DOE/EIS-0226
January 2010

Final 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 2

(Appendices A through R)

NYSERDA

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

For further information on this Final EIS, or to request a copy of the EIS or references, please contact:

Catherine Bohan, EIS Document Manager
West Valley Demonstration Project
U.S. Department of Energy
Ashford Office Complex
9030 Route 219
West Valley, NY 14171
Telephone: 716-942-4159
Fax: 716-942-4703
E-mail: catherine.m.bohan@wv.doe.gov

Printed with soy ink on recycled paper

COVER SHEET

Co-Lead Agencies: U.S. Department of Energy (DOE)
New York State Energy Research and Development Authority (NYSERDA)

Cooperating Agencies: U.S. Nuclear Regulatory Commission (NRC)
U.S. Environmental Protection Agency (EPA)
New York State Department of Environmental Conservation (NYSDEC)

Involved Agencies: New York State Department of Health (NYSDOH)
New York State Department of Environmental Conservation (NYSDEC)

Title: *Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center* (DOE/EIS-0226)

Location: Western New York Nuclear Service Center, 10282 Rock Springs Road, West Valley, New York 14171-0191 (Erie and Cattaraugus Counties)

For additional information on this Final Environmental Impact Statement (EIS) or for references, contact:

Catherine Bohan, EIS Document Manager
West Valley Demonstration Project
U.S. Department of Energy
Ashford Office Complex
9030 Route 219
West Valley, NY 14171

Telephone: 716-942-4159
Fax: 716-942-4703
E-mail: catherine.m.bohan@wv.doe.gov

For general information on the DOE National Environmental Policy Act (NEPA) process, contact:

Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0103

Telephone: 202-586-4600, or leave a message at 1-800-472-2756

For general questions and information about NYSERDA, contact:

Paul J. Bembia, Program Director
West Valley Site Management Program
New York State Energy Research and Development Authority
Ashford Office Complex
9030 Route 219
West Valley, NY 14171

Telephone: 716-942-9960 x4900
Fax: 716-942-9961
E-mail: pjb@nyserda.org

For general information on the State Environmental Quality Review Act (SEQR) process, contact:

David A. Munro, Deputy Counsel
New York State Energy Research and Development Authority
17 Columbia Circle
Albany, NY 12203

Telephone: 1-866-697-3732
Fax: 518-862-1091
E-mail: dam@nyserda.org

Abstract: The Western New York Nuclear Service Center (WNYNSC) is a 1,351-hectare (3,338-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 68-hectare (167-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 WVDP issued by NRC since the publication of the 1996 *Cleanup and Closure Draft EIS* and public comments on that EIS, DOE and NYSERDA issued the *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*) in December 2008, revising the 1996 Draft EIS. This *Decommissioning and/or Long-Term Stewardship EIS* has been prepared in accordance with NEPA and the State Environmental Quality Review Act (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 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 are 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 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 scientific studies to facilitate consensus decisionmaking for the remaining facilities or areas. Phase 2 actions would complete decommissioning or long-term management decisionmaking according to the approach determined most appropriate during the additional Phase 1 evaluations. 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. Phase 1 activities are expected to take 8 to 10 years to complete. The Phase 2 decision would be made no later than 10 years after issuance of the initial DOE Record of Decision and NYSERDA Findings Statement, if the Phased Decisionmaking Alternative is selected. In response to public comments, the Preferred Alternative has been modified since the Revised Draft EIS was issued.

Public Comments: In preparing this Final EIS, DOE considered comments received during the scoping period (March 13 through April 28, 2003) and public comment period on the Revised Draft EIS (December 5, 2008 through September 8, 2009). Public hearings on the Revised Draft EIS were held in Albany, Irving, West Valley, and Buffalo, New York during the public comment period. In addition, a videoconference with the DOE Assistant Secretary for Environmental Management, the President of NYSERDA, and various stakeholders was held on September 4, 2009. Comments on the Revised Draft EIS were requested during the 9-month period following publication of the U.S. Environmental Protection Agency's (EPA's) Notice of Availability in the *Federal Register*. All comments, including late comments and those presented during the September 4, 2009 videoconference, were considered during preparation of this Final EIS.

