

# Conceptual Design Report Nevada Test Site Mixed Waste Disposal Facility Project

**January 2009**

Prepared for:

U.S. Department of Energy  
National Nuclear Security Administration  
Nevada Site Office  
under Contract Number  
DE-AC52-06NA25946

Prepared by:

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## LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre(s)
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
FEMA	Federal Emergency Management Agency
FY	fiscal year
GCL	geosynthetic clay liner
HDPE	high density polyethylene
LLW	low-level waste
LCRS	leachate collection and removal system
LDS	leachate detection system
mi	mile(s)
mi <sup>2</sup>	square mile(s)
MW	mixed waste
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NEPA	<i>National Environmental Policy Act</i>
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NTS	Nevada Test Site
RCRA	<i>Resource Conservation and Recovery Act</i>
ROM	rough order of magnitude
RWMC	Radioactive Waste Management Complex
RWMS	Radioactive Waste Management Site
USEN	U.S. Ecology Nevada Inc.

## 1.0 INTRODUCTION

### 1.1 BACKGROUND

Environmental cleanup of contaminated nuclear weapons manufacturing and test sites generates radioactive waste that must be disposed. Site cleanup activities throughout the U.S. Department of Energy (DOE) complex are projected to continue through 2050. Some of this waste is mixed waste (MW), containing both hazardous and radioactive components. In addition, there is a need for MW disposal from other mission activities. The Waste Management Programmatic Environmental Impact Statement Record of Decision designates the Nevada Test Site (NTS) as a regional MW disposal site. The NTS has a facility that is permitted to dispose of onsite- and offsite-generated MW until November 30, 2010. There is not a DOE waste management facility that is currently permitted to dispose of offsite-generated MW after 2010, jeopardizing the DOE environmental cleanup mission and other MW-generating mission-related activities.

A mission needs document (CD-0) has been prepared for a newly permitted MW disposal facility at the NTS that would provide the needed capability to support DOE's environmental cleanup mission and other MW-generating mission-related activities.

### 1.2 CONTENT

This report presents a conceptual engineering design for a MW facility that is fully compliant with *Resource Conservation and Recovery Act* (RCRA) and DOE O 435.1, "Radioactive Waste Management." The facility, which will be located within the Area 5 Radioactive Waste Management Site (RWMS) at the NTS, will provide an approximately 20,000-cubic yard waste disposal capacity. The facility will be licensed by the Nevada Division of Environmental Protection (NDEP).

The siting and the design of the facility comply with U.S. Environmental Protection Agency (EPA) regulations in Title 40 Code of Federal Regulations (CFR) Part 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," which identifies the design and operating requirements for owners and operators that dispose of hazardous waste in landfills. The siting and design must also comply with the requirements of DOE O 435.1, as stated in DOE M 435.1, Chapter IV, "Low-Level Waste Requirements":

"Low-level waste determined to contain both source, special nuclear, and byproduct material subject to the *Atomic Energy Act of 1954*, as amended, and a hazardous component subject to the *Resource Conservation and Recovery Act* (RCRA), as amended, shall be managed in accordance with the requirements of RCRA and DOE O 435.1, *Radioactive Waste Management*, and this Manual."

DOE M 435.1 provides both siting and general design criteria, as well as specific waste management controls that shall be part of the radioactive waste management basis for disposal facilities: the performance assessment, composite analysis, disposal authorization statement, waste acceptance requirements, and closure and monitoring plan. These management controls are established for the Area 5 RWMS, and future performance assessments will include the proposed cell's inventory.

The site characteristics for the proposed facility are summarized in Section 2.0 of this report. Site selection and the conceptual engineering design for the facility are presented in Sections 3.0 and 4.0 of this report. In the subsequent sections of this report, the cost estimate and schedule, safeguards and security, and environmental safety and health are presented. The conceptual engineering design drawings are included as Appendix A of this report. The *National Environmental Policy Act* (NEPA) Environmental Evaluation Checklist is included as Appendix B of this report.

## 2.0 AREA 5 RWMS CHARACTERISTICS

The Area 5 Radioactive Waste Management Complex (RWMC) is a 732-acre (ac) site allocated for low-level waste (LLW) disposal in northern Frenchman Flat on the NTS. The Area 5 RWMS is the operationally active disposal area, located on approximately 144 ac in the southeast corner of the RWMC.

The NTS is a 1,375-square mile (mi<sup>2</sup>) DOE-operated, restricted-access facility currently used for hazardous chemical spill testing, emergency response training, non-nuclear weapons testing, radioactive waste management, and environmental technology studies. The NTS is surrounded on most of its boundaries and further isolated by U.S. government-controlled land used as a military gunnery range and a wildlife refuge.

The Area 5 RWMS accepts LLW generated by DOE operations and classified LLW generated by U.S. government agencies. Categories of waste currently accepted for disposal include classified and unclassified LLW and MW generated by the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) within the state of Nevada.

The NTS is located between the northern boundary of the Mojave Desert and the southern limits of the Great Basin Desert. This “transitional desert” is considered to be typical of either the dry mid-latitude or dry subtropical climatic zones. The climate is arid and characterized by low precipitation, a large diurnal temperature range, a large evaporation rate, and moderate to strong winds.

The Area 5 RWMS is located in one of the most arid and least populated regions of the U.S. Annual potential evapotranspiration is approximately 15 times annual precipitation. Approximate annual precipitation is 5 inches. Accumulation of chloride in the vadose zone indicates that percolation of rainwater below the root zone ceased at least 10,000 to 15,000 years ago. The saturated zone occurs more than 790 feet (ft) below the surface. The median travel time through the thick dry vadose zone is estimated to be greater than 50,000 years (Shott et al., 1998). Transport of contaminants to the uppermost aquifer is extremely unlikely under current climatic conditions. The arid conditions at the site have undoubtedly contributed to the low population density of the region, which is among the lowest in the U.S.

No permanent surface water is present within Frenchman Flat, with the exception of small artificial impoundments and Cane Spring, which issues from a perched aquifer recharged from infiltration through fractures in the nearby mountains. Cane Spring is approximately 9 miles (mi) southwest of the Area 5 RWMS. Alluvial fans within Frenchman Flat are cut by numerous arroyos that drain storm runoff to the playa. Water that accumulates on the playa typically evaporates or infiltrates, or both, within a short period of time. Frenchman Flat Playa is approximately 4 mi southeast of the Area 5 RWMS.

Flood analyses for the 25-year and 100-year storm events have been conducted for the Area 5 RWMS (Shott et al., 1998). Although the southwest corner of the Area 5 RWMS is within the 100-year floodplain, most of the 92-Acre Area is outside the floodplain delineation. Disposal units within the Area 5 RWMS are protected from offsite flooding events by a RCRA-compliant berm and channel system capable of conveying flood flows from a 25-year, 24-hour storm event.

### 3.0 SITE SELECTION

Three locations within the Area 5 RWMC were screened (the North, East, and South sites) for siting the new RCRA cell. The locations were screened against the location standards presented in 40 CFR 264.18 as well as the following criteria:

- Site within or outside the existing 25-year, 24-hour flood berm
- Proximity to power
- Availability of adjacent land for future expansion
- Impacts to existing facilities/operations

The East site is near power and within the flood berm. However, it is outside the designated nuclear facility boundary. Changing these boundaries to include the East site was determined to be cost prohibitive. The South site is within the flood berm and near existing power. The South site was excluded, however, due to its relatively small area that would not allow for expansion of the facility. The North site was selected as the proposed site for its large available area within the flood berm and its relatively close proximity to power. Area 5 RWMS operations personnel were included in the screening process and also conducted a site walk-down of the proposed areas.

