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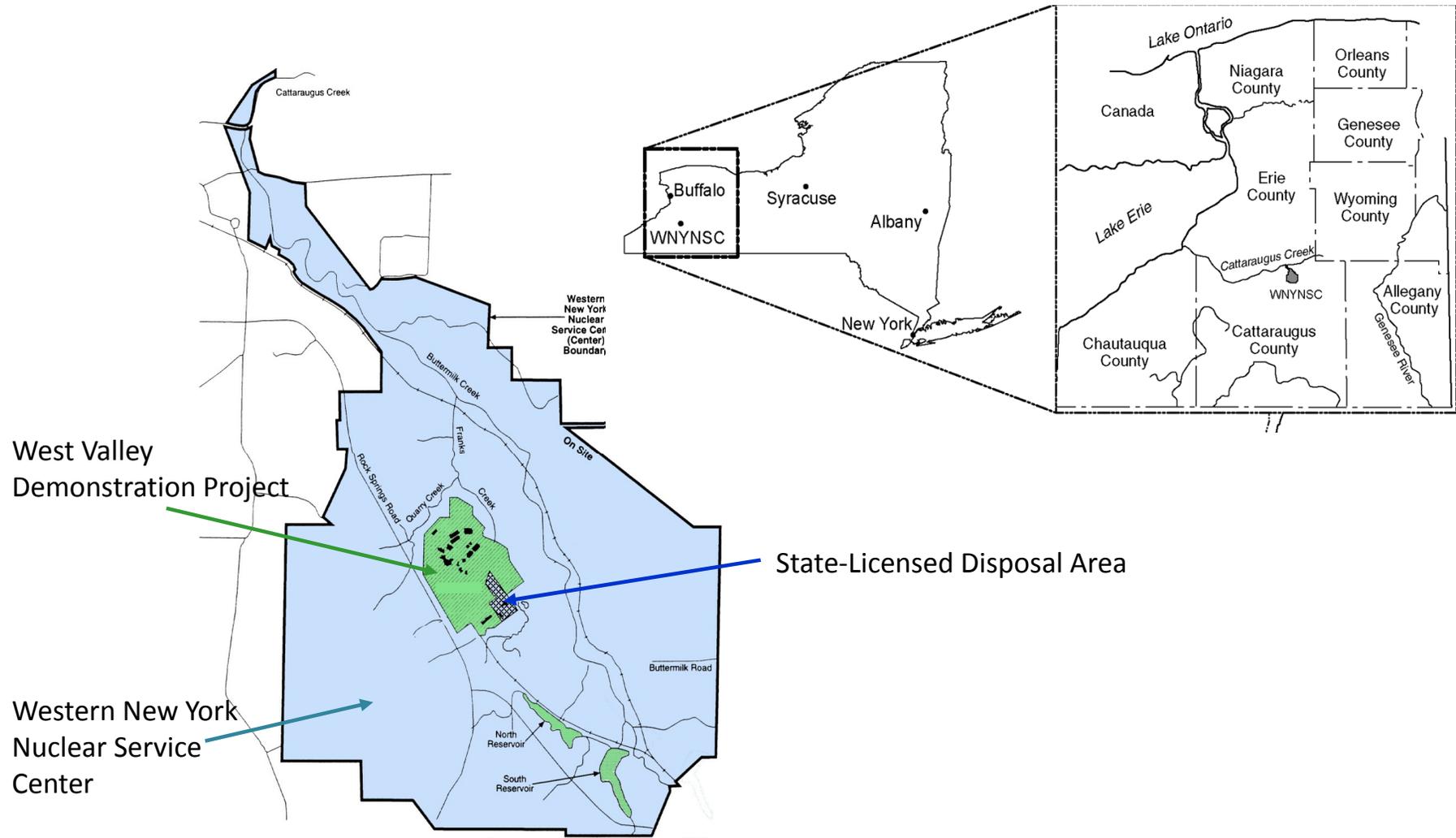
OFFICE OF  
**ENVIRONMENTAL  
MANAGEMENT**

# Probabilistic Modeling and Phase 2 Decision Making at the West Valley Demonstration Project and the Western New York Nuclear Service Center

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# Western New York Nuclear Service Center and West Valley Demonstration Project



