UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 14, 2016

Mr. Paul J. Bembia, Director
West Valley Site Management Program
New York State Energy Research
and Development Authority
9030-B Route 219
West Valley, NY 14171-9500

SUBJECT: REGULATORY AUDIT REPORT - REVIEW OF OFFSITE CHARACTERIZATION AND PUBLIC DOSE ASSESSMENT DOCUMENTATION AND PROCESSES FOR THE WESTERN NEW YORK NUCLEAR SERVICE CENTER IN FOLLOW UP TO THE AERIAL GAMMA RADIATION SURVEY CONDUCTED IN 2014 (CSF-1, DOCKET NUMBER: 050-00201 COST ACTIVITY CODE: L53127)

Dear Mr. Bembia:

As requested by the New York State Energy Research and Development Authority (NYSERDA), the U.S. Nuclear Regulatory Commission (NRC) staff conducted an audit of NYSERDA's documentation and processes supporting NYSERDA's offsite characterization and public dose assessment processes. The audit was conducted by the NRC staff during June 8-9, 2016, at NYSERDA's Ashford Office Complex near the West Valley Site in New York.

The purpose of the audit was to prepare for the submittal of NYSERDA's characterization and dose assessment evaluations to enable a more efficient and timely review. The audit assessed whether the information was sufficient for the NRC staff to evaluate NYSERDA's assessment of public health and safety upon receiving NYSERDA's submittal. The staff's audit observations, as well as the description of information that NYSERDA should include that would be helpful to the NRC's review are found in the attached audit report. Please note that information in the audit report may be used in the NRC staff's safety evaluation report.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," 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.

Should you have any questions, please contact Amy Snyder, Senior Project Manager for CSF-1 at (301) 415-6822 or Amy.Snyder@nrc.gov.

Sincerely,

/RA/

Mathew R. Meyer, Acting Chief
Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No. 50-201

Should you have any questions, please contact Amy Snyder, Senior Project Manager for CSF-1 at (301) 415-6822 or Amy.Snyder@nrc.gov.

Sincerely,

/RA/

Mathew R. Meyer, Acting Chief
Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No.: 50-201

DISTRIBUTION:

PUBLIC	CBarr, NMSS	GChapman,NMSS
SClark, OGC	RNelson, NMSS	S.Poy NMSS
KO'Sullivan, NMSS	RPowell, RI	M.Roberts, RI
S. Patterson, SNI	BBower, DOE-WVDP	AIglesias, EPA
TRice, NYSDEC	DSamson, NYSDOH	

ADAMS Accession Number: ML16174A055

OFC	DUWP/MDB	DUWP/MDB	DUWP/PAB	DUWP/MDB	OGC
NAME	ASnyder	CHolsten	CMcKenney	MMeyer	NLO
DATE	6/21/16	6/ 23/16	6/ 24 /16	6/29/16	7/14/16

OFFICIAL RECORD COPY

ATTACHMENT

REGULATORY AUDIT REPORT - REVIEW OF OFFSITE CHARACTERIZATION AND PUBLIC DOSE ASSESSMENT DOCUMENTATION AND PROCESSES FOR THE WESTERN NEW YORK NUCLEAR SERVICE CENTER IN FOLLOW UP TO THE AERIAL GAMMA RADIATION SURVEY CONDUCTED IN 2014

1. Background

This report summarizes the U.S. Nuclear Regulatory Commission (NRC) staff's audit of the New York State Energy Research and Development Authority (NYSERDA) documentation and processes supporting NYSERDA's offsite characterization results and an associated public dose assessment, which evaluated the potential risk to residents in the area of the potential offsite residual radioactivity above background. NYSERDA conducted characterization in the fall of 2015 to verify the results of an aerial gamma radiation survey conducted in 2014. The audit was conducted on June 8-9, 2016 at the NYSERDA offices located in the Ashford Complex near West Valley, New York.

The NRC staff assembled an interdisciplinary audit team to facilitate the team's understanding and expedite its review upon receiving the submittal. The audit team consisted of the NRC staff members identified in Table 1. The NYSERDA staff and contractors who participated in the audit are identified in Table 2.