The site selection criteria for a RCRA hazardous disposal facility are presented in 40 CFR 264.18, "Location Standards." The considerations for site selection include the following:

- Seismic considerations
- Floodplains
- Salt dome formations, salt bed formations, underground mines, and caves

The 1998 Area 5 RWMS Performance Assessment concluded that seismic activity was not a significant concern for the Area 5 RWMS (Shott et al., 1998). This judgment was based on the following:

- Maximum predicted magnitudes and peak accelerations for seismicity are not significant concerns for the engineered structures (unlined pits and trenches in alluvium with a monolayer soil cover) used for shallow-land disposal of LLW.
- The return periods for large-magnitude earthquakes (> 5.8 magnitude) are long and exceed 10,000 years (infrequent events relative to 1,000-year compliance period).
- There is no surface evidence of recent faulting in the vicinity of the Area 5 RWMS.
- There is a low likelihood of a future seismic event centered at the facility.
- It is unlikely that the facility will be compromised by future seismic activity.

The 100-year flood zone delineation map for the Area 5 RWMS (Shott et al., 1998), developed using methods used by the Federal Emergency Management Agency (FEMA) as stipulated in 40 CFR 270.14, shows that the candidate site for the new RCRA cell is in FEMA Zone X. This is outside the 100-year flood hazard zone.

The last criteria of 40 CFR 264.18 is not relevant since the site is located over a thick zone of alluvium underlying all of Area 5 RWMC.

Therefore, it is concluded that the site selected for the new RCRA cell meets the siting criteria of 40 CFR 264.18.

The siting requirements under DOE M 435.1 are similar to criteria of 40 CFR 264.18 for flood plains, tectonically active areas, or zones of water table fluctuation. In addition, DOE M 435.1 also requires selecting locations where radionuclide migration pathways are predictable and erosion and surface runoff can be controlled. As stated in DOE M 435.1, Chapter IV, the general siting criterion addresses long-term stability and maintenance: “low-level waste disposal facilities shall be sited to achieve long-term stability and to minimize, to the extent practical, the need for active maintenance following final closure.” These requirements are met in that the proposed cell will be located in a currently operating LLW facility at the NTS, the Area 5 RWMS.

## 4.0 CONCEPTUAL ENGINEERING DESIGN

The proposed conceptual design satisfies both the prescriptive design standards for hazardous waste disposal under RCRA and the general design criteria for LLW disposal under DOE M 435.1.

RCRA regulations in 40 CFR 264 (subparts 264.300 to 264.317 inclusive) identify design and operating requirements. These regulations involve requirements for the installation of two or more liners and a leachate collection and removal system (LCRS) as well as a leachate detection system (LDS) above and between the liners to protect human health and the environment. Likewise, Nevada Administrative Code (NAC) 444 adopts and implements EPA's RCRA regulations in the state of Nevada. NDEP reviews and approves RCRA permits in Nevada.

DOE M 435.1, Chapter IV, also provides general design criteria for LLW disposal facility design. These design criteria address, at a minimum, confinement, stability, and control of water. Chapter IV states the following:

- **Confinement:** LLW systems and components shall be designed to maintain waste confinement.
- **Stability:** LLW disposal facilities shall be designed to achieve long-term stability and to minimize to the extent practical the need for active maintenance following final closure.
- **Control of Water:** LLW disposal facilities shall be designed to minimize to the extent practical the contact of waste with water during and after disposal.

DOE M 435.1 does not prescribe design criteria; rather, the protection of public health and safety are achieved when the proposed disposal facility meets the prescribed performance objectives for a compliance period of 1,000 years, as demonstrated in the performance assessment and composite analysis of the facility, and in the closure and monitoring plan. To achieve the same end result, that of protection of public health and safety, RCRA relies on a prescribed design for the facility and the closure cover and post-closure monitoring for a 30-year period.

In this section, the proposed conceptual design for the new RCRA cell in the Area 5 RWMS is evaluated for the prescriptive design criteria under RCRA. It is demonstrated that the proposed conceptual design of the proposed MW cell is fully compliant with the requirements under EPA's RCRA regulations in 40 CFR 264 as well as the requirements in NAC 444, which adopts those of RCRA.

### 4.1 CONCEPTUAL DESIGN CONCEPT

The design concept is based on NDEP-approved landfill designs at the hazardous waste facility operated by the U.S. Ecology Nevada Inc. (USEN) in Beatty, Nevada. Beatty is approximately 60 mi east of the Area 5 RWMS, located in a similar hydrogeologic and climatic setting.

Under NDEP permit NEV HW0019, USEPA ID#NVT330010000, USEN's Beatty facility has three Subtitle C landfills. These consist of Trench 10 (closed), Trench 11 (existing operating

trench), and Trench 12 (under construction), with a combined design capacity of 4.01 million cubic yards (AquAeTer Inc., 2007).

The Area 5 RWMS RCRA cell design is adopted from the final design for USEN’s Trench 12, which has a total capacity of 1.65 million cubic yards. Trench 12 has a footprint of 11.2 ac. The trench is approximately 1,350 ft long with a width varying from 225 ft to 430 ft. The trench will extend 75 ft below the ground surface at 0.5:1.0 (horizontal to vertical) slopes, and upon completion will rise 75 ft above the original ground surface.

In contrast, the proposed new cell at the Area 5 RWMS will have an approximate capacity of 20,000 cubic yards, with trench base dimensions of 150 ft by 300 ft, and a depth of approximately 20 ft below the ground surface.

The typical base liner system of USEN’s Trench 12 and the Area 5 RWMS RCRA cell are compared in Table 4-1 below.

**Table 4-1 Liner Characteristics**

Layers from Working Surface Down	USEN’s Trench 12	Area 5 RWMS RCRA Cell
Operations layer	30-inch alluvium	12 inches modified Type II aggregate underlain by 6 inches of sand bedding
LCRS	Double-sided geocomposite	Geotextile/geonet
Liner	80 mil high density polyethylene (HDPE) geomembrane	80 mil HDPE geomembrane
LDS	Double-sided geocomposite	Geotextile/geonet
Liner	60 mil HDPE geomembrane	60 mil HDPE geomembrane
Subgrade	Geosynthetic clay liner (GCL) above 9-inch prepared subgrade	GCL above 9-inch prepared subgrade

**4.2 DESIGN DRAWINGS**

The following design drawings for the conceptual design of the Area 5 RWMS RCRA cell are included in Appendix A:

- Document Transmittal Sheet
- Document No. 08105-SPC-C01: Outline Specifications
- Document No. 08105-G-0001: Title Sheet
- Document No. 08105-C-1002: Overall Location Maps
- Document No. 08105-C-1003: Proposed Site Plan
- Document No. 08105-C-3001: Typical Sections and Details

### 4.3 ANALYSIS OF THE CONCEPTUAL DESIGN

Subparts 264.301 through 264.317 of 40 CFR 264 Subpart N, “Landfills,” are listed below:

- § 264.301 Design and operating requirements
- § 264.302 Action leakage rate
- § 264.303 Monitoring and inspection
- § 264.304 Response actions
- § 264.309 Surveying and recordkeeping
- § 264.310 Closure and post-closure care
- § 264.312 Special requirements for ignitable or reactive waste
- § 264.313 Special requirements for incompatible wastes
- § 264.314 Special requirements for bulk and containerized liquids
- § 264.315 Special requirements for containers
- § 264.316 Disposal of small containers of hazardous waste in overpacked drums (lab packs)
- § 264.317 Special requirements for hazardous wastes FO20, FO21, FO22, FO23, FO26, and FO27

The proposed conceptual design is discussed in terms of the criteria of 40 CFR 264.301. The final design and permit application will thoroughly address all requirements. The design and operating requirements in 40 CFR 264.301 include the following:

- (a) Specification for the liner system, including materials for liners, subbase for the liner to provide support for the liner, LCRS, LDS, sumps with dedicated pumps
- (b) Exemptions from (a) subject to approval of the Regional Administrator
- (c) Requirements for two or more liners, and leachate collection and removal systems for facilities built or expanded past July 1992
- (d) Alternative design and operating practices, subject to approval by the Regional Administrator
- (e) Waiver from double liner requirements of (c) subject to approval by the Regional Administrator
- (f) Exemptions from (c) for any replacement landfills
- (g) Requirement to design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 25-year storm
- (h) Requirement to design, construct, operate, and maintain a runoff management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm
- (i) Collection and holding facilities (e.g., tanks or basins) associated with run-on and runoff control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system

- (j) If the landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the landfill to control wind dispersal
- (k) The Regional Administrator will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this section are satisfied

The proposed conceptual design is fully compliant with 264.301 (a) and (c). The final design and the permit application for the new cell will address compliance with all relevant and applicable requirements listed above.

