,000 = 10^{12}
giga-	G	1,000,000,000 = 10^{9}
mega-	M	1,000,000 = 10^{6}
kilo-	k	1,000 = 10^{3}
deca-	D	10 = 10^{1}
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001 = 10^{-12}