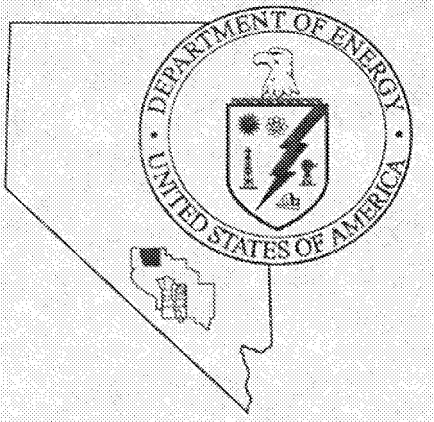
DOE/NV/11718--284

Nevada
Environmental
Restoration
Project



Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada

Controlled Copy No.:
Revision No.: 0

UNCONTROLLED

July 1999

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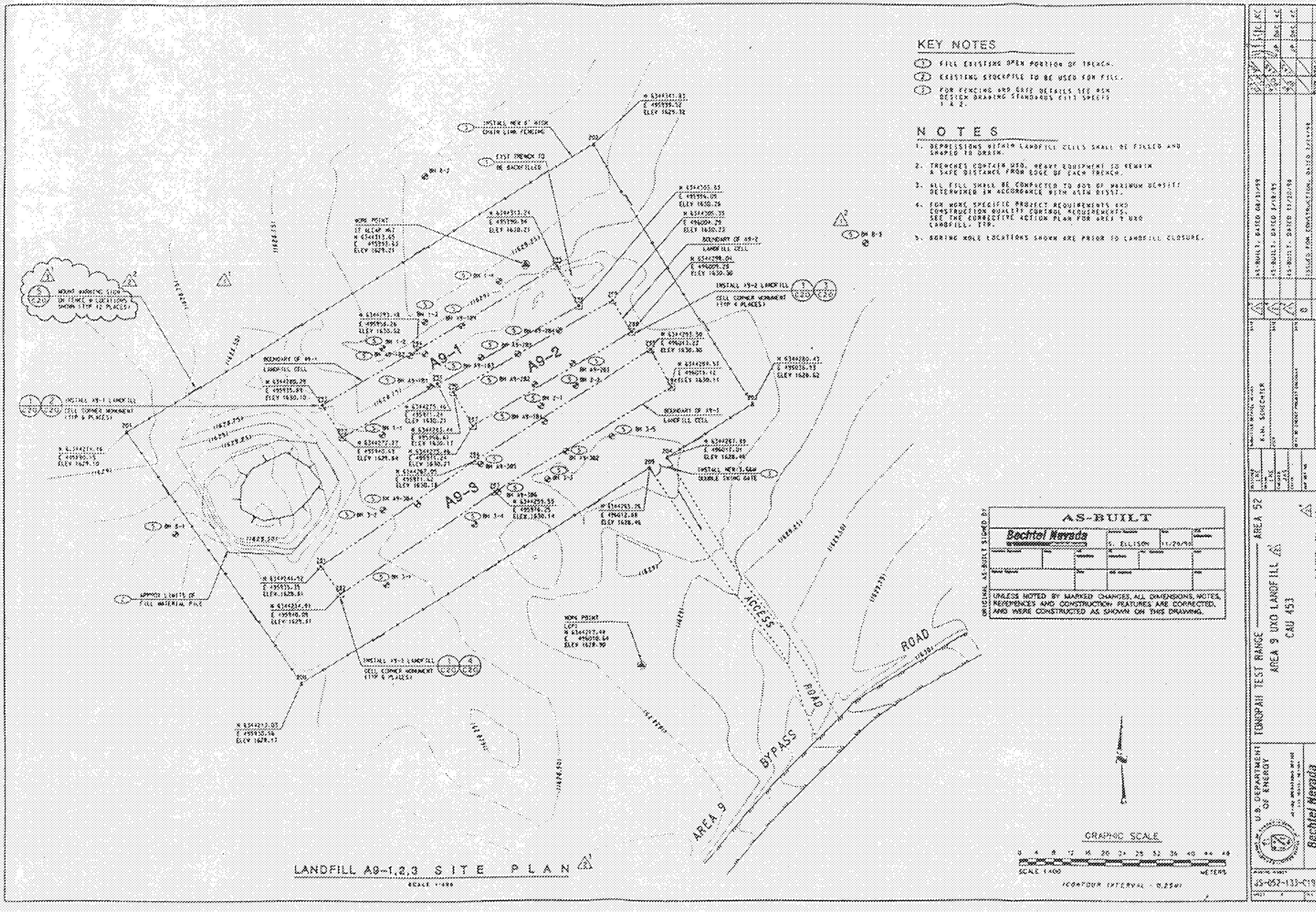
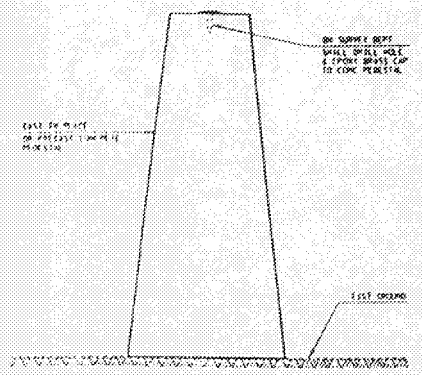
ERRATA SHEET

This errata sheet corrects two errors in Appendix A "As-Built Engineering Drawings" in the Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, Revision No. 0, July 1999 (DOE/NV/11718--284).

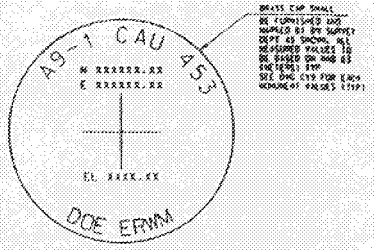
- In the fourth drawing of Appendix A (No. JS-052-133-C19 "Landfill A9-1,2,3 Site Plan"), a notation in the upper lefthand quadrant indicating warning signs mounted on the perimeter fence was incorrectly deleted. The warning signs do exist and are installed as shown. A replacement drawing with the error corrected is attached to this errata sheet.

- In the fifth drawing of Appendix A (No. JS-052-133-C20 "Monument Details"), the incorrectly worded warning sign was deleted but was not replaced with a correctly worded warning sign, which should read, "Danger, buried hazards including unexploded ordnance. Contact Security at 295-8285 prior to entry or any work at this site." A replacement drawing with the error corrected is attached to this errata sheet.


KEY NOTES
FILL EXISTING OPEN PORTION OF TRENCH.
EXISTING STOCKPILE TO BE USED FOR FILL.
NOTES
1. DEPRESSIONS WITHIN LANDFILL CELLS SHALL BE FILLED AND SHAPED TO DRAIN.
2. TRENCHES CONTAIN UXO. HEAVY EQUIPMENT IS TO REMAIN A SAFE DISTANCE FROM EDGE OF EACH TRENCH.
5. BORING HOLE LOCATIONS SHOWN ARE PRIOR TO LANDFILL CLOSURE.
A9-1
A9-2
A9-3
ACCESS ROAD
AREA 9 BYPASS ROAD
AS-BUILT
Bechtel Nevada
UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.
GRAPHIC SCALE
METERS
LANDFILL A9-1,2,3 SITE PLAN
U.S. DEPARTMENT OF ENERGY
TONOPAH TEST RANGE — AREA 52
AREA 9 UXO LANDFILL
CAU 453
LANDFILL A9-1,2,3 SITE PLAN
JS-052-133-C19



MONUMENT DETAIL ① C19
NOT TO SCALE



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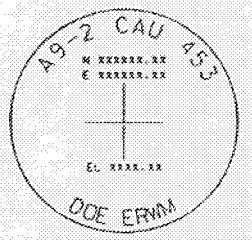

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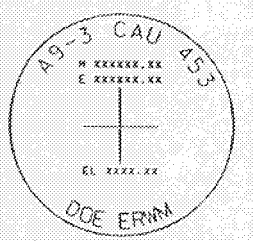

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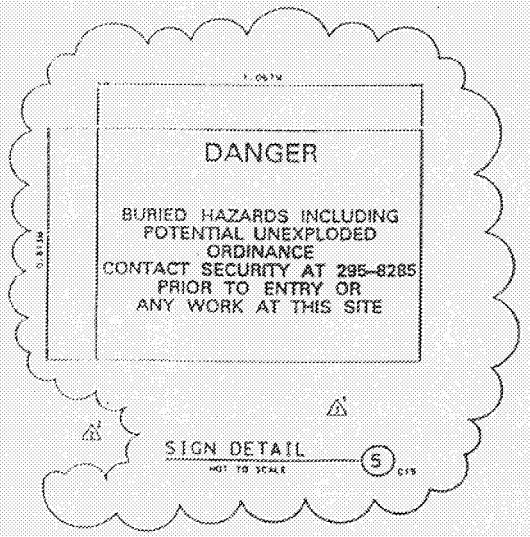

SIGN DETAIL ⑤ C19
NOT TO SCALE

AS-BUILT
Bechtel Nevada
UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.

U.S. DEPARTMENT OF ENERGY
Bechtel Nevada
TONOPAH TEST RANGE — AREA 52
AREA 9 UXO LANDFILL
CAU 453
MONUMENT DETAILS
NS-052-133-C20

DOE/NV/11718--284

Closure Report For Corrective Action Unit 453: Area 9 UXO Landfill Tonopah Test Range, Nevada

Prepared for
U. S. Department of Energy
Nevada Operations Office
Work Performed Under Contract No. DE-AC08-96NV11718

Controlled Copy No.:____

Revision: 0

July 1999

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Closure Report For
Corrective Action Unit 453:
Area 9 UXO Landfill
Tonopah Test Range, Nevada

Approved by: _____ Date: 7/27/99
Janet L. Appenzeller-Wing, Project Manager
Industrial Sites Subproject

Approved by: _____ Date: 7/27/99
Runore C. Wycoff, Project Manager
Nevada Environmental Restoration Project

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAP	Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
CR	Closure Report
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
FFACO	Federal Facilities Agreement and Consent Order
ft	feet
km	kilometer
m	meter
mi	mile
NDEP	Nevada Division of Environmental Protection
TTR	Tonopah Test Range
USAF	United States Air Force
UXO	unexploded ordnance

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ABSTRACT

This Closure Report provides the documentation for closure of the Area 9 UXO (Unexploded Ordnance) Landfill, Corrective Action Unit (CAU) 453. The site is located on the Tonopah Test Range, approximately 225 kilometers (140 miles) northwest of Las Vegas, Nevada.

CAU 453 consists of Corrective Action Site No. 09-55-001-0952 and is comprised of three individual waste cells designated as A9-1, A9-2, and A9-3. The three cells received wastes from daily operations at Area 9 and from range cleanups that were performed after weapons testing. Cell locations and contents were not well documented due to the unregulated disposal practices commonly associated with early landfill operations.

A corrective action investigation was performed in 1997 and results were reported in the Corrective Action Decision Document (Department of Energy [DOE], 1998b). Although cell contents were not investigated directly due to the potential for live unexploded ordnance, undisturbed soils beneath the cells were sampled using angled borings. Results from characterization indicated that hazardous waste was not found in the corrective action investigation.

The remedial alternative proposed in the Corrective Action Decision Document (DOE, 1998b) for CAU 453 was closure in place by administrative controls (Alternative 2). The following closure activities were completed following the Nevada Division of Environmental Protection (NDEP)-approved Corrective Action Plan (DOE, 1998c): the surface depression of cell A9-1 was backfilled and graded; warning signs, cell corner monuments, and perimeter fencing were installed; and use restrictions, which control access and prevent intrusive activities, were enacted.
Since closure activities for CAU 453 have been completed following the NDEP-approved Corrective Action Plan (DOE, 1998c) as documented in this Closure Report, the U.S. Department of Energy, Nevada Operations Office requests that:

- CAU 453 be moved from Appendix III to Appendix IV of the Federal Facility Agreement and Consent Order.

- NDEP provide a Notice of Completion to the U.S. Department of Energy, Nevada Operations Office.

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1.0 INTRODUCTION

The U.S. Department of Energy, Nevada Operations Office (DOE/NV) operates the Nevada Test Site and entered into a trilateral agreement with the state of Nevada and the U.S. Defense Threat Reduction Agency. The trilateral agreement, the Federal Facilities Agreement and Consent Order (FFACO), provides a framework for identifying, characterizing, remediating, and closing DOE/NV environmental sites in Nevada (FFACO, 1996). Corrective Action Units (CAUs) have been identified in the FFACO at the Tonopah Test Range (TTR) which is currently operated by the U.S. Department of Energy, Albuquerque Operations Office and the U.S. Air Force (USAF).

This Closure Report (CR) provides documentation for the closure of CAU 453: Area 9 UXO (Unexploded Ordnance) Landfill, as proposed in the Corrective Action Plan (CAP) (DOE, 1998c). The site is located on the TTR, approximately 225 kilometers (km) (140 miles [mi]) northwest of Las Vegas, Nevada (Figure 1).

CAU 453 consists of Corrective Action Site (CAS) No. 09-55-001-0952, which is comprised of three northeast-southwest trending waste cells designated as Cells A9-1, A9-2, and A9-3 (Figure 2). The cells were operated during different time intervals beginning in the early 1960s through 1993, and received waste generated from daily operations at Area 9 and from range cleanups which occurred after weapons testing. Cell contents were not well documented during early landfill operations, but site process knowledge indicates they were used for solid waste disposal, including disposal of UXO.

Details of the site history and results of previous investigations were reported in the Corrective Action Investigation Plan (CAIP) (DOE, 1997), and the Corrective Action Decision Document (CADD) (DOE, 1998b).

Site investigation results indicate the following:

- The cells were overlain by a soil cover at grade except for a surface depression in the northeast end of Cell A9-1 where landfill wastes were removed during a voluntary cleanup performed in 1995.

- The buried contents of the cells were not investigated due to the potential for live UXO. Instead, undisturbed soil from beneath the cells was sampled using angled borings. The results indicated the soil was not impacted by landfill wastes.

