Nevada
Environmental
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Project

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Closure Plan
for Corrective Action Unit No. 94
Building 650 Leachfield
Nevada Test Site, Nevada

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Revision No.: 0

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March 1998

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Nevada Operations Office

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UC-702

CLOSURE PLAN FOR CORRECTIVE ACTION UNIT 94: BUILDING 650 LEACHFIELD NEVADA TEST SITE, NEVADA

**Prepared for the U.S. Department of Energy
Nevada Operations Office
under Contract No. DE-AC08-96NV11718**

Controlled Copy No.: UNCONTROLLED

Revision 0

**Prepared by:
Bechtel Nevada
Environmental Restoration**

March 1998

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**CLOSURE PLAN FOR CORRECTIVE ACTION
UNIT 94: BUILDING 650 LEACHFIELD
NEVADA TEST SITE, NEVADA**

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ACRONYMS AND ABBREVIATIONS

BN	Bechtel Nevada
CAS	Corrective Action Site
CAU	Corrective Action Unit
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
EC	Emergency Coordinator
EMP	Emergency Management Plan
ER	Environmental Restoration
FFACO	Federal Facility Agreement and Consent Order
ft	foot
ft ³	cubic foot
gal	gallon
JHA	Job Hazard Analysis
kg	kilogram
L	liter
μg	microgram
m	meter
m ³	cubic meter
mL	milliliter

ACRONYMS AND ABBREVIATIONS (Continued)

MSDS	Material Safety Data Sheet
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act
NTS	Nevada Test Site
NTSWAC	Nevada Test Site Waste Acceptance Criteria
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PPE	Personal Protection Equipment
PID	Photoionization Detector
RCRA	Resource Conservation and Recovery Act
REEC _o	Reynold's Electrical and Engineering Co., Inc.
RWAP	Radioactive Waste Acceptance Program
RWP	Radiological Work Permit
SAP	Sampling and Analysis Plan
SSHASP	Site-Specific Health and Safety Plan
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The Building 650 Leachfield, Corrective Action Unit (CAU) 94, will be clean closed by removal in accordance with the Resource Conservation and Recovery Act (RCRA) operational permit (NDEP, 1995) and the Federal Facility Agreement and Consent Order (FFACO, 1996). Historically, laboratory effluent was discharged through pipelines leading from the Radiochemistry Laboratory in Building 650 to a distribution box and a series of pipes dispersed across the leachfield. Effluent from the laboratory contained both hazardous and radioactive constituents. Discharge of hazardous and radioactive waste began in 1965. Discharge of radioactive waste ended in 1979 and hazardous waste discharge ended in 1987. From 1987 to 1993 the leachfield was used for the disposal of non-hazardous waste water. The piping leading to the leachfield was sealed in 1993 (REECo, 1993).

Site characterization activities determined that both radioactive and RCRA-regulated constituents were found on the site and they are confined to the northeast corner of the site. The distribution box and the soil directly below the distribution box were impacted only with radioactive constituents above background levels. Radioactive constituents were also found in an area to the southeast of the distribution box, but the constituents were well below background levels. Polychlorinated biphenyls (PCBs) were also found at this location, but at levels below established regulatory level for new spills; no established levels exist for releases of PCBs prior to 1984. Acetone, which was discharged as a solvent from the laboratory was found at another location in the northeast corner at low levels and is a listed RCRA hazardous waste.

Clean closure by removal will involve the excavation and disposal of the distribution box, impacted piping from the northeast corner of the leachfield, and impacted soil below and around the distribution box and piping in the northeast corner of the leachfield. Because of the proximity of the impacted areas, one excavation will be made to address both areas. The soil, distribution box, and impacted piping will be disposed of as mixed waste because of the presence of both radioactive and RCRA listed constituents. The remaining piping in the leachfield will be removed, containerized, and sampled to determine if it has been impacted by any constituents of concern. All waste will be characterized and disposed of in accordance with the proper regulations.

Upon completion of excavation, verification samples will be collected from below and around the distribution box and northeast corner of the leachfield to show that the levels of the radioactive constituents of concern are below background levels and the acetone is below the regulatory level. Swipe samples will be collected from within the Discharge piping and site characterization validation samples will be collected from below the lower leachfield piping. After sample results show that the constituents of concern have been removed, all excavated areas will be backfilled and an independent registered professional engineer will certify the site as clean. Because this is a clean closure, no post-closure care is required and the site should be released for unrestricted use.

1.0 INTRODUCTION

The Building 650 Leachfield is a historic laboratory disposal unit located southeast of Building 650 in Mercury, Nevada, Area 23 of the Nevada Test Site (NTS) (Figure 1). The Federal Facility Agreement and Consent Order (FFACO, 1996) lists the Building 650 Leachfield as Corrective Action Unit (CAU) 94 and Corrective Action Site (CAS) 23-05-01. Remediation of the Building 650 Leachfield is required under the Resource Conservation and Recovery Act (RCRA) operational permit, which is the Permit for a Hazardous Waste Facility, Permit Number NEV HW009 (Nevada Division of Environmental Protection [NDEP], 1995), and the FFACO (1996).

Building 650 currently houses the Radiochemistry Laboratory used for bioassay and environmental sample analysis in support of the NTS radiological environmental monitoring and other programs. Historically, laboratory effluent was discharged to the leachfield through two pyrex pipelines, one originating at the north end of Building 650 and extending south along the east side of the building and the other originating at the south end of Building 650 and extending east along the south side of the building. These pipelines converge into a single pipeline approximately 3 meters (m) (10 feet [ft]) east of the southeast corner of Building 650 (Figure 1). The pipeline terminates at a distribution box measuring 0.9 x 0.9 x 2 m (3 x 3 x 7 ft). The pipeline was grouted from the distribution box back 0.6 m (2 ft) during the operational closure (REECo, 1994). Although the most recent characterization results indicated that the area between the building and the distribution box has not been impacted by piping leading to the distribution box, earlier precharacterization sampling activities suggest that constituents of concern may be present.

The distribution box is connected to four, 15-m (50-ft) long, infiltration pipes consisting of solid clay piping with open spaces at the pipe joints spaced across a 9-m (30-ft) wide field. Each section of piping is approximately 0.6 m (2 ft) long with 5 cm (2 in) spacing between each section. The pipes are located approximately 2 m to 2.5 m (6 ft to 8 ft) below the ground surface. These pipes provided for the distribution of effluent over a large area so that liquid could slowly percolate into the underlying soil of the leachfield. Characterization results showed that the distribution box and soil below the distribution box and northeast corner of the leachfield have been impacted with radiological and hazardous waste. Site characterization results from the lower leachfield are questionable and additional sampling will be required to validate the results.

The leachfield was used as a land disposal unit from 1965 to October 1993, with an estimated annual discharge rate of less than 984 liters (L) (260 gallons [gal]) (Reynolds Electrical and Engineering Co., Inc. [REECo], 1993). Hazardous waste discharged to the leachfield included hydrochloric acid, nitric acid, toluene, xylene, acetone, detergents, and other chemicals used to perform radionuclide separations. Radionuclides found in the discharge included tritium, Americium-241, Cobalt-60, Cesium-137, Plutonium-239, Strontium-89, Strontium-90, and other

Figure 1
Location of Building 650 and Layout of Pipeline, Distribution Box, and Distribution Pipelines
(DOE, 1997).

mixed fission products (U.S. Department of Energy [DOE], 1989). Discharge of radioactive waste was discontinued in 1979. Discharge of RCRA-regulated materials to the leachfield ended in 1987. Discharge of non-RCRA regulated materials (water) continued until the discharge piping leading to the distribution box was sealed in 1994 (REECo, 1994).

1.1 PURPOSE

The purpose of this Closure Plan is to provide the strategy to clean close the Building 650 Leachfield. This corrective action will be undertaken to remediate the site so that it may be released for unrestricted use. Previous characterization activities at the Building 650 Leachfield have involved excavating and sampling a series of trenches (REECo, 1993; IT, 1995), collecting soil samples during closure of the discharge line (REECo, 1994), a geophysical evaluation (IT, 1996), and subsurface sampling of the distribution box (Emer, 1995). The results of these previous site characterization studies are summarized in the Building 650 Leachfield Characterization Plan (DOE, 1997a).

The most recent site characterization report (DOE, 1997b) revealed waste was limited in extent. Constituents of concern exceeding background levels were found in the following locations:

- Radioactive constituents Plutonium-238 and Plutonium-239/240 were detected in the distribution box and the soil below the distribution box to a depth of 6.7 m (22 ft) at sample location LCHB-1.
- Acetone, a listed hazardous waste, was detected at low level 3.4 m (11 ft) below ground surface at sample location LCHB-8.