Table 1

NAME	AFFILIATION
Amy Snyder	NRC Senior Project Manager
Robert Nelson	NRC Health Physicist
Cynthia Barr	NRC Senior Systems Performance Analyst
Sheldon Clark*	NRC Attorney

Note: * Present for audit exit meeting only.

Table 2

NAME	AFFILIATION
Paul Bembia	NYSERDA
Andrea Mellon	NYSERDA
Lee Gordon	NYSERDA
Doug Coble	NYSERDA
Janice Dean*	NYSERDA
Louis G. Henry	MJW Corporation
Mutty M. Sharfi	MJW Technical Services
Jack Gerber	The MJW Companies
Moira Maloney*	U.S. DOE-WVDP

NOTE: * Present for audit exit meeting only.

The NRC staff provided its audit plan (Agencywide Documents Access and Management System Accession No. ML16133A270) to NYSERDA prior to the audit. Before the audit, NYSERDA clarified for the NRC staff that the last sampling and analysis plan is dated October 1, 2015. NYSERDA explained that any modifications or changes to MJW's survey and sampling process after October 1, 2015, were based on the comments received by the regulatory agencies. NYSERDA also noted that summary of the changes up until October 1, 2015, is provided in Appendix A of the October 1, 2015, sampling and analysis plan. The NRC staff requested to begin reviewing NYSERDA's draft assessment package the evening of June 8, 2016, in advance of a full day's agenda planned for June 9, 2016. NYSERDA agreed to the request, enabling the NRC staff to become familiar with the package before discussions with NYSERDA and NYSERDA's contractor, MJW and Associates, on June 9, 2016. The audit results are documented in this audit report.

2. Objective

Objectives of the audit were to assess whether the following were addressed by NYSERDA:

- Appropriate application of data collection and analysis methods;

- Technically sound measurement methods or calculation approaches to estimate the dose to members of the public as related to the requirement in Title 10 of the *Code Federal Regulations* (10 CFR) 20.1402. The dose limit, 0.25 mSv/yr (25 mrem/yr). Total Effective Dose Equivalent will be used as a benchmark to assess the risk significance of the potential offsite residual radioactivity that clearly identify assumptions, rationale for selection and elimination of pathways, and rationale for any modeling parameters; and

- Transparent and traceable documentation that includes sufficient characterization and dose assessment information to allow NRC staff to independently evaluate NYSERDA's dose assessment once submitted.

3. Regulatory Basis

This regulatory audit was a planned, license-related activity that included the examination and evaluation of NYSERDA's draft package and other supporting documentation not required by regulation to be submitted to the NRC. The NRC assessed whether the information NYSERDA intends to submit is sufficient for the NRC staff to evaluate NYSERDA's assessment of public health and safety upon receiving NYSERDA's characterization and dose assessment evaluations. No decisions or conclusions about verification of public health and safety were made at the audit.

4. Audit Activities

NYSERDA gave an overview of the area of potential concern and its activities, to include how it addressed data quality. The NRC staff reviewed NYSERDA's draft submittal package and supporting documentation, such as some of the laboratory data reports, and asked questions

about the representativeness of the data, whether the data quality objectives were met, and how the dose assessment was conducted.

5. Observations

- NYSERDA walked through an ArcGIS project file that showed each of the areas of concern, as well as data collected during (or interpreted following) the 2014 aerial survey. For example, under NYSERDA's direction, Remote Sensing Laboratory used anthropogenic and Cs-137 extraction data from the 2014 aerial survey to recommend potential areas of concern for follow-up investigation. After these areas were agreed upon by project personnel and as identified in NYSERDA's sampling and analysis plan, NYSERDA performed walk over surveys to identify elevated areas for targeted sampling and/or collected a minimum number of random, depth discrete soil/sediment samples for analysis[1]. Generally, 5 cm thick samples were collected for areas impacted by the air pathway (Cesium Prong footprint) and 15 cm samples were taken for areas impacted by water deposition.