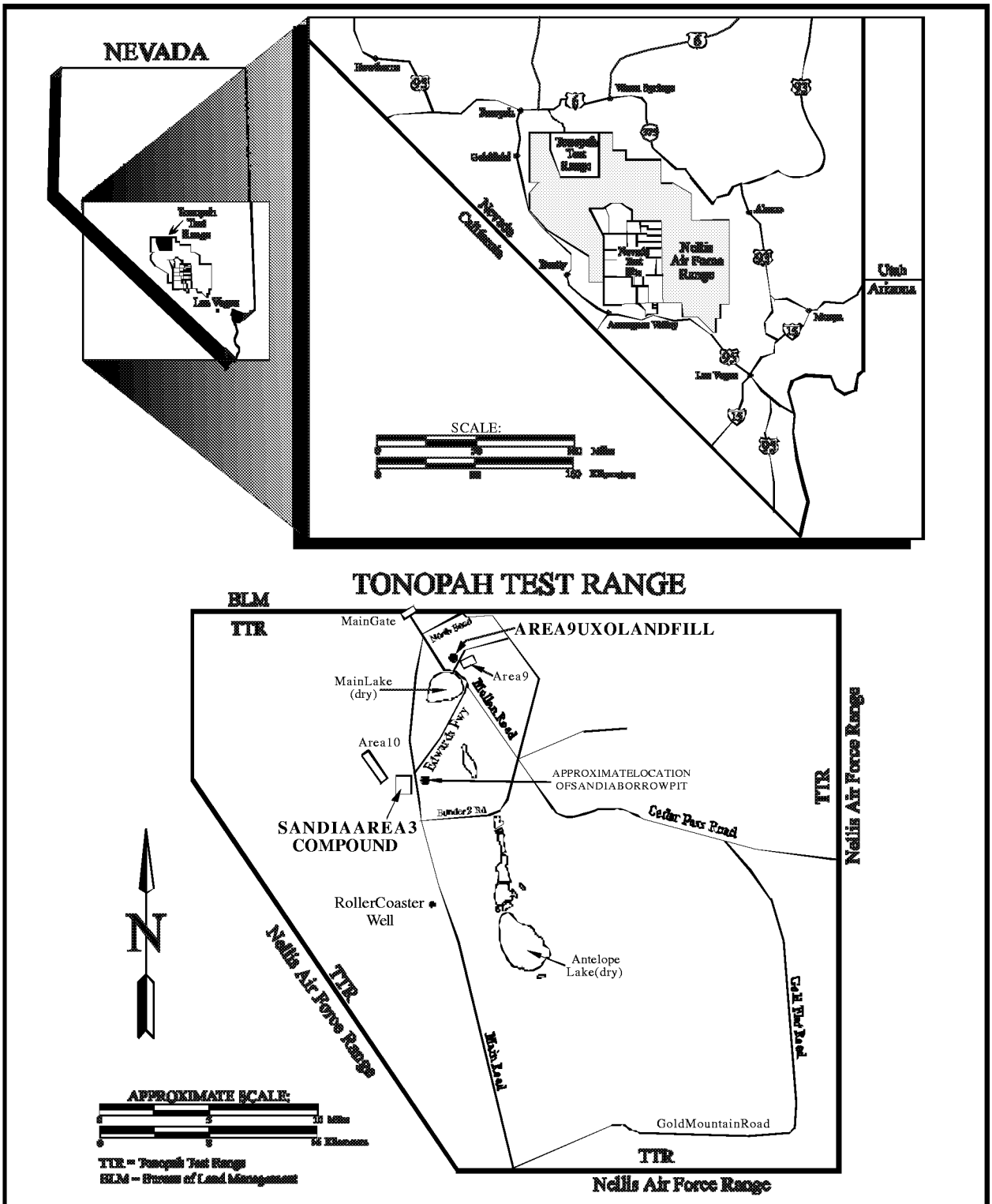

FIGURE 1
LOCATION OF THE AREA 9 UXO LANDFILL
ATTHETONOPAHTESTRANGE

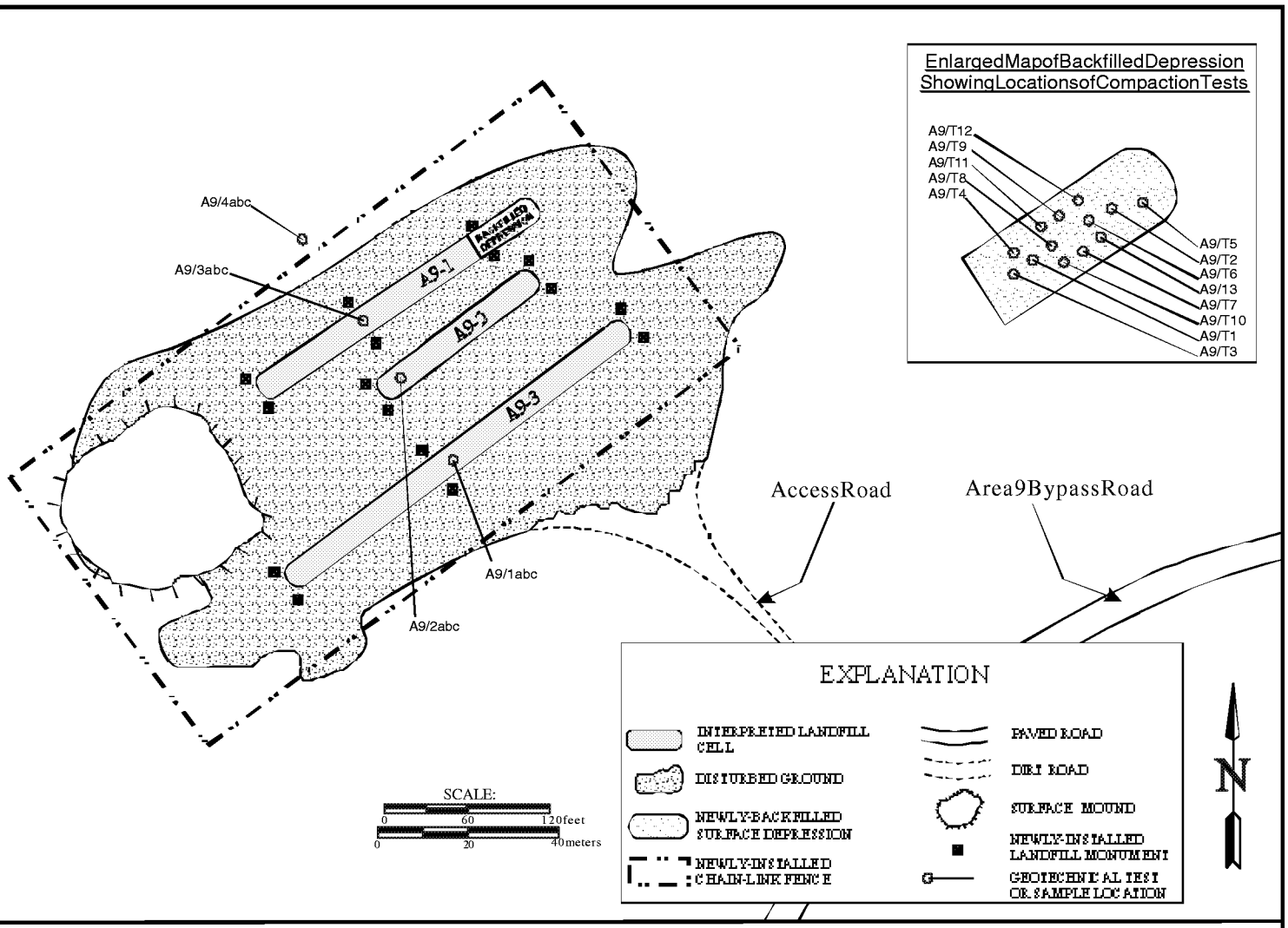

FIGURE 2
SITE PLAN FOR THE AREA 9 UXO LANDFILL

- Inadvertent contact with landfill debris and UXO needs to be prevented and the following measures were recommended: backfill the surface depression in the northeast end of Cell A9-1; install cell-corner monuments and perimeter fencing with warning signs; and enact use restrictions to control access and prevent intrusive activities.

The CADD (DOE, 1998b) stated that the Area 9 UXO Landfill qualified for a waiver from the requirements for a Class III Landfill. The CAP (DOE, 1998c) provided additional information requested by the NDEP to justify that additional capping of landfill cells was not necessary.

1.1 PURPOSE

The purpose of this CR is to:

- Document the closure activities and provide the information collected, as recommended in the CADD (DOE, 1998b) and proposed on the CAP (DOE, 1998c).
- Provide a Post-Closure Inspection Plan.
- Obtain a Notice of Completion from the NDEP.
- Recommend the movement of CAU 453 from Appendix III to Appendix IV of the FFACO.

1.2 SCOPE

The following closure activities were implemented for CAU 453:

- The surface depression of Cell A9-1 was backfilled and graded.
- Warning signs, perimeter fencing, and cell-corner monuments were installed, and administrative use restrictions were enacted.
- Closure activities were coordinated with the USAF because of the location of the site and use restrictions.
- This CR documents remedial closure activities, provides a Post-Closure Inspection Plan, and proposes closure of CAU 453.

1.3 CLOSURE REPORT CONTENTS

This CR is divided into the following sections:

- Section 1.0 - Introduction: Site background, purpose, scope, and report contents
- Section 2.0 - Closure Activities: Corrective action activities, deviations from the CAP as approved, corrective action schedule as completed, and site plan
- Section 3.0 - Waste Disposition
- Section 4.0 - Closure Verification Results
- Section 5.0 - Post-Closure Inspection Plan
- Section 6.0 - Summary, Conclusions, and Recommendations
- Section 7.0 - References
- Appendix A - As-Built Engineering Drawings
- Appendix B - Use Restriction Documentation
- Appendix C - Geotechnical Test Results
- Appendix D - Post-Closure Inspection Checklist

This report was developed using information and guidance from the following documents:

- Corrective Action Investigation Plan For CAU No. 453: Area 9 Landfill, Tonopah Test Range, Revision 0, DOE/NV--475, DOE, 1997.
- Corrective Action Decision Document For The Area 9 UXO Landfill, Tonopah Test Range, CAU 453, Revision 0, DOE/NV--497, DOE, 1998b.
- Corrective Action Plan For Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, DOE/NV--235, DOE, 1998c.
- Nevada Environmental Restoration Project, Health and Safety Plan, Revision 3, DOE, 1998.
- Nevada Environmental Restoration Project, Industrial Sites, Quality Assurance Project Plan, Nevada Test Site, Revision 1, DOE/NV--372, DOE, 1996.
- Nevada Environmental Restoration Project, Project Management Plan, Revision 0, DOE, 1994.

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2.0 CLOSURE ACTIVITIES

This section of the CR details the specific activities involved in the closure of CAU 453: Area 9 UXO Landfill. This section also includes the rationale for deviations from the approved CAP (DOE, 1998c) and provides a detailed schedule of site activities as completed.

2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

Closure activities performed at the Area 9 UXO Landfill include the following:

- Backfilling the surface depression in Cell A9-1.
- Construction of a perimeter chain-link fence.
- Installation of warning signs and cell monuments.
- Enactment of administrative use restrictions.

2.1.1 Site Preparation

2.1.1.1 Sandia Borrow Pit Materials

The Sandia Borrow Pit is located approximately 8 km (5 mi) south of the Area 9 UXO Landfill (see Figure 1 and Engineering Drawings in Appendix A for the location of the borrow pit). At the beginning of field closure activities, a soil sample of the borrow material was collected and submitted to Bechtel Nevada's Material Testing Laboratory for geotechnical testing. The results of geotechnical laboratory tests are discussed in Section 4.1.

Prior to placement of backfill, water was thoroughly mixed into the borrow material to control dust and to approximate the optimum moisture content for compaction purposes. Water for the closure activities was obtained from the Roller Coaster Well located approximately 18 km (11 mi) south of the Area 9 UXO Landfill (see Figure 1 and Engineering Drawings in Appendix A for the location of the well).

2.1.1.2 Geophysical Survey

Prior to beginning intrusive field activities (such as grading of the fence alignment, drilling of fence-post holes, and digging of shallow pits to place monuments), surface geophysical surveys were run to identify potential UXO within 3 meters (m) (10 feet [ft]) of the proposed perimeter fence, and within 1.5 m (5 ft) of proposed monuments. Using a Geonics EM-61 time-domain metal detector, electromagnetic anomalies were located and then investigated further with explosive ordnance personnel from Sandia National Laboratories using a Schonstedt GA-52C hand-held magnetic locator. No UXO was found.

2.1.1.3 Exclusion Zones

Due to the potential for UXO, cell locations were staked with flagging and all personnel were instructed to keep equipment, vehicles, and themselves away from the cells. The southwest edge of the surface depression, where it joined the remaining covered portion of Cell A9-1, was delineated with additional flagging so that personnel involved with backfilling activities were aware of the boundary with the area of potential UXO.

2.1.2 Backfilling of Cell A9-1

On July 28, 1998, borrow material was transported to the Area 9 UXO Landfill using belly-dump trucks. Backfill, compaction, and area grading in the Cell A9-1 surface depression was completed using a front-end loader. Approximately 92 cubic meters (120 cubic yards) of borrow material was placed as backfill during the Area 9 UXO Landfill closure activities.

Except for the southwest edge containing potential UXO, the Cell A9-1 surface depression was backfilled in 0.2-m (8-inch) lifts and compacted by repeated passes of the loader. For the southwest edge, the backfill was dropped or pushed into place without personnel or equipment contacting the ground. Because no compaction was performed over this area, the borrow material was mounded to an approximate height of 1.0 m (3.3 ft) above grade to account for future gradual consolidation. As a further precaution, a site worker was dedicated to monitor the work and alert the operator when the loader came within 1 m (3.3 ft) of the delineated area of potential UXO. Field compaction test results are discussed further in Section 4.2.

2.1.3 Installation of Perimeter Chain-Link Fence

Between July 28, 1998, and August 10, 1998, a perimeter chain-link fence was installed approximately 15 m (50 ft) beyond cell boundaries to provide sufficient room within the fenced area to operate equipment without disturbing the cells. The fence is approximately 1.8 m (6 ft) high and surrounds an area of approximately 128 m (420 ft) by 73 m (240 ft) (Figure 2).

2.1.4 Installation of Warning Signs and Monuments

Twelve warning signs were posted at intervals of 24 to 32 m (80 to 100 ft) on the perimeter fence. The warning signs read:

> **Danger, buried hazards including potential unexploded ordnance.**
> **Contact Security at 295-8285 prior to entry or any work at this site.**

A total of 16 monuments were installed to mark the boundaries of the three cells (Figure 2). The monuments were placed approximately 1.5 m (5 ft) beyond actual cell boundaries as a precaution so that potential UXO areas are clearly delineated. The monuments are embedded with brass survey markers which are stamped with waste cell identification. The monuments are truncated pyramids approximately 1.8 m (6 ft) high with a square base (approximately 0.6 m by 0.6 m [2 ft by 2 ft]) and a square top (approximately 0.3 m by 0.3 m [1 ft by 1 ft]). The monument bases are buried approximately 0.3 m (1 ft) below grade, leaving the tops approximately 1.5 m (5 ft) above the ground surface.

2.2 DEVIATIONS FROM CORRECTIVE ACTION PLAN AS APPROVED

No deviations from the approved CAP (DOE, 1998c) occurred.

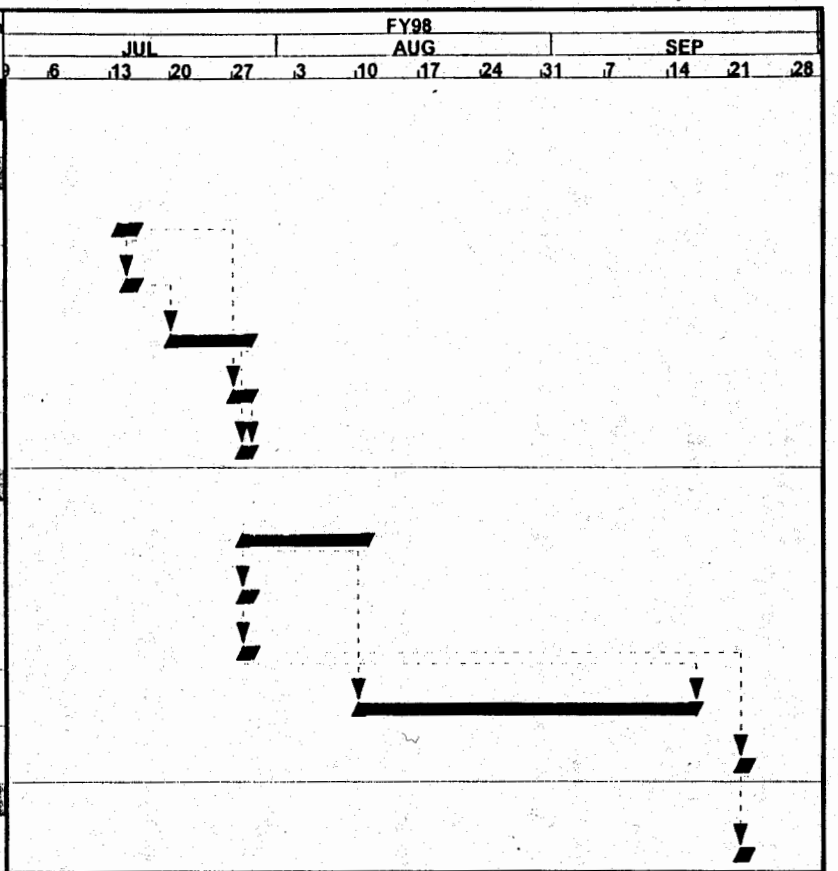
2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED

The corrective action activities were completed in a timely manner. A detailed schedule of the project activities as completed can be found in Figure 3.

2.4 SITE PLAN/SURVEY PLAT

As-built engineering drawings are included in Appendix A and indicate that the soil covers over the waste cells are flat to slightly sloped, with minimal potential for ponding. The topography in the vicinity of CAU 453 is shown in Figure 4 and demonstrates that the Area 9 UXO Landfill is located in an area slightly sloped to the southwest and is not located in a low-lying area where significant ponding or channeling of surface water is likely.

Activity ID	Activity Description	Actual Start	Actual Finish
453 Area 9 UXO Landfill/TTR			
Closure Report (CR)			
Mobilization/Site Preparation			
CK400A10	Conduct Geophysical Surveys for Potential UXO	14JUL98A	15JUL98A
CK400A20	Conduct Geotechnical Sampling of Existing Soils	15JUL98A	15JUL98A
CK400A30	Soil Cond. & Geo. Sampling of Sandia Borrow Pit	20JUL98A	28JUL98A
CK400A40	Conduct Geophysical Surveys for Potential UXO	27JUL98A	28JUL98A
CK400A50	Exclusion Zone Boundary Set-Up	28JUL98A	28JUL98A
Corrective Actions			
CK400D10	Install Perimeter Fencing	28JUL98A	10AUG98A
CK400D20	Backfill Open Portion of Landfill Cell A9-1	28JUL98A	28JUL98A
CK400D30	Field Compaction Tests of the Compacted Backfill	28JUL98A	28JUL98A
CK400D40	Install Monuments and Warning Signs	10AUG98A	16SEP98A
CK400D80	Field Compaction Tests of the Compacted Backfill	22SEP98A	22SEP98A
Demobilization			
CK400E10	Demobilization	22SEP98A	22SEP98A



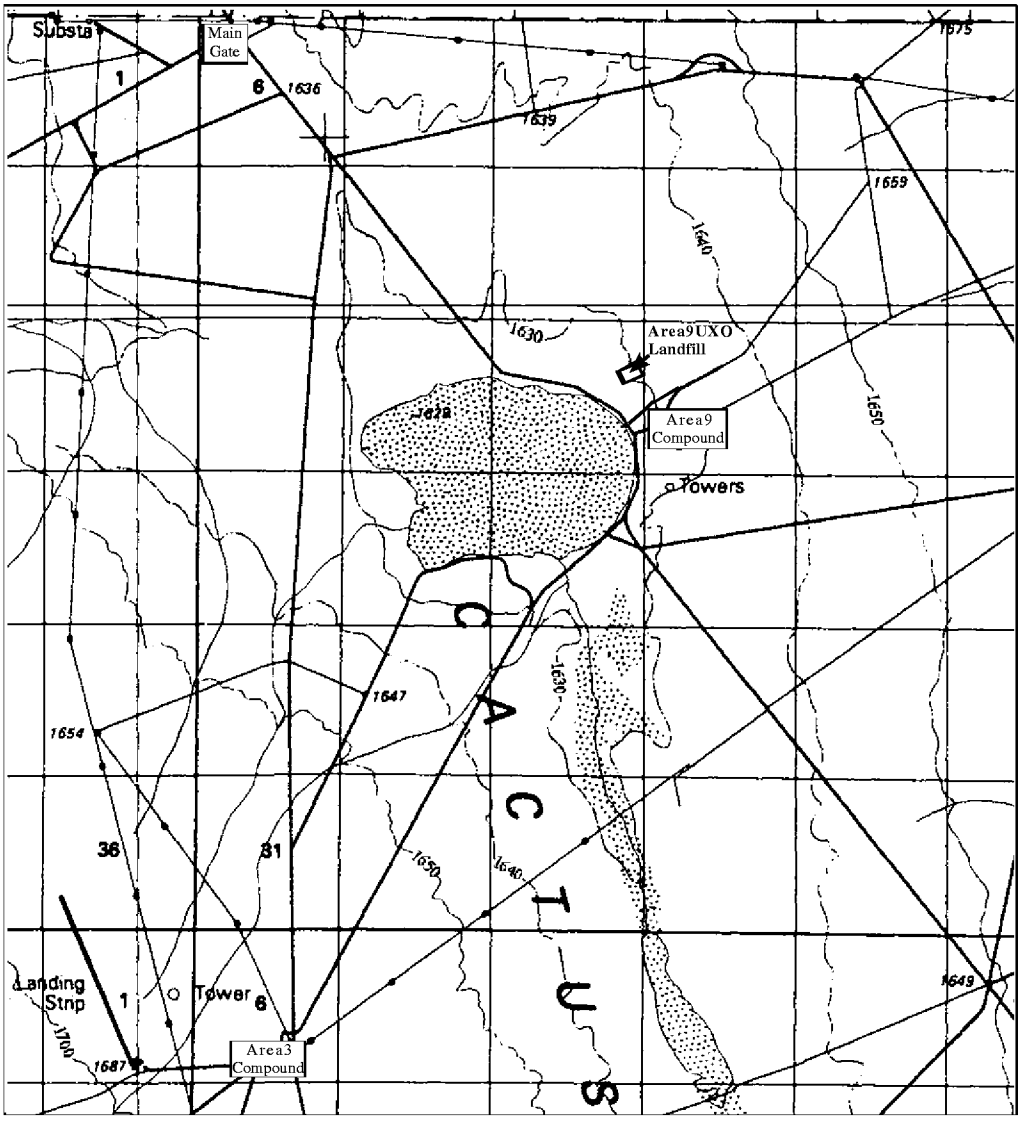
Project Start 01JUL98
Project Finish 30JUN98
Data Date 01JUL98
Run Date 03DEC98
© Primavera Systems, Inc.