At sample location LCHB-1 (Figure 2), the radioactive constituents Plutonium-238 and Plutonium-239/240 were found in the distribution box and the soil directly below the distribution box to a depth of 6.7 m (22 ft). These radioactive constituents were the only constituents of concern above established background levels found at this sample location (DOE, 1997b) (Figure 3). Background levels for radioactive constituents have been established in the Offsite Radiation Exposure Review Project, Phase II Soils Programs report (DOE, 1989). The level established in this report for Plutonium-238/239/240 is 0.5 picocuries per gram (pCi/g), which is the proposed remediation level for this site. Any soil with levels below 0.5 pCi/g will also meet the performance objectives for certification of nonradioactive waste at the NTS (REECo, 1995).

Acetone was found at low levels 2.7 to 3.4 m (9 to 11 ft) below ground surface at sample location LCHB-8, which is located to the southeast of the distribution box (Figure 2). Because the acetone was used in the laboratory and discharged as a spent solvent, it is considered a RCRA listed hazardous waste (F003) and must be removed. Based on the results of this site

Figure 2
Location of Site Characterization Samples at Building 650 Leachfield (DOE, 1997b).

MAP VIEW

Figure 3
Characterization results at sample locations LCHB-1, LCHB-2, and LCHB-8
(DOE, 1997b).

characterization, the distribution box, piping, and impacted soil around sample location, LCHB-1 and LCHB-8 will be excavated and disposed.

The remediation level for acetone will be the standard analytical method detection limit, which is 20 $\mu\text{g/kg}$ for SW846, EPA Method 8260. Occasionally, with ideal matrix material and analytical equipment, a laboratory is able to obtain a reliable analytical result that is below the standard method detection limit. Soils, however, are particularly complicated matrices that can interfere with analytical results. Often, these results are qualified as best estimates and are not entirely reliable. A laboratory-specific method detection limit that is lower than the standard analytical method detection limit of 20 $\mu\text{g/kg}$ may be used as a remediation level only if the data are deemed reliable through data validation. If data cannot be validated, the standard analytical method detection limit will be used.

Other constituents were also detected in the northeast corner of the leachfield; however, the concentrations were generally considered to be less than regulatorily established cleanup levels. These consisted of the following:

- PCB's down to a depth of 3.4 m (11 ft)
- Cobalt-60 to a depth of 2.7 m (9 ft).

These constituents were found at sample location LCHB-2 (Figure 2). The area where these constituents were detected will also be excavated and disposed of as a mixed waste because of the proximity to the areas requiring remediation.

1.2 SCOPE

The scope of work for this project consists of the following activities:

- Preplanning and site preparation, including the preparation of all plans and permits, utility clearance, and mobilization of equipment to the site.
- Excavation of the distribution box and the soil below the box to a minimum depth of 7 m (23 ft) at sample location LCHB-1 and excavation of the piping and the soil below the piping to 3.7 m (12 ft) at sample locations LCHB-2 and LCHB-8.
- Removal of the grouted section of the discharge piping leading into the distribution box and collection of swipe samples from within the ungrouted section.

- Collection of soil samples to verify that constituents of concern have been removed to approved clean up levels beneath and around the distribution box and the northeast corner of the leachfield.
- Excavation of the remaining piping in the leachfield. The pipe will be containerized and sampled for waste characterization to determine if it has been impacted by radiological or RCRA-regulated constituents.
- Collection of soil samples to validate the results of site characterization samples from the areas of the leachfield piping.
- Decontamination of equipment used to excavate the soil, distribution box, and piping.
- Backfilling the excavated areas and returning the site to unrestricted use.
- Disposal of excavated materials following applicable federal, state, and DOE regulations in accordance with Section 2.3 of this Closure Report.

The characterization, handling, shipping, and certification of the impacted soil and other waste will be conducted according to the waste profile developed under the requirements of the Nevada Test Site Waste Acceptance Criteria (NTSWAC) (DOE, 1996a) and the Bechtel Nevada Waste Certification Program Plan for Radioactive Waste Storage or Disposal (Bechtel Nevada [BN], 1996) as appropriate. Waste control and certification activities will be subject to a U.S. Department of Energy, Nevada Operations Office (DOE/NV) Radioactive Waste Acceptance Program (RWAP) approval process.

1.3 CLOSURE PLAN CONTENTS

This document is divided into the following sections:

- Section 1.0 - Introduction
- Section 2.0 - Detailed Statement of Work
- Section 3.0 - Schedule
- Section 4.0 - Post-Closure Care
- Section 5.0 - References

2.0 DETAILED STATEMENT OF WORK

2.1 CLOSURE APPROACH

This section describes how the clean closure of the Building 650 Leachfield will be undertaken. Clean closure will be accomplished subject to the conditions of 40 Code of Federal Regulations (CFR) § 270.1.

2.1.1 Preplanning and Site Preparation

Prior to beginning excavation activities, several planning and preparation activities must be accomplished. These activities include document, plan, and site preparation.

2.1.1.1 Site-Specific Health and Safety Plan / Job Hazard Analysis

A Site-Specific Health and Safety Plan (SSHASP) and Job Hazard Analysis (JHA) will be prepared. A copy of the document will be kept on-file in the BN Environmental Restoration and the BN Environmental, Safety, and Health Division offices in Mercury, Nevada. The original document will be kept by the site supervisor at the work site. The SSHASP and JHA will be available on-site for review and signature by all workers prior to beginning work at the site. The SSHASP will provide a detailed, job-specific plan covering protection against accidents or exposure of workers to contamination. It will also discuss weather/air monitoring, accident reporting, emergency procedures, and physical and environmental hazards. The work will also be performed in accordance with the DOE/NV Environmental Restoration Project Health and Safety Plan (1996c) and the BN Environmental, Safety, Security, and Health Manual. In addition, the material safety data sheets (MSDSs) file will be maintained by the Health and Safety Officer and will also be available on-site.

2.1.1.2 Field Management Plan

A Field Management Plan will be prepared for the Building 650 activities. The plan will outline how the work will be accomplished and provide a detailed schedule for the project. In addition, it will identify the responsible parties for each aspect of the project and determine how decisions will be made. A copy of the Field Management Plan will be placed on file at the BN Environmental Restoration offices in Mercury, Nevada, and a copy will also be available at the project field site.

2.1.1.3 National Environmental Policy Act Documentation

A National Environmental Policy Act (NEPA) checklist, and any subsequent documentation, will be completed prior to beginning any excavation activities at the site. The checklist will be prepared by BN Environmental Restoration. If necessary, a follow-up survey will be performed and will report on the condition of existing trees, shrubs, grassed areas, cultural resources, sacred sites, and wildlife immediately adjacent to the area which may be affected by construction activities, equipment and material storage areas, and access routes. Based on the findings of this survey, the excavation activities at the Building 650 Leachfield will be implemented in accordance with applicable federal, state, and local laws; regulations; and permits for protection of the environment. Off-road use of vehicles is not permitted.

2.1.1.4 Site Preparation

Site preparation involves utility surveys, removal of fencing, cutting of asphalt, mobilization of equipment to the site, and designation of the exclusion zone, contamination reduction zone, decontamination area, and waste management area.

Above ground electrical lines and telephone lines that lead into Building 650 cross over the site in such a way that tall excavation equipment may not be able to work in the area. Initial planning suggests the equipment can be positioned in such a way that it will not interfere with the power lines. However, a survey of both above ground and underground utilities will be conducted so that the excavation areas will not cross any utilities lines. A Goldaking instrument will be used for the underground survey. Existing as-built drawings will also be used during this survey. If necessary, the lines will be removed and rerouted or shielded for the duration of excavation. Because Building 650 houses the medical facility and several other critical functions, the building requires continuous electrical power and telephones. In order to allow Building 650 to remain operational, the utilities may have to be rerouted to the building. The site will be surveyed to determine the best way to reroute the required utilities and engineering drawings will be prepared. If rerouting is determined necessary, it will take place in sufficient time to begin excavation without an interruption in service to Building 650.

Fencing will be removed or moved around the site to allow equipment access to the site and provide a barricade for site restriction. The fencing will be located in such a way that allows the equipment ample room to maneuver while still restricting unauthorized access to the site.

The distribution box is located under an asphalt parking area, therefore, the asphalt will have to be cut. The asphalt will be cut prior to any excavation activities to allow access to the distribution box for removal. Once the project is completed the asphalt will be patched to return the area to a functional parking lot.

A proposed site layout is provided as Figure 4. This proposed layout is to be used for planning purposes only and may change depending on conditions at the time field work begins.

2.1.2 Field Activities

2.1.2.1 Distribution Box and Northeast Corner of the Leachfield

Site characterization revealed that the distribution box, the soil directly below the distribution box, and piping and soil in the northeast corner of the leachfield have been impacted by radiological and volatile organic constituents (Figure 1). The distribution box, which is confirmed as impacted, will be removed, broken up, and placed into B-25 boxes to await disposal. After removal of the distribution box, the impacted soil below the box will be excavated from the bottom of the box (approximately 2 m [7 ft] below ground surface) to a minimum of 7 m (23 ft) below ground surface. Because of the depth of the excavation and the irregular topography in the area of the excavation, it may be necessary to bench down a few feet to lower the excavation equipment so that it can reach the deeper areas on a level surface and maintain a safe distance from the edge of the excavation.