The proposed site plan on Drawing 08105-C-1003 shows the trench cut into the alluvium with a base 150 ft wide and 300 ft long and a minimum working surface depth of 20 ft. The approach ramp to the trench is on an 8-percent slope, and the trench bottom is sloped at 2 percent. The side slopes of the trench will be 3:1 (horizontal: vertical). A leachate collection holding tank is placed west of the cell, which is connected through piping to the LCRS and LDS sumps.

The site plan shows the security fence around the cell and the 20-ft wide access road to the cell. The existing flood control berm north of the cell provides the necessary run-on protection from a 25-year, 24-hour storm, built for RCRA compliance of the Pit 3 MW unit currently operating under an interim status.

Drawing 08105-C-3001 shows profile cross sections of the trench with a double liner system, which covers the trench base and side walls and is anchored into a trench around the cell periphery, as required under 40 CFR 264.301. A minimum of 12-inch thick modified aggregate underlain by a 6-inch thick sand layer will provide the working surface for the trench. Below that lies a layer of geotextile/geonet to serve as the LCRS, sloped 2 percent towards a primary sump with a dedicated sump pump. Per 40 CFR 264.301, the slope is greater than 1 percent, and the geotextile/geonet will provide a transmissivity of  $3 \times 10^{-5}$  square meters per second or more. As required under 40 CFR 264.301 (a) (2), the final design and operating conditions in the permit will ensure that the leachate depth over the liner does not exceed 1 ft. An 80-mil high density polyethylene (HDPE) geomembrane serves as the top liner. The top liner will prevent the migration of hazardous constituents into the liner during the active life and post-closure care period. Below the top liner is a layer of geotextile/geonet, which serves as the LDS. A secondary liner made up of 60-mil HDPE will be placed below the LDS. Below the secondary liner will be a geosynthetic clay liner (GCL), placed over the excavated and backfilled trench bottom, serving as the base. As required by 40 CFR 264.301, this base would be capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent liner failure due to settlement, compression, or uplift.

The design provides for two sumps for the LCRS and the LDS, with dedicated sump pumps, which will operate automatically when the level of leachate exceeds prescribed settings in order to avoid leachate depths exceeding allowable levels. The sump pumps will direct the leachate to holding tanks installed at ground level next to the cell, through riser pipes. The flow capacities of the LCRS and LDS and the holding tanks will be determined in the final design through water-budget calculations assuming a 25-year, 24-hour storm event.

## 5.0 COST ESTIMATE AND SCHEDULE

A rough order of magnitude (ROM) cost estimate ranges from \$8,500,000 to \$12,600,000. The costs are for design and construction of the new disposal cell only. Operating costs and costs for closure of the cell after operation is completed are not included in this estimate.

The cost breakdown for the 4-year planning period is shown in Table 5-1.

**Table 5-1 Cost Breakdown**

Fiscal Year (FY)	2008	2009	2010	2011
ROM estimate	\$66,528	\$3,433,472	\$7,000,000	\$1,800,000

The current target dates for major project milestones are shown in Table 5-2.

**Table 5-2 Project Schedule**

Activity	Target Date	Fiscal Year
Critical Decision 0, Approve Mission Need	February 2009	FY2009
Critical Decision 1, Alternative Selection and Cost Range	February 2009	FY2009
Receive permit approval	May 2010	FY2010
Critical Decision 2/3, Approve Performance Baseline and Construction	May 2010	FY2010
Complete cell construction	December 2010	FY2011
Critical Decision 4, Start of Operations	January 2011	FY2011

## **6.0 SAFEGUARDS AND SECURITY**

A security assessment has been completed for the Area 5 RWMC. A security plan is in the process of being finalized. The assessment and plan contain Official Use Only material and are therefore not included in this report. These documents can be obtained by contacting NNSA/NSO Safeguards and Security.

## **7.0 ENVIRONMENTAL SAFETY AND HEALTH**

### **7.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) ACTIONS**

The location of the proposed facility is within the existing Area 5 RWMC. This site is within a Hazard Category 2 nuclear facility.

A NEPA Environmental Evaluation Checklist has been completed to address waste disposal operations and encompasses the proposed project. The completed checklist is included as Appendix B of this report.

### **7.2 SAFETY AND HEALTH PLAN**

A preliminary screening level analysis indicates that the addition of the facility would not involve a Major Modification to the Area 5 RWMC; therefore, a Preliminary Documented Safety Analysis is not required. The addition of the new facility will be reflected in the annual updates of the existing Documented Safety Analysis/Technical Safety Requirements for the Area 5 RWMC.

## 8.0 REFERENCES

AquAeTer Inc., 2007. Supplement Landfill Report for Trench 12, prepared for U.S. Ecology Nevada Inc. October 2007.

Shott, G. J., L. E. Barker, S. E. Rawlinson, M. J. Sully, and B. A. Moore, 1998. *Performance Assessment for the Area 5 Radioactive Waste Management Site at the Nevada Test Site, Nye County, Nevada*. Revision 2.1. DOE/NV/11718--176. June 1998.

**APPENDIX A**

**Conceptual Engineering Design Drawings**

Document Transmittal Sheet

Document No. 08105-SPC-C01: Outline Specifications

Document No. 08105-G-0001: Title Sheet

Document No. 08105-C-1002: Overall Location Maps

Document No. 08105-C-1003: Proposed Site Plan

Document No. 08105-C-3001: Typical Sections and Details

# NEVADA TEST SITE

## CONCEPTUAL OUTLINE SPECIFICATION

Project No. 08105

Document No. 08105-SPC-C01

QG-3

### RCRA Area 5 CD0/1 Exhibits

Revision B

Derivative Classifier: V Sel., NSTec Date: 9-24-08

Preparer: \_\_\_\_\_ Date: \_\_\_\_\_ Checker: \_\_\_\_\_ Date: \_\_\_\_\_

Preparer: \_\_\_\_\_ Date: \_\_\_\_\_ Checker: \_\_\_\_\_ Date: \_\_\_\_\_

Preparer: \_\_\_\_\_ Date: \_\_\_\_\_ Checker: \_\_\_\_\_ Date: \_\_\_\_\_

Project Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

## CONCEPTUAL OUTLINE SPECIFICATION

SECTION 013300	SUBMITTAL PROCEDURES
SECTION 014000	QUALITY REQUIREMENTS
SECTION 014200	REFERENCES
SECTION 015713	TEMPORARY EROSION AND SEDIMENT CONTROL
SECTION 016000	PRODUCT REQUIREMENTS
SECTION 017500	STARTUP AND TURNOVER ACCEPTANCE
SECTION 017700	CLOSEOUT PROCEDURES
SECTION 017823	OPERATION AND MAINTENANCE DATA
SECTION 017839	PROJECT RECORD DOCUMENTS
SECTION 017900	DEMONSTRATION AND TRAINING
SECTION 311000	SITE CLEARING
SECTION 312000	EARTH MOVING
SECTION 313526.13	CLAY CONTAINMENT BARRIERS
SECTION 313526.16	GEOMEMBRANE CONTAINMENT BARRIERS
SECTION 334616	SUBDRAINAGE PIPING
SECTION 334623.16	GRAVEL DRAINAGE LAYERS
SECTION 334623.19	GEOSYNTHETIC DRAINAGE LAYERS
SECTION 334626	GEOTEXTILE SUBSURFACE DRAINAGE FILTRATION

# NATIONAL NUCLEAR SECURITY ADMINISTRATION

NEVADA SITE OFFICE

LAS VEGAS, NEVADA

# RADIOACTIVE WASTE MANAGEMENT SITE AREA 5 NEW DISPOSAL CELL CONCEPTUAL DESIGN

## SCOPE OF WORK

THE PURPOSE OF THIS PROJECT IS TO ASSIST THE ENVIRONMENTAL MANAGEMENT DIRECTORATE (EMD) WITH DEVELOPMENT OF NECESSARY CIVIL ENGINEERING EXHIBITS FOR INCLUSION IN THE CD-0/1 SUBMITTAL FOR A NEW RCRA CELL IN AREA 5.