This Final EIS contains revisions and new information based in part on comments received on the 2008 Revised Draft EIS. Vertical change bars in the margins indicate the locations of these revisions and new information. Volume 3 contains the comments received during the public comment period on the Revised Draft EIS including late comments, and DOE's and NYSERDA's responses to the comments. DOE will use the analysis presented in this Final EIS, as well as other information, in preparing its Record(s) of Decision (RODs) regarding actions to complete WVDP. DOE will issue ROD(s) no sooner than 30 days after EPA publishes a Notice of Availability of this Final EIS in the *Federal Register*. NYSERDA will use the analysis presented in this Final EIS, as well as other information, in preparing its Findings Statement, which will be published in the *New York State Environmental Notice Bulletin* no sooner than 10 days after the Final EIS is issued.

TABLE OF CONTENTS

TABLE OF CONTENTS

Volume 2
Appendices A through R

Appendix C
Descriptions of Facilities/Areas, Decommissioning Activities, and New Construction

Appendix D
Overview of Performance Assessment Approach

Appendix E
Geohydrological Analysis

Appendix F
Erosion Studies

Appendix G
Models for Long-term Performance Assessment

Appendix H
Long-Term Performance Assessment Results

Appendix K
Method for Estimating Nonradiological Air Quality Impacts

Appendix L
Regulatory Compliance Discussion

Appendix M
Floodplain and Wetland Assessment

Appendix N
Intentional Destructive Acts

Appendix O

Appendix P
The SDA Quantitative Risk Assessment

Appendix Q

Appendix R

LIST OF FIGURES

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I

Appendix J

Appendix K

Appendix L

Appendix M

Appendix P

LIST OF TABLES

Appendix A

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I

Appendix J

Appendix K

Appendix L

Appendix N

Appendix P

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ACRONYMS, ABBREVIATIONS, AND CONVERSION CHARTS

ALARA	as low as is reasonably achievable
AMCG	average member of the critical group
BEIR	Biological Effects of Ionizing Radiation
CDD	Chemical Dispersal Device
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
C-R-D	remote-handled Class C
DCGL	Derived Concentration Guideline Levels
DDE	deep-dose equivalent
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EDE	effective dose equivalent
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
FEHM	Finite Element Heat and Mass Transfer Code
FEMA	Federal Emergency Management Agency
FR	*Federal Register*
GTCC	Greater-Than-Class C waste
HEPA	high-efficiency particulate air
HEC	Hydrologic Engineering Center
HIC	high-integrity container
HRU	hydrologic response unit
ICRP	International Commission on Radiological Protection
IDA	intentional destructive acts
IRIS	Integrated Risk Information System
ISCORS	Interagency Steering Committee on Radiation Standards
LCF	latent cancer fatality
LLW	low-level radioactive waste
MAR	material at risk
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCL	maximum contaminant level
MEI	maximally exposed individual
NAAQS	National Ambient Air Quality Standards
NDA	NRC-licensed Disposal Area
NEPA	National Environmental Policy Act
NFS	Nuclear Fuel Services, Inc.
NRC	U.S. Nuclear Regulatory Commission
NRF	National Response Framework

NRIA	Nuclear/Radiological Incident Annex
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
NYSERDA	New York State Energy Research and Development Authority
OSL	optically stimulated luminescence
PCB	polychlorinated biphenyl
PM	particulate matter
PMF	probable maximum flood
PVC	polyvinyl chloride
QRA	quantitative risk assessment
rad	radiation absorbed dose
RCRA	Resource Conservation and Recovery Act
RDD	Radiological Dispersal Device
rem	roentgen equivalent man
RH	remote-handled
RMSE	root-mean-square-error
ROD	Record of Decision
SDA	State-Licensed Disposal Area
SEQR	State Environmental Quality Review Act
SPDES	State Pollutant Discharge Elimination System
SSR	sum of the square of the residuals
STOMP	Subsurface Transport Over Multiple Phases
STS	Supernatant Treatment System
SWMU	Solid Waste Management Unit
TEDE	total effective dose equivalent
TRAGIS	Transportation Routing Analysis Geographic Information System
TRU	transuranic
U.S.C.	United States Code
USGS	U.S. Geological Survey
USLE	Universal Soil Loss Equation
WEPP	Waste Erosion Prediction Project
WIPP	Waste Isolation Pilot Plant
WMA	Waste Management Area
WNYNSC	Western New York Nuclear Service Center
WVDP	West Valley Demonstration Project
WVNS	West Valley Nuclear Services Company, Inc.
° C	degrees Celsius
° F	degrees Fahrenheit

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}