The soil above the leachfield piping was not impacted because constituents of concern leached downward through the piping due to gravity. Therefore, the clean soil above the piping will be excavated and stockpiled in a separate area to be used during backfilling operations. The impacted soil in the northeast corner at sample location LCHB-2 and LCHB-8 will be excavated from the bottom of the piping (approximately 2.5 m [8 ft] below ground) to 3.7 m [12 ft] below ground surface. The piping will also be placed into the B-25 boxes with the soil. Due to the proximity of the impacted areas, one hole sloping down toward the distribution box will be excavated. The lateral extent of impacted soil around the piping is unclear. However, the preferential pathway for the constituents would be the more loosely packed soil that was excavated and replaced during the original installation of the piping. Soils at the NTS that have not been disturbed are typically tightly packed and do not easily allow lateral movement of fluids. Therefore, the lateral extent of the impacted soil to be removed is limited to the soil disturbed during the installation of the piping.

During excavation, the soil and excavated area will be examined visually for stains or discoloration that may be a result of the leachfield effluent. The excavated area will also be surveyed with a hand-held Electra and Photoionization Detector (PID) to identify impacted areas. Any areas identified as impacted will be removed.

Impacted soil will be placed into B-25 boxes in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site" and stored temporarily in a waste management area to await disposal at the NTS in

Figure 4
Proposed site-layout plan for Building 650 Leachfield work..

accordance with Section 2.3 of this Closure Plan. The distribution box and section of piping above the impacted soil will also be containerized with the soil. It is estimated that approximately 50 cubic meters (m^3) (1,800 cubic feet [ft^3]) of soil will be excavated for disposal.

Verification sampling will be done after all impacted soil is believed to have been removed. Sampling will be conducted in accordance with Section 2.4 of this Closure Plan. Collected samples will be analyzed for the constituents of concern so that the site is below approved clean up levels. The excavation will remain open until the results of verification samples show that cleanup levels have been met and no additional excavation is required. If necessary, the sides of the deeper excavations will be shored or secured by other means to limit collapse of the hole. Berms will be placed on the upgradient side of the excavation to prevent flooding of the excavation by runoff from the parking area.

2.1.2.2 Discharge Piping

The discharge piping that leads from Building 650 into the distribution box was grouted shut from the distribution box back approximately 0.6 m (2 ft) (REECO, 1994). After the distribution box has been removed, the grouted section of piping will be removed. Once the grouted section has been removed, a swipe sample will be collected from the exposed ungrouted section of the pipe. In addition, one of the verification samples from the distribution box excavation will be a biased sample collected where the pipeline intersects the excavation.

2.1.2.3 Leachfield Piping

Leachfield piping consists of four 15-m (50-ft) long infiltration pipes consisting of solid piping with open spaces at the pipe joints spaced across a 9-m (30-ft) wide field. Each section of piping is approximately 0.6 m (2 ft) long with 5 cm (2 in) spacing between each section. The pipes are located approximately 2 m to 2.5 m (6 ft to 8 ft) below the ground surface. These pipes provided for the distribution of effluent over a large area so that liquid could slowly percolate into the underlying soil of the leachfield. Given the low volumes of liquids discharged at a particular time, combined with the spacing designed in the piping, the potential is low that liquids containing constituents of concern ever reached further than the top section of the piping. This assumption was confirmed by site characterization which determined the soil below the leachfield piping is not impacted outside of the northeast corner of the leachfield as discussed in Section 2.1.2.1 of this Closure Report. Soil above the pipe is not impacted by waste as water from the pipe moved downward by gravity.

The clean soil above the piping will be excavated, placed aside, and stockpiled as clean soil to be returned into the excavated area during final site housekeeping. The piping will then be

excavated using a backhoe. Because the piping has never been sampled, it will be removed and placed in B-25 boxes where it will be sampled and stored in the waste management area to await analysis. The piping will be disposed of in accordance with Section 2.3 of this Closure Plan. The NDEP has questioned the validity of site characterization results in the lower leachfield (NDEP, 1998). To address these concerns, validation samples will be collected from below the leachfield piping after the piping has been removed. The sampling will be conducted in accordance with Section 2.4 of this plan.

2.1.2.4 Decontamination of Equipment

Equipment that becomes contaminated during the excavation process will be decontaminated on-site. A decontamination pad will be established by lining a bermed area large enough to hold a piece of heavy equipment. The bermed area used for decontamination during site characterization activities in 1997 already exists on-site and will only need to be lined with new plastic. The equipment will be driven onto the pad and steam cleaned. Hand-held equipment will be cleaned with a solution of Alconox™ and water, and rinsed with clean water. Rinsate will be held in the bermed area and allowed to evaporate unless it is in excess of what the bermed area can hold. Excess rinsate will be pumped into drums. Any remaining rinsate at the time of final site housekeeping will be containerized and disposed of in accordance with Section 2.3 of this Closure Plan. The plastic liner will be containerized as compactable waste and disposed of in accordance with Section 2.3.

2.1.2.5 Site Restoration

After confirmatory sampling indicates that the site is clean, the site will be returned to its original state. All excavated areas will be refilled with the stockpiled clean soil and additional clean fill material to return the site to its original grade. All fencing will be removed and the berms around the decontamination pads will be torn down and graded across the site. The equipment will be demobilized from the site and any reroute utilities will be returned to their previous routing. The area of asphalt that had been cut will be patched. Any utilities, pipelines, electrical conduits or other items that have been identified or removed during remediation will be reflected on revised as-built drawings for the site.

2.2 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

Construction activities primarily consist of excavation and earth moving. As a result, no construction quality assurance/quality control is required.

2.3 WASTE MANAGEMENT

Waste from the Building 650 Leachfield closure will be managed in accordance with Table 1. Potential waste types include low-level radioactive waste, hazardous waste, mixed waste, and non-hazardous (sanitary) waste. All waste types that are generated will be managed in a manner that complies with all state and federal regulations, DOE orders, BN procedures, and the RCRA Operational Permit. Non-hazardous waste will be handled in accordance with DOE standard operating procedure ERD-05-210, "Management and Minimization of Nonhazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." If the waste is determined to be hazardous waste, it will be handled in accordance with DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." All low-level radioactive waste and mixed waste containers will be packaged, managed, tracked, and stored according to BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." All waste, except the piping outside the northeast corner of the leachfield, is anticipated to be disposed of before the completion of the field phase of this project because a Waste Profile and Material Evaluation Form is currently being prepared in accordance with the NTSWAC (DOE, 1996a) and BN procedure L-E10.32.P, "Radioactive Waste Evaluation," based on previous site characterization results. If the Waste Profile and Material Evaluation Form, however, indicate that additional sampling and analysis is necessary, the waste may not be disposed of until after the end of the field phase.

The leachfield piping has never been analyzed. Therefore, it will be placed in B-25 boxes, sampled, and stored in the waste management area to await sample analysis results. The piping and any surrounding soil that appears impacted, either through visual or field instrument screening, will be managed as a potential mixed hazardous and low-level radioactive waste.

2.3.1 Container Management

All containers will be handled in accordance with 40 CFR § 262.34 and Subpart I of 40 CFR § 265 which deals with the use and management of containers. All containers must be in good condition (no significant rust or dents). If the container begins to leak, the contents must be transferred to a container that is in good condition. The containers must be lined or made of a material that will not react with the waste. The containers must always be closed while stored unless waste is added or removed. They must also be handled in such a manner that will not jeopardize the integrity of the container.

**TABLE 1— MANAGEMENT OF VARIOUS WASTE TYPES TO BE PRODUCED AT BUILDING 650
LEACHFIELD**

MEDIA	WASTE TYPE	DECISION
Distribution Box, Soil, and Piping from Northeast Corner of Leachfield	Low-Level Radioactive Waste	The distribution box and piping will be managed in accordance with the BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the NTS." Waste will be containerized, labeled, and placed in the designated waste management area. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	RCRA-Regulated Hazardous Waste	Waste will be managed in accordance with the DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal.
	Mixed waste	Waste will be managed in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, NTS Onsite Waste Transport Manifest, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	Levels Less Than Regulated Limits	The distribution box and piping will be loaded onto a truck and transported to the Area 9, U10C Landfill for disposal.