THE NEW CELL WILL HAVE BOTTOM DIMENSIONS OF 150' X 300'. THE CELL WILL BE DOUBLE LINED AND INCLUDE A LEACHATE COLLECTION AND REMOVAL SYSTEM. LEACHATE COLLECTED IN THE PRIMARY AND SECONDARY SUMP PITS WILL BE PUMPED TO THE SURFACE AND STORED IN A RCRA COMPLIANT TANK.

## GENERAL NOTES

- "DO NOT SCALE DRAWINGS". DIMENSIONS AND COORDINATES SHOWN ON DRAWINGS SHALL TAKE PRECEDENCE.

## DRAWING INDEX

DRAWING NUMBER	DRAWING TITLE
<b>TITLE</b>	
08105-G-0001 REV B	TITLE SHEET
<b>CIVIL</b>	
08105-C-1002 REV B	OVERALL LOCATION MAPS
08105-C-1003 REV B	PROPOSED SITE PLAN
08105-C-3001 REV B	TYPICAL SECTIONS AND DETAILS

Reviewed and determined to be UNCLASSIFIED.  
This review does not constitute clearance  
for public release.

Derivative Classifier: V SAU, NStec  
(Name/Organization)

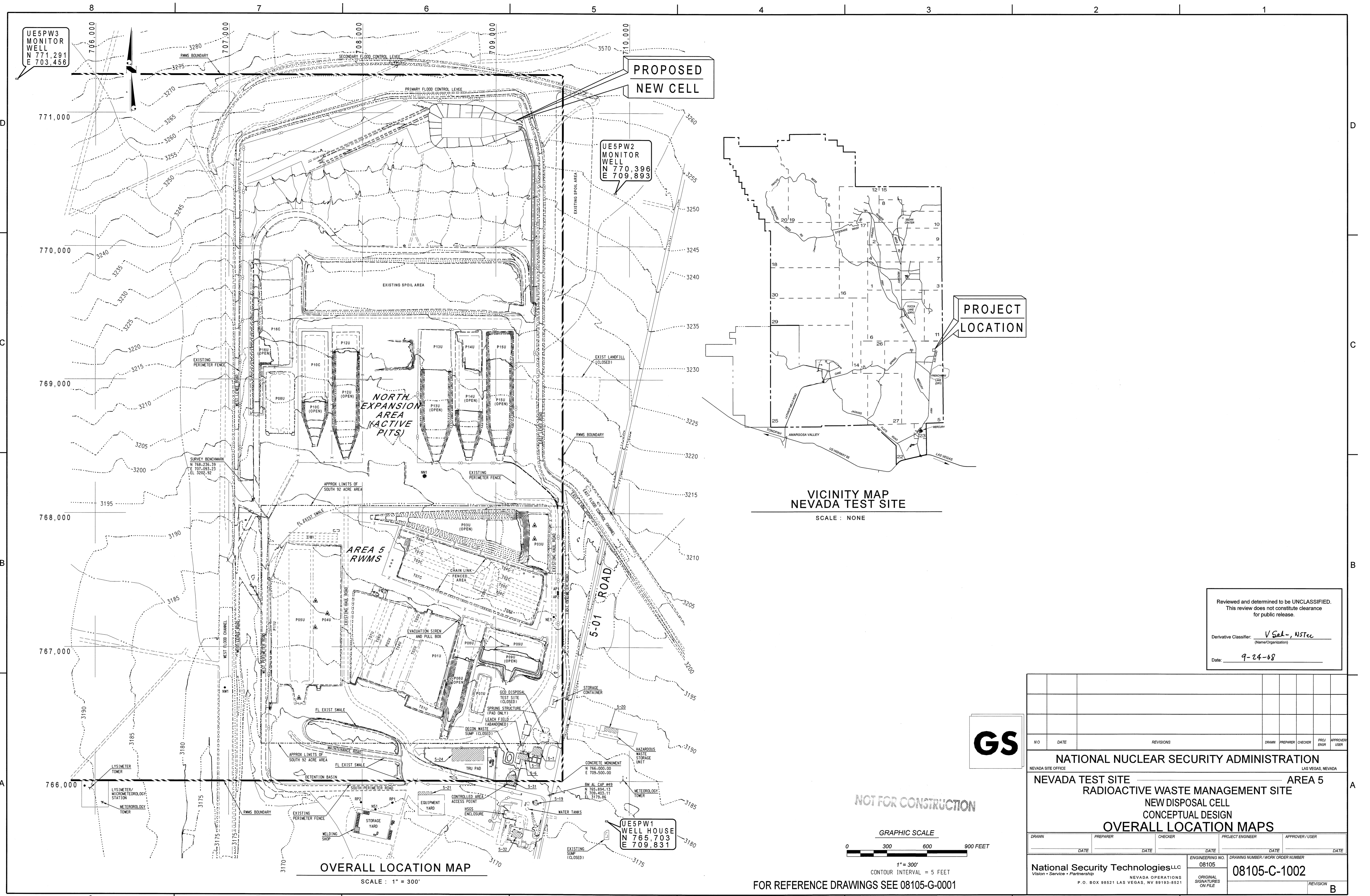
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INFORMATION SHOWN ON THE DRAWINGS.

NO		DATE		REVISIONS		DRAWN	PREPARED	CHECKED	PROJECT ENGINEER	APPROVED/USER
<p align="center"><b>NATIONAL NUCLEAR SECURITY ADMINISTRATION</b> NEVADA SITE OFFICE LAS VEGAS, NEVADA</p> <p align="center"><b>NEVADA TEST SITE AREA 5</b> <b>RADIOACTIVE WASTE MANAGEMENT SITE</b> <b>NEW DISPOSAL CELL</b> <b>CONCEPTUAL DESIGN</b> <b>TITLE SHEET</b></p>										
DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
<p><b>National Security Technologies LLC</b> Vision • Service • Partnership NEVADA OPERATIONS P.O. BOX 98521 LAS VEGAS, NV 89193-8521</p>						ENGINEERING NO. 08105	DRAWING NUMBER / WORK ORDER NUMBER <b>08105-G-0001</b>		REVISION <b>B</b>	

