WSMS-WV-08-0004
Revision 0
November 2008

Western New York Nuclear Service Center

Sitewide Close-In-Place Alternative Technical Report

Prepared for the

U.S. Department of Energy

West Valley, New York

Prepared By: _____ 11/24/08
Kevin D. Sullivan, Date
URS Washington Division

Approved By: _____ 11/24/08
Robert E. Steiner II, Date
URS Washington Division

URS

Washington Division

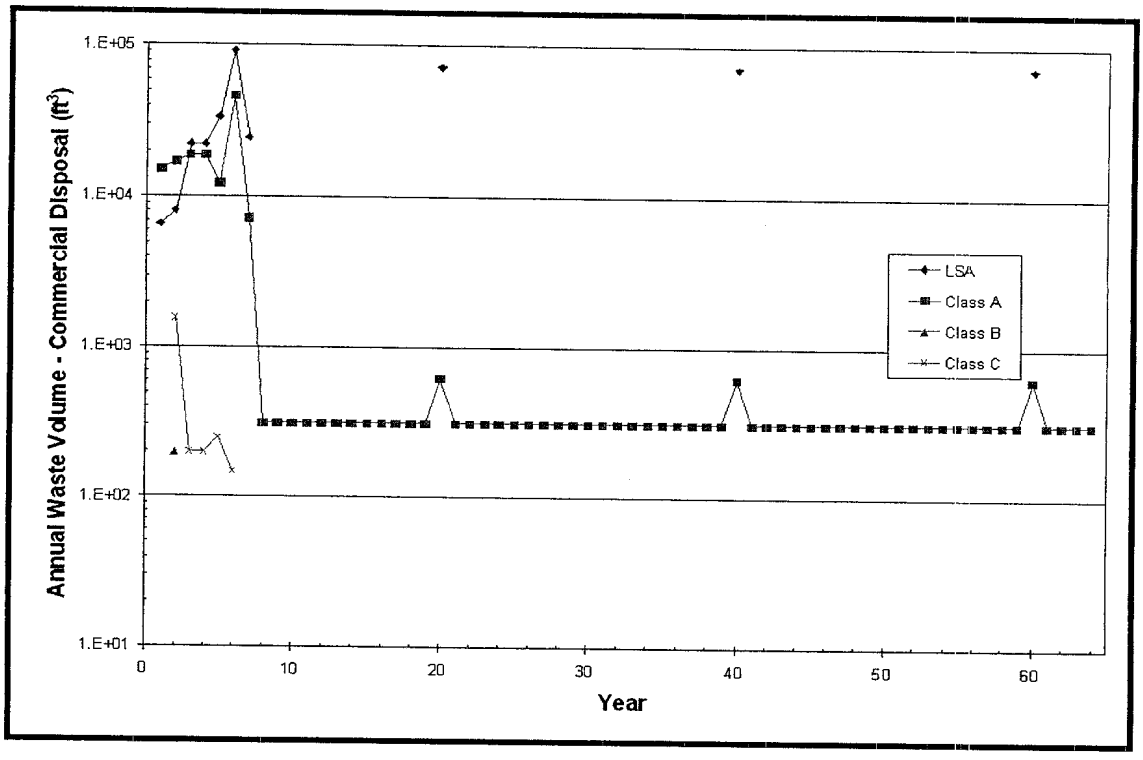

Figure 3-13. Volume of Packaged Waste for Commercial Facilities Disposal by Implementation Year

3.5 Costs

For purposes of these estimates, cost was separated into the four major categories of materials, labor, waste disposal, and contingencies, which were generated for each WMA or Facility.

The two cost tables produced in the report are nearly identical with the exception of the location where the waste would be disposed. For example, Table 3-18 displays the costs for each WMA and Facilities as represented by waste transported to DOE and commercial facilities; whereas, Table 3-19 presents the costs related to waste transported to Commercial facilities only. Since the disposal facilities are different under each scenario, a few ancillary costs are different as well, such as waste packaging, transportation, and subsequent contingency costs. The distinctions are most noticeable in the sum-total costs in the last row, where labor costs are identical and waste disposal costs are different by approximately $3.4 million.

Figure 3-14 illustrates the annual breakdown in spending of the assumed annual $100 million site budget, using a stacked bar chart.