**TABLE 1 (Cont.)— MANAGEMENT OF VARIOUS WASTE TYPES TO BE PRODUCED AT BUILDING 650
 LEACHFIELD**

MEDIA	WASTE TYPE	DECISION
Remaining Piping	Low-Level Radioactive Waste	The piping will be managed in accordance with the BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the NTS." Waste will be containerized, labeled, and placed in the designated waste management area. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	RCRA-Regulated Hazardous Waste	Waste will be managed in accordance with the DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal.
	Mixed Waste	Waste will be managed in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, NTS Onsite Waste Transport Manifest, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	Levels Less Than Regulated Limits	The piping will be loaded onto a truck and transported to the Area 9, U10C Landfill for disposal.

**TABLE 1 (Cont.)— MANAGEMENT OF VARIOUS WASTE TYPES TO BE PRODUCED AT BUILDING 650
LEACHFIELD**

MEDIA	WASTE TYPE	DECISION
Remaining Excavated Soil	Low-Level Radioactive Waste	The piping will be managed in accordance with the BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the NTS." Waste will be containerized, labeled, and placed in the designated waste management area. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	RCRA-Regulated Hazardous Waste	Waste will be managed in accordance with the DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal.
	Mixed Waste	Waste will be managed in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal. If necessary absorbent will be added. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, NTS Onsite Waste Transport Manifest, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	Levels Less Than Regulated Limits	Uncontaminated soil will be spread on the site or returned to excavated area.

**TABLE 1 (Cont.)— MANAGEMENT OF VARIOUS WASTE TYPES TO BE PRODUCED AT BUILDING 650
 LEACHFIELD**

MEDIA	WASTE TYPE	DECISION
Decontamination Rinsate and Liner	Low-Level Radioactive Waste	Waste will be managed in accordance with the BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the NTS." Waste will be solidified, containerized, labeled, and placed in the designated waste management area. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	RCRA-Regulated Hazardous Waste	Waste will be managed in accordance with the DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." Waste will be solidified, containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal.
	Mixed Waste	Waste will be managed in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." Waste will be solidified, containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal. Appropriate paperwork (Package Inventory, Waste Traveller, Packaging Certification, Radioactive Material Shipping Exception Record or Radioactive Material Shipping Record, Waste Shipment Checklist, Certification Statement, NTS Onsite Waste Transport Manifest, and Radioactive Waste Receipt Verification) will be completed prior to shipment for disposal.
	Levels Less Than Regulated Limits	Waste will be solidified, if necessary, and transported to the Area 9, U10C Landfill for disposal.

**TABLE 1 (Cont.)— MANAGEMENT OF VARIOUS WASTE TYPES TO BE PRODUCED AT BUILDING 650
LEACHFIELD**

MEDIA	WASTE TYPE	DECISION
Personal Protective Equipment and Sampling Equipment	Low-Level Radioactive Waste (Based on Field-Screening Background Levels)	Waste will be managed in accordance with the BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the NTS." PPE generated in association with a hotline will also be managed in accordance with Procedure L-A14.004.P, for hotlines. PPE will be placed in the containers of soil to occupy any void space in the container.
	RCRA-Regulated Hazardous	Waste will be managed in accordance with the DOE Standard Operating Procedure ERD-05-211, "Management and Minimization of Hazardous Waste at the Nevada Test Site for the Nevada Environmental Restoration Project." Waste will be containerized, labeled, and placed in the designated waste management area where it will be inspected weekly until the time of disposal.
	Mixed Waste	Waste will be managed in accordance with BN Procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." PPE will be placed in the containers of soil to occupy any void space in the container.
	Levels Less Than Field-Screening Background Levels	Waste will be managed as sanitary waste and transported to the Area 9, U10C Landfill for disposal.

The B-25 boxes to be used during this project will be filled to meet their weight capacity, which is anticipated to be 3,600 kilograms (8,000 pounds). Compactable waste will then be placed in the B-25 boxes to fill any existing void spaces. After a box has been filled, the clips will be secured, effectively locking the box. If a box is not completely filled to capacity at the end of a work day, the lid will be closed without securing the clips and tamper-resistant tape will be placed on the box.

A secondary containment system will only be required if the containers hold free liquid or are unprotected from contact with accumulated liquid. Because the majority of the waste produced during this project is anticipated to be soil and debris, no secondary containment will be required. If, however, free liquid is containerized, such as the decontamination water, it will be placed on spill containment pallets.

Appropriate labels and relevant information must be marked on each container with an indelible marker and must be legible and clearly visible for inspections. Pertinent data may be written on duct tape or a blank adhesive label that is applied to the side of the container.

The following information will be included:

- Waste-Tracking Label.
- Type of waste in the container (i.e., it must be marked "Hazardous Waste").
- Location waste was derived from.
- Date accumulation begins/ends.
- "Awaiting Analysis" sticker after sampling has been completed, if sampling is required.

2.3.2 Site Control

A fenced hazardous waste storage area will be established at the southwest end of the leachfield to store material that could potentially be RCRA-regulated, low-level radioactive waste, or mixed waste. This will consist primarily of the B-25 containers holding the piping that will be awaiting analysis. The site is currently fenced to prevent unauthorized persons from entering the site and has been used as a waste management area for waste generated during characterization activities. Figure 4 shows the planned locations for the waste management area. These locations may change as field conditions dictate.

2.3.3 Preparedness and Prevention

Under 40 CFR § 265, Subpart C, all hazardous waste facilities must be maintained and operated in a manner that minimizes the possibility of fire, explosion, or any unplanned event. Hazards posed by the waste stored at the facility do not require a specific kind of equipment; however, fire extinguishers will be available in all vehicles and temporary office trailers that will be brought to the site. Two-way radios will be available in field vehicles or as hand-held types.

Aisle space between containers must be sufficient to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility in the event of an emergency.

NTS Emergency Response Teams, Fire Department, and Police, must be familiar with the layout of the facility, properties of the hazardous waste, possible excavation routes, etc. Hospitals must be informed of the type of injuries or illness which could result from fires, explosions, or releases at the facility. The work site is located next to the Mercury Medical Facility. Emphasis will be placed on close communication with the medical facility and the NTS Fire Protection and Emergency Medical Services. Care will be taken to keep the driveway leading to the emergency entrance to the facility open, or measures will be taken in coordination with both organizations to allow access to the emergency entrance.

2.3.4 Contingency Plan

As required under 40 CFR § 265, Subpart D, a contingency plan must be designed to minimize hazards to human health or the environment in the event of fire, explosion, or any unplanned or non-sudden release of hazardous waste constituents. The provisions of the plan must be carried out immediately after such an event and provide actions that facility personnel must take. A copy of the contingency plan is provided in Appendix D.

A copy of the contingency plan and all revisions will be maintained at the facility and provided to the NTS Fire Department, Medical Facilities, and Emergency Response Teams. There must be at least one employee either on the facility premises or on call at all time. This person must have the authority to commit the resources needed to carry out the contingency plan. The emergency coordinator must have thorough knowledge of all aspects of the contingency plan, all operations and activities at the facility, the location and characteristics of the waste handled, the location of the record within the facility, and the facility layout.

2.3.5 Personnel Training

Training for all personnel working at a hazardous waste facility is required as part of 40 CFR § 265.16, Subpart B. The program may be classroom instruction or on-the-job training. On-the-job training must be designed so that personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, equipment, and systems. All personnel responsible for packing low-level or mixed radioactive waste will be required to read and understand BN procedure L-E10.308.WWC, "Radioactive Waste Tracking, Handling, and Management at the Nevada Test Site." The operators of the facility must maintain the training records at the facility until closure has been completed.

Title 29 CFR § 1910.120 details the occupational safety and health requirements that will be followed for personnel supporting excavation activities. All personnel will be required to read and understand the SSHASP prior to working at the site. A tailgate safety briefing will be conducted every morning and as needed as activities or circumstances change. In addition, all personnel will require Radiation Worker II training.

2.3.6 Inspections

An inspection of the areas in which the containers are stored will be conducted at least weekly. The purpose is to identify leaking or deteriorating containers due to corrosion or other factors. Unusual circumstances must be reported immediately so that corrective measures can be taken. Completed inspection forms will be maintained in the project file.

2.3.7 Waste Minimization

For the duration of the project, site workers will adhere to the principles of the BN Waste Minimization and Pollution Prevention Program. Care will be taken to segregate waste from nonwaste materials if at all possible and avoid cross contamination. As part of this approach, clean soil from above the impacted areas will be stockpiled in a location separate from waste soil.

2.4 CLEAN-UP VERIFICATION

Clean-up verification will be accomplished by confirmatory sampling of the excavated impacted area. Swipe samples will also be collected from the inside of the discharge piping. In addition to the verification sampling, site characterization data validation sampling will also be performed. Although site characterization results indicated that the only impacted areas at the site are below the distribution box and the northeast corner of the leachfield, the validity of the volatile organic

compound (VOC) analytical results have not been adequately substantiated (NDEP, 1998). To ensure that the site is clean closed, samples will be collected from below the lower leachfield piping to validate the results of site characterization VOC analyses.