Early Bar
Progress Bar
Critical Activity

453W

Sheet 1 of 1

Figure 3
CORRECTIVE ACTION SCHEDULE
AS COMPLETED



ModifiedfromCactusFlat,Nevada,1988,U.S.G.S.
1:100,000-scale(30'x60')metrictopographicmap.
Elevationsinmeters.

FIGURE 4
TOPOGRAPHY IN THE VICINITY OF THE AREA 9 UXO LANDFILL

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3.0 WASTE DISPOSITION

Based on available process knowledge, the waste inventory described in the CAIP (DOE, 1997), and analytical results provided in the CADD (DOE, 1998b), hazardous wastes were not expected. Hazardous wastes were neither found nor generated from closure activities at CAU 453.

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4.0 CLOSURE VERIFICATION RESULTS

4.1 GEOTECHNICAL TESTING OF EXISTING SOILS

A total of five soil samples were collected prior to backfilling activities. A sample of native soil was collected from a relatively undisturbed area adjacent to the Area 9 UXO Landfill, three samples were collected from existing landfill covers, and one sample was collected from the Sandia Borrow Pit. These soil samples were submitted to the Bechtel Nevada Materials Testing Laboratory for Proctor maximum density tests (American Society for Testing and Materials [ASTM], 1997a), sieve analyses (ASTM, 1997b), and permeability tests (ASTM, 1997c). In addition, 12 nuclear density tests (ASTM, 1997d) were done to determine the field compaction of native and landfill cover soils. Field test and sample collection locations are shown in Figure 2. Test results were reported in the geotechnical laboratory report (Appendix C) and are summarized in Table 1.

The results of the Proctor maximum density tests indicate that the borrow material exhibits greater maximum density (2,035 kilograms per cubic meter [kg/m^3] [127.0 pounds per cubic foot (lb/ft^3)]) than the existing landfill cover soils (1,821 to 1,994 kg/m^3 [113.8 to 124.0 lb/ft^3]) or the native soil (1,664 kg/m^3 [104.0 lb/ft^3]). The results of the nuclear density tests indicate that the native soil tends to be more compacted (88.1 to 92.2 percent maximum density) than the existing landfill cover soils (79.2 to 90.1 percent maximum density). Prior to permeability testing, samples of native and existing landfill cover soils were remolded to field conditions and samples of borrow material were recompacted to 85, 90, and 95 percent maximum density. The results of the permeability tests indicate that the native soil is more permeable (5.06×10^{-3} centimeters per second [cm/sec]) than the existing landfill cover soils (2.84×10^{-6} to 1.60×10^{-4} cm/sec) or the borrow material (8.82×10^{-4}, 3.80×10^{-5}, and 1.39×10^{-5} cm/sec, after recompaction to 85, 90, and 95 percent maximum density, respectively). Based on these data, preferential infiltration through the existing landfill covers is not expected.

4.2 FIELD COMPACTION TESTING OF BACKFILL

Field compaction (ASTM, 1997d) of backfilled borrow material was also tested by personnel from the Bechtel Nevada Materials Testing Laboratory. A total of 13 nuclear density tests were done, reported in the geotechnical laboratory report (Appendix C), and summarized in Table 1.

At the beginning of backfilling activities, a field performance specification was established to provide compaction of the backfill to at least 80 percent maximum density, as required in the CAP (DOE, 1998c). Similar fill and compaction activities using the same borrow material were occurring in surface depressions at CAU 424: Area 3 Landfill Complex, and a field performance specification was developed based on six nuclear density tests (two in compacted fill in A9-1, and four in compacted fill at Area 3). The tests were done on the bottom 0.2-m (8-in) lift after being compacted by one complete pass (once forward and once back) of the loader. The compaction values ranged from 88.1 to 98.2 percent, meeting the compaction requirement.

TABLE 1 - SUMMARY OF GEOTECHNICAL TEST RESULTS

TEST AND SAMPLE LOCATION[a]	REFERENCE NUMBER OF INDIVIDUAL TEST OR SOIL SAMPLE	PERCENT FIELD COMPACTION n	min	avg	max	PROCTOR DENSITY kg/m^3	lb/ft^3	REMOLDED PERCENT COMPACTION[b]	PERMEABILITY[c] cm/sec
EXISTING SOILS									
Native/undisturbed north of A9-1	A9/4a, 4b, 4c	3	88.1	89.9	92.2	1,664	104.0	93.3	5.06×10^{-3}
Waste Cell A9-1 existing landfill cover	A9/3a, 3b, 3c	3	80.9	84.7	90.1	1,984	124.0	84.7	2.84×10^{-6}
Waste Cell A9-2 existing landfill cover	A9/2a, 2b, 2c	3	79.2	80.4	82.1	1,994	121.5	80.0	1.53×10^{-4}
Waste Cell A9-3 existing landfill cover	A9/1a, 1b, 1c	3	85.1	85.7	86.7	1,821	113.8	86.3	1.60×10^{-4}
BORROW MATERIAL									
Sandia Borrow Pit	Sandia Borrow			NA		2,035	127.0	85.0	8.82×10^{-4}
Sandia Borrow Pit	Sandia Borrow			NA		2,035	127.0	90.0	3.80×10^{-5}
Sandia Borrow Pit	Sandia Borrow			NA		2,035	127.0	95.0	1.39×10^{-5}
PERFORMANCE SPECIFICATION									
Initial compaction of borrow material at Area 9 UXO Landfill and at Area 3 Landfill Complex	A9/T1, T2; A3-1a/T1, T2; A3-1/T3, T4	6	88.1	93.7	98.2	NA		NA	NA
COMPACTION VERIFICATION									
A9-1 backfill compaction	A9/T1 through T13	13	85.3	89.0	95.0	NA		NA	NA

Notes:

[a] = Location of Sandia Borrow Pit is shown in Figure 1. Area 9 sample and test locations are shown in Figure 2. Area 3 test locations are shown in Appendix C.

[b] = Samples of "existing soils" were remolded to field conditions for permeability tests.

[c] = Permeability value shown is the mean of final three readings of each test.

n = number of field compaction tests performed.

min = minimum test result value.

avg = average value of "n" tests.

max = maximum test result value.

During and following backfilling activities, an additional 11 nuclear density tests were done on compacted backfill to verify compaction at intermediate depths, and in the final top lift. The compaction ranged from 85.3 to 95.0 percent, meeting the compaction requirement. The permeability of the borrow material at 85 and 95 percent maximum density was determined to be 8.82×10^{-4} and 1.39×10^{-5} cm/sec, respectively, less than the native soil permeability of 5.06×10^{-3} cm/sec. Therefore, preferential infiltration through the backfilled depression is not expected.

4.3 USE RESTRICTIONS

Closure activities conducted at the site were coordinated with and acknowledged by the USAF (Appendix B). The Acknowledgement of CAU 453 from the USAF was received by the DOE/NV on July 15, 1998, the CAU Use Restriction Information Form was submitted by the DOE/NV to the USAF on April 29, 1999, and the Recordation of CAU 453 was send by the USAF to the DOE/NV on July 1, 1999.

The future use of any land related to this CAU, as described in Appendix B, is restricted from any DOE or USAF activity that may alter or modify the containment control as identified in this CR or other documentation for this CAU unless appropriate concurrence is obtained in advance.

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5.0 POST-CLOSURE INSPECTION PLAN

Post-closure inspection of the Area 9 UXO Landfill is intended to determine:

- If maintenance and repairs to the cell soil covers are needed.
- If maintenance and repairs to the perimeter fence, warning signs, and monuments are needed.
- If modifications to the administrative use restrictions are needed.
- If termination of post-closure inspection can be proposed in the future.

5.1 POST-CLOSURE INSPECTION

The inspection will consist of biannual (twice per year) visual inspections of:

- The cell soil cover for indications of subsidence, erosion, unauthorized excavation, etc.
- The perimeter fence, warning signs, and monuments for signs of wear, disturbance, etc.

The inspections will be documented on a checklist (Appendix D) and with photography, if needed. Repairs to the cell soil covers (placement and compaction of additional fill), perimeter fence, warning signs, and monuments (repair, reposition, and/or replacement) may be required. Additional, nonscheduled inspections may be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remedied within 90 days of discovery and documented in writing at the time of repair.

5.2 ANNUAL REPORTING

An annual post-closure inspection report will be prepared that will provide the observations and describe modifications and/or repairs made to the cover and cover area. The annual report will be prepared and submitted to the NDEP following the second inspection of each year that post-closure inspection is conducted. The annual reports will include the following information:

- Discussion of observations.
- Inspection checklist (Appendix D) and maintenance record.
- Conclusions and recommendations.

5.3 DURATION

The biannual inspections will be performed for five years after the closure activities have completed, and will be documented on inspection forms.

Completion of post-closure inspection of CAU 453 may be proposed by DOE/NV to NDEP within five years after the completion of closure activities. Completion of post-closure inspection may also be proposed by DOE/NV to NDEP if two consecutive years of visual inspections do not indicate the recurrence of subsidence depressions.

6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY AND CONCLUSIONS

The following summary and conclusions are made based upon the completed site closure activities and information provided in this report:

- The surface depression in Cell A9-3 was backfilled and compacted as specified in the CAP (DOE, 1998c).
- A perimeter fence, warning signs, and monuments were installed to restrict inadvertent access, to warn of buried wastes, and to document cell locations.
- Closure activities have been coordinated with the USAF.
- The CAU Use Restriction Information Form was submitted to the USAF on April 29, 1999, for recordation. On July 1, 1999, the Recordation of CAU 453 was returned to the DOE/NV.
- The field closure activities conducted at the site were completed in accordance to the approved CAP (DOE, 1998c).

6.2 RECOMMENDATIONS

Since the closure activities for CAU 453 have been completed in accordance with the NDEP-approved CAP (DOE, 1998c) as documented in this CR, the DOE/NV requests that:

- A Notice of Completion be provided by the NDEP to DOE/NV for the closure of CAU 453 (Area 9 UXO Landfill [CAS No.09-55-001-0952]).
- CAU 453 be moved from Appendix III to Appendix IV of the FFACO.
- DOE/NV will continue to perform post-closure inspection of the site as indicated in Section 5.0 of this CR.

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7.0 REFERENCES

American Society for Testing and Materials, see ASTM

ASTM, 1997a. Method D 1557-91: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort, 1997Annual Book of ASTM Standards, Volume 04.08, Soil and Rock (I): D 420 - D 4914.

ASTM, 1997b. Method D 422-63 (Reapproved 1990): Standard Test Method for Particle-Size Analysis of Soils, and Method D 1140-92: Standard Test Method for Amount of Material in Soils Finer Than the No. 200 Sieve, 1997 Annual Book of ASTM Standards, Volume 04.08, Soil and Rock (I): D 420 - D 4914.

ASTM, 1997c. Method D 2434-68 (Reapproved 1974): Standard Test Method for Permeability of Granular Soils (Constant Head), 1997 Annual Book of ASTM Standards, Volume 04.08, Soil and Rock (I): D 420 - D 4914.

ASTM, 1997d. Method D 2922-96: Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), 1997 Annual Book of ASTM Standards, Volume 04.08, Soil and Rock (I): D 420 - D 4914.

DOE, 1994. Nevada Environmental Restoration Project, Project Management Plan, Revision 0.

DOE, 1996. Nevada Environmental Restoration Project, Industrial Sites, Quality Assurance Project Plan, Nevada Test Site, Revision 1, DOE/NV--372.

DOE, 1997. Corrective Action Investigation Plan for CAU No. 453: Area 9 Landfill,Tonopah Test Range, Rev. 0, May 1997, DOE/NV--475 UC-700.

DOE, 1998a. Nevada Environmental Restoration Project, Health and Safety Plan, Revision 3.

DOE, 1998b. Corrective Action Decision Document for the Area 9 UXO Landfill, Tonopah Test Range, CAU 453, Rev. 0, March 1998, DOE/NV--497 UC-700.

DOE, 1998c. Corrective Action Plan for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, September 1998, DOE/NV-235 UC-702.

Federal Facilities Agreement and Consent Order, see FFACO

FFACO, 1996, Agreed to by the Nevada Division of Environmental Protection, the U.S. Department of Energy, and the U.S. Department of Defense.

U.S. Department of Energy, see DOE

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APPENDIX A

AS-BUILT ENGINEERING DRAWINGS

UNITED STATES DEPARTMENT OF ENERGY

NEVADA OPERATIONS OFFICE

LAS VEGAS, NEVADA

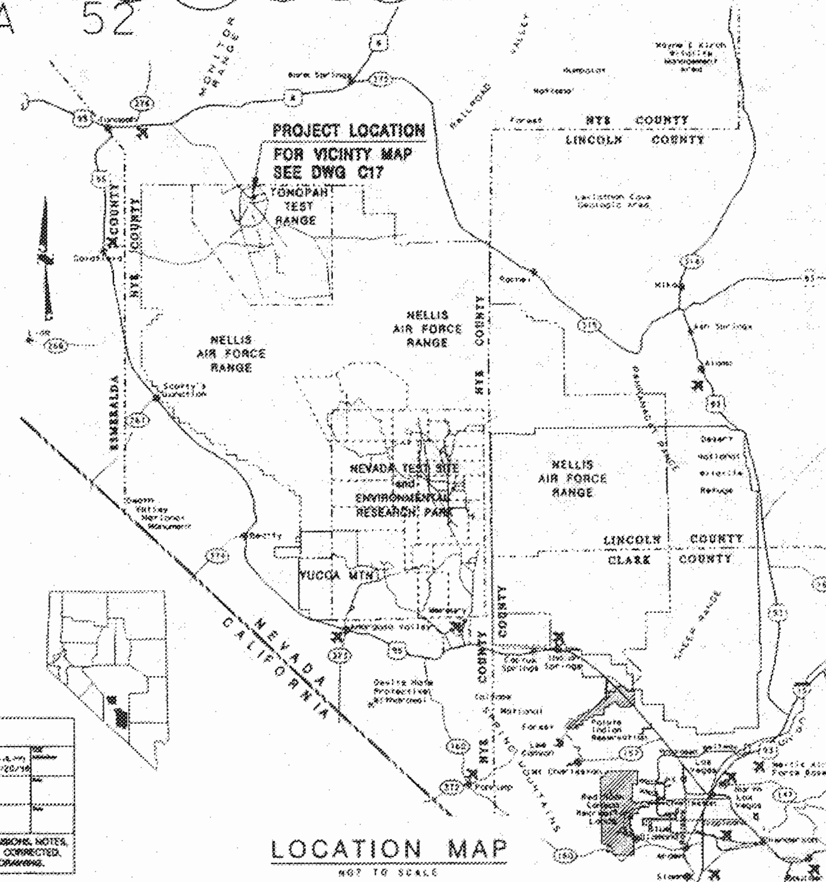
TONOPAH TEST RANGE

AREA 9 UXO LANDFILL CAU 453

AREA 52

INDEX

DRAWING NUMBER		DRAWING TITLE	STANDARD NUMBER	DESCRIPTION
TITLE				
JS-052-133-T4	REV 2	TITLE SHEET	STD T1 SHT 1	STANDARDS INDEX
			STD T2 SHT 1	GENERAL NOTES, DRAFTING SYMBOLS & ANSI STANDARDS
CIVIL				
JS-052-133-C17	REV 2	VICINITY MAP	STD C100 SHT 1	NOTES, LEGEND & SYMBOLS
JS-052-133-C18	REV 2	A9 LANDFILL COMPLEX SITE PLAN	STD C101 SHT 1	ABBREVIATIONS
JS-052-133-C19	REV 2	A9-1,2,3, SITE PLAN	STD C113 SHT 1 & 2	FENCING
JS-052-133-C20	REV 2	MONUMENT DETAILS		



LOCATION MAP

NOT TO SCALE

SCOPE OF WORK

THIS PROJECT INCLUDES THE RESTORATION OF 1 EXISTING LANDFILL LOCATION. WORK WILL PRIMARILY INVOLVE FILLING OF LOCAL SURFACE DEPRESSION WITH NATIVE SOILS, AND INSTALLATION OF NEW FENCE AROUND ENTIRE SITE.

