

Quantitative Risk Assessment for the State-Licensed Disposal Area

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State-Licensed Disposal Area Location

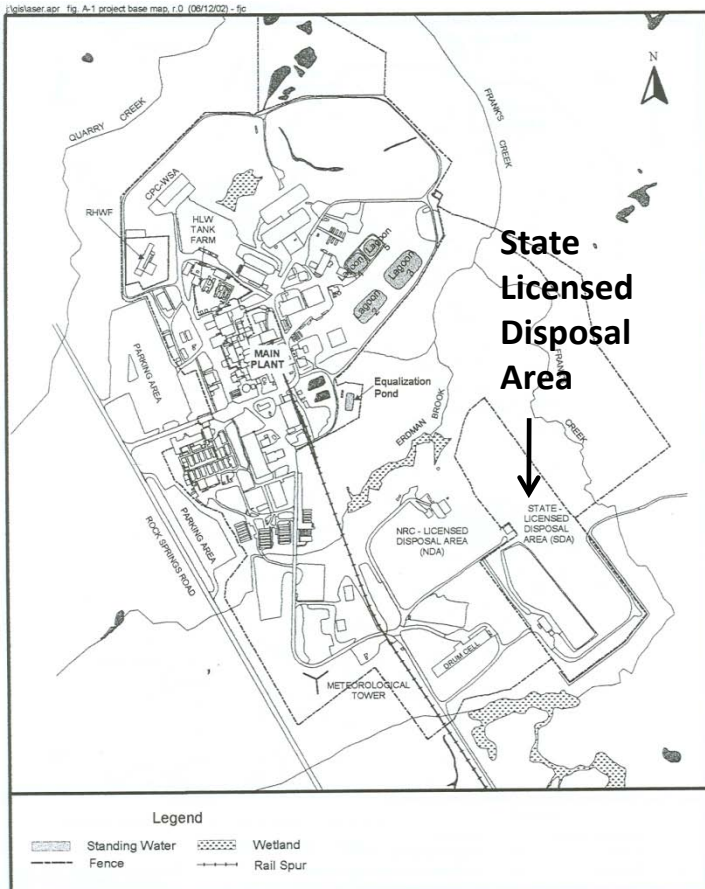
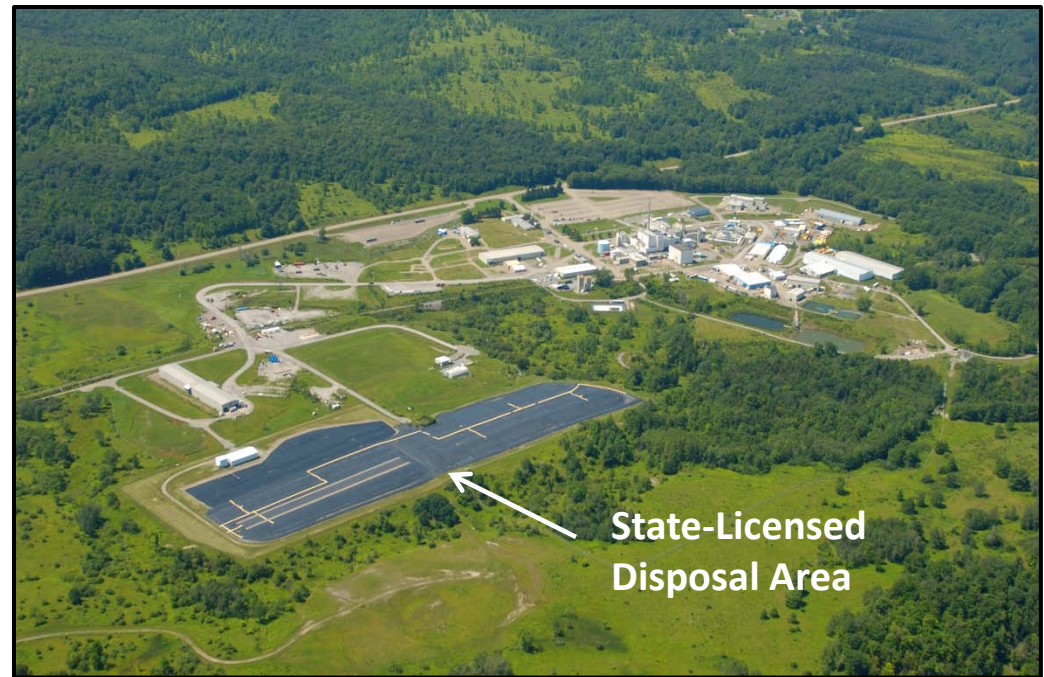


Figure A-1. West Valley Demonstration Project Base Map



The State Licensed Disposal Area is adjacent to the WVDP Premises at the WNYNSC

State-Licensed Disposal Area

SDA is one of six commercial radioactive waste disposal facilities that began operation in the U.S. in the 1960s and 1970s.