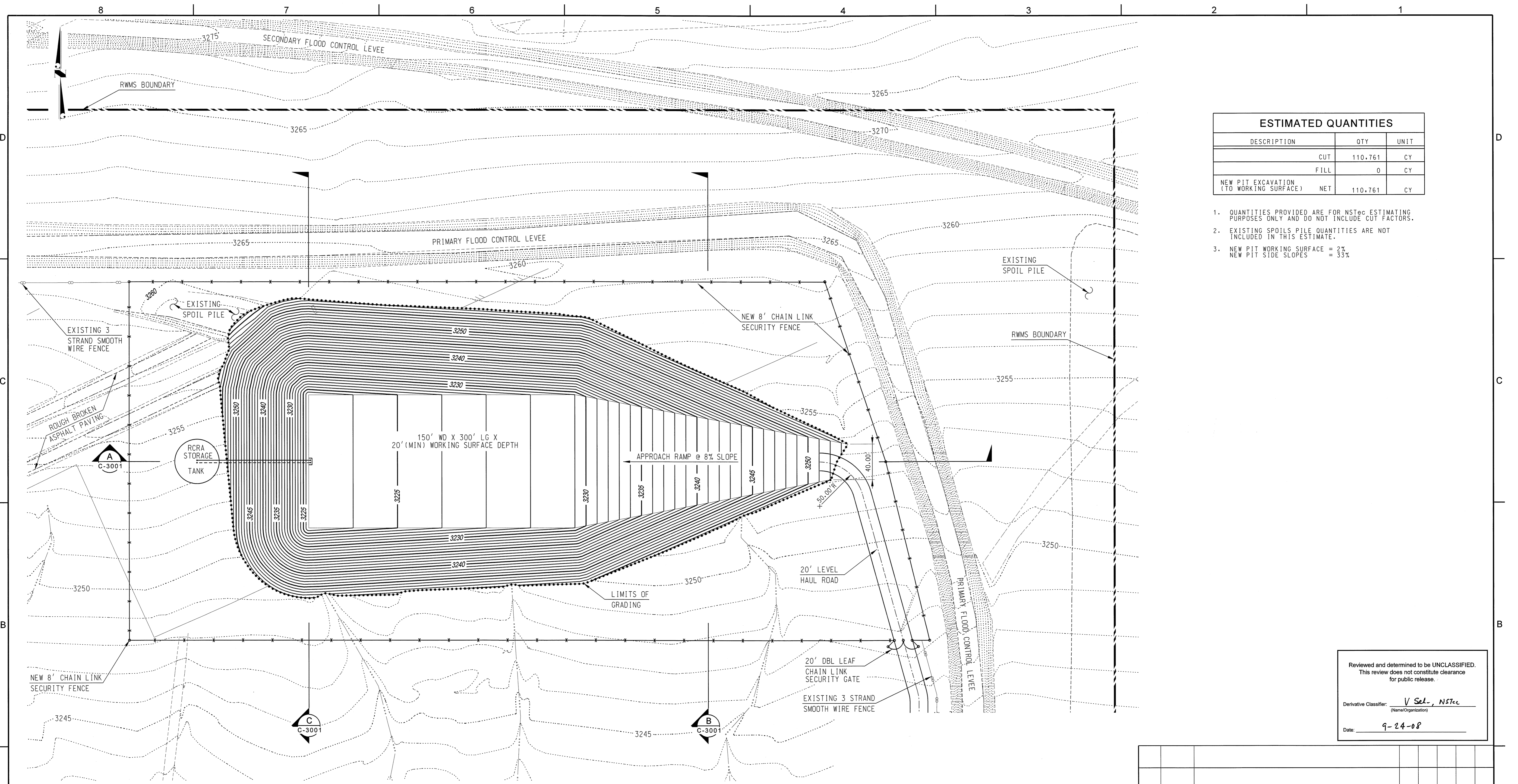


Reviewed and determined to be UNCLASSIFIED.  
This review does not constitute clearance  
for public release.

Derivative Classifier: V Sel., NSTec  
(Name/Organization)

Date: 9-24-08

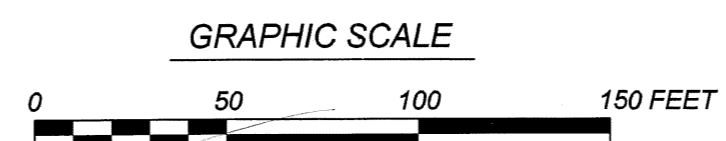
NO		DATE	REVISIONS	DRAWN	PREPARED	CHECKED	PROJ. ENGR.	APPROVED
<b>NATIONAL NUCLEAR SECURITY ADMINISTRATION</b>								
NEVADA TEST SITE <span style="float: right;">AREA 5</span>								
RADIOACTIVE WASTE MANAGEMENT SITE								
NEW DISPOSAL CELL								
CONCEPTUAL DESIGN								
<b>OVERALL LOCATION MAPS</b>								
DRAWN	PREPARED	CHECKED	PROJECT ENGINEER	APPROVER / USER				
National Security Technologies LLC Vision • Service • Partnership			ENGINEERING NO. 08105	DRAWING NUMBER / WORK ORDER NUMBER 08105-C-1002				
NEVADA OPERATIONS P.O. BOX 98521 LAS VEGAS, NV 89193-8521			ORIGINAL SIGNATURES DWG FILE	REVISION				



**PROPOSED SITE PLAN**

SCALE : 1" = 50'

**NOT FOR CONSTRUCTION**



1" = 50'  
CONTOUR INTERVAL = 1'  
FOR REFERENCE DRAWINGS SEE 08105-G-0001

ESTIMATED QUANTITIES			
DESCRIPTION	QTY	UNIT	
CUT	110.761	CY	
FILL	0	CY	
NEW PIT EXCAVATION (TO WORKING SURFACE)	NET 110.761	CY	

1. QUANTITIES PROVIDED ARE FOR NStec ESTIMATING PURPOSES ONLY AND DO NOT INCLUDE CUT FACTORS.
2. EXISTING SPOILS PILE QUANTITIES ARE NOT INCLUDED IN THIS ESTIMATE.
3. NEW PIT WORKING SURFACE = 2%  
NEW PIT SIDE SLOPES = 33%

Reviewed and determined to be UNCLASSIFIED.  
This review does not constitute clearance for public release.

Derivative Classifier: V Sel., NStec  
(Name/Organization)

Date: 9-24-08

NO	DATE	REVISIONS	DRAWN	PREPARED	CHECKER	PROJ ENGR	APPROVER / USER

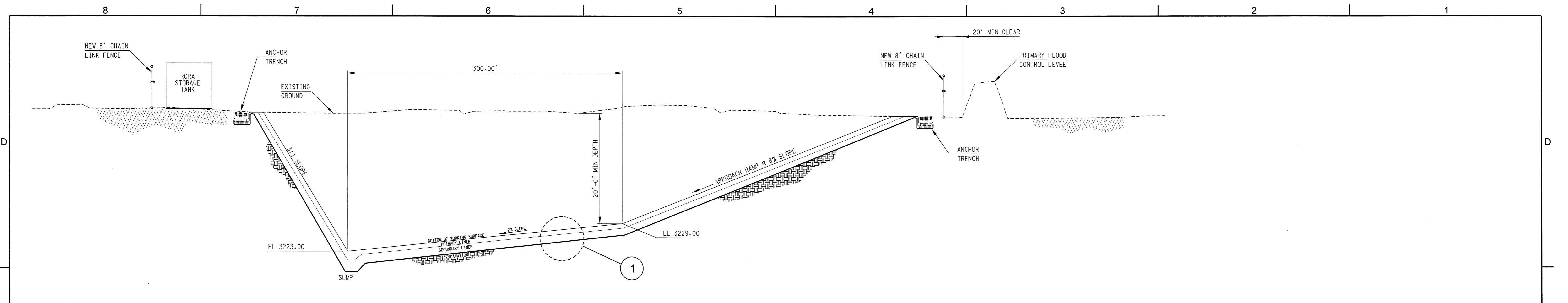
**NATIONAL NUCLEAR SECURITY ADMINISTRATION**  
NEVADA TEST SITE AREA 5  
RADIOACTIVE WASTE MANAGEMENT SITE  
NEW DISPOSAL CELL  
CONCEPTUAL DESIGN  
**PROPOSED SITE PLAN**

DRAWN	PREPARED	CHECKER	PROJECT ENGINEER	APPROVER / USER

ENGINEERING NO. **08105** DRAWING NUMBER / WORK ORDER NUMBER **08105-C-1003**

**National Security Technologies LLC**  
Vision • Service • Partnership  
NEVADA OPERATIONS  
P.O. BOX 98521 LAS VEGAS, NV 89193-8521