Table 3-18. DOE/Commercial Facilities Waste Disposal (2008 Dollars)

Effort	Total Materials Cost	Total Labor Cost	Total Waste Disposal Cost	Total Contingency Cost	Total Cost
HLW Canister Removal					
Construction of DCSA	$31,851,100	$7,178,800	$0	$5,361,900	$44,391,800
LILO Modification and Operation	$9,547,000	$8,760,600	$153,000	$6,114,800	$24,575,400
Operation of DCSA	$42,000	$16,235,400	$0	$4,074,600	$20,352,000
Demolition of DCSA	$1,858,800	$6,441,700	$1,938,500	$2,559,900	$12,798,900
WMA 1 Closure	$14,469,300	$80,136,900	$2,291,200	$24,224,800	$121,122,200
WMA 2 Closure	$6,178,300	$8,089,400	$1,196,800	$3,866,200	$19,330,700
WMA 3 Closure					
Surface Structure Removal	$1,075,000	$8,397,200	$129,500	$2,400,600	$12,002,300
Grouting Operations	$7,036,800	$2,561,800	$31,300	$2,407,600	$12,037,500
North Plateau Cap Construction	$8,699,900	$14,947,200	$1,941,700	$6,397,200	$31,986,000
WMA 4 Closure					
WMA 5 Closure	$1,586,300	$3,463,900	$2,726,800	$1,944,500	$9,721,500
WMA 6 Closure	$118,600	$308,000	$135,800	$140,700	$703,100
Leachate Treatment Facility					
LTF Construction	$5,365,400	$1,611,200	$22,600	$1,085,500	$8,084,700
LTF Operation	$3,421,400	$52,043,100	$2,446,800	$14,478,100	$72,389,400
LTF Closure	$174,100	$1,742,800	$356,700	$568,500	$2,842,100
WMA 7 Closure	$10,505,300	$24,080,300	$140,700	$8,681,700	$43,408,000
WMA 8 Closure	$33,613,100	$99,284,700	$838,000	$33,434,100	$167,169,900
WMA 9 Closure	$609,800	$5,543,000	$828,700	$1,745,500	$8,727,000
WMA 10 Closure	$208,300	$649,700	$216,000	$268,600	$1,342,600
WMA 11 Closure					
WMA 12 Closure	$39,200	$139,900	$52,800	$58,000	$289,900
North Plateau Groundwater Plume (non-source area)	$17,600	$51,400	$52,800	$30,500	$152,300
Existing Facility Maintenance	$1,781,000	$7,760,100	$343,500	$2,455,300	$12,339,900
Security*	$0	$41,385,800	$0	$10,346,500	$51,732,300
Environmental Monitoring Installations	$1,450,400	$2,944,400	$240,600	$1,159,000	$5,794,400
Security Installations	$342,500	$1,188,400	$208,500	$434,900	$2,174,300
Erosion Control Installations	$9,559,800	$24,526,300	$487,200	$8,643,500	$43,216,800
Long-Term Monitoring and Maintenance*	$49,590,000	$128,193,000	$849,300	$44,676,600	$223,308,900
NPP PTW Replacement*	$5,343,600	$2,789,100	$2,622,300	$2,689,200	$13,444,200
TOTALS*	**$204,484,600**	**$550,454,100**	**$20,251,100**	**$190,248,300**	**$965,438,100**
TRU Waste Disposal	**$0**	**$0**	$3,140,000	**$0**	$3,140,000
HLW Canister Disposal	$0	$0	$137,500,000	$0	$137,500,000
TOTAL NON-PROJECT COST	$0	$0	$140,640,000	$0	$140,640,000
TOTAL ALTERNATIVE COST	**$204,484,600**	**$550,454,100**	**$160,891,100**	**$190,248,300**	**$1,106,078,100**

* Over 64 years

Table 3-19. Commercial Facilities Waste Disposal (2008 Dollars)