- NYSERDA noted that only in Area 3.1[2] did the walk over survey identify any elevated areas for targeted soil sampling (areas that were greater than two standard deviations above the anthropogenic or Cs-137 extractions count rates reported in the aerial survey).

- NYSERDA indicated that it provided 100 percent coverage of the areas of concern in walkover surveys. However, when further questioned NYSERDA contractors indicated that a 30 m spacing was used in certain areas (e.g., Areas 4 and 5), although the range of the detector was much less than 30 m. Due to the small area of Area 2, a more-dense walkover survey spacing was utilized. In Area 3, corn had been cultivated and the rows of corn were used to guide walkover surveys for this Area. The NRC staff noted that although NYSERDA did not use a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) approach and it is not clear that the density of the walkover surveys or the number of samples taken would be sufficient, if MARSSIM protocols were used, NYSERDA attempted to identify elevated areas of contamination and perform biased sampling in an effort to verify the aerial survey results.

- NYSERDA indicated that in all, 641 samples were collected and 519 samples analyzed by the Environmental Laboratory Approval Program and New York State approved GEL Laboratories, located in Charleston, South Carolina.

- NYSERDA noted that although only two expanded analyses were required per the field survey plan, in many cases NYSERDA collected additional samples

[1] A minimum of four sample locations were identified for areas less than 2000 m^2. A larger number of samples was collected for larger areas.

[2] Area 3 was previously identified in aerial surveys and further investigated in this 2016 characterization effort. Area 3 is located near the Western New York Nuclear Service Center site boundary and where Buttermilk Creek drains into Cattaraugus Creek.

beyond the minimum specified in its sampling and analysis plan to better understand the distribution of radionuclides in offsite sediments and soils and for duplicate analyses.

- NYSERDA conducted dose assessments using RESRAD-OFFSITE. Depending on the exposure scenario, NYSERDA contractors indicated that parameters were adjusted to maximize the dose (e.g., when deer ingestion was thought to be an important pathway the soil erodibility factor was maximized to maximize surface runoff to the nearby streams).

- NYSERDA's contractors considered irrigation using a site well in Area 3, the location of an existing farm.

- NYSERDA's contractors said that the exposure scenario was updated to a home site resident in Area 1 due to a new home construction in the area.

- NYSERDA's contractors said that, in general current land use was used to assess dose to potential receptors.

- The NRC staff observed that all surface samples were analyzed for gross alpha, gross beta, and gamma spectroscopy. If surficial sample results were statistically above (2 sigma) background, additional subsurface samples were sent for analysis.

- NYSERDA's contractors made qualitative arguments regarding the lack of presence of C-14, I-129, and Tc-99 based on results of the limited expanded analysis that included radioisotopic analysis and indicated the lack of presence or low risk associated with these potential radionuclides of concern in offsite samples.

- The NRC noted that reported concentrations and doses appeared to be generally below screening values and well below regulatory benchmarks (e.g., well below unrestricted release criteria found in 10 CFR 20.1402).

- NYSERDA contractors indicated that several different approaches were taken to estimate dose including comparison of concentrations against U.S. Department of Energy's (DOE) West Valley Demonstration Project Phase 1 Decommissioning Plan derived concentration guideline levels, site-specific dose assessment using RESRAD-OFFSITE, use of aerial survey results for the external dose pathway, and use of Bicron radiation measurements for the external dose pathway. The NRC staff noted that NYSERDA's efforts to provide multiple lines of evidence that potential doses are below levels of concern will help minimize requests for additional information (RAIs).

- NYSERDA's contractors presented an overview of the data quality project plan and described how the data was verified and validated. The NRC staff asked if data quality objectives (DQOs) were developed. NYSERDA said that MARSSIM

was used as guidance to develop DQOs for the purpose of characterization. The NRC noted that seven steps used to the DQO process are used to generate the optimal design for sampling and analytical work and that each step should be used to complete the process, but depending on the site, may or may not be in as much depth. These steps should be clearly described somewhere such as the quality assurance project plan. In addition, the NRC staff stated that the DQOs should be approved by the project decision makers prior to any work being done in the field. NYSERDA said that the information was in the quality assurance project plan. Through discussion with NYSERDA and its contractors and upon review of portions of the quality assurance project plan, it was unclear to the NRC staff whether NYSERDA clearly documented and approved all the steps in the data quality objectives process apriori and clearly described and documented its associated data quality assessment.