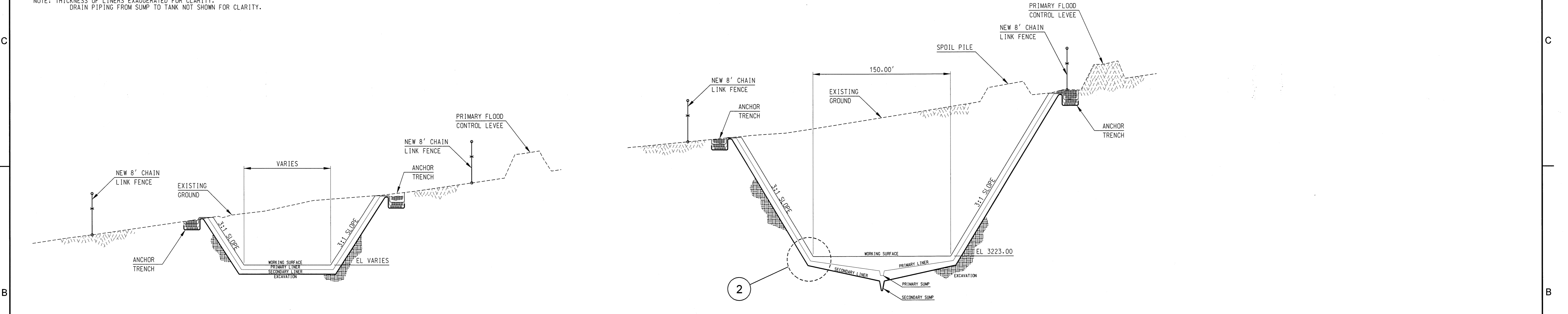
ORIGINAL SIGNATURES ON FILE



**SECTION @ CL PIT (LOOKING NORTH)**

SCALE: 1"=50' HORIZ. - 1"=10' VERT.  
 NOTE: THICKNESS OF LINERS EXAGGERATED FOR CLARITY.  
 DRAIN PIPING FROM SUMP TO TANK NOT SHOWN FOR CLARITY.

**A**



**SECTION @ RAMP (LOOKING WEST)**

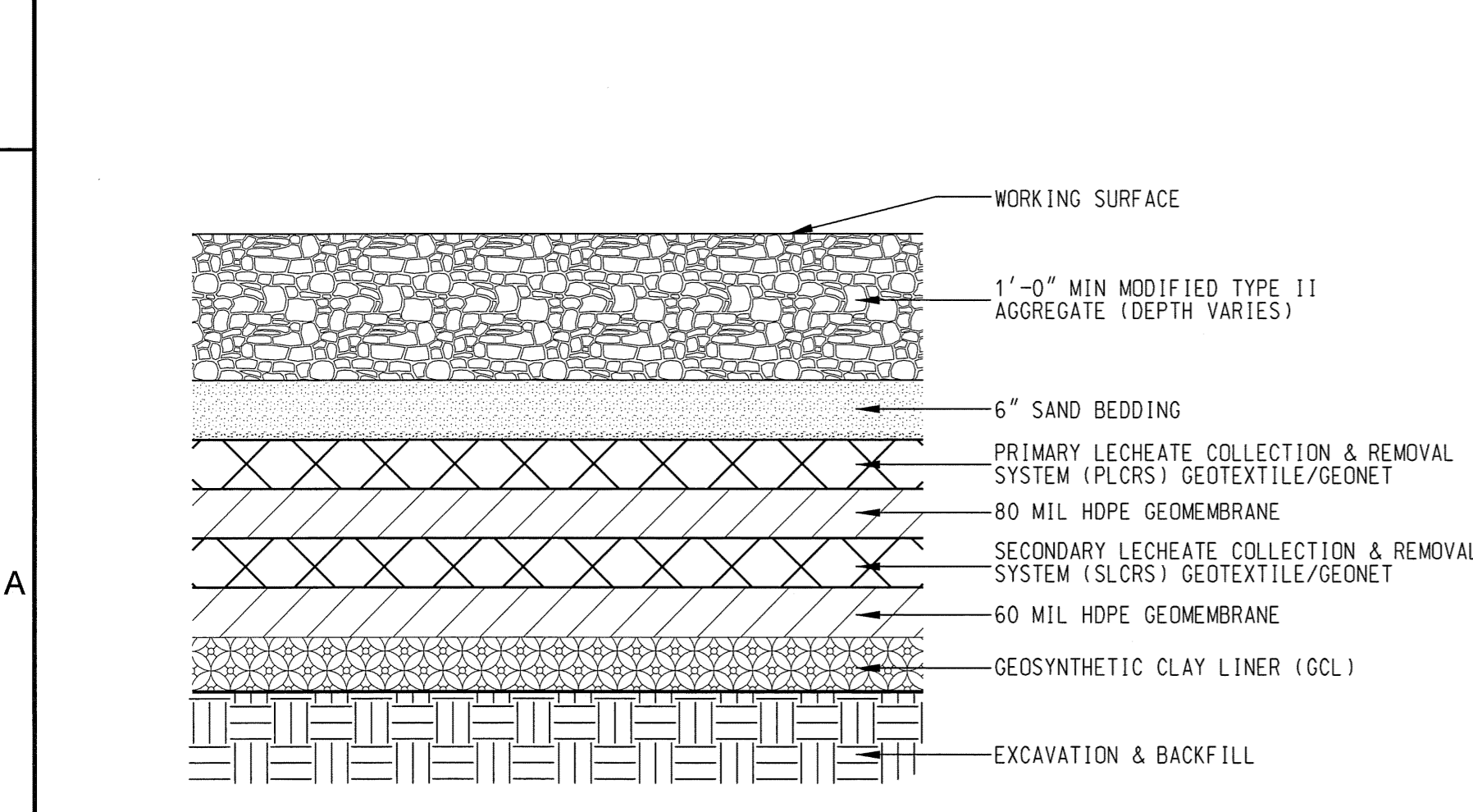
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 NOTE: THICKNESS OF LINERS EXAGGERATED FOR CLARITY.