Effort	Total Materials Cost	Total Labor Cost	Total Waste Disposal Cost	Total Contingency Cost	Total Cost
HLW Canister Removal					
Construction of DCSA	$31,851,100	$7,178,800	$0	$5,361,900	$44,391,800
LILO Modification and Operation	$9,537,600	$8,760,600	$99,200	$6,099,000	$24,496,400
Operation of DCSA	$42,000	$16,235,400	$0	$4,074,600	$20,352,000
Demolition of DCSA	$1,858,800	$6,441,700	$1,938,500	$2,559,900	$12,798,900
WMA 1 Closure	$14,432,900	$80,136,900	$1,437,000	$24,002,200	$120,009,000
WMA 2 Closure	$6,141,900	$8,089,400	$455,100	$3,671,700	$18,358,100
WMA 3 Closure					
Surface Structure Removal	$2,031,900	$8,397,200	$1,464,300	$2,973,500	$14,866,900
Grouting Operations	$7,036,800	$2,561,800	$39,400	$2,409,600	$12,047,600
North Plateau Cap Construction	$8,645,900	$14,947,200	$692,600	$6,071,500	$30,357,200
WMA 4 Closure					$0
WMA 5 Closure	$1,540,900	$3,463,900	$934,900	$1,485,100	$7,424,800
WMA 6 Closure	$109,200	$308,000	$111,000	$132,200	$660,400
Leachate Treatment Facility					
LTF Construction	$5,365,400	$1,611,200	$22,600	$1,085,500	$8,084,700
LTF Operation	$3,421,400	$52,043,100	$2,584,300	$14,512,500	$72,561,300
LTF Closure	$163,500	$1,742,800	$277,500	$546,100	$2,729,900
WMA 7 Closure	$10,505,300	$24,080,300	$140,700	$8,681,700	$43,408,000
WMA 8 Closure	$33,613,100	$99,284,700	$838,000	$33,434,100	$167,169,900
WMA 9 Closure	$609,800	$5,543,000	$828,700	$1,745,500	$8,727,000
WMA 10 Closure	$208,300	$649,700	$216,000	$268,600	$1,342,600
WMA 11 Closure					
WMA 12 Closure	$39,200	$139,900	$52,800	$58,000	$289,900
North Plateau Groundwater Plume (non-source area)	$17,600	$51,400	$52,800	$30,500	$152,300
Existing Facility Maintenance	$1,781,000	$7,760,100	$343,500	$2,455,300	$12,339,900
Security*	$0	$41,385,800	$0	$10,346,500	$51,732,300
Environmental Monitoring Installations	$1,441,000	$2,944,400	$109,600	$1,123,900	$5,618,900
Security Installations	$342,500	$1,188,400	$208,500	$434,900	$2,174,300
Erosion Control Installations	$9,559,800	$24,526,300	$487,200	$8,643,500	$43,216,800
Long-Term Monitoring and Maintenance*	$49,590,000	$128,193,000	$849,300	$44,676,600	$223,308,900
NPP PTW Replacement*	$5,343,600	$2,789,100	$2,622,300	$2,689,200	$13,444,200
TOTALS*	**$205,230,500**	**$550,454,100**	**$16,805,800**	**$189,573,600**	**$962,064,000**
TRU Waste Disposal	**$0**	**$0**	$3,140,000	**$0**	$3,140,000
HLW Canister Disposal	$0	$0	$137,500,000	$0	$137,500,000
TOTAL NON-PROJECT COST	$0	$0	$140,640,000	$0	$140,640,000
TOTAL ALTERNATIVE COST	**$205,230,500**	**$550,454,100**	**$157,445,800**	**$189,573,600**	**$1,102,704,000**