AREA EVALUATION FOR RESIDUAL SOIL CONTAMINATION SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH DOE/NV 5480.1 AND THE CONTRACTOR'S STANDARD OPERATING PROCEDURES PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

PROJECT NOTES

ALL CONSTRUCTION FEATURES, MATERIALS, TESTS AND DETAILS SHALL CONFORM TO "USDOE/NV STANDARD SPECIFICATIONS, DATED DECEMBER 1994". FOR STANDARDS REFERENCED ON THIS PROJECT, SEE THE NTS OVERHEAD POWER LINE STANDARDS AND THE RSN DESIGN DRAWING STANDARDS.

AS-BUILT

Bechtel Nevada

N/A

11/20/98

UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.

U.S. DEPARTMENT OF ENERGY

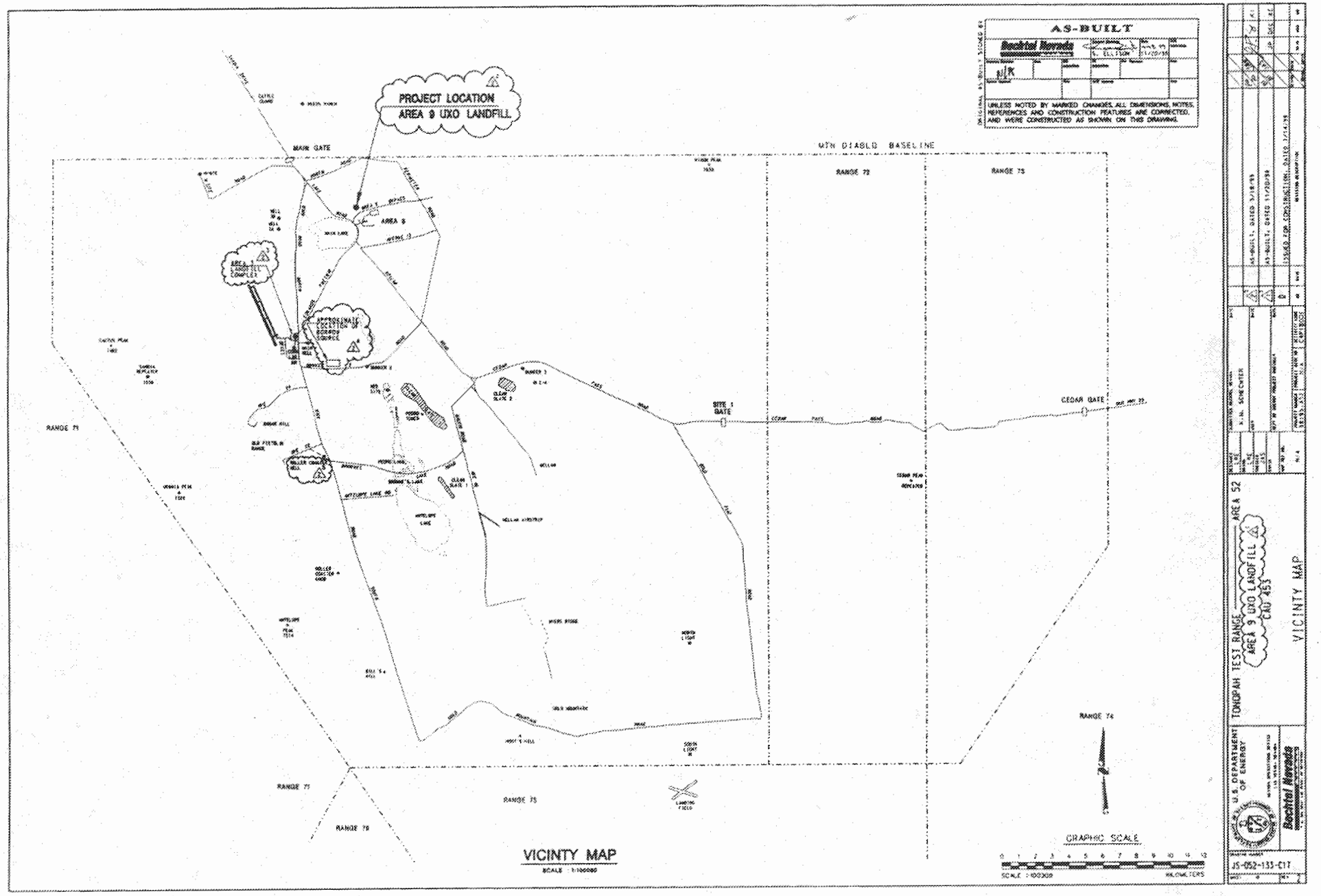
TONOPAH TEST RANGE AREA 52

AREA 9 UXO LANDFILL CAU 453

TITLE SHEET

Bechtel Nevada

JS-052-133-T4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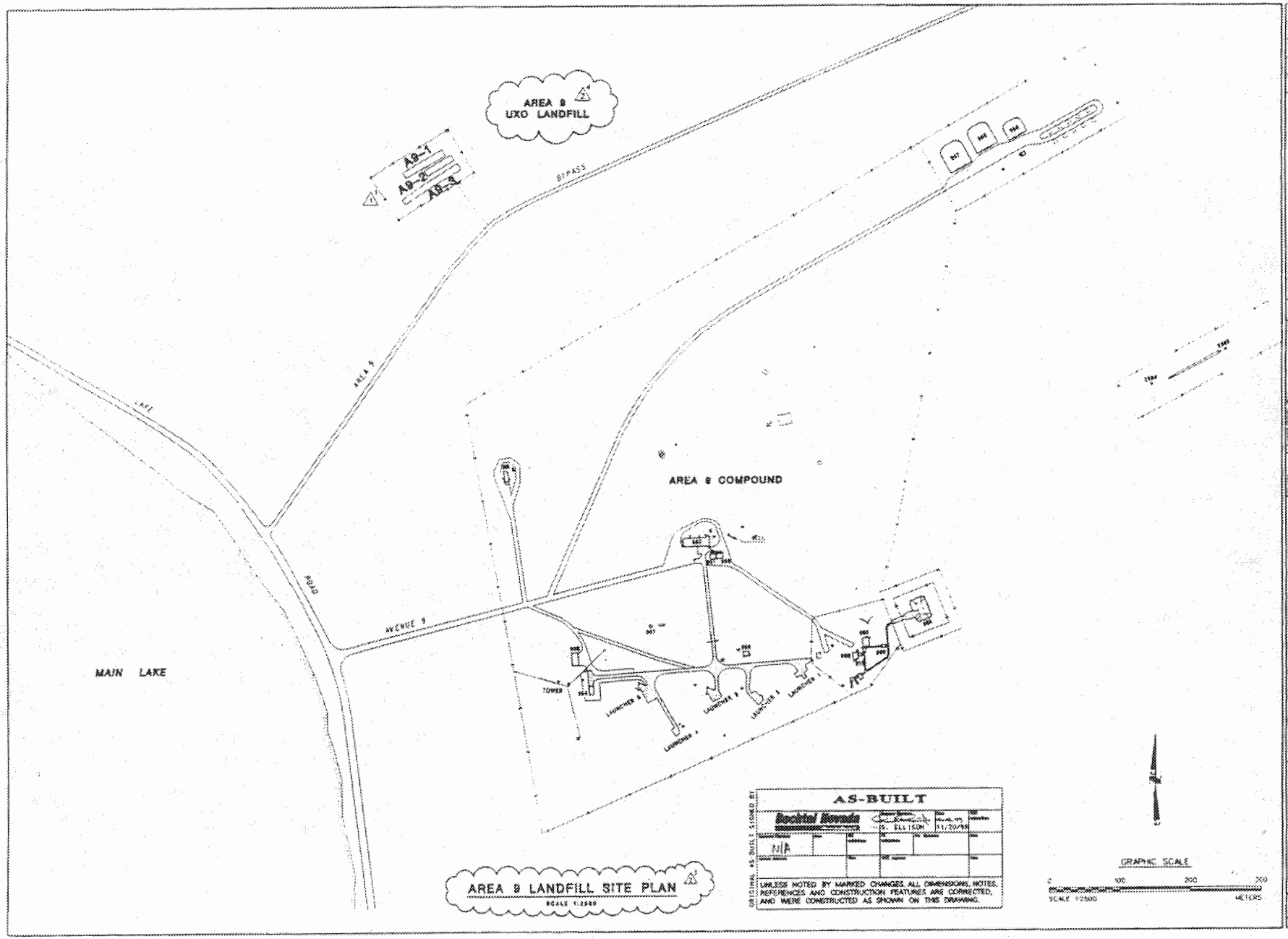
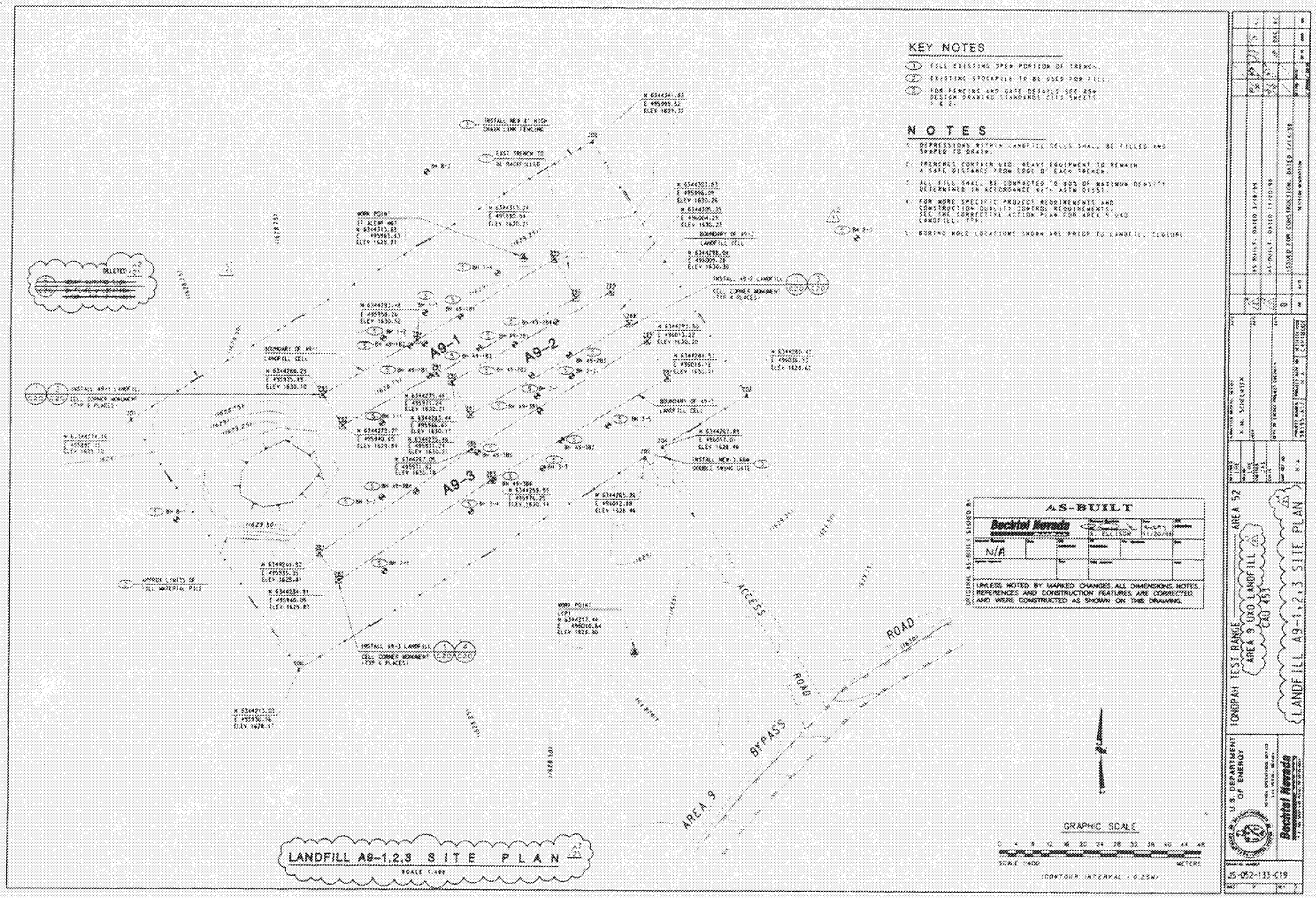
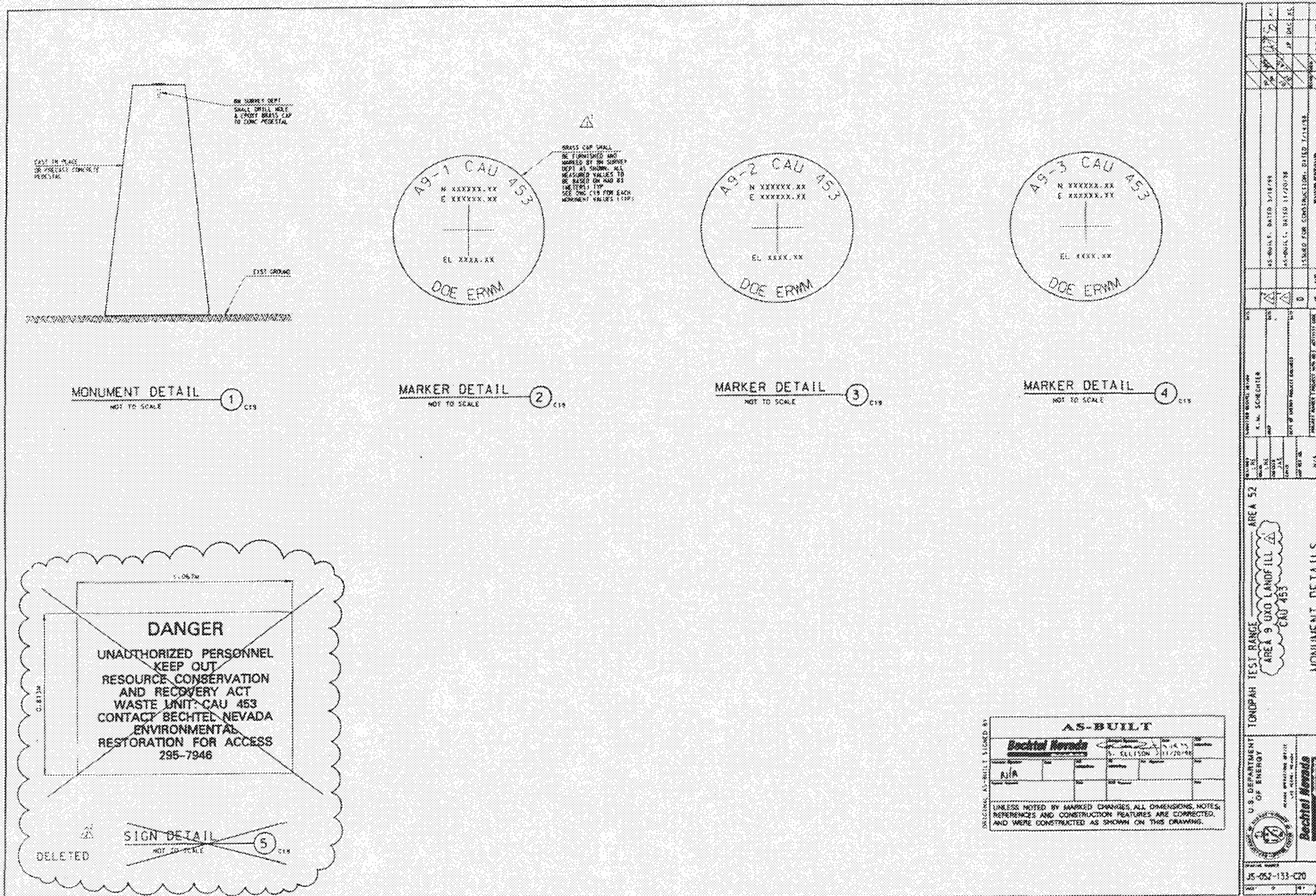
PROJECT LOCATION
AREA 9 UXO LANDFILL
MAIN GATE
MTN DIABLO BASELINE
RANGE 72
RANGE 73
RANGE 74
RANGE 75
RANGE 76
AREA 9
SITE 5 GATE
CEDAR GATE
VICINITY MAP
SCALE 1:100000
GRAPHIC SCALE
TONOPAH TEST RANGE
AREA 9 UXO LANDFILL
CNU 453
AREA 52
VICINITY MAP
U.S. DEPARTMENT OF ENERGY
Bechtel Nevada
J5-052-133-C17


AREA 8
UXO LANDFILL
AB-1
AB-2
AB-3
BYPASS
AREA 9
LAKE
ROAD
AVENUE 9
MAIN LAKE
AREA 8 COMPOUND
TOWER
LAUNCHER 6
LAUNCHER 5
LAUNCHER 4
LAUNCHER 3
LAUNCHER 2
LAUNCHER 1
AS-BUILT
Bechtel Nevada
S. ELLISON
11/20/98
N/A
UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.
GRAPHIC SCALE
0
100
200
300
METERS
SCALE 1:2500
AREA 9 LANDFILL SITE PLAN
SCALE 1:2500
U.S. DEPARTMENT OF ENERGY
TONOPAH TEST RANGE
AREA 9 UXO LANDFILL
CAU 453
AREA 52
AREA 9 LANDFILL SITE PLAN
Bechtel Nevada
NS-052-133-C18