West Valley Demonstration Project

State-Licensed Disposal Area

Western New York Nuclear Service Center

# Western New York Nuclear Service Center (WNYNSC)

- Established in 1961 as a commercial nuclear fuel reprocessing and waste disposal facility approximately 30 miles south of Buffalo NY
- 1,351-hectare (3,338-acre) facility owned by the New York State Energy Research and Development Authority (NYSERDA)
- Licensed by the Atomic Energy Commission in 1966, site was the only operational commercial nuclear fuel reprocessing facility in the United States
- Contains the 6.1-hectare (15-acre) State Licensed Disposal Area (SDA), a low-level radioactive waste disposal facility that received 2.3M ft<sup>3</sup> of LLW from 1963-1975
- Contains the 68-hectare (167-acre) West Valley Demonstration Project

# West Valley Demonstration Project (WVDP)

- In 1982, U.S. Department of Energy (DOE) assumed control but not ownership of the WVDP premises to carry out the WVDP Act
- Site contains the nuclear fuel reprocessing facilities operated by Nuclear Fuel Services, Inc. (NFS) (1966-1972)
- Major facilities include the:
  - Former NFS reprocessing facility (Main Plant Process Building)
  - DOE WVDP Vitrification Facility,
  - Waste Tank Farm,
  - Liquid Low-level Waste Treatment Facility (lagoons)
  - NRC-licensed Disposal Area
  - North Plateau Groundwater Plume

# West Valley Demonstration Project and State- Licensed Disposal Area



# West Valley Demonstration Project Act of 1980 (Public Law 96-368)

The WVDP Act directed the U.S. Department of Energy to:

1. Solidify the high-level radioactive waste at the Center **Completed**
2. Develop containers suitable for permanent disposal of the waste **Completed**
3. Transport the solidified waste to a federal repository for permanent disposal **Pending Repository**
4. Dispose of low-level radioactive waste (LLW) and transuranic (TRU) waste **In Progress**
5. Decontaminate and decommission the underground high-level waste tanks, facilities and any material and hardware used in connection with the Project **In Progress**

## Final Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the WVDP and WNYNSC (FEIS) (January 2010)

- Jointly prepared by the DOE and NYSERDA to fulfill requirements of the National Environmental Policy Act (NEPA) and the New York State Environmental Quality Review Act (SEQR)
- Identified and assessed the impacts of the closure alternatives proposed for the WVDP and WNYNSC
  - Sitewide Removal
  - Sitewide Close-in-Place
  - Phased Decisionmaking
  - No Action
- Long-Term Deterministic Performance Assessment
- Long-Term (10,000 year) Landscape Evolution Model (CHILD)

## Preferred Alternative – Phased Decisionmaking

### NYSERDA - FEIS Long-term Performance Assessment is not Adequate to Support In-Place Closure:

- Erosion
  - Landscape evolution modeling (CHILD) incapable of accurately predicting erosion and stream/gulley development
- Future performance of engineered barriers (caps, slurry walls) are overly optimistic
- Exhumation approaches may be overly conservative
- Uncertainty associated with the deterministic long-term performance assessment not adequately presented or discussed

- Two Phase Decommissioning of the WVDP and WNYNSC
- Phase 1 - Near-term decommissioning and removal actions where there is DOE and NYSERDA consensus
  - Removal of the Main Plant Process Building; Vitrification Facility; North Plateau Groundwater Plume Source Area; LLWTF lagoons, facilities, and soil
  - Characterization of site contamination and scientific studies (Phase 1 Studies) to facilitate future decision-making for the remaining facilities at the WVDP/WNYNSC
  - Phase 1 activities originally expected 8 to 10 years to complete
- Phase 2 decision to be made no later than 10 years after the DOE ROD and NYSERDA Findings Statement (CY 2020)

## Preferred Alternative - Phased Decisionmaking (concluded)

- Phase 2 - Decommissioning and/or removal actions for facilities and areas at the WVDP/WNYNSC remaining after the completion of Phase 1 decommissioning
  - Waste Tank Farm;
  - NRC-licensed Disposal Facility (NDA);
  - Non-source area of the North Plateau Groundwater Plume,
  - State-licensed Disposal Area (SDA),
  - Remainder of the WNYNSC
- Phase 2 decision to be made by DOE and NYSERDA by May 2020