**B**

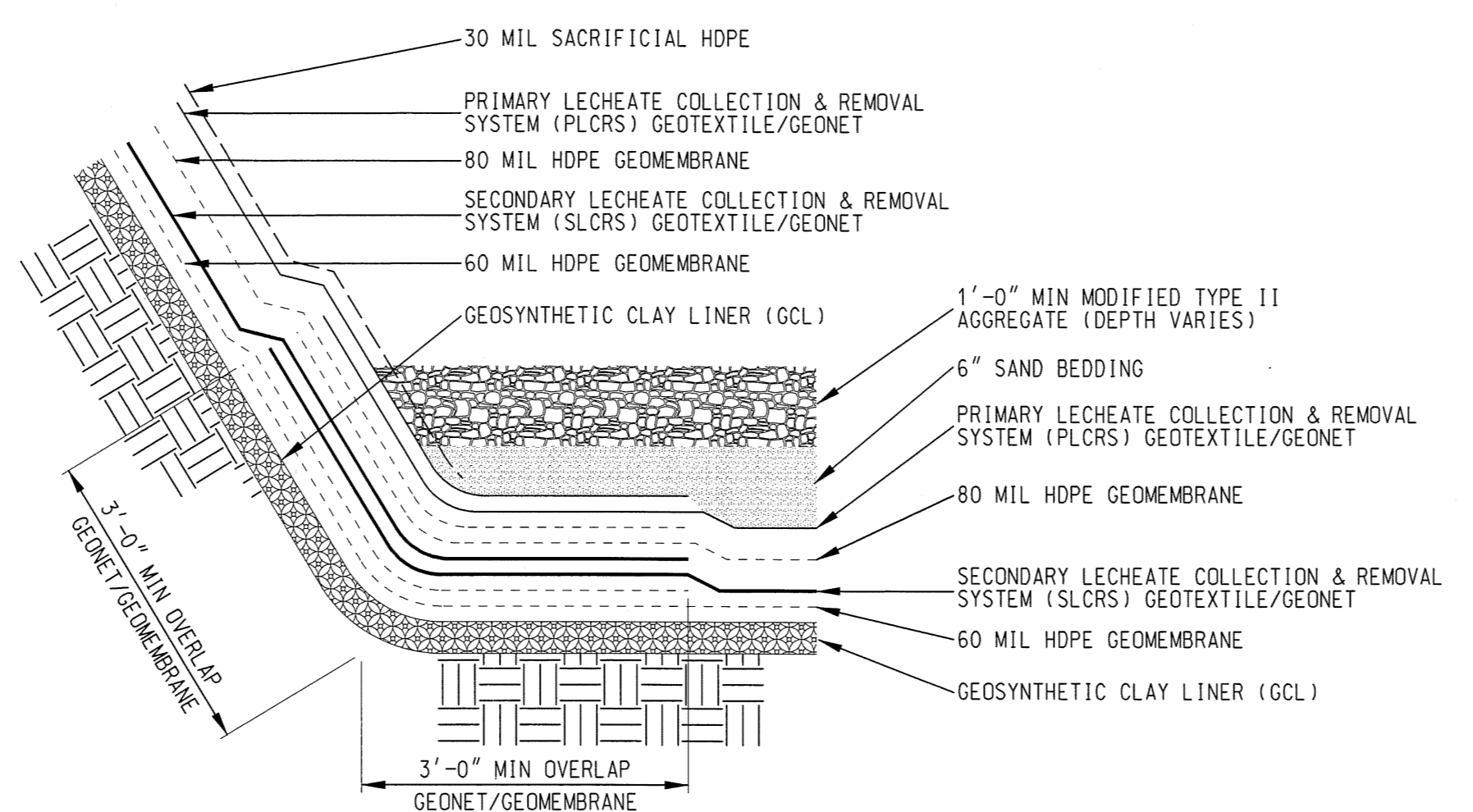
**SECTION @ SUMP (LOOKING WEST)**

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 NOTE: THICKNESS OF LINERS EXAGGERATED FOR CLARITY.

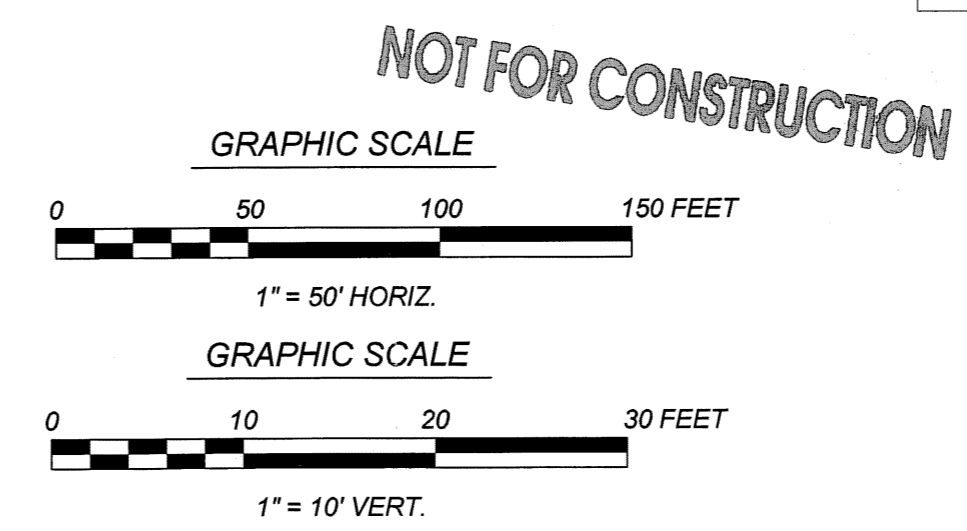
**C**



**DETAIL 1**  
 SCALE: NONE



**DETAIL 2**  
 SCALE: NONE



Reviewed and determined to be UNCLASSIFIED.  
 This review does not constitute clearance  
 for public release.  
 Derivative Classifier: V Sel., NSTec  
 (Name/Organization)  
 Date: 9-24-08

NO.		DATE		REVISIONS		DRAWN		PREPARED		CHECKED		PROJECT ENGINEER		APPROVED / USER	
<b>NATIONAL NUCLEAR SECURITY ADMINISTRATION</b> NEVADA TEST SITE AREA 5 RADIOACTIVE WASTE MANAGEMENT SITE NEW DISPOSAL CELL CONCEPTUAL DESIGN <b>TYPICAL SECTIONS AND DETAILS</b>															
National Security Technologies LLC NEVADA OPERATIONS P.O. BOX 98521 LAS VEGAS, NV 89193-8521															
ENGINEERING NO. 08105 DRAWING NUMBER / WORK ORDER NUMBER 08105-C-3001												ORIGINAL SIGNATURES ON FILE			

**APPENDIX B**

**NEPA Environmental Evaluation Checklist**

**U.S. DEPARTMENT OF ENERGY  
NATIONAL NUCLEAR SECURITY ADMINISTRATION NEVADA SITE OFFICE  
NEPA ENVIRONMENTAL EVALUATION CHECKLIST**

<b>FOLLOW ATTACHED PROCEDURES FOR COMPLETING CHECKLIST</b>	Date 10/31/06
A. Project/Activity Title (Attach a brief description of proposed project) <b>Operation of Area 5 Radioactive Waste Management Complex (RWMC) &amp; Completion of TRU Project Activities</b>	Anticipated Start Date <b>Ongoing</b>

Project Location Area 5 RWMC	Proposed By (if other than NNSA/NSO)
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NNSA/NSO Line Management Organization <b>EM/Waste Management</b>	NNSA/NSO Project/Program Manager <b>Jhon Carilli</b>
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**ENVIRONMENTAL CONSIDERATIONS:** If any phase of the project/activity involves any of the following considerations, check yes and explain in project description. See NV-16A for consideration guidelines and examples.

CONSIDERATION	YES	NO	UNK	CONSIDERATION	YES	NO	UNK
<b>WASTE</b>				<b>AIR EMISSIONS</b>			
1 Non-Rad Solid Waste	<b>X</b>			1 Biological Material/Chemical Release		<b>X</b>	
2 Hazardous Waste	<b>X</b>			2 Dust/Particulate Matter	<b>X</b>		
3 Low-level Rad Waste	<b>X</b>			3 Explosives		<b>X</b>	
4 Mixed Waste	<b>X</b>			4 Diesel Generators	<b>X</b>		
5 TRU/Mixed TRU Waste	<b>X</b>			5 Open Burning		<b>X</b>	
6 Wastewater (domestic/industrial)	<b>X</b>						
				<b>SITE LOCATION/OTHER</b>			
<b>HAZARDOUS MATERIALS</b>				1 Environmental Restoration Site (CAU)	<b>X</b>		
1 Petroleum/Fuel (storage/use)	<b>X</b>			2 Excavation/Land Surface Disturbance	<b>X</b>		
2 Underground Storage Tanks		<b>X</b>		3 Off road travel		<b>X</b>	
3 Aboveground Storage Tanks	<b>X</b>			4 Biological/Tortoise Resource Area	<b>X</b>		
4 PCB's/Asbestos	<b>X</b>			5 Cultural/Historic Resource Area		<b>X</b>	
5 Pesticides/Herbicides	<b>X</b>			6 Change in Existing Drainage Pattern	<b>X</b>		
6 Radioactive Materials	<b>X</b>			7 Impact to Environmental Monitoring System		<b>X</b>	
7 Biological Materials/Simulants		<b>X</b>		8 Unexploded Ordnance Area		<b>X</b>	
8 Beryllium	<b>X</b>			9 Noise	<b>X</b>		
9 Chemical storage/use		<b>X</b>		10 Radiation controlled area	<b>X</b>		
10 Use of explosives/firearms	<b>X</b>			11 Drinking water system involvement	<b>X</b>		

**DO NOT TYPE OR WRITE BELOW THIS LINE. FOR ESHD USE ONLY.**

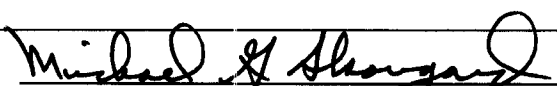
B. Is the project/activity included in the final NTS EIS and the ROD or other NEPA document?  
 Yes  (complete Sections C, D, and E) No  (complete Sections D, E, and F)

C. This project/activity is included in the NTS EIS/ROD (or other NEPA document) under the following section and page no.:  
 NTS EIS, section 3.1.3.2, Waste Management Program Under Alternative 3, pp. 3-9 to 3-12.