* Over 64 years

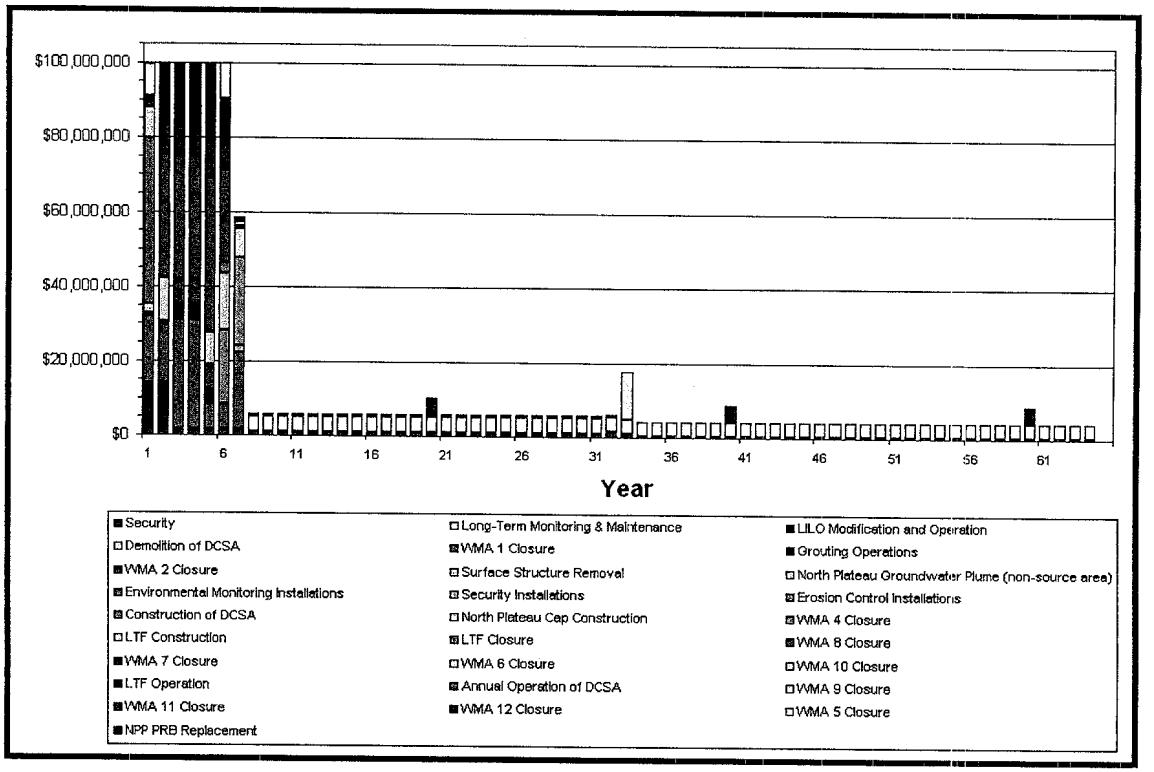

Figure 3-14. Total Costs (Y2008) by Implementation Year

4.0 POST-IMPLEMENTATION IMPACTS

4.1 Introduction

This section addresses longer-term issues related to Environmental Impact Statement (EIS) alternative analyses and selection, but which are outside the typical activities associated with implementing an EIS alternative. The primary issue addressed here is the implementation of long-term, post-implementation environmental monitoring, facility maintenance, and security.

4.1.1 Post-Implementation Long-Term Stewardship

Following the completion of the In-Place Closure activities, a long-term stewardship program would be implemented to monitor and maintain the closed facilities in the North Plateau and South Plateau. The stewardship program would include environmental monitoring and inspections, and monitoring and maintenance of engineered barriers and erosion control systems. A long-term site security program would also be implemented, which would include maintenance of security system installations. Monitoring data would be routinely evaluated and access to the closed areas re-assessed as part of the performance evaluations.

4.2 Post-Implementation Environmental Monitoring and Facility Maintenance

The environmental monitoring and inspection program would include groundwater and surface water monitoring to evaluate water quality conditions associated with the closed facilities in the North Plateau and South Plateau. This program would also include site-wide inspections of engineered barriers and erosion control structures. The monitoring and inspection program would contain the following elements:

- Semi-annual measurement of groundwater levels in groundwater monitoring wells and piezometers to evaluate groundwater flow patterns and long-term performance and effectiveness of engineering-controls.
- Semi-annual groundwater sampling and analysis to evaluate groundwater quality.
- Periodic hydraulic conductivity testing and redevelopment of groundwater monitoring wells and piezometers.
- Periodic decommissioning and replacement of groundwater monitoring wells and piezometers, as warranted.
- Annual site inspections that evaluate the condition of the engineered multi-layer covers, erosion control structures and security systems in the North and South Plateaus. Issues identified during the inspection process would be corrected as part of routine site maintenance activities.
- Reporting of the inspection, testing, sampling, and analytical results into periodic Site-Wide Long-Term Monitoring Program Reports.

4.2.1 General Environmental Monitoring and Inspections

4.2.1.1 Groundwater Monitoring

A total of 53 groundwater wells and 42 piezometers would be installed to monitor groundwater elevations and groundwater quality in the North and South Plateaus, as discussed in Section 2.15. Another eight off-site residential water supply wells would be included in the site monitoring program to monitor off-site groundwater quality.