KEY NOTES
NOTES
A9-1
A9-2
A9-3
ACCESS ROAD
AREA 9 BYPASS ROAD
AS-BUILT
Bechtel Nevada
GRAPHIC SCALE
LANDFILL A9-1,2,3 SITE PLAN
AREA 9 UXO LANDFILL
CAU 453
AREA 52
TONOPAH TEST RANGE
U.S. DEPARTMENT OF ENERGY
45-052-133-C19



BN SURVEY DEPT SHALL DRILL HOLE & EPOXY BRASS CAP TO CONC PEDESTAL
CAST IN PLACE OR PRECAST CONCRETE PEDESTAL
EXIST GROUND
MONUMENT DETAIL
NOT TO SCALE
1
C19
BRASS CAP SHALL BE FURNISHED AND MARKED BY BN SURVEY DEPT AS SHOWN. ALL MEASURED VALUES TO BE BASED ON NAD 83 (METERS) TYP
A9-1 CAU 453
N XXXXXX.XX
E XXXXXX.XX
EL XXXX.XX
DOE ERWM
MARKER DETAIL
NOT TO SCALE
2
C19
A9-2 CAU 453
N XXXXXX.XX
E XXXXXX.XX
EL XXXX.XX
DOE ERWM
MARKER DETAIL
NOT TO SCALE
3
C19
A9-3 CAU 453
N XXXXXX.XX
E XXXXXX.XX
EL XXXX.XX
DOE ERWM
MARKER DETAIL
NOT TO SCALE
4
C19
DANGER
UNAUTHORIZED PERSONNEL
KEEP OUT
RESOURCE CONSERVATION
AND RECOVERY ACT
WASTE UNIT: CAU 453
CONTACT BECHTEL NEVADA
ENVIRONMENTAL
RESTORATION FOR ACCESS
295-7946
SIGN DETAIL
NOT TO SCALE
5
C19
DELETED
AS-BUILT
Bechtel Nevada
S. ELLISON
11/20/98
N/A
UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.
ORIGINAL AS-BUILT SIGNED BY
AS-BUILT, DATED 3/18/99
AS-BUILT, DATED 11/20/98
ISSUED FOR CONSTRUCTION, DATED 7/14/98
K.M. SCHECHTER
U.S. DEPARTMENT OF ENERGY
TONOPAH TEST RANGE AREA 52
AREA 9 UXO LANDFILL
CAU 453
MONUMENT DETAILS
Bechtel Nevada
JS-052-133-C20

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APPENDIX B

USE RESTRICTION DOCUMENTATION

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USAF ACKNOWLEDGEMENT OF CAU 453

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 99TH AIR BASE WING (ACC)
NELLIS AIR FORCE BASE, NEVADA

Colonel Michael F. Fukey
Director, Environmental Management
4349 Duffer Dr., Ste. 1601
Nellis AFB NV 89191-7007

JUL 15 1998

Ms. Runore C. Wycoff,
Director, Environmental Restoration Division
DOE Nevada Operations Office
P.O. Box 98518
Las Vegas NV 89193-8518

ACKNOWLEDGEMENT OF CORRECTIVE ACTION UNIT (CAU) 453

Nellis Air Force Base (Nellis) has reviewed the U. S. Department of Energy's (DOE) Corrective Action Decision Document for Corrective Action Unit (CAU) 453. Nellis has the right to use this land for military purposes under Public Law 99-606, as amended, and Public Land Order 7131.

Nellis can only impose restrictions on its use of the land while under its control. For the above referenced site, these self-imposed restrictions by Nellis on its use of this section of NAFR (hereafter "use restrictions") will be placed in the Geographic Information System (GIS) for NAFR. The Range Management Office (RMO) at Nellis will administer use restrictions to ensure that there are institutional controls on users of the NAFR, ensuring that they are aware of these restrictions located in the GIS, which should assist the DOE in working with the state regulators on Corrective Active Units. If RMO determines that a proposed mission use would not comport with existing use restrictions or that there is a proposed transfer/relinquishment of all or part of the NAFR, it will notify DOE of the proposed transfer/relinquishment. Then DOE must contact the regulators or transferee/returnee to address and resolve cleanup issues associated with the proposed use or transfer/relinquishment.

If RMO needs to modify its use restrictions thereby causing additional cleanup requirements to meet the proposed land-use scenarios, then DOE will clean the restricted land up to the level to meet the proposed land-use scenarios in an expeditious manner so that RMO may amend the use restrictions.

Also, Nellis and DOE are negotiating a Memorandum of Understanding that will address DOE's future obligations to clean up any of its contaminated areas.

Please contact me at 652-6828 if you have any questions.

Sincerely

Michael F. Fukey

MICHAEL F. FUKEY, Colonel, USAF

cc:
HQAWC RMO/RML
HQ AWFC/JAV

CAU USE RESTRICTION FORM

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065666

Department of Energy
Nevada Operations Office
P. O. Box 98518
Las Vegas, NV 89193-8518

APR 29 1999

BECHTEL CCR RECD
MAY 3 10 38 AM '99

Colonel Michael F. Fukey, USAF
Director, Environmental Management
4349 Duffer Dr., Ste. 1601
Nellis AFB, NV 89191-7007

SUBMITTAL OF THE *CAU USE RESTRICTION INFORMATION FORMS FOR* CAU 424 AREA 3 LANDFILL COMPLEX, AND CAU 453 AREA 9 UNEXPLODED ORDNANCE LANDFILL

Please find enclosed copies of the subject CAU Use Restriction Information forms for your office to file in your GIS system. All sites are on the Tonopah Test Range. The use restriction coordinates are in UTM NAD83 (meters). A reply letter is requested stating that the use restriction information has been recorded.

If you have any questions, please contact Kevin J. Cabble, of my staff, at (702) 295-5000.

Sincerely,

Runore C. Wycoff, Director
Environmental Restoration Division

ERD:KJC

Enclosure:
As stated

ENV 3

cc w/o encl:
Col. G. C. Carpenter, USAF Liaison, DOE/NV, Las Vegas, NV
P. J. Liebendorfer, NDEP, Carson City, NV
K. K. Beckley, NDEP, Carson City, NV
M. D. McKinnon, NDEP, Las Vegas, NV
J. J. Johnson, NDEP, Carson City, NV
D. A. Bedsun, DTRA, Mercury, NV
Vern Gabbard, SNL/TTR, Tonopah, NV
R. B. Jackson, IT, Las Vegas, NV
J. M. Moore, IT, Las Vegas, NV
L. F. Roos, IT, Las Vegas, NV
D. K. Cowser, BN, Las Vegas, NV
D. D. Madsen, BN, Mercury, NV
K. A. Hoar, ESHD, DOE/NV, Las Vegas, NV
R. C. Wycoff, ERD, DOE/NV, Las Vegas, NV
J. L. Appenzeller-Wing, ERD, DOE/NV, Las Vegas, NV
P. L. Hall, EM, DOE/NV, Las Vegas, NV

CAU Use Restriction Information

CAU Number/Description: CAU 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada

Applicable CAS Numbers/Descriptions: CAS No. 09-55-001-0952

Contact (organization/project): DOE/NV Industrial Sites Project Manager

Surveyed Area (UTMs): UTM Zone 11 (NAD83)

North fence corner:	4,189,596.17 mN,	525,324.66 mE;
East fence corner:	4,189,534.92 mN,	525,362.28 mE;
South fence corner:	4,189,467.16 mN,	525,256.18 mE;
West fence corner:	4,189,527.97 mN,	525,215.56 mE.

Site Monitoring Requirements: Visual inspection as specified by the closure documentation

Required Frequency (quarterly, annually?): inspections biannually to commence six months after the closure concurrence date

Survey Date 11/20/98 **Survey Method (GPS, etc.)** GPS **Datum** NAD 83

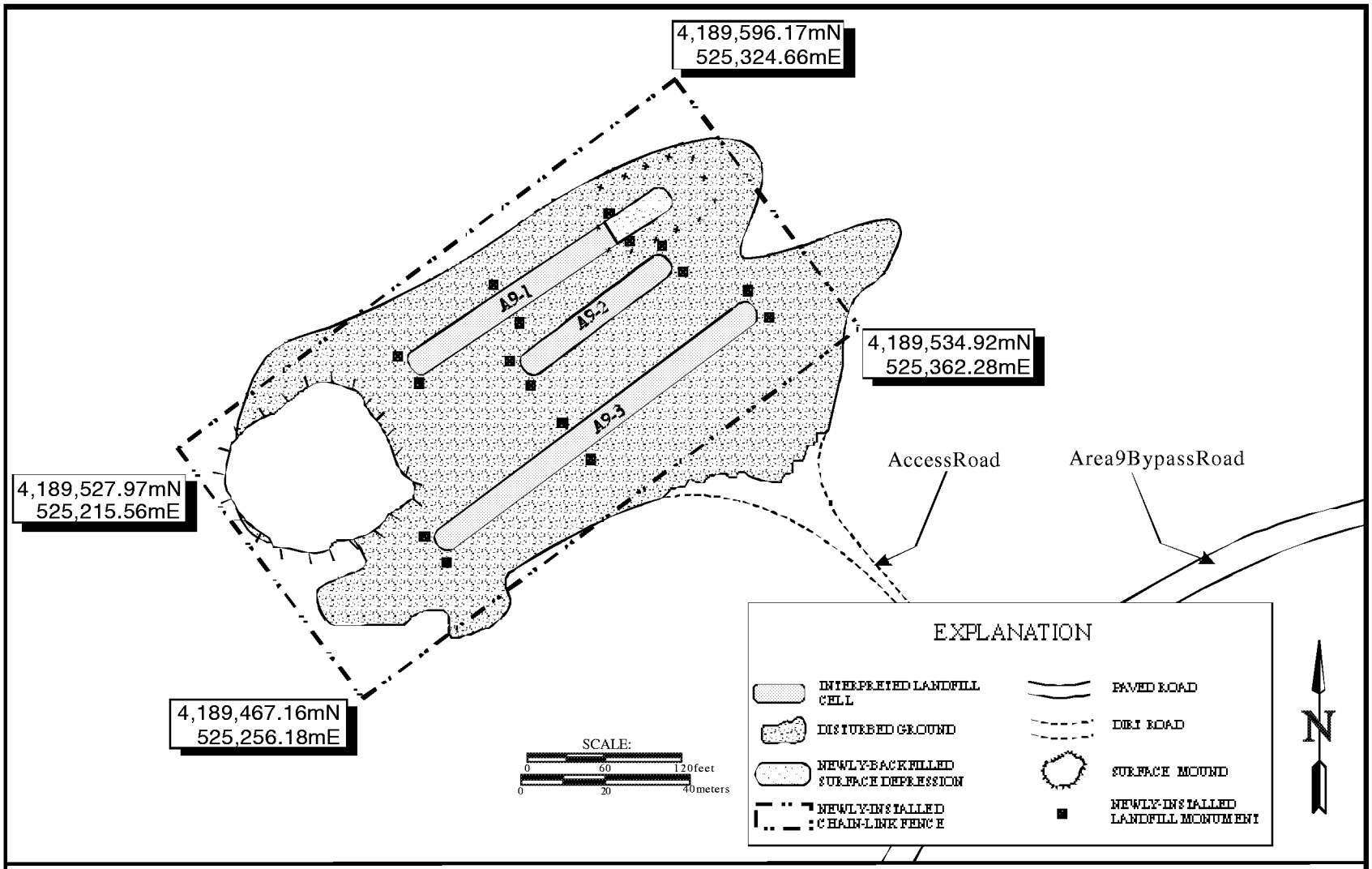
Use Restrictions

The future use of any land related to this Corrective Action Unit (CAU), as described by the above surveyed location, is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the CAU Closure Report or other CAU documentation unless appropriate concurrence is obtained in advance.

Comments: See the Closure Report for additional information on the condition of the site(s) and any monitoring and/or inspection requirements.

Submitted By: Kevin Cabble **Date:** 4/28/99

Attachments: Survey Map



USE RESTRICTION COORDINATES
FOR TTR AREA 9 UXO LANDFILL
(CAU 453, CAS 09-55-001-0952)

USAF RECORDATION OF CAU 453

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 99TH AIR BASE WING (ACC)
NELLIS AIR FORCE BASE, NEVADA

Ms. Eloisa Hopper
Director, Environmental Management
4349 Duffer Drive, Suite 1601
Nellis AFB NV 89191-7007

1 Jul 99

Ms. Runore C. Wycoff
Director, Environmental Restoration Branch
DOE Nevada Operations Office
P.O. Box 98518
Las Vegas NV 89193-8518

RECORDATION OF CORRECTIVE ACTION UNIT (CAU) 453

Nellis Air Force Base (Nellis) has recorded the corrected U.S. Department of Energy's Use Restriction Information for Corrective Action Unit (CAU) 453. The information was placed in the Geographic Information System at the Range Management Office, Nellis.

Please contact me at 652-4123 if you have any questions.

Sincerely,

Eloisa V. Hopper

ELOISA HOPPER
Director, Environmental Management

cc:
NDEP
HQ AWC RMO/RML
HQ AWFC/JAV

Global Power For America

APPENDIX C

GEOTECHNICAL TEST RESULTS

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September 02, 1998

TRNS:MTL:037:98

David D. Madsen
Bechtel Nevada
P. O. Box 98521, M/S NST 306
Las Vegas, NV 89193-8521

TONOPAH TEST RANGE AREA 9

As requested, the Materials Testing Laboratory performed Modified Proctor, Gradation, Nuclear Moisture / Density, and Permeability tests. On 07/15/98 3 Nuclear Moisture / Density tests were taken at 4 different locations. A Proctor sample was also taken at each location. Proctors were also run on the Sandia stockpile and the Sandia borrow pit. Permeability tests were remolded and run on the average Moisture and Density for each location. Permeabilities were also run for the Sandia stockpile and borrow pit material remolded at 85%, 90%, and 95% optimum density at optimum moisture content. On 07/28/98 compaction tests were taken on Sandia borrow pit material being placed in the open pit area. The test results are attached.

If you have any further questions concerning this matter or need additional tests, please contact me at 295-6813.

Charles Dale Herrington

Charles Dale Herrington
Senior Technologist

Enclosures
As Stated

bc: V. Thummala, w/encl.
C. Obi, w/encl.
MTL Files, w/encl. (C4T2C0DE)

APPENDIX

1. NUCLEAR MOISTURE / DENSITY
2. PROCTOR
3. GRADATION
4. GRADATION CURVE
5. COMPACTION TESTS
6. PERMEABILITY

NUCLEAR DENSITY ASTM D2922-96 CAMPBELL MC-2/MC-3 TROXLER	BECHTEL NEVADA MATERIALS TESTING LABORATORY P. O. BOX 98521, M/S NTS188 LAS VEGAS, NV 89193-8521	C4T2CODE 07/31/98 1 OF 1

Requested by D. MADSEN User/Agency BECHTEL Material NATIVE

Project TTR AREA 9 Location of Tests SEE BELOW

Tested by D. HERRINGTON Date Tested 07/15/98 Checked by

Information given to CURTIS OBI By D. HERRINGTON How VERBAL Date 07/15/98

LABORATORY NO		1906	1907	1908		1909	1910	1911	
TEST LOCATION		A9/1A	A9/1B	A9/1C		A9/2A	A9/2B	A9/2C	
DEPTH OF PROBE		BS	BS	BS		BS	BS	BS	
DEPTH OF TESTS	Below grade	Grade	Grade	Grade	AVG	Grade	Grade	Grade	AVG
WET DENSITY-PCF		100.0	99.9	100.6	100.2	101.1	100.6	103.9	101.9
DRY DENSITY-PCF		96.9	97.1	98.7	97.6	96.9	96.2	99.8	97.6
MOISTURE %		3.3	2.8	2.0	2.7	4.3	4.6	4.1	4.3
MAX DENSITY-PCF		113.8	113.8	113.8		121.5	121.5	121.5	
OPTIMUM MOISTURE %		6.3	6.3	6.3		8.6	8.6	8.6	
PERCENT COMPACTION		85.1	85.3	86.7	85.7	79.8	79.2	82.1	80.4

LABORATORY NO		1912	1913	1914		1915	1916	1917	
TEST LOCATION		A9/3A	A9/3B	A9/3C		A9/4A	A9/4B	A9/4C	
DEPTH OF PROBE		BS	BS	BS		BS	BS	BS	
DEPTH OF TESTS	Below grade	Grade	Grade	Grade	AVG	Grade	Grade	Grade	AVG
WET DENSITY-PCF		108.1	104.2	116.8	109.7	97.5	93.3	94.4	95.1
DRY DENSITY-PCF		103.2	100.3	111.7	105.1	95.9	91.6	92.9	93.5
MOISTURE %		4.7	3.9	4.5	4.4	1.7	1.9	1.6	1.7
MAX DENSITY-PCF		124.0	124.0	124.0		104.0	104.0	104.0	
OPTIMUM MOISTURE %		10.1	10.1	10.1		5.0	5.0	5.0	
PERCENT COMPACTION		83.2	80.9	90.1	84.7	92.2	88.1	89.3	89.9

GAUGE NO 23205 DATE OF STANDARDIZATION 07/15/98 VALUE OF M 633

STANDARDIZATION D 2944

REMARKS: AVERAGE MOISTURE AND DENSITY WILL BE USED FOR PERMEABILITY.