# Phased Decision Making

In 2010, DOE published the Final Environmental Impact Statement and Record of Decision (ROD) for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project (WVDP) and the Western New York Nuclear Service Center (WNYNSC)

- Phased Decisionmaking ROD
- Phase 1 Decommissioning Plan

- Final Decommissioning ROD
- Phase 2 Decommissioning Plan

## Phase 1 Decommissioning

### Phase 1 Facility Disposition

- Relocate 275 HLW Canisters to new dry cask storage facility
- Ship legacy Low Level Waste
- Demolish Vitrification Facility (VF) and Main Plant Process Building (MPPB)
- Remove ancillary facilities

### Phase 1 Soil Remediation

- Remove Below Grade Portion of MPPB (including source area of plume) and VF
- Remove Lagoons and Liquid Waste Treatment Facility
- Ship Legacy TRU Waste
- Remove Remote-Handled Waste Facility and remaining ancillary facilities
- Remediate all WMA 1 & 2 Soil

## Phase 2 Decommissioning

(Decisions made by 2020)

### Phase 2 Decisions

- HLW Canister Shipment (permanent disposal decision)
- Decommissioning decisions for:
  - Waste Tank Farm
  - NRC-licensed Disposal Area
  - State-licensed Disposal Area
  - Construction Demolition Debris Landfill

# Before Phase 1 Decommissioning



# After Phase 1 Decommissioning



DOE and NYSERDA have committed to the following activities to reach a Phase 2 Decommissioning Decision by 2020:

- Phase 1 Studies
- Transition to a Probabilistic Performance Assessment
- Supplemental Environmental Impact Statement (SEIS)

## Phase 1 Studies (2014-2017)

- Scientific studies performed to facilitate interagency consensus to complete the decommissioning of the facilities remaining after Phase 1 decommissioning
- Erosion Working Group
  - Collect supplemental geologic and hydrologic data to support erosion modeling
- Engineered Barriers Working Group
  - Evaluate performance and design of engineered barriers for use in Close In-Place closure designs
- Exhumation Working Group
  - Evaluate total and partial waste removal/exhumation approaches for facilities remaining after the completion of Phase 1 decommissioning