6. Conclusions

- All topics on the agenda were covered during the audit.
- The NRC staff reviewed the associated documentation and noted that additional documentation was needed in certain areas to help facilitate NRC's review of NYSERDA's submittal and preparation of a safety evaluation report. A list of information that NYSERDA should include that would be helpful to the NRC's review is provided in Enclosure 1.
- The NRC emphasized that NYSERDA's submittal needs to be as complete as possible. Although NYSERDA clarified information for the NRC staff at the audit, the NRC will only evaluate what is submitted to the NRC.
- Neither the audit activities nor the identification of information that NYSERDA should include that would be helpful for the NRC's review precludes the potential for requests for additional information after the submittal is provided to the NRC.
- The NRC noted that if certain radionuclides and pathways constituted 10 percent or less of the targeted dose limits, a detailed analysis of the radionuclides and pathways may not be necessary[3]. In general, the rigor of the technical analysis is less substantial for relatively low risk sites (or in this case offsite areas of contamination).
- The NRC staff noted that it would consider the relatively low risk when developing RAIs.

[3] Guidance to address insignificant radionuclides and exposure pathways is provided in NUREG-1757, Section 3.3 of Volume 2. Insignificant means that the radionuclide or pathway contributes less than 10 percent of the applicable dose criteria (e.g., 10 percent of the 25 mrem/y criterion). Licensees may eliminate insignificant radionuclides and exposure pathways from further detailed consideration; however, the dose from the insignificant radionuclides and pathways must be accounted for in demonstrating compliance with the applicable dose criteria.

- Although NYSERDA did not follow a MARSSIM approach for demonstrating radiological criteria for license termination could be met, the NRC staff noted that if a licensee was demonstrating compliance with unrestricted use criteria for decommissioning, it should consider reasonably foreseeable future land use. On the other hand, NYSERDA attempted to estimate doses based on current land use informed by land use surveys including interviews with property owners and review of geographical data. Because land use surveys were not complete for the Seneca Nation of Indians at the time of preparation of the dose assessment, and it was not clear that all potentially risk-significant pathways of exposure were considered (e.g., fish ingestion), NYSERDA should address potential dose from these pathways to provide confidence that the doses were not significantly underestimated. NYSERDA could present arguments on why these pathways of exposure did not need to be considered or use other sources of information to evaluate the potential risk of the pathways (e.g., environmental monitoring data collected by DOE in the Annual Site Environmental Reports).

- Documentation that the NRC staff reviewed during the audit is listed in Enclosure 2.

7. <u>References</u>:

- C.Yu, et al., User's Guide for RESRAD-OFFSITE, NUREG/CR/7189, U.S. Nuclear Regulatory Commission (2015).

- D.W. Schmidt, K.L Banovac, J.T. Buckley, D.W. Esh, R.L Johnson, J.J. Kottan, C.A. McKenney, T.G. McLaughlin, and S. Schneider, Consolidated NMSS Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria, NUREG-1757, Vol. 2, Rev. 1, U.S. Nuclear Regulatory Commission (2006).

- Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, NUREG-1748, U.S. Nuclear Regulatory Commission (2003).

- Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev. 1, EPA 402-R-97-016, Rev. 1, DOE/EH-0624, Rev. 1, U.S. Department of Defense, U.S. Department of Energy, U.S. Environmental Protection Agency, and U.S. Nuclear Regulatory Commission (2000).

- NMSS Handbook for Decommissioning Fuel Cycle and Materials Licensees, NUREG/BR-0241, U.S. Nuclear Regulatory Commission (1997).