2.4.1 Clean-Up Verification Samples

Verification sampling is required for a RCRA clean closure. A verification program must support the field decision that remaining constituents of concern are less than remediation standards and provide the regulator with confidence that sufficient samples have been collected to verify that the site has been remediated. For the Building 650 Leachfield, site characterization data indicated that radiological constituents and acetone are the only remaining constituents of concern above remediation standards. Therefore, the verification samples will be analyzed for VOC and radiological constituents. A summary of the samples to be collected and the analyses to be performed is provided in Table 2. A three-week analytical turnaround time will be requested for all samples.

Because of the depths of the excavations, all samples will have to be collected using excavation equipment. For safety reasons, personnel will not be allowed to enter the excavation, therefore, a grid system is unrealistic to use for sampling. Samples will be collected from the side walls and floor every 1.5 m (5 ft) along the length of the excavation. Side wall samples will be collected from below the depth of the distribution box and the piping. One biased sample will be collected from the area where the discharge piping intersects the excavation. In the deeper excavated area under the distribution box, an upper and a lower sample will be collected from each side wall from between the depth of 2 m (7 ft) and the bottom of the trench (approximately 7 m [23ft]). In the shallower excavated area under the piping in the northeast corner of the leachfield, one sample will be collected every five-foot increment from below the depth of 2.5 m (8 ft) and the bottom of the trench (approximately 3.7 m [12 ft]). The excavation equipment will scrape the wall or floor, the samples will then be collected as grab samples from the bucket of the excavation equipment, and placed in the proper containers (Table 2). All samples will be labeled with a unique sample number and handled under strict chain-of-custody procedures.

The excavation will encompass an area approximately 7 m (23 ft) long, 2.5 m (8 ft) wide, and ranging from 6.7 m to 3.7 m (23 ft to 12 ft) in depth. Based on these dimensions and samples collected every 1.5 m (5 ft), approximately 23 verification samples will be collected and analyzed for radiological constituents and VOCs. If the dimensions of the excavation area are different, the number of samples collected will be modified to reflect the accurate size of the excavation. Verification samples will be analyzed using the analytical methods shown in Table 2.

2.4.2 Discharge Pipeline Samples

The discharge pipeline will be sampled by swiping the inside of the piping just past the grouted section. These swipe samples will be analyzed for radiological constituents as shown in Table 2. Although unlikely to be present, if any sludge or liquid is found in the pipeline, and it is in sufficient quantities, it will be collected and analyzed for all constituents of concern.

2.4.3 Data Validation Samples

Because the site characterization results for VOC analysis are suspect, samples will be collected to validate that these characterization results correctly reported the absence or presence of these compounds. After the piping has been excavated and removed, validation samples will be collected from the bottom of the trench, approximately 2.5 m (8 ft) below ground surface. Validation samples will be collected from both ends and the middle of each of the four pipelines in the leachfield. All samples will be collected at a break in the pipeline.

The excavation equipment will scrape the trench floor and grab samples will be collected from the bucket of the excavation equipment. All samples will be placed in the proper containers (Table 2), labeled with a unique sample number, placed on ice, and handled under strict chain-of-custody procedures. A three-week analytical turnaround time will be requested for all samples.

2.4.4 Quality Control Samples

For each set of samples to be collected, one quality control sample will also be collected for every twenty samples collected. Each blind replicate will be labeled with its own distinct sample number so that the laboratory will not be able to readily identify it as a quality control sample. Additional sample material will also be provided for the laboratory to run a matrix spike and a matrix spike duplicate. In addition, one trip blank will be sent with each cooler containing VOC samples. The data packages provided by the laboratory will be validated and any laboratory method blanks will be evaluated by qualified personnel.

2.5 PERMITS

Required permits for this project include a Radiological Work Permit (RWP), an Excavation and Trenching Permit, and a Hot Line Work Permit Request.

TABLE 2— BUILDING 650 LEACHFIELD VERIFICATION AND VALIDATION SAMPLING PARAMETERS

PARAMETERS	NUMBER OF SAMPLES	NUMBER OF QUALITY CONTROL SAMPLES	SAMPLE TOTAL	ANALYTICAL METHOD	SAMPLE CONTAINER
Excavated Area					
Total VOCs	23	2 Blind Replicate, 1 Trip Blank, 1 Matrix Spike, 1 Matrix Spike Duplicate	28	SW846, EPA 8260	2 - 120 mL glass bottle (zero head space)
<u>Radioactive Constituents*</u> : Gamma Scan, Isotopic Plutonium, Gross Alpha/Beta	23	2 Blind Replicate	25	L-E10.602.PC, L-E10.601.PL, L-E10.612.PL	500 mL nalgene bottle

* All radioactive constituents can be run from one, 500 ml sample.

TABLE 2 (Cont.)— BUILDING 650 LEACHFIELD VERIFICATION AND VALIDATION SAMPLING PARAMETERS

PARAMETERS	NUMBER OF SAMPLES	NUMBER OF QUALITY CONTROL SAMPLES	SAMPLE TOTAL	ANALYTICAL METHOD	SAMPLE CONTAINER
Discharge Piping					
Alpha/Beta Gamma	5	N/A	5	1 minute count 20 minute count	42.5 mm diameter filter paper circle
Leachfield Piping					
Total VOCs	12	1 Blind Replicate, 1 Trip Blank, 1 Matrix Spike, 1 Matrix Spike Duplicate	16	SW846, EPA 8260	2 - 120 mL glass bottle (zero head space)
<u>Radioactive Constituents*</u> : Gamma Scan, Isotopic Plutonium, Gross Alpha/Beta	12	2 Blind Replicate	14	L-E10.602.PC, L-E10.601.PL, L-E10.612.PL	500 mL nalgene bottle

* All radioactive constituents can be run from one, 500 ml sample.

2.5.1 Radiological Work Permit

An RWP will be developed and approved to inform workers of the specific personnel protective equipment necessary to protect them while performing their tasks. The workers will be required to read the permit and acknowledge their understanding of the requirements before entry into the exclusion zone. The RWP will be maintained by the radiological control personnel at the access station. All site workers will be required to be Radiation Worker II-certified.

2.5.2 Excavating and Trenching Permit

An approved Excavating and Trenching Permit will be obtained prior to any excavation. The permit contains a justification for the trenching operation and a checklist of pertinent organizations who must inspect the site so that the trenching will not impact utilities. A copy of this permit will be kept at the project site by the site supervisor.

2.5.3 Hot Line Work Permit Request

Any work to be performed within 4.6 m (15 ft) of overhead power lines requires the completion of a Hot Line Work Permit Request. This permit describes the location and type of work to be done, as well as the exact circuit and voltage of the overhead power lines. In addition, a work location checklist must be completed daily to ensure that all potential electrical safety hazards have been addressed each day before work begins.

2.6 CLOSURE CERTIFICATION

Closure will be verified through appropriate observations and documentation of closure activities. A closure report detailing the closure activities will be prepared and submitted by DOE/NV by certified mail or other means of verifiable delivery to the NDEP. The report will contain:

- Information regarding the volume of impacted material removed from the various components of the unit.

- The disposal history of the impacted soil and other wastes generated during the clean closure of the unit.
- The methodology used and results of verification sampling of the unit.
- Photographs of closure activities.
- Figures identifying excavation and sample areas.

Included in the closure report will be certification by an independent, registered professional engineer and an authorized representative of DOE/NV that the unit has been closed in accordance with the specifications of this plan. The NDEP has waived the Title 40 CFR § 265.115 requirement that the certification and closure report be submitted to the NDEP within 60 days of the completion of closure activities. The closure certification and closure report will be delivered by the date specified in Section 3.0.

3.0 SCHEDULE

3.1 PROJECT SCHEDULE

A project schedule for the Building 650 Leachfield is provided in Table 3. The schedule will require modifications if conditions exist that are outside the assumptions on which the schedule is developed. The DOE will keep the NDEP apprised of any conditions that may impact the project schedule. In the event the project schedule requires modifications, the DOE will consult with NDEP personnel prior to initiating any changes.

3.2 FIELD WORK CLOSURE SCHEDULE

The schedule for closure field work for the unit can be found in Table 3. In general, field work will consist of the following:

- Preparation for Field Work August 1998
- Excavation Activities August-September 1998
- Disposal of Distribution Box, Piping, and Soil from Northeast Corner August-September 1998
- Verification and Validation Sampling September 1998
- Final Site Restoration September 1998

Field work will be conducted in the most efficient manner possible. Due to the nature of clean closure, work must be halted while verification samples are being analyzed. All verification, validation and waste characterization samples will be submitted for two-week analytical turnaround. Sufficient flexibility has been placed within the project schedule to account for minor difficulties (weather, equipment breakdown, etc.). The schedule may require modification if conditions exist that are outside the assumptions on which the schedule was developed.