## Probabilistic Performance Assessment (2015-2017)

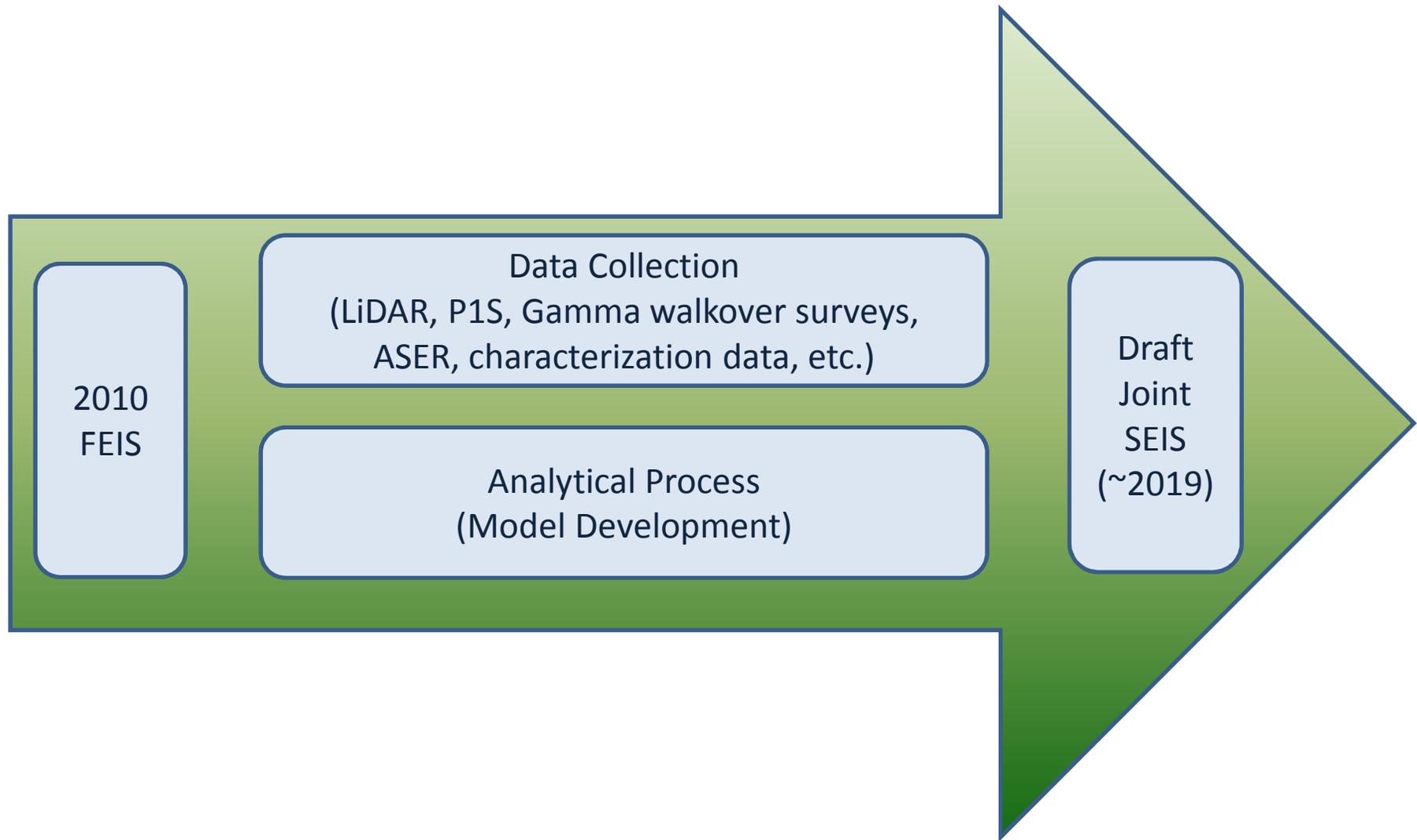
- Uncertainty in the long-term deterministic performance analysis was at the heart of many of the technical issues raised with respect to the 2010 FEIS
- Approach will build upon the 2010 FEIS deterministic performance assessment and incorporate probabilistic analytical methods
- Sensitivity and uncertainty analysis will be used to identify key uncertainties and provide focus for data collection and model development efforts
- A probabilistic assessment will be prepared to evaluate and provide estimates of the uncertainty in the long-term site analysis
- The probabilistic performance assessment will provide input to future NEPA/SEQRA analysis

## Probabilistic Performance Assessment Contract (2015-2017) – Major Components

- Sensitivity analysis of the 2010 deterministic PA to identify input parameters that cause significant uncertainty in the PA output and which may benefit from additional data collection
- Transition component modules and input parameters from the 2010 deterministic PA to a probabilistic modeling approach capable of performing a long-term probabilistic PA to evaluate future closure alternatives for the site
- Evaluate the nature and magnitude of uncertainty and determine the extent to which uncertainty may be reduced
- Evaluate potential Phase 2 decommissioning alternatives
- Perform a long-term probabilistic PA to evaluate impacts from the decommissioning alternatives analyzed in the Supplemental Environmental Impact Statement (SEIS)

## Supplemental Environmental Impact Statement (2016-2020)

- A joint Supplemental Environmental Impact Statement (SEIS) will be prepared as part of a NEPA/SEQRA process for ensuring transparency and obtaining public input in the Phase 2 decision making process
- SEIS will be prepared to further the purposes of NEPA/SEQRA and is in keeping with the agencies commitment to develop an integrated Phase 2 decommissioning decision approach for the WVDP, WNYNSC, and SDA



- Continue Phase 1 Studies (2014-2017)
- Execute Probabilistic Modeling Contract (2015)
- Model Development (2015-2017)
- Continue ongoing data collection activities: LiDAR, aerial radiation survey, and site characterization work (2015-2017)
- Execute NEPA/SEQRA contract (2016)
- Issue Joint DOE/NYSERDA Draft SEIS (2019)
- Publish Joint DOE/NYSERDA Phase 2 SEIS (2020)
- Publish Phase 2 DOE ROD and NYSEDA Findings Statement (2020)

Questions?