D. Does the proposed project/activity require any local, state, or federal permits or notifications? Yes  No

E. If, based on the project description and the preliminary environmental considerations noted above, the proposed action fits within a class of action listed in Subpart D of 10 CFR 1021, write in the space below, the paragraph number and short title from the appropriate table of contents of Subpart D, Appendix B, C, or D, for a CX, EA, or EIS. If the proposed action does not fit within any class of action, write "Not Listed" below.

**F. NEPA COMPLIANCE OFFICER DETERMINATION OR RECOMMENDATION:**  
 I have determined that the impacts of the proposed action, described in item A, are adequately addressed in the NTS EIS. No further analysis or documentation is required pursuant to NEPA.

 NNSA/NSO NEPA Compliance Officer	01 November 2006 Date
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## Project Description

The Area 5 Radioactive Waste Management Complex (A5 RWMC) is the primary disposal site for low level radioactive waste (LLW), low level radioactive mixed waste (LLMW) and the storage of low level radioactive classified (waste) materials. Small volumes of radioactive asbestos containing materials and PCBs are also disposed. The complex has been in operation since 1961. All waste received for disposal including classified materials at the Area 5 RWMC must meet the current NTS Waste Acceptance Criteria. In addition to various closed and operating disposal pits, the facility has a real-time radiography (RTR) unit in Building 5-6 used as needed to inspect MLLW shipments received from off-site generators. The S02C area stores classified TRU materials. Various types of heavy equipment, such as forklifts and front-end loaders, are used to move, stack and cover waste containers.

The Transuranic (TRU) Project is completing work on legacy TRU/Mixed TRU waste currently stored at the facility. Work involves visual examination, characterization, repackaging, and transport off site of the remaining TRU waste inventory. Waste is stored on the TRU Pad and the TRU Pad Covered Storage Building. The project may generate other waste streams (LLW, MLLW, hazardous waste) resulting from these activities. The work will be done in the Visual Examination and Repackaging Building (VERB) and on the TRU Pad. Activities are planned to be completed by the end of FY 2008.

## Environmental Considerations

### **WASTE**

W-1. Non-Rad Solid Waste- Operations generate normal office waste and trash that will be disposed in a NTS Landfill.

W-2 Hazardous Waste- The TRU Project visual examination and repackaging work on the oversized boxes and drums may result in the identification of hazardous waste. Waste will be managed under RCRA.

W-3. Low-Level Rad Waste- LLW is disposed in various cells at the Area 5 RWMC.

W-4. Mixed Waste- Mixed Waste is disposed in Pit 3 at the Area 5 RWMC. Pit 3 has interim status under the current RCRA Permit (NEV HW0021). NTSWAC disposal requirements are followed.

W-5. TRU-Mixed TRU- The TRU Project is completing the characterization, repackaging and shipment off-site of legacy TRU waste.

W-6. Wastewater- Domestic wastewater generated from site workers and visitors will be discharged into a septic tank permitted by the State of Nevada (Permit NY-1083).

## HAZARDOUS MATERIALS

H-1. Petroleum/Fuel (storage/use) - The facility uses heavy equipment to handle waste containers, maintain existing waste cells, excavate new waste cells, and maintain roads. Fueling for the equipment is done on a routine basis using a mobile fuel truck.

H-3. Above Ground Storage Tank- A small amount of fuel (80 gallons) is stored on site in an above ground storage tank for use in a backup diesel powered generator for the VERB.

H-4 PCB's/Asbestos- PCBs and asbestos wastes that are radiologically contaminated are disposed in permitted/regulated cells (For Asbestiform LLW Permit SW13-000-01).

H-5 Pesticides/Herbicides- Routine spraying of herbicides is done to control vegetation around buildings. The Area 5 RWMC is a nuclear facility and combustible materials such as weeds need to be minimized. Normal pesticide practices are also used on a routine basis to control rodents and other pests.

H-6. Radioactive Materials- Radioactive waste is disposed in various cells at the Area 5 RWMC. Workers only handle waste packages. The TRU Project will be repackaging waste from 58 oversized boxes. An additional 31 classified and 38 unclassified drums containing TRU and MTRU waste will also be repackaged and/or transported off site.

Facility and TRU Project operations are managed under the Area 5 Documented Safety Analysis/Technical Safety Requirements (DSA/TSR). The NV/YMP RADCON Manual requirements are also followed. Exposure levels are kept low using the As Low As Reasonable Achievable (ALARA) principle. Radioactive Work Permits are used for activities involving radioactive waste, and workers have required training.

H-8. Beryllium- Beryllium may be present inside waste packages. Workers disposing waste in one of the cells are not directly exposed to Be from the waste or from other activities at the facility. Packages are appropriately labeled. Beryllium may be present in the TRU Project repackaging activities. The appropriate IH controls such as preparation of a work package, involvement of Industrial Hygiene professionals during the planning and implementation phases of work, use of proper PPE, etc. will be in place to protect all workers from exposure.

H-10- Use of Explosives/Firearms- Security Guards with firearms routinely inspect the facility and the classified cells and are stationed at the S02C area.

## AIR EMISSIONS

A-2. Dust/Particulate Matter- Water is used to control dust emissions from the operation of heavy equipment used to move waste containers, place soil over the waste packages, excavation of new waste cells and routine road grading.

A-4. Diesel Generator- The VERB has a small backup diesel generator that is used occasionally. The generator operates within the requirements of the NTS Sitewide Air Quality Operating Permit.

## **SITE LOCATION/OTHER**

S-1. Environmental Restoration Site (CAU) - Several of the closed cells comprise CAU 111 currently in Appendix 2 of the FFACO. The CAU is managed under RCRA and the FFACO. A characterization report for CAU 111 and other adjacent closed cells that are not a part of CAU 111 (collectively known as the "92 Acre Area") was recently completed.

S-2. Excavation/Land Surface Disturbance- New cells are excavated when needed in the established expansion area. The new cells are within the established boundary of the Area 5 RWMC. Spoil piles created from the excavations are used for the operational cover placed over waste containers. Excavations are done according to company procedures.

S-4. Biological/Tortoise Resource Area- The Area 5 RWMS is within Tortoise territory. New excavations require a survey by a qualified biologist before any surface disturbance is allowed.

S-6. Change In Existing Drainage Pattern- Excavation and land disturbance activities are not anticipated to change existing drainage patterns. There is a large existing diversion berm on the north side of the facility to prevent floodwaters from flowing through the site.

S-9. Noise- Heavy equipment produces noise through the normal operation of the equipment. Operators and all workers near the equipment must wear appropriate hearing protection equipment (single or double hearing protection as appropriate).

S-10. Radiation Controlled Area- Radiation controlled areas resulting from disposal operations are found at the Area 5 RWMS. Cells are properly fenced and marked following the NV/YMP RADCON Manual. The facility operates under the Area 5 Documented Safety Analysis/Technical Safety Requirements. Routine radiological surveys of the facility are performed by RADCON.

S-11. Drinking Water System Involvement- The facility is supplied potable water for personnel use and fire protection by state permitted system NY-0360-12NTNC.