TABLE 3— PROJECT SCHEDULE FOR BUILDING 650 CORRECTIVE ACTION

Activity ID	CAU	Activity Description	RESP	Orig Cal	Start	Finish	<div> <div>FY98</div> <div>FY99</div> <div>FY00</div> </div>											
Part 'A' Sites (Smith)																		
Building 650 Leachfield/NTS (Urban)																		
Corrective Action Decision Document (CADD)																		
CQ2070	94	IT completes CADD, DOE submits, state approves	IT	41	5	01OCT97	10NOV97											
Corrective Action Plan (CAP)																		
CQ3000	94	Provide project support	BN	250	1	13OCT97	09OCT98											
CQ3010	94	Prepare draft Corrective Action Plan (CAP)	BN	20	2	13OCT97	17NOV97											
CQ3030	94	Prepare draft Waste Management Plan (WMP)	BN	8	2	27OCT97	06NOV97											
CQ3020	94	Prepare draft Health & Safety Plan (HASP)	BN	8	2	18NOV97	02DEC97											
CQ3045	94	Conduct internal review on draft CAP & WMP	BN	8	2	18NOV97	02DEC97											
CQ3040	94	Conduct internal review on draft HASP	BN	8	2	03DEC97	16DEC97											
CQ3047	94	Incorp. review comments on draft CAP & WMP	BN	16	2	03DEC97	31DEC97											
CQ3042	94	Incorp. review comments on draft HASP	BN	4	2	17DEC97	23DEC97											
CQ3043	94	Submit draft HASP to DOE	BN	0	2		23DEC97											
CQ3050	94	Submit draft CAP to DOE	BN	0	2		31DEC97											
CQ3060	94	DOE reviews draft CAP	DOE	30	5	01JAN98	30JAN98											
CQ3065	94	Return draft CAP to BN	DOE	0	1		30JAN98											
CQ3070	94	Address DOE comments on draft CAP	BN	18	2	02FEB98	04MAR98											
CQ3080	94	Submit final CAP to DOE	BN	0	2		04MAR98											
CQ3090	94	DOE reviews final CAP	DOE	30	5	05MAR98	03APR98											
CQ3095	94	DOE submits final CAP to NDEP	DOE	0	1		03APR98											

FFACD deadline: 11/3/97

FFACD deadline: 4/30/98
 F-CAPIS

TABLE 3 (Cont.)— PROJECT SCHEDULE FOR BUILDING 650 CORRECTIVE ACTION

Revision: 3
Date: 3/24/98

TABLE 3 (Cont.)— PROJECT SCHEDULE FOR BUILDING 650 CORRECTIVE ACTION

Activity ID	CAU	Activity Description	Responsible Party	Start Date	End Date	Duration	Activity Type	Activity Status	Activity Notes
CQ4080	94	Address DOE comments on CLR	BN	21FEB98	21FEB98	1	Task	Completed	
CQ4090	94	Submit final CLR to DOE	BN	22FEB98	22FEB98	1	Task	Completed	
CQ4100	94	DOE transmits final CLR to NDEP	DOE	23FEB98	24MAR98	30	Task	In Progress	
CQ4102	94	NDEP reviews CLR	NDEP	25MAR98	23APR98	30	Task	In Progress	
CQ4105	94	NDEP returns approved CLR to DOE	NDEP	23APR98	23APR98	1	Task	Completed	

Project Start
 Project Finish
 State Start
 State Finish

01/01/97
 01/01/98
 01/01/97
 01/01/98

Early Bar
 Progress Bar
 Critical Activity

01/01/97
 01/01/98
 01/01/97
 01/01/98

01/01/97
 01/01/98
 01/01/97
 01/01/98

01/01/97
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 01/01/97
 01/01/98

4.0 POST-CLOSURE PLAN

Closure of the Building 650 Leachfield is governed by the RCRA Operational Permit (NDEP, 1995) and FFACO (1996). It is assumed that a permit modification will be granted by NDEP to allow clean closure of this site. Therefore, closure of the Building 650 Leachfield, when completed in accordance with this plan, will meet the requirements for clean closure by removal. This document meets the RCRA Operational Permit requirement for submittal of a Closure Plan to NDEP for approval. The clean closure by removal of the Building 650 Leachfield is subject to the conditions of 40 CFR § 270.1. Under the conditions of 40 CFR § 270.1(c)(5) and (6), no post-closure permit is required if it is demonstrated that the closure by removal meets the requirements of 40 CFR § 264.228, 40 CFR § 264.280(e), or 40 CFR § 265.258, respectively. The level of post closure care will be determined by demonstration of closure equivalency under 40 CFR § 270.1(c)(5) and (6). The clean closure of the Building 650 Leachfield is expected to meet these requirements and no post-closure care will be required.

4.1 INSPECTIONS

Because this is a clean closure by removal, all constituents of concern will have been removed to the approved clean-up levels. No inspections will be required following closure and the land can be released for unrestricted use.

4.2 MONITORING

Because this is a clean closure by removal, no post-closure monitoring is required at the Building 650 Leachfield as all constituents of concern will have been removed to the approved clean-up levels. The land can be released for unrestricted use.

4.3 MAINTENANCE AND REPAIR

No construction is planned as part of the clean closure of the Building 650 Leachfield. As a result, maintenance or repairs will not be necessary at the site following closure.

5.0 REFERENCES

BN, see Bechtel Nevada.

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- U.S. Department of Energy, Nevada Operations Office, 1997a, Resource Conservation and Recovery Act Industrial Site Environmental Restoration Site Characterization Plan, Area 23, Building 650 Leachfield, Las Vegas, NV.
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APPENDIX A

ENGINEERING SPECIFICATIONS AND DRAWINGS

Closure Plan - CAU No. 94
Building 650 Leachfield
Section: APPENDIX A
Revision: 0
Date: 3/24/98

Engineering specifications and design are not required for this closure. The as-built drawings will be modified to reflect site changes and will be included in the Closure Report.

APPENDIX B

SAMPLING AND ANALYSIS PLAN

The sampling and analysis for verification sampling at the Building 650 Leachfield will be conducted in accordance with Section 2.4 of the Closure Report. A waste characterization sampling and analysis plan will be prepared to address the characterization requirements of the NTSWAC (DOE, 1995) for any additional waste characterization sampling that is deemed necessary, including the sampling of the piping removed from the leachfield.

APPENDIX C

PROJECT ORGANIZATION

The following are the DOE/NV project contacts:

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Project Manager
Industrial Sites Subproject
U.S. Department of Energy, Nevada Operations Office
P.O. Box 98518
Las Vegas, NV 89193-8518
(702) 295-0461

The identification of the project Health and Safety Officer and the Quality Assurance Officer can be found in the appropriate DOE plan. However, personnel are subject to change and it is suggested that the Project Manager be contacted for further information. The Task Manager will be identified in the FFACO Biweekly Activity Report prior to the start of field activities.

APPENDIX D

CONTINGENCY PLAN

AREA 23
BUILDING 650 LEACHFIELD
CONTINGENCY PLAN AND EMERGENCY
PROCEDURES

March 1998

Prepared for
U. S. Department of Energy
Nevada Operations Office
Environmental Restoration Division

**Prepared by
Bechtel Nevada
Environmental Restoration**

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Approved By:

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3/25/98
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3/25/98
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NTS Fire Protection and Emergency Medical Services

3/25/98
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Environmental Restoration

3/25/98
Date

Prepared By:

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1.0 INTRODUCTION

1.1 PURPOSE

This document satisfies the requirements for a contingency plan and emergency procedures required by the federal hazardous waste regulations defined in the Resource Conservation and Recovery Act (RCRA). These requirements are prescribed by:

- Title 40 Code of Federal Regulations (CFR) Part 265, Subparts C and D
- Title 40 CFR 262.34
- Title 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response"
- BN Emergency Management Plan (EMP)

This plan discusses the actions that the BN Environmental Restoration (ER) and other Nevada Test Site (NTS) personnel will take in response to fires, explosions, or unplanned sudden or non-sudden releases of hazardous waste or hazardous waste constituents to the air, soil, or surface water at the Area 23 Building 650 Leachfield during closure activities.

1.2 SCOPE

This Plan covers a variety of emergencies at the Building 650 Leachfield. This document applies to all personnel assigned to the Building 650 Leachfield project activities.

1.3 FACILITY DESCRIPTION

1.3.1 Site Location

The Building 650 Leachfield is a historic laboratory disposal unit located southeast of Building 650 in Mercury, Nevada, Area 23 of the NTS (Figure 1).