The North Plateau groundwater monitoring network would include the following elements:

- Installation of eight pairs of piezometers (16 total piezometers) to monitor the performance of the circumferential and upgradient hydraulic barrier walls at WMA 1 and WMA 3.
- Installation of 29 monitoring wells for long-term groundwater monitoring. These would include 25 screened in the Sand and Gravel Unit and four screened in the Kent Recessional Unit.

The groundwater monitoring network around WMA 7 in the South Plateau would include the following elements:

- Installation of five pairs of piezometers (10 total piezometers) to monitor the performance of the NDA hydraulic barrier wall.
- Installation of eight monitoring wells for long-term groundwater monitoring. These would include five screened in the weathered Lavery till and three screened in the Kent Recessional Unit,

The groundwater monitoring network around WMA 8 in the South Plateau would include the following elements:

- Installation of eight pairs of piezometers (16 total piezometers) to monitor the performance of the SDA hydraulic barrier wall.
- Installation of 16 monitoring wells for long-term groundwater monitoring. These would include nine screened in the weathered Lavery till and seven screened in the Kent Recessional Unit

Groundwater Monitoring and Sampling

Groundwater monitoring wells would be routinely monitored during the long-term stewardship program. Monitoring tasks would include measurement of water levels, well purging, sampling, and inspection of each well. Groundwater would be routinely collected and analyzed for site-specific radiological and chemical parameters on a semi-annual schedule for the radiological indicator parameters gross alpha, gross beta, and tritium. Selected wells would also be sampled and analyzed for site-specific radionuclides by gamma spectroscopy or other appropriate method. Chemical parameters would include contamination indicator parameters. Selected wells would also be sampled and analyzed for metals, volatile organic compounds (VOCs), and semi-volatile organics compounds (SVOCs). Quality assurance/quality control samples would also be collected as part of sampling activities. The groundwater monitoring wells would also be routinely inspected during the course of the monitoring program and any repairs or maintenance required to maintain these wells in proper working condition would be performed.

Piezometer Monitoring

Pairs of groundwater piezometers would be installed along the upgradient and downgradient sides of subsurface barrier walls installed on the North and South Plateaus to evaluate the performance of these features. These piezometers would be routinely inspected during the course of the monitoring program and any repairs or maintenance required to maintain them in proper working condition would be performed as needed.

Hydraulic Conductivity Testing and Well Redevelopment

Hydraulic conductivity testing would be performed routinely on groundwater monitoring wells to evaluate their hydraulic performance. It is also anticipated that 25% of the wells would be tested each year, with 100% of the wells tested every four years. It is assumed that 25% of the monitoring wells would be redeveloped every year, with 100% of the wells redeveloped every four years.

Groundwater Monitoring Well and Piezometer Decommissioning and Replacement

It is anticipated that groundwater monitoring wells and piezometers would be decommissioned and replaced once every 25 years. Decommissioned wells would either be removed or grouted and abandoned in place.

4.2.1.2 Surface Water Monitoring

Surface waters draining the North and South Plateaus would be routinely monitored for radionuclide indicator parameters at 11 locations on Franks Creek, Erdman Brook, and Quarry Creek on a semi-annual schedule, as discussed in Section 2.15. Another four sampling locations would be located upstream and downstream of the WNYNSC along Buttermilk Creek and Cattaraugus Creek near the perimeter of the WNYNSC.

4.2.1.3 Report Preparation

Annual environmental monitoring and inspection reports and multi-year review reports would be prepared as part of the environmental monitoring program. The report would provide data summaries and trends, highlight data points above regulatory or site-specific action levels, and include conclusions, and recommendations for interim action, if appropriate. Annual reporting would be conducted up to each scheduled Multi-Year Review cycle (anticipated to range from 5 to 10 years). The Multi-Year Review would contain summarized data and evaluations from the annual reports, as well as additional analysis, and recommendations for modification to the stewardship program or further remedial action, if necessary.

4.2.2 Monitoring and Maintenance of Caps and Erosion Controls

A long-term monitoring and maintenance program would be implemented to monitor the performance and condition of the engineered barriers and erosion control structures installed in the North and South Plateaus. This program would include routine inspections of the barrier walls, engineered covers, and erosion control structures for signs of decreased performance or degradation. Actions would be implemented to correct any observed defects or irregularities with these systems. This section describes the proposed long-term monitoring and

maintenance program for the engineered barriers and erosion control systems in the North and South Plateau areas.