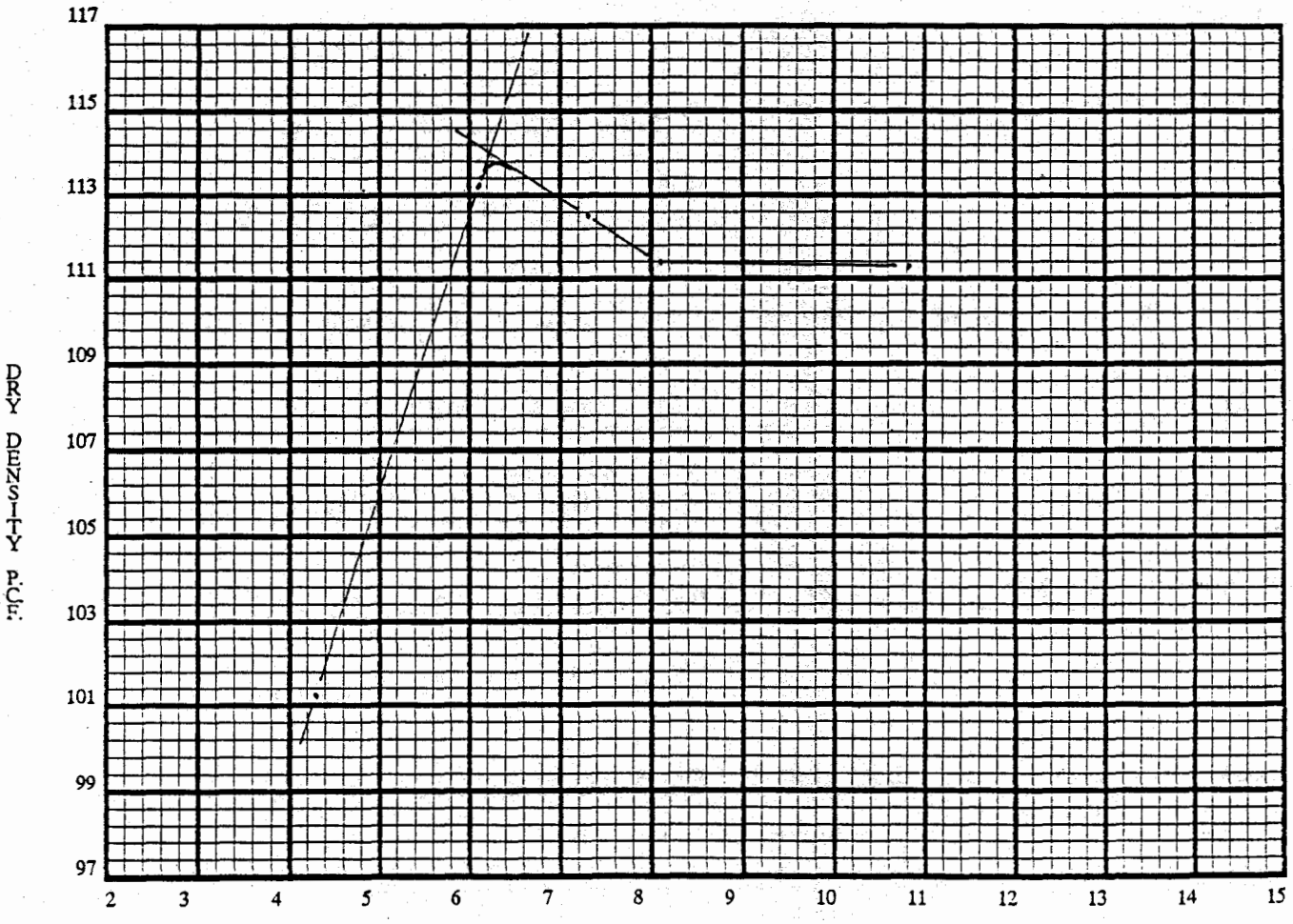
PROCTOR TEST
ASTM D 1557–91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

CHARGE # C4T2CODE
LAB # 1902
DATE 07/25/98

Project: TTR AREA 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. HERRINGTON Date sampled: 07/15/98 Material: A9/1 A,B,C
Tested by: D. HERRINGTON Date tested: 07/24/98 Checked by:

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	6929.0	6941.5	7039.5	6434.0	6946.5	N/A
2	Wt. mold	2843.3	2843.3	2843.3	2843.3	2843.3	N/A
3	Wt. wet soil	4085.7	4098.2	4196.2	3590.7	4103.2	N/A
4	Wet Density, PCF	120.1	120.5	123.3	105.5	120.6	N/A
5	Moisture Tare #	H	A	B	F	115.0	N/A
6	Wt wet soil + tare	1014.3	971.1	1124.9	1005.3	1295.9	N/A
7	Wt dry soil + tare	956.8	899.6	1017.0	964.8	1209.4	N/A
8	Wt moisture	57.5	71.5	107.9	40.5	86.5	N/A
9	Wt tare	16.9	16.8	16.8	17.0	16.9	N/A
10	Wt dry soil	939.9	882.8	1000.2	947.8	1192.5	N/A
11	**% Moisture**	**6.1**	**8.1**	**10.8**	**4.3**	**7.3**	**N/A**
12	**Dry Density, PCF**	**113.2**	**111.4**	**111.3**	**101.2**	**112.5**	**N/A**



MAX. DENSITY = 113.8 PCF
OPT. MOISTURE = 6.3 %

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

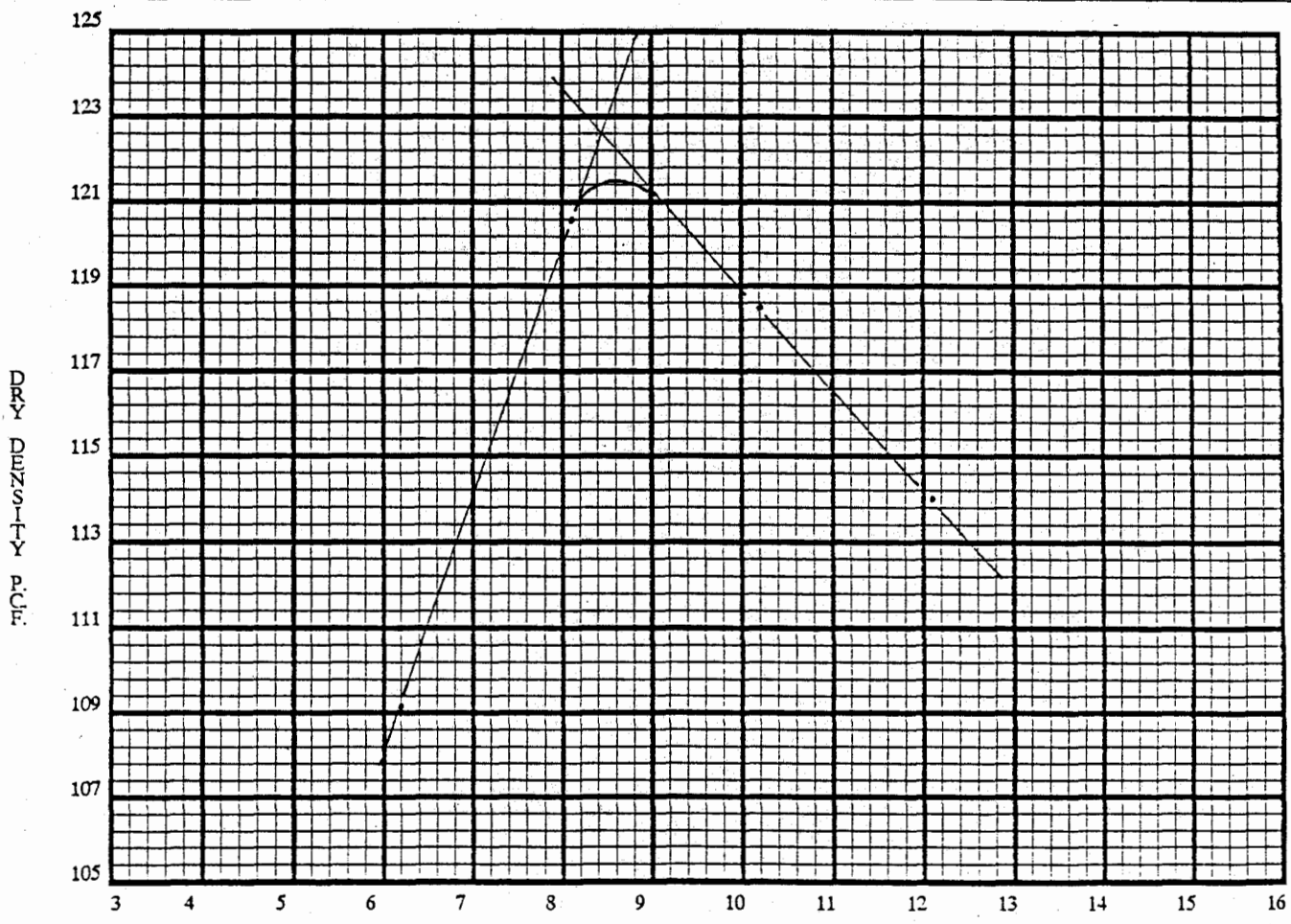
PROCTOR TEST
ASTM D 1557-91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

CHARGE # C4T2CODE
LAB # 1903
DATE 07/25/98

Project: TTR AREA 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. HERRINGTON Date sampled: 07/15/98 Material: A9/2 A,B,C
Tested by: D. HERRINGTON Date tested: 07/24/98 Checked by: V. Quinn

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	7280.3	7283.3	6783.5	9980.5	N/A	N/A
2	Wt. mold	2843.3	2843.3	2843.3	5634.9	N/A	N/A
3	Wt. wet soil	4437.0	4440.0	3940.2	4345.6	N/A	N/A
4	Wet Density, PCF	130.4	130.5	115.8	127.7	N/A	N/A
5	Moisture Tare #	108.0	C	G	108.0	N/A	N/A
6	Wt wet soil + tare	1249.7	1115.6	966.2	1236.3	N/A	N/A
7	Wt dry soil + tare	1157.2	1014.3	910.9	1104.9	N/A	N/A
8	Wt moisture	92.5	101.3	55.3	131.4	N/A	N/A
9	Wt tare	16.9	17.0	17.0	16.9	N/A	N/A
10	Wt dry soil	1140.3	997.3	893.9	1088.0	N/A	N/A
11	**% Moisture**	**8.1**	**10.2**	**6.2**	**12.1**	**N/A**	**N/A**
12	**Dry Density, PCF**	**120.6**	**118.5**	**109.1**	**114.0**	**N/A**	**N/A**



MAX. DENSITY = 121.5 PCF
OPT. MOISTURE = 8.6 %

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

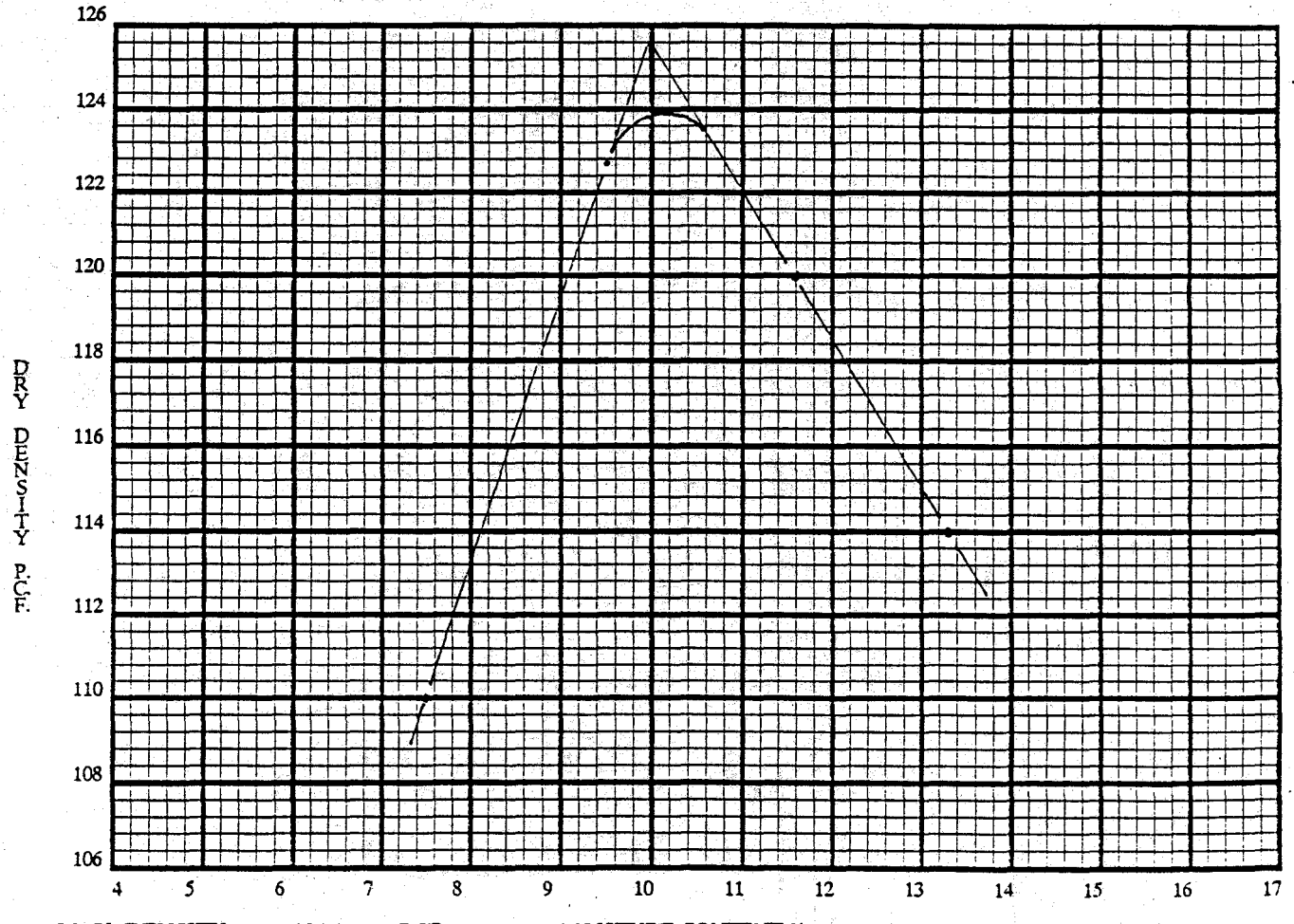
PROCTOR TEST
ASTM D 1557-91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

CHARGE # C4T2CODE
LAB # 1904
DATE 07/25/98

Project: TTR AREA 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. HERRINGTON Date sampled: 07/15/98 Material: A9/3 A,B,C
Tested by: D. HERRINGTON Date tested: 07/24/98 Checked by: V. Dennis

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	7414.4	7399.8	6868.9	10030.0	N/A	N/A
2	Wt. mold	2843.3	2843.3	2843.3	5634.9	N/A	N/A
3	Wt. wet soil	4571.1	4556.5	4025.6	4395.1	N/A	N/A
4	Wet Density, PCF	134.4	133.9	118.3	129.2	N/A	N/A
5	Moisture Tare #	110.0	D	H	109.0	N/A	N/A
6	Wt wet soil + tare	1390.5	1087.3	1022.6	1322.7	N/A	N/A
7	Wt dry soil + tare	1271.6	976.0	952.0	1169.5	N/A	N/A
8	Wt moisture	118.9	111.3	70.6	153.2	N/A	N/A
9	Wt tare	17.0	17.0	16.8	16.9	N/A	N/A
10	Wt dry soil	1254.6	959.0	935.2	1152.6	N/A	N/A
11	**% Moisture**	**9.5**	**11.6**	**7.5**	**13.3**	**N/A**	**N/A**
12	**Dry Density, PCF**	**122.7**	**120.0**	**110.0**	**114.0**	**N/A**	**N/A**