- Barnwell
- Beatty
- Hanford
- Maxey Flats
- Sheffield
- West Valley

One of two radioactive waste disposal areas at the Center.

First operational facility at the Center - Operated by NFS.

Began operation in 1963 under a regulatory exemption to the NYS Sanitary Code.

Not regulated by AEC under the 10 CFR Part 50 License for the Reprocessing Facility.

NYSERDA took over management of the SDA in 1983.

SDA Waste Characteristics

Wastes disposed in the SDA came from a number of facilities and industries:

- Nuclear Power Plants
- Hospitals
- Isotope Production Facilities
- Pharmaceutical Companies
- DoD Facilities
 - Army, Air Force, Naval Reactors
- AEC/DOE Facilities
 - Mound – Radioisotope Thermoelectric Generators
 - Manhattan Project (Middlesex Sampling Station)
- NFS West Valley Reprocessing Plant

SDA Waste Characteristics

2.4 million cubic feet of waste disposed in shallow land disposal configuration.

12 shallow land disposal trenches, one set of shallow disposal holes, one “trench” with waste encased in concrete.

Key Radionuclides and Curies (year 2000)

| | |
|--------|-------|
| H-3 | 41300 |
| Pu-238 | 26500 |
| Ni-63 | 20700 |
| Cs-137 | 14600 |
| Co-60 | 5330 |
| Pu-241 | 3890 |
| Ni-59 | 800 |
| Am-241 | 439 |
| C-14 | 306 |
| Sr-90 | 175 |
| U-238 | 192 |
| Fe-55 | 186 |
| Pu-239 | 184 |



SDA Performance Issues and Improvements

Water Infiltration – Major issue for three decades

- Began early in the life of the facility.
- Water filled most trenches - two trenches overflowed and seeped through the trench caps.
- Caused the facility to be shut-down in 1975.
- Required leachate pumping by NFS and NYSERDA



Infiltration Controls resolve this issue

- 1980s - South trench sand lens removal
- 1992 - South trench slurry wall and membrane cover
- 1995 - Additional membrane covers
- 2010 - South trench cover replacement

SDA Performance Issues and Improvements

Erosion – Significant Issue today

Significant long-term performance and short-term stability issue.



Erosion controls now being implemented

2009 - Erdman Brook

2011 - Additional controls planned for
Erdman Brook, Franks Creek and
Lagoon Road Creek

Quantitative Risk Assessment

The need for the analysis:

- DOE and NYSERDA were joint lead agencies on an EIS for Decommissioning or Long-Term Stewardship at the WVDP and Western New York Nuclear Service Center.
- NYSERDA was considering managing the SDA in place for an additional period of time (10-30 years).
- NYSERDA identified technical issues with certain EIS analyses and results.
- The EIS would not be structured to provide an analysis of short-term (10-30 year) performance for the SDA.
- NYSERDA decided to commission its own “short-term performance assessment” to evaluate 30 years of additional in-place management of the SDA.

It was recommended that NYSERDA contact Dr. B. John Garrick regarding this analysis.

Quantitative Risk Assessment

Dr. Garrick believed that a traditional “PA” was not the best approach to address NYSERDA’s analysis needs:

- Relatively short-term nature of the management period;
- Needed to consider presence and absence of specific monitoring and maintenance activities in the analysis;
- Wanted to quantify probabilities as well as consequences; and
- Needed to evaluate a number of different triggering events and release scenarios.

Dr. Garrick recommended that NYSERDA commission a Quantitative Risk Assessment.



Quantitative Risk Assessment

QRA Results:

- Provided potential impacts and probabilities from managing the SDA in place for 30 more years;
- Provided information on full range of release events, including low probability events;
- Provides probabilities and consequences from release mechanisms that had not been previously evaluated;
- Identified additional monitoring to improve our ability to detect a release in a timely manner; and
- Being used to evaluate and improve emergency response planning.



Critical input for NYSERDA's 2010 decision to manage the SDA in place for ten more years