Multi-Layer Cover Systems

The multi-layer cover systems would be routinely inspected for signs of deterioration or damage resulting from subsidence, erosion, or the growth of deep-rooted vegetation. Routine repairs to the covers, such as reseeding or backfilling small depressions, would be performed as needed. Additional maintenance activities would include periodic mowing of the vegetated portions of the covers, trimming of vegetation, and removal of vegetation with root depths in excess of one foot to prevent deep root growth into the multi-layer covers.

Hydraulic Barrier Walls

The hydraulic barrier walls in the North Plateau and South Plateau would be installed under a documented QA/QC construction program. The barrier walls would be designed to minimize long-term degradation and the need for long-term maintenance. Pairs of piezometers installed upgradient and downgradient of the barrier walls would be monitored to evaluate the performance of these hydraulic barriers

Erosion Control Structures

The erosion control structures would be regularly inspected to ensure that they are functioning as designed and to identify signs of blockage and/or physical damage. Maintenance would be performed in response to the inspections and would include clearing debris and silt blocking erosion control structures and performing local regrading where necessary. Although these erosion control structures have been conceptually designed according to NUREG-1623, considering the PMP as the design storm creating a robust design that does not rely on regular maintenance for effectiveness, routine maintenance is still assumed to be necessary. Maintenance repairs are assumed to be limited to the upper layers of the caps and erosion controls. In general, these upper layers are assumed to be refurbished annually, incorporating $1/30^{th}$ of the original construction volume into the annual material budget.

4.2.3 Long-Term Security

Access to the closed facilities in the North Plateau and South Plateau would be restricted by installing an eight-foot-high chain link fence around these facilities. The fence would have one or more access points with locked gates. Motion sensors and video cameras would be installed at intervals along these security fences. These sensors would be wired to activate alarms at local law enforcement facilities.

Signs would be placed around the perimeter as well as near the main WNYNSC access point providing appropriate information identifying the nature of the site and the existence of residual radioactive inventories in the North Plateau and of buried radioactive wastes at WMA 7 and WMA 8. These signs would also list current telephone numbers to call to obtain additional information regarding the

property. These signs would be maintained for the duration of the post-closure maintenance period.

The security systems constructed around the closed facilities would be routinely inspected for signs of distress or damage resulting from normal wear from natural elements or from vandalism. Repairs of minor damage would be performed during these inspections, as needed.

The security systems, including fencing, are assumed to require complete replacement once every 35 years. Advancements in motion detector and camera technologies are assumed to be addressed by the annual monitoring and maintenance program, within which equipment using current technologies would be procured and installed whenever equipment would need to be replaced.

4.3 Data Summary

The total resource requirements, impacts, and costs associated with the post-implementation environmental monitoring, facility maintenance and security program are summarized in Tables 4-1 through 4-15.

Table 4-1. Resource Requirements - Consumable Materials – PPE and HP Supplies

Effort	PPE (sets)	Sample Bags (each)	Bioassay Containers (each)	Filter Papers (each)	Smears (each)	Tygon Tubing (ft)
North Plateau Cap Maintenance	0	0	0	0	0	0
WMA 7 Cap Maintenance	0	0	0	0	0	0
WMA 8 Cap Maintenance	0	0	0	0	0	0
Erosion Controls Maintenance	0	0	0	0	0	0
NPP PTW Replacement(1)	226	330	2	330	700	35
Annual Environmental Monitoring	205	300	1	300	600	30

Effort	TLDs (each)	Plastic Sheeting (rolls)	HEPA Filters (each)	Tape (rolls)	Herculite Sheeting (rolls)	Small Tools (each)
North Plateau Cap Maintenance	0	0	0	0	0	0
WMA 7 Cap Maintenance	0	0	0	0	0	0
WMA 8 Cap Maintenance	0	0	0	0	0	0
Erosion Controls Maintenance	0	0	0	0	0	0
NPP PTW Replacement(1)	2	7	1	33	7	13
Annual Environmental Monitoring	1	6	1	30	6	12

(1) quantities expressed are based on each replacement, not annual expenditure.