MAX. DENSITY = 124.0 PCF
OPT. MOISTURE = 10.1 %

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

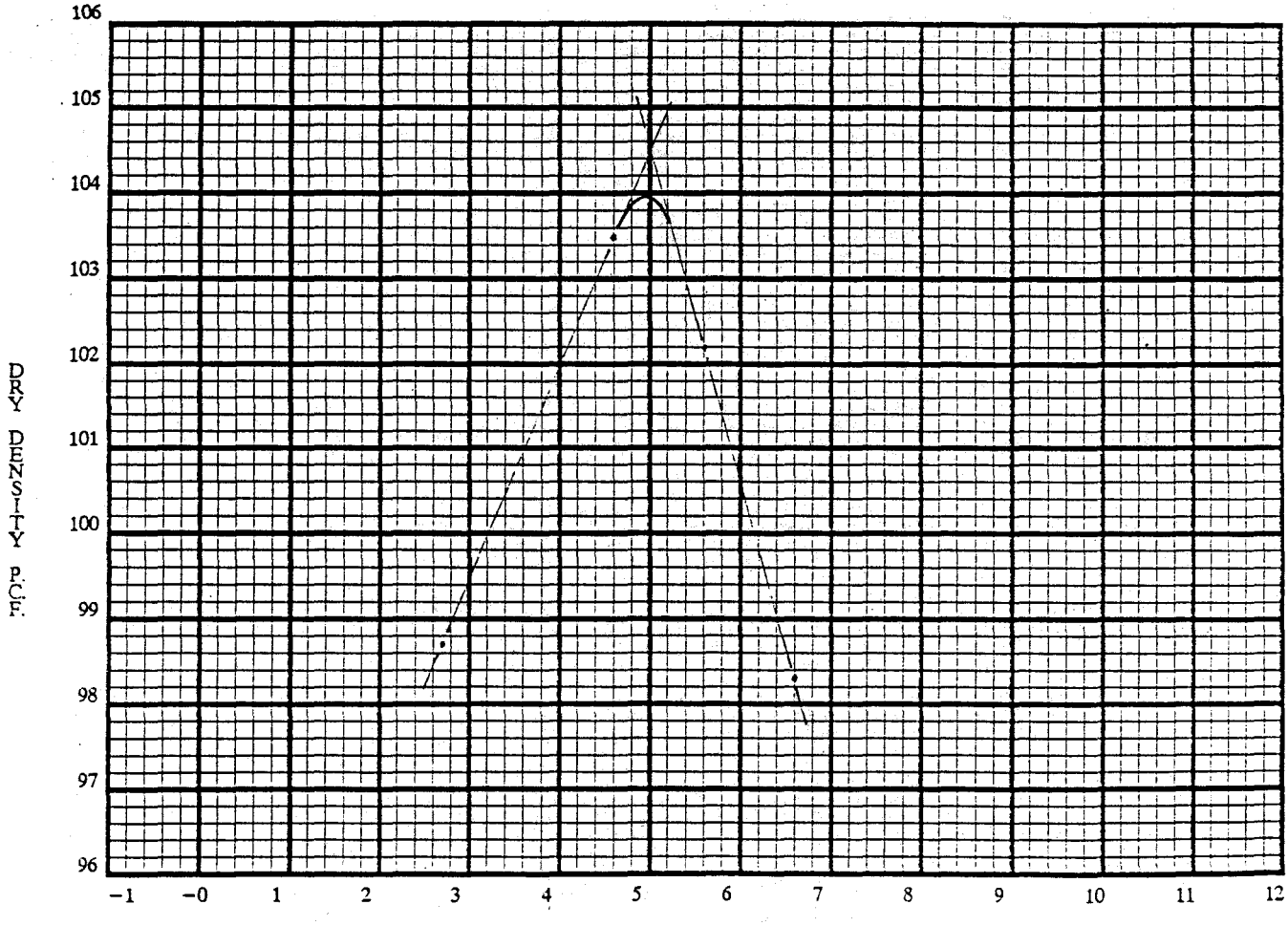
PROCTOR TEST
ASTM D 1557–91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

CHARGE # C4T2CODE
LAB # 1905
DATE 07/25/98

Project: TTR AREA 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. HERRINGTON Date sampled: 07/15/98 Material: A9/4 A,B,C
Tested by: D. HERRINGTON Date tested: 07/24/98 Checked by: V. Duncan

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	6526.1	6410.0	6291.4	6516.4	N/A	N/A
2	Wt. mold	2843.3	2843.3	2843.3	2843.3	N/A	N/A
3	Wt. wet soil	3682.8	3566.7	3448.1	3673.1	N/A	N/A
4	Wet Density, PCF	108.3	104.8	101.4	108.0	N/A	N/A
5	Moisture Tare #	111.0	E	110.0	114.0	N/A	N/A
6	Wt wet soil + tare	1119.5	1002.2	890.6	887.0	N/A	N/A
7	Wt dry soil + tare	1071.1	941.0	867.4	840.5	N/A	N/A
8	Wt moisture	48.4	61.2	23.2	46.5	N/A	N/A
9	Wt tare	17.0	17.0	16.9	16.9	N/A	N/A
10	Wt dry soil	1054.1	924.0	850.5	823.6	N/A	N/A
11	**% Moisture**	**4.6**	**6.6**	**2.7**	**5.6**	**N/A**	**N/A**
12	**Dry Density, PCF**	**103.5**	**98.3**	**98.7**	**102.2**	**N/A**	**N/A**



MAX. DENSITY = 104.0 **PCF**
OPT. MOISTURE = 5.0 **%**

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

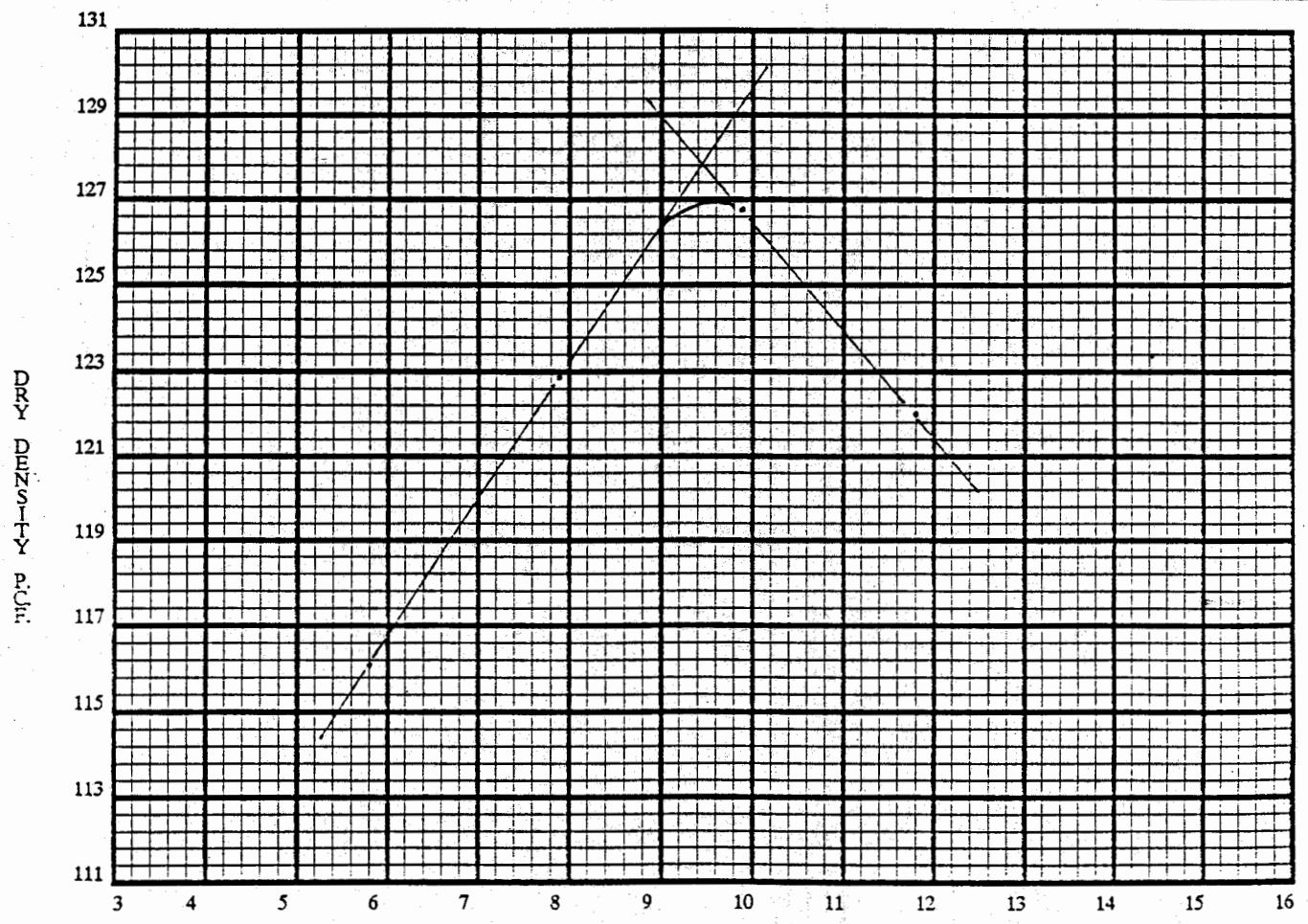
PROCTOR TEST
ASTM D 1557–91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

CHARGE # C4P1CODE
LAB # 1987
DATE 07/31/98

Project: TTR AREA 3 & 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. HERRINGTON Date sampled: 07/28/98 Material: SANDIA BORROW PIT
Tested by: T. HIGH Date tested: 07/30/98 Checked by: V. Gruna

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	7583.4	7485.8	7354.3	7019.3	N/A	N/A
2	Wt. mold	2843.3	2843.3	2843.3	2843.3	N/A	N/A
3	Wt. wet soil	4740.1	4642.5	4511.0	4176.0	N/A	N/A
4	Wet Density, PCF	139.3	136.5	132.6	122.8	N/A	N/A
5	Moisture Tare #	124	127	128	108	N/A	N/A
6	Wt wet soil + tare	1181.2	1332.7	1291.8	1147.9	N/A	N/A
7	Wt dry soil + tare	1076.1	1193.4	1198.3	1086.4	N/A	N/A
8	Wt moisture	105.1	139.3	93.5	61.5	N/A	N/A
9	Wt tare	17.1	17.2	17.2	17.2	N/A	N/A
10	Wt dry soil	1059.0	1176.2	1181.1	1069.2	N/A	N/A
11	**% Moisture**	**9.9**	**11.8**	**7.9**	**5.8**	**N/A**	**N/A**
12	**Dry Density, PCF**	**126.8**	**122.0**	**122.9**	**116.1**	**N/A**	**N/A**



MAX. DENSITY = 127.0 PCF MOISTURE CONTENT %
OPT. MOISTURE = 9.5 %

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

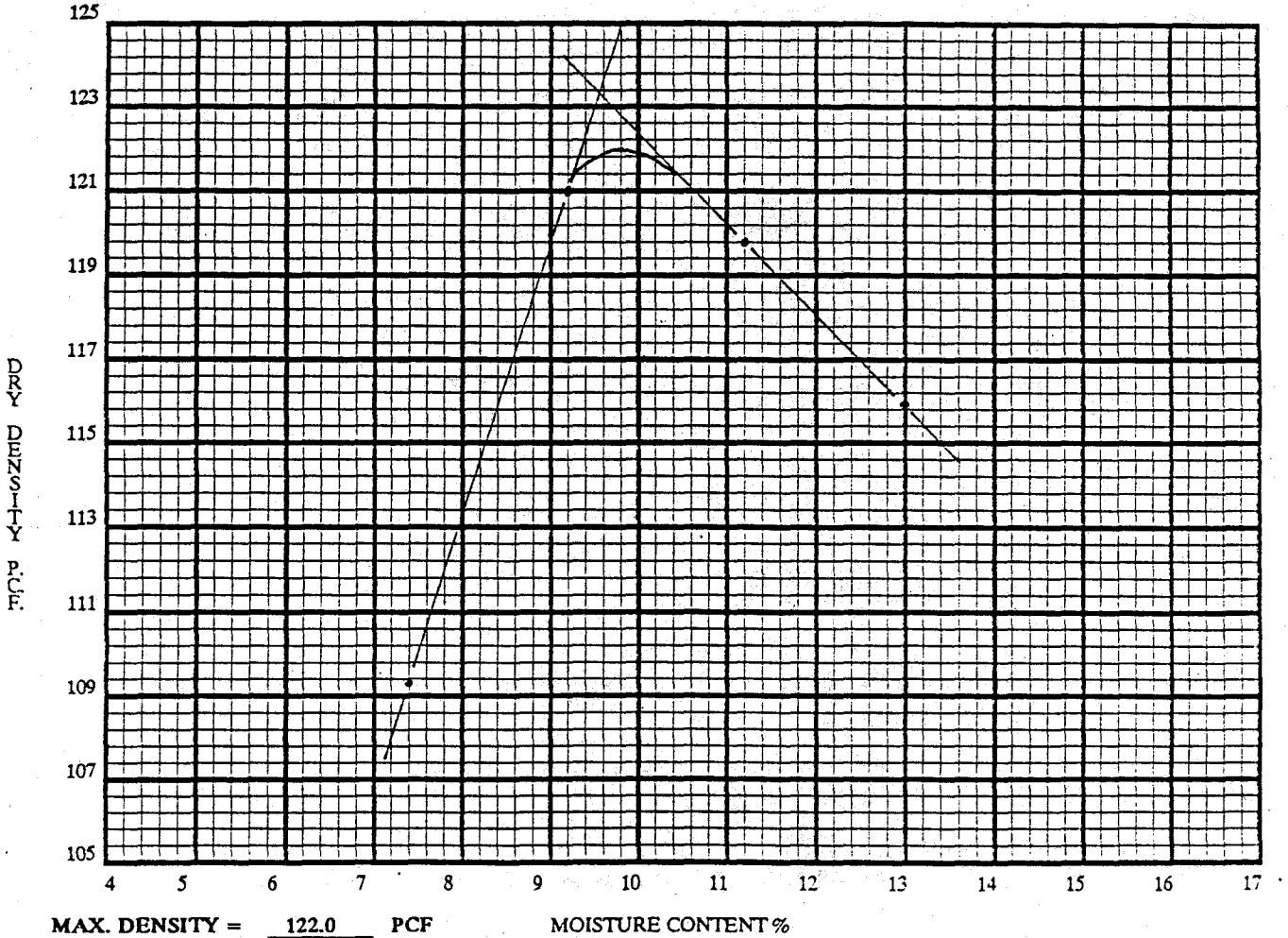
PROCTOR TEST
ASTM D 1557-91
METHOD C

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

CHARGE # C4T2CODE
LAB # 1898
DATE 07/24/98

Project: TTR AREA 9 Requested by: D. MADSEN User/Agency: BECHTEL
Sampled by: D. FINNEY Date sampled: 07/08/98 Material: STOCKPILE
Tested by: D. HERRINGTON Date tested: 07/22/98 Checked by: V. Quinn

	TRIAL	1	2	3	4	5	6
1	Wt.mold + wet soil	7338.0	7374.1	7301.7	6837.3	N/A	N/A
2	Wt. mold	2843.3	2843.3	2843.3	2843.3	N/A	N/A
3	Wt. wet soil	4494.7	4530.8	4458.4	3994.0	N/A	N/A
4	Wet Density, PCF	132.1	133.2	131.1	117.4	N/A	N/A
5	Moisture Tare #	D	F	G	114.0	N/A	N/A
6	Wt wet soil + tare	1239.0	1271.1	1181.9	1104.2	N/A	N/A
7	Wt dry soil + tare	1136.1	1144.8	1047.6	1029.5	N/A	N/A
8	Wt moisture	102.9	126.3	134.3	74.7	N/A	N/A
9	Wt tare	17.0	17.0	16.9	16.9	N/A	N/A
10	Wt dry soil	1119.1	1127.8	1030.7	1012.6	N/A	N/A
11	**% Moisture**	**9.2**	**11.2**	**13.0**	**7.4**	**N/A**	**N/A**
12	**Dry Density, PCF**	**121.0**	**119.8**	**115.9**	**109.3**	**N/A**	**N/A**



MAX. DENSITY = 122.0 PCF
OPT. MOISTURE = 9.8 %

NO SPECIFICATIONS: INFORMATION ONLY
Equipment used: PM 16, PTL W1256, Cal. date: 06/02/98, Cal. due: 06/02/99

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

Request / Test Report

Requested by: D. MADSEN | Charge #: C4T2C0DE
User/Agency: BECHTEL | Log # N/A | MTL Lab #: 1898

Project: TTR AREA 9 | Material: SANDIA STOCKPILE
Sampled by: D. FINNEY | Date Sampled: 07/08/98
Tested By: T. HIGH & D. JOHNSON | Date tested: 07/20/98
Checked by: D. HERRINGTON DLH | Date checked: 9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C–136–96)
- [ ] (ASTM C–117–95)
- [X] (ASTM D–422–90)
- [X] (ASTM D–1140–92)
- Moisture Content
- [ ] (ASTM C–566–96)
- [X] (ASTM D–2216–92)
- Unit Weight
- [ ] (ASTM C–29–91)
- [ ] Soil Classification
- [ ] Percent Porosity
- Specific Gravity
- [ ] (ASTM C–127–88/128–93)
- [ ] (ASTM D–584–92)
- [ ] Other (as noted)

Soil Class:

SIEVE ANALYSIS (– 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	0.0	0%	100%	N/A
3/8"	0.0	0%	100%	N/A
4	1.7	0%	100%	N/A
10	22.1	1%	99%	N/A
40	487.0	31%	69%	N/A
100	975.8	63%	37%	N/A
200	1213.5	77.7%	22.3%	N/A
Sample Wt (g):	DRY =	1561.1	WET =	N/A

MOISTURE CONTENT

	PAN # 25	N/A	N/A
Wet Weight + Tare	2589.3	N/A	N/A
Dry Weight + Tare	2507.9	N/A	N/A
Water	81.4	N/A	N/A
Tare	946.8	N/A	N/A
Dry Weight	1561.1	N/A	N/A
Moisture %	5.2%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A | Specific Gravity: N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 | Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

Request / Test Report

Requested by: D. MADSEN | Charge #: C4T2C0DE
User/Agency: BECHTEL | Log # N/A | MTL Lab #: 1902

Project: TTR AREA 9 | Material: NATIVE A9/1
Sampled by: D. HERRINGTON | Date Sampled: 07/15/98
Tested By: T. HIGH & D. JOHNSON | Date tested: 07/20/98
Checked by: D. HERRINGTON D. H. | Date checked: 9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C–136–96)
- [ ] (ASTM C–117–95)
- [X] (ASTM D–422–90)
- [X] (ASTM D–1140–92)
- [ ] Moisture Content (ASTM C–566–96)
- [X] (ASTM D–2216–92)
- [ ] Unit Weight (ASTM C–29–91)
- [ ] Soil Classification
- [ ] Percent Porosity
- [ ] Specific Gravity (ASTM C–127–88/128–93)
- [ ] (ASTM D–584–92)
- [ ] Other (as noted)