- K.L. Banovac, J.T. Buckley, R.L. Johnson, G.M. McCann, J.D. Parrott, D.W. Schmidt, J.C. Shepherd, T.B. Smith, P.A. Sobel, B.A. Watson, D.A. Widmayer, and T.H. Youngblood, Consolidated NMSS Decommissioning Guidance: Decommissioning Process for Materials Licensees, NUREG-1757, Vol. 1, Rev. 2, U.S. Nuclear Regulatory Commission (2006).

- K.M. Kline, C.M. Dean, T.L. Fredrichs, M.C. Maier, E.R. Pogue and R.N. Young, Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness, NUREG-1757, Vol. 3, Rev. 1, U.S. Nuclear Regulatory Commission (2012).

- Yu, C., E. Gnanapragasam, B.M. Biwer, S. Kamboj, J.-J. Cheng, T. Klett, D. LePoire,A.J. Zielen, S.Y. Chen, W.A. Williams, A. Wallo, S. Domotor, T. Mo, and A. Schwartzman, User's Manual for RESRAD-OFFSITE Version 2, ANL/EVS/TM/07-1, DOE/HS-0005, NUREG/CR-6937 (2001, 2007).

8. <u>Enclosures:</u>

- Enclosure 1, Information That NYSERDA Should Include That Would Be Helpful to the NRC's Review.

- Enclosure 2, List of Documents Reviewed During NYSERDA Audit, July 8-9, 2016

Information That NYSERDA Should Include That Would Be Helpful to the NRC's Review

ID No.	Description of Information
Health Physics (HP)	
HP-01	Provide documented data quality objectives for field measurements and analytical measurements.
HP-02	Provide documented data quality assessment methods and results for field measurements and analytical measurements.
HP-03	Clarify how results for radionuclides besides Cs-137 were recorded and evaluated.
HP-04	For each sample area, explain how uncertainty was considered in the conclusions regarding health and safety risk.
ID No.	**Description of Information**
Performance Assessment (PA)	
PA-01	Additional information addressing the fish ingestion pathway and other pathways that may be important to potential receptors in the area based on reasonably foreseeable future land use.
PA-02	Information on how land use survey and geographical data helped informed development of site-specific exposure scenarios for use in the dose assessment.
PA-03	Provide rationale for selection of Am-241 or Pu-239 (alpha-emitting), and Sr-90 (beta emitting) to represent the most limiting alpha- and beta-emitting radionuclides (e.g., other alpha-emitting radionuclides have lower Phase 1 U.S. Department of Energy's West Valley Demonstration Project Phase 1 Decommissioning Plan clean-up values or derived concentration guideline levels).
PA-04	Provide clarification on approach used to identify areas of concern for the purpose of conducting walkover surveys including use of 300 to 3000 ft range (see Section 3.1 of Draft report).
PA-05	RESRAD-OFFSITE input files associated with Appendix H used for dose assessment.
PA-06	GIS Project file containing Remote Sensing Laboratory data, and shape files used to delineate areas of concern.
PA-07	Spreadsheet of data linking Appendix F of the draft report coordinates and Appendix B of the draft report sampling results.

List of Documents Reviewed During NYSERDA Audit
July 8-9, 2016

1. "DRAFT Radiological Survey and Dose Assessment Report for the Western New York Nuclear Service Center and Off-Site Areas in Follow-up to Aerial Gamma Radiation Survey Conducted in 2014," Prepared by MJW Technical Services, Inc., for New York State and Research Development Authority West Valley site Management Program, West Valley, New York, May 9, 2016.

2. Appendix A, "Field Sampling and Dose Assessment Plan, Rev. 0 and Summary of Field Changes".

   Appendix B, "Field Guides". *Contains coordinates of sample locations*
   Appendix D, "Land Use Surveys". *Interview Form Only (no survey data)*
   Appendix F, "Soil Sample Survey".
   Appendix H, "Dose Assessment Appendices".

3. Quality Assurance Project Plan.

4. Analytical Data Reports – sampling of data reports.

5. NYSERDA's Overview Slide Presentation.