1.3.2 Site Description

Building 650 currently houses the Radiochemistry Laboratory used for bioassay and environmental sample analysis in support of the NTS radiological environmental monitoring and other programs. Historically, laboratory effluent was discharged to the leachfield through two pipelines, one originating at the north end of Building 650 and extending south along the east side of the building and the other originating at the south end of Building 650 and extending east along the south side of the building. These pipelines converge into a single pipeline approximately 3 meters (m) (10 feet [ft]) east of the southeast corner of Building 650 (Figure 1). The pipeline terminates at a distribution box measuring 0.9 x 0.9 x 2 m (3 x 3 x 7 ft). The distribution box is connected to four 15-m (50-ft) long infiltration pipes consisting of solid piping with open spaces at the pipe joints spaced across a 9-m (30-ft) wide field. The pipes are located approximately 2 m to 2.5 m (6 ft to 8 ft) below the ground surface. These pipes provided for the distribution of effluent over a large area so that liquid could slowly percolate into the underlying soil of the leachfield.

The leachfield was used as a land disposal unit from 1965 to October 1992, with an estimated annual discharge rate of less than 984 liters (L) (260 gallons [gal]) and a total discharge of approximately 27,500 L (7,300 gal) over the lifetime of the leachfield (Reynolds Electrical and Engineering Co., Inc. [REECo], 1993). The discharge was predominantly waste water, with only a small portion of the discharge containing hazardous or radioactive constituents. Hazardous waste discharged to the leachfield included hydrochloric acid, nitric acid, toluene, xylene, acetone, detergents, and other chemicals used to perform radionuclide separations. Radionuclides found in the discharge included tritium, Americium-241, Cobalt-60, Cesium-137, Plutonium-239, Strontium-89, Strontium-90, and other mixed fission products (U.S. Department of Energy [DOE], 1989). Discharge of radioactive waste was discontinued in 1979. Discharge of RCRA-regulated materials to the leachfield ended in 1987. Discharge of non-RCRA regulated materials (water) continued until the piping leading to the leachfield was sealed in 1993 (REECo, 1993).

1.3.3 Topography

The NTS is located in the Great Basin of the Basin and Range province. The Building 650 Leachfield is located in the Mercury base camp. The topography and soils around Mercury are typical of the NTS alluvial basins. The alluvial plain at Mercury slopes gently to the southwest. The soil is dense, silty sand which contains gravel and scattered boulders and common layers of caliche. Mercury is located within a major drainage basin. A steeply sloping local sub-basin drains from the northeast directly into Mercury. The sub-basin is drained by an arroyo system and is subject to high peak runoff.

Figure 1
Location of Building 650 and Layout of Pipeline, Distribution Box, and Distribution Pipelines (DOE, 1997).

1.3.4 Climate

Lower elevations of the NTS receive approximately six inches of precipitation annually. Annual wind patterns are characterized by strong winds in the spring. The daily cycle is generally light winds at night, increasing winds from morning to afternoon and declining wind speed in the evening. Average monthly wind speed vary from 4 m per second (13 ft per second) in April to 2.7 m per second (9 ft per second) in November.

2.0 WASTE DESCRIPTIONS AND ASSOCIATED HAZARDS

The Building 650 Leachfield contains materials that present chemical and physical hazards. Potential routes of entry could include inhalation, ingestion, absorption, and injection. The specific hazards associated with the site are described in the following sections.

2.1 CHEMICAL HAZARDS

The following is a generalization of the hazards associated with the various chemical classes that may possibly be encountered at the Building 650 Leachfield. Although analytical data indicates the presence of these chemical classes in the soil, it should be noted that they were detected in small concentrations.

2.1.1 RCRA-Regulated Constituents

It is possible that RCRA-regulated hazardous constituents may be encountered at the Building 650 Leachfield. The volatile organic compound (VOC) acetone, which is an F-listed RCRA waste was detected at low levels in the soil samples collected during characterization. Acetone may be harmful or fatal if inhaled, swallowed, or absorbed through the skin. Contact can cause irritation of the eyes, nose, and throat, fatigue, headaches, and drowsiness. Target organs include the respiratory system, eyes, liver, and kidneys. The low levels of acetone detected at the site, however, significantly reduce the risk associated with this compound.

2.1.2 Radiological Constituents

The main ionizing radiological constituent of concern is plutonium, which is an alpha particle. Alpha particles do not present an external hazard because they are easily stopped by the dead layer of skin on the body. However, alpha particles do present an internal hazard if inhaled or injected, and less of a hazard if ingested. Once inside the body, they tend to concentrate in the lungs, liver, and bones where they are in close contact with body tissue and can deposit large amounts of energy in a small volume of body tissue.

2.2 PHYSICAL HAZARDS

The following is a generalization of the physical hazards associated with the various chemical classes that may possibly be encountered at the Building 650 Leachfield.

2.2.1 RCRA-Regulated Constituents

In greater concentrations, acetone presents a dangerous fire and explosion hazard. However, the extremely low levels of acetone at the Building 650 Leachfield decrease the risk of fire and explosion significantly. For more specific physical hazard information consult the Material Safety Data Sheet (MSDS) for the material, an Industrial Hygienist, or other source.

2.2.2 Radiological Constituents

The radiological constituents themselves do not present any kind of physical hazard. All physical hazards will be associated with the removal and containerizing of the waste soil.

2.2.3 Other Physical Hazards

Other physical hazards present at the Building 650 Leachfield associated with container-handling, heavy equipment operations, and working outdoors. These may include potential back injury, vehicle accidents, and heat and cold stress. Physical hazards are discussed in BN safety procedures and the Site-Specific Health and Safety Plan (SSHASP).

3.0 EMERGENCY NOTIFICATION PROCEDURES

The reporting and notification procedure outlined in BN Safety Procedure M-A11-007, "Accidents/Incident Notifying, Investigating, and Reporting" will be followed in the event of an accident, injury or other incident. Expedient reporting and notification will be made for, but not limited to, personnel injury or fatality, toxic material release, fire, or explosion. Figure 2 shows the Emergency/Contingency Plan notice that will be posted at the site. Information includes a list of the telephone numbers, emergency response procedures, waste description, etc.

3.1 DESIGNATION OF EMERGENCY COORDINATOR

The Emergency Coordinator (EC) system consists of one primary EC, one secondary EC, and one alternate EC. The ECs are onsite or on call at all times. In the event of an emergency, the primary EC should be contacted; if not available, the secondary EC should be contacted. If neither of these are available, the alternate should be contacted. The individual who is available first becomes the EC for the situation. Actual home addresses and phone numbers for ECs will be provided in the document used in the field. The ECs appointed by the Environmental Restoration Program Manager are as follows:

Primary Emergency Coordinator

Steve J. Nacht

Work: (702) 295-7234

Address to be provided in field document

Home: To be provided in field document

Net 3 #762

Secondary Emergency Coordinator

Jerry F. Bonn

Work: (702) 295-7341

To be provided in field document

Home: To be provided in field document

Net 3 #763; Net 15 #813

EMERGENCY/CONTINGENCY PLAN

COMPANY: Bechtel Nevada

ADDRESS: Mercury, Nevada

LOCATION OF FACILITY: Nevada Test Site, Area 23

PRIMARY EMERGENCY COORDINATOR

Steve J. Nacht

To be provided in field document

Work: (702) 295-1632

Home: To be provided in field document

Net 3 #762

SECONDARY EMERGENCY COORDINATOR

Jerry F. Bonn

To be provided in field document

Work: (702) 295-7341

Home: To be provided in field document

Net 3 #763; Net 15 #813

ALTERNATE EMERGENCY COORDINATOR

Allison T. Urbon

To be provided in field document

Work: (702) 295-7520

Home: To be provided in field document

Net 3 #768

DESCRIPTION OF WASTE HANDLED

Possible radioactive constituents and solvents contained in soil and decontamination water. Wastes are contained in B-25 boxes.

EMERGENCY RESPONSE CONTACTS

All emergency response teams can be contacted through the 900 Net Coordinator:

"MAYDAY, MAYDAY, MAYDAY" OR "911"

PRIMARY HOSPITAL:

Area 23 295-1702

SECONDARY HOSPITAL:

Area 6 295-3490

EMERGENCY MANAGEMENT OFFICE:

Area 23 295-1962

EMERGENCY CONTACT CENTER (24 hour contact numbers):

295-1381 or 295-1422

Bechtel Nevada

FIGURE 2. EMERGENCY/CONTINGENCY PLAN NOTICE
THAT WILL BE POSTED AT THE SITE.

Alternate Emergency Coordinator

Allison T. Urbon

Address to be provided in field document

Work: (702) 295-7520

Home: to be provided in field document

Net 3 #768

3.2 RESPONSIBILITIES

The ECs have the authority to commit the necessary resources to implement this plan. Personnel resources will be applied consistent with the requirements of Title 40, CFR § 1910.120. The ECs will remain thoroughly familiar with the following:

- All aspects of this Plan.
- All operations and activities under control at the Building 650 Leachfield.
- The locations and characteristics of the wastes handled.
- The locations of all the records.
- The Building 650 Leachfield layout.