SIEVE ANALYSIS (– 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	0.0	0%	100%	N/A
3/8"	0.0	0%	100%	N/A
4	0.2	0%	100%	N/A
10	8.2	1%	99%	N/A
40	538.0	34%	66%	N/A
100	1165.1	73%	27%	N/A
200	1394.1	87.3%	12.7%	N/A

Soil Class: Sample Wt (g): DRY = 1597.1 WET = N/A

MOISTURE CONTENT

	PAN # 26	N/A	N/A
Wet Weight + Tare	2512.5	N/A	N/A
Dry Weight + Tare	2500.2	N/A	N/A
Water	12.3	N/A	N/A
Tare	903.1	N/A	N/A
Dry Weight	1597.1	N/A	N/A
Moisture %	0.8%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A **Specific Gravity:** N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

Request / Test Report

Requested by: D. MADSEN | Charge #: C4T2C0DE
User/Agency: BECHTEL | Log # N/A | MTL Lab #: 1903

Project: TTR AREA 9 | Material: NATIVE A9/2
Sampled by: D. HERRINGTON | Date Sampled: 07/15/98
Tested By: T. HIGH & D. JOHNSON | Date tested: 07/20/98
Checked by: D. HERRINGTON DLH. | Date checked: 9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C–136–96)
- [ ] (ASTM C–117–95)
- [X] (ASTM D–422–90)
- [X] (ASTM D–1140–92)
- [ ] Moisture Content (ASTM C–566–96)
- [X] (ASTM D–2216–92)
- [ ] Unit Weight (ASTM C–29–91)
- [ ] Soil Classification
- [ ] Percent Porosity
- [ ] Specific Gravity (ASTM C–127–88/128–93)
- [ ] (ASTM D–584–92)
- [ ] Other (as noted)

Soil Class:

SIEVE ANALYSIS (– 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	0.0	0%	100%	N/A
3/8"	0.0	0%	100%	N/A
4	0.0	0%	100%	N/A
10	3.6	0%	100%	N/A
40	399.9	30%	70%	N/A
100	897.4	67%	33%	N/A
200	1098.1	82.2%	17.8%	N/A
Sample Wt (g):	DRY =	1336.3	WET =	N/A

MOISTURE CONTENT

	PAN # 27	N/A	N/A
Wet Weight + Tare	2352.6	N/A	N/A
Dry Weight + Tare	2315.2	N/A	N/A
Water	37.4	N/A	N/A
Tare	978.9	N/A	N/A
Dry Weight	1336.3	N/A	N/A
Moisture %	2.8%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A | **Specific Gravity:** N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

Request / Test Report

Requested by: D. MADSEN | Charge #: C4T2C0DE
User/Agency: BECHTEL | Log # N/A | MTL Lab #: 1904

Project: TTR AREA 9 | Material: NATIVE A9/3
Sampled by: D. HERRINGTON | Date Sampled: 07/15/98
Tested By: T. HIGH & D. JOHNSON | Date tested: 07/20/98
Checked by: D. HERRINGTON DLH. | Date checked: 9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C–136–96)
- [ ] (ASTM C–117–95)
- [X] (ASTM D–422–90)
- [X] (ASTM D–1140–92)
- [ ] Moisture Content (ASTM C–566–96)
- [X] (ASTM D–2216–92)
- [ ] Unit Weight (ASTM C–29–91)
- [ ] Soil Classification
- [ ] Percent Porosity
- [ ] Specific Gravity (ASTM C–127–88/128–93)
- [ ] (ASTM D–584–92)
- [ ] Other (as noted)

Soil Class:

SIEVE ANALYSIS (– 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	0.0	0%	100%	N/A
3/8"	15.2	1%	99%	N/A
4	33.5	2%	98%	N/A
10	73.2	5%	95%	N/A
40	451.1	32%	68%	N/A
100	854.8	61%	39%	N/A
200	1055.8	75.5%	24.5%	N/A
Sample Wt (g):	DRY =	1399.0	WET =	N/A

MOISTURE CONTENT

	PAN # 28	N/A	N/A
Wet Weight + Tare	2431.1	N/A	N/A
Dry Weight + Tare	2398.6	N/A	N/A
Water	32.5	N/A	N/A
Tare	999.6	N/A	N/A
Dry Weight	1399.0	N/A	N/A
Moisture %	2.3%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A | **Specific Gravity:** N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

Request / Test Report

Requested by: D. MADSEN | Charge #: C4T2C0DE
User/Agency: BECHTEL | Log #: N/A | MTL Lab #: 1905

Project: TTR AREA 9 | Material: NATIVE A9/4
Sampled by: D. HERRINGTON | Date Sampled: 07/15/98
Tested By: T. HIGH & D. JOHNSON | Date tested: 07/20/98
Checked by: D. HERRINGTON DLH | Date checked: 9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C–136–96)
- [ ] (ASTM C–117–95)
- [X] (ASTM D–422–90)
- [X] (ASTM D–1140–92)
- [ ] Moisture Content (ASTM C–566–96)
- [X] (ASTM D–2216–92)
- [ ] Unit Weight (ASTM C–29–91)
- [ ] Soil Classification
- [ ] Percent Porosity
- [ ] Specific Gravity (ASTM C–127–88/128–93)
- [ ] (ASTM D–584–92)
- [ ] Other (as noted)

Soil Class:

SIEVE ANALYSIS (– 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	0.0	0%	100%	N/A
3/8"	0.0	0%	100%	N/A
4	0.0	0%	100%	N/A
10	1.1	0%	100%	N/A
40	446.9	40%	60%	N/A
100	880.0	79%	21%	N/A
200	1046.1	93.8%	6.2%	N/A
Sample Wt (g):	DRY =	1115.0	WET =	N/A

MOISTURE CONTENT

	PAN # 29	N/A	N/A
Wet Weight + Tare	2031.2	N/A	N/A
Dry Weight + Tare	2023.4	N/A	N/A
Water	7.8	N/A	N/A
Tare	908.4	N/A	N/A
Dry Weight	1115.0	N/A	N/A
Moisture %	0.7%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A | **Specific Gravity:** N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

Request / Test Report

Requested by:	D. MADSEN	Charge #:	C4T2C0DE
User/Agency:	BECHTEL	Log # N/A	MTL Lab #: 1987

Project:	TTR AREA 9	Material:	SANDIA BORROW PIT
Sampled by:	D. HERRINGTON	Date Sampled:	07/28/98
Tested By:	D. JOHNSON	Date tested:	08/01/98
Checked by:	D. HERRINGTON DLH.	Date checked:	9-2-98

LABORATORY TEST REQUIRED

- [ ] Sieve Analysis (ASTM C-136-96)
- [ ] (ASTM C-117-95)
- [X] (ASTM D-422-90)
- [X] (ASTM D-1140-92)
- [ ] Moisture Content (ASTM C-566-96)
- [X] (ASTM D-2216-92)
- [ ] Unit Weight (ASTM C-29-91)
- [ ] Soil Classification
- [ ] Percent Porosity
- [ ] Specific Gravity (ASTM C-127-88/128-93)
- [ ] (ASTM D-584-92)
- [ ] Other (as noted)

Soil Class:

SIEVE ANALYSIS (- 3/8")

U.S. Standard Sieve #	Cumulative Wt Retained	% Retained	% Passing	Spec % Passing
3"	0.0	0%	100%	N/A
1 1/2"	0.0	0%	100%	N/A
3/4"	27.8	2%	98%	N/A
3/8"	108.1	9%	91%	N/A
4	257.9	22%	78%	N/A
10	469.1	40%	60%	N/A
40	775.5	66%	34%	N/A
100	921.8	78%	22%	N/A
200	1004.4	85.2%	14.8%	N/A
Sample Wt (g):	DRY =	1179.1	WET =	N/A

MOISTURE CONTENT

	PAN # 4	N/A	N/A
Wet Weight + Tare	1313.8	N/A	N/A
Dry Weight + Tare	1196.1	N/A	N/A
Water	117.7	N/A	N/A
Tare	17.0	N/A	N/A
Dry Weight	1179.1	N/A	N/A
Moisture %	10.0%	N/A	N/A

UNIT WEIGHT

	Loose	Rodded
Container Size(ft^3)	N/A	N/A
Total Weight (lb)	N/A	N/A
Tare Weight (lb)	N/A	N/A
Material Weight (lb)	N/A	N/A
Unit Weight (P.C.F.)	N/A	N/A
Percent Porosity	N/A	N/A

Oversize Specific Gravity: N/A

Specific Gravity: N/A

EQUIPMENT USED: PM 16, PTL #1256, Calibration Date: 06/02/98 Calibration Due: 06/02/99

Sieve 1 1/2"	PTL # Y303222	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/4"	PTL # Y303276	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve 3/8	PTL # Y302106	Cal. Date: 03/27/98	Cal. Due: 03/27/99
Sieve # 4	PTL # Y302043	Cal. Date: 03/26/98	Cal. Due: 03/26/99
Sieve # 10	PTL # Y11621	Cal. Date: 10/08/97	Cal. Due: 10/08/99
Sieve # 16	PTL # Y302079	Cal. Date: 03/25/98	Cal. Due: 03/26/99
Sieve # 40	PTL # Y106	Cal. Date: 10/09/97	Cal. Due: 10/09/99
Sieve # 100	PTL # Y10035	Cal. Date: 05/21/98	Cal. Due: 05/21/99
Sieve # 200	PTL # Y11599	Cal. Date: 10/09/97	Cal. Due: 10/09/99

REMARKS: NONE

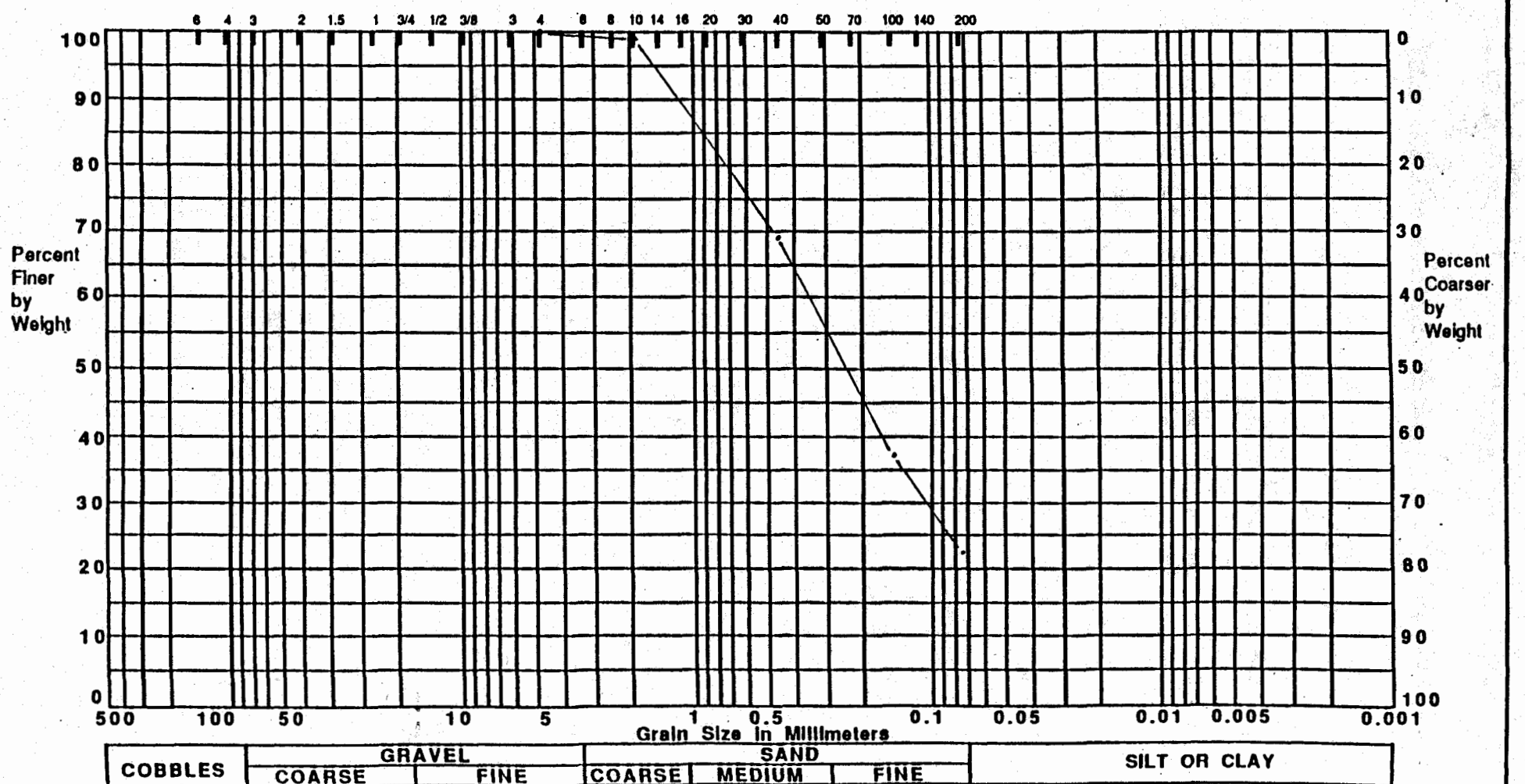
GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

LAB NO. 1698
CHARGE # C472C0DE
DATE 08/02/98

PROJECT: TTR AREA 9 CLASSIFICATION: SM

CHECKED BY: D. HERRINGTON Del H. DATE CHECKED: 9-2-98 MATERIAL SANDIA STOCKPILE



NO EQUIPMENT USED.

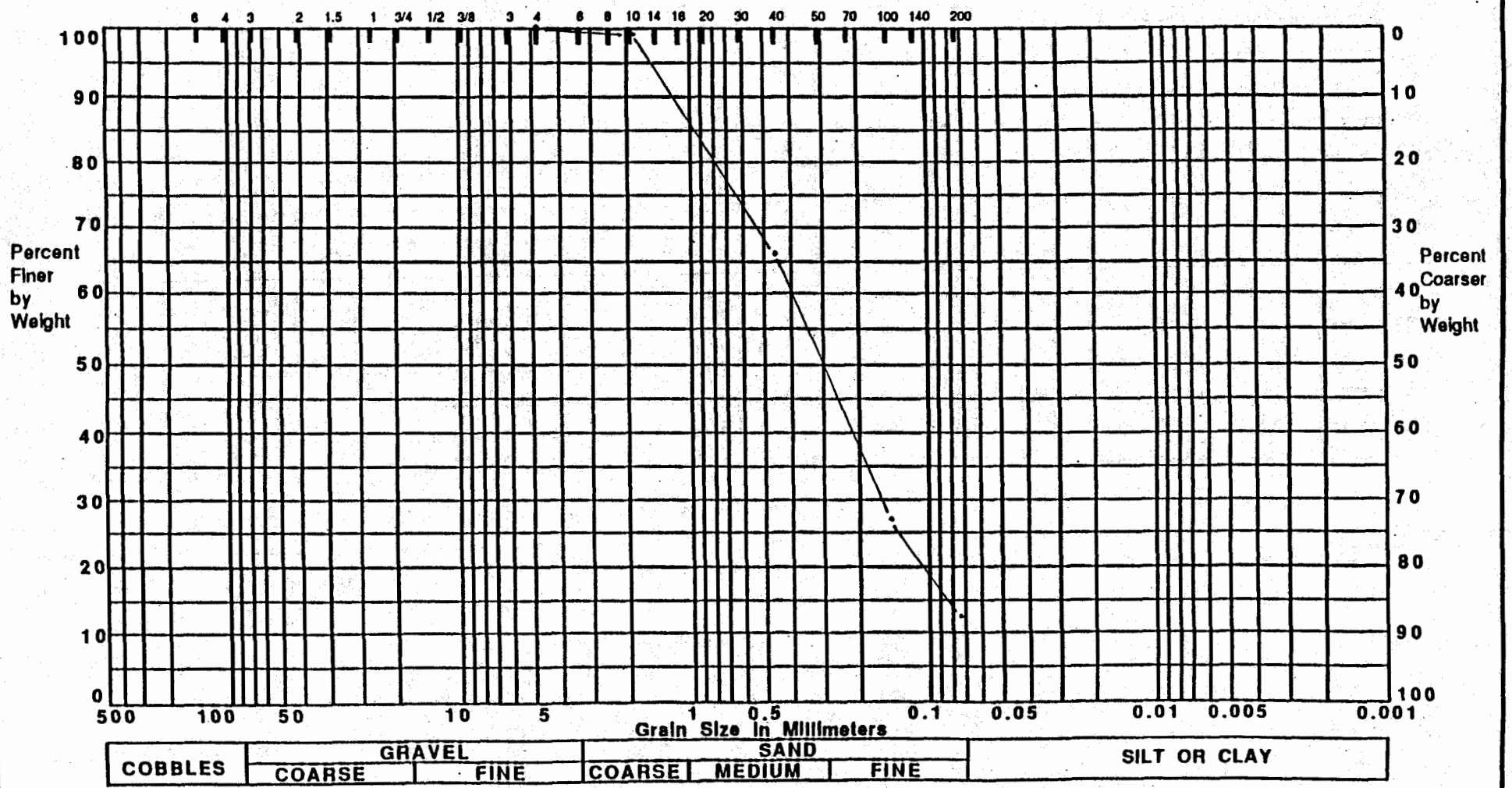
GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

LAB NO. 1902
CHARGE # C472C0DE
DATE 08/02/98

PROJECT: TTR AREA 9 CLASSIFICATION: SM

CHECKED BY: D. HERRINGTON DH DATE CHECKED: 9-2-98 MATERIAL NATIVE A9/1