In the event of an emergency, the EC will be responsible for the following:

- Stopping all operations, where applicable.
- Implementing this Plan.
- Contacting the 900 Radio Net Coordinator through the MAYDAY/911 system and making notification of the emergency.
- Notifying all Building 650 Leachfield personnel of the emergency.
- Acting as the incident coordinator.

- Attempting to stop, slow, or dike the discharge, if it can be done safely with the materials at hand.
- Providing the technical expertise necessary so that all responders are fully informed of the potential hazards.

The secondary EC will also be responsible for preparing, posting, and maintaining an emergency information sheet which provides the emergency response information such as telephone number for emergency response teams. The secondary EC is also responsible for personnel evacuation. In the event the secondary EC is not available the alternate EC will conduct these duties.

3.3 NOTIFICATION

The first person who becomes aware of an emergency at the Building 650 Leachfield shall immediately notify the proper authorities. Initial notification should be to their supervisor. If the emergency involves only a release of hazardous materials, the supervisor shall contact the EC who will initiate the necessary notification.

When the nature of the emergency is a fire, explosion, or involves personnel injury, the supervisor shall immediately notify the 900 Net Coordinator via the MAYDAY/911 system. The 900 Net Coordinator shall notify the Fire Protection Services Section and/or medical personnel, as required. The supervisor shall contact the EC.

If the first person to become aware of an emergency is not an ER employee and there are no ER personnel in the area, that person should follow the notification instructions posted at the perimeter of the Building 650 Leachfield.

3.4 RESPONSE PROCEDURES

There are two general classifications of incidents that could occur at the Building 650 Leachfield; fire and/or explosions and a spill of potentially hazardous materials. The initial response will be to protect human health and safety, and then the environment. The following actions will be taken:

- Work in the area will cease immediately.
- For fire: Contact the NTS Fire Protection and Emergency Medical Services by using the Net MAYDAY/911 system. In the case of a small, controllable fire, an ABC-type fire extinguisher can be used. If fire extinguisher is used, still contact NTS Fire Protection and Emergency Medical Services for follow-up requirements.
For spill: Attempt to stop, slow, or dike the discharge without compromising health and safety.
- Notify the cognizant EC who will obtain additional emergency response assistance as required. Excavate area. Verify that all personnel are out of area.
- Remove injured persons and administer first aid as required.
- Shut down operating equipment as practical.
- Complete appropriate documentation (Figure 3).

3.5 EVACUATION PLAN

Notification for personnel to evacuate the area will be received by an emergency signal. The EC will be in possession of a blow-horn or similar device that will signal all workers to leave the area and gather in the designated assembly area. Evacuation notification will be discussed in the tailgate safety briefings. All radio nets will be kept clear and be used to transmit emergency information only. The EC will be accountable for all personnel. The assembly area for evacuated personnel will be in the front (west) parking lot of Building 650. If cover must be taken, personnel will be instructed to enter Building 650 from the office entrance located on the west side of the building. A telephone is available at this location.

3.6 EMERGENCY DECONTAMINATION AND FIRST AID

If a worker is contaminated with a chemical substance, direct the worker to proceed at once to the temporary decontamination pad and drench the worker with copious amounts of water. Pay particular attention to the victim's eyes and face. Do not remove Personal Protective Equipment

Bechtel Nevada		INJURY/ILLNESS/INCIDENT REPORT			
<p>The supervisor completes this report immediately after being notified of any work-related accident or incident (injury, illness, vehicle accident, property damage, or near-miss incident) and forwards it to the assigned Safety Representative or the Occupational Safety Department within two working days. Be specific. Provide enough data that anyone reading the report, who is not familiar with the incident, can understand what happened. For near-miss incidents complete Parts I and IV. For accidents, injuries, or illnesses, complete the applicable blocks in Parts I, II, III and IV. (Instructions are listed on the back of the last copy.)</p>					
PART I					
1. Company:	2. Org./Dept. No.:	3. Date of Occurrence	4. Time (Military)	5. Location	6. Date Reported
7. Employee Name:		Social Security No.:	Job Classification:	Age:	☐ Male ☐ Female
8. Job Being Done at Time of Incident		9. Experience on This Job or This Equipment (Months) ☐ Under 3 ☐ 3 to 12 ☐ Over 12 10. Length of Present Employment (Months) ☐ Under 3 ☐ 3 to 12 ☐ Over 12			
PART II - INJURY/ILLNESS					
11. Body Part(s) Involved	☐ Left ☐ Right	12. Nature of Injury/Illness		13. Object/Equip./Substance Inflicting Injury	
PART III - VEHICLE OR PROPERTY DAMAGE					
14. Description of Vehicle/Equipment		15. Vehicle/Property No.:	16. Nature of Damage		
17. Activity in Progress at Time of Incident			18. Estimated Repair/Replacement Cost	19. Seat Belts Used ☐ Yes ☐ No ☐ N/A	
PART IV - DESCRIPTION OF EVENTS, ANALYSIS OF CAUSES, AND ACTIONS TO PREVENT RECURRENCE (☐ Mark if additional sheets are attached to accomplish adequate detail.)					
20. Describe clearly how the accident/incident occurred:					
21. What acts, failures to act and/or conditions contributed most directly to this accident/incident?					
22. What root causes, basic or fundamental reasons, caused the existence of these failures, acts and/or conditions?					
23. What action has or will be taken to prevent recurrence?					Implementation Date(s):
24. Preventable ☐ Yes ☐ No					25. Witnesses 1. _____ 2. _____ 3. _____
26. Investigating Supervisor:		Phone:	Signature:		Date:
27. Reviewing Safety Representative:		Phone:	Signature:		Date:
28. Manager:		Phone:	Signature:		Date:

FIGURE 3. INJURY/ILLNESS/ACCIDENT REPORT

(PPE) until all contamination has been thoroughly rinsed off. Contact the Occupational Medicine Department for assistance and advice. Move the victim to fresh air.

3.7 CLEAN-UP

Clean-up of potential hazardous waste will be conducted by personnel having the appropriate training and PPE as determined by the EC. Clean-up will meet all current applicable standards and regulations.

4.0 EMERGENCY SERVICES

4.1 ON-SITE CONDITION OF EMERGENCY SERVICES

No coordination agreement with off-site organizations has been made because services are available onsite to respond to all credible emergencies. These services include the NTS Fire Protection and Emergency Medical Services, medical services, laboratory services, and radiological and Industrial Hygiene services. These services are linked to the communications systems and have the capability to respond to emergencies involving hazardous, radioactive, or mixed waste constituents.

4.2 MEDICAL SERVICES

Emergency services are provided in Mercury 24 hours a day, seven days a week, by physicians, registered nurses, and paramedical personnel. All nurses and physicians are licensed by the state of Nevada paramedical qualifications which meet or exceed U. S. Department of Transportation Highway Safety Program requirements for emergency medical services.

4.3 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

The NTS Fire Station serves the NTS 24 hours a day, seven days a week. It is located in Building 650 adjacent to the work site and will be the primary response team. The NTS Fire Protection and Emergency Medical Services responds to spills, explosions, fires, and non-fire emergencies involving cleanup.

5.0 EMERGENCY EQUIPMENT

Emergency equipment includes equipment for fire control, emergency communications, spill control and cleanup, personnel protection, and first aid. The on-site emergency equipment is inspected monthly to ensure there is adequate inventory and that it is in good working order. Extra PPE, respiratory equipment, and environmental monitoring equipment are available. A list of the available equipment and the location(s) they can be found in Table 1.

TABLE 1— LIST OF AVAILABLE EQUIPMENT AND LOCATION.

EQUIPMENT	LOCATION
Fire Extinguishers (20 lb. ABC)	Each Vehicle, Office
First Aid Kits	Each Vehicle, Office
Eye Wash Station	Decon Pad
PPE: Tyvek Nitrile Gloves Rubber Boots Rain Suits Emergency Respirators Face Shield Safety Glasses	Office or Designated Field Vehicle
Portable Net 15 Radios with charger	Office and Site Supervisor Vehicle
Spill Response Materials: Blow Horn 55-gallon drums Spill Kit Absorbent Pads	Office or Designated Field Vehicle
Miscellaneous: Garbage Bags Buckets Brushes Soap Kimwipes Plastic Sandbags Duct Tape	Office or Designated Field Vehicle

6.0 REFERENCES

Reynold's Electrical and Engineering Co., Inc, 1993, Building 650 Leachfield Waste Discharge Line Sampling Activity, Mercury, NV.

U.S. Department of Energy, Nevada Operations Office, 1989, Offsite Radiation Exposure Review Project, Phase II Soils Programs, Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 1997, Characterization Report for the Area 23, Building 650 Leachfield, Corrective Action Unit No. 94, Nevada Test Site, Las Vegas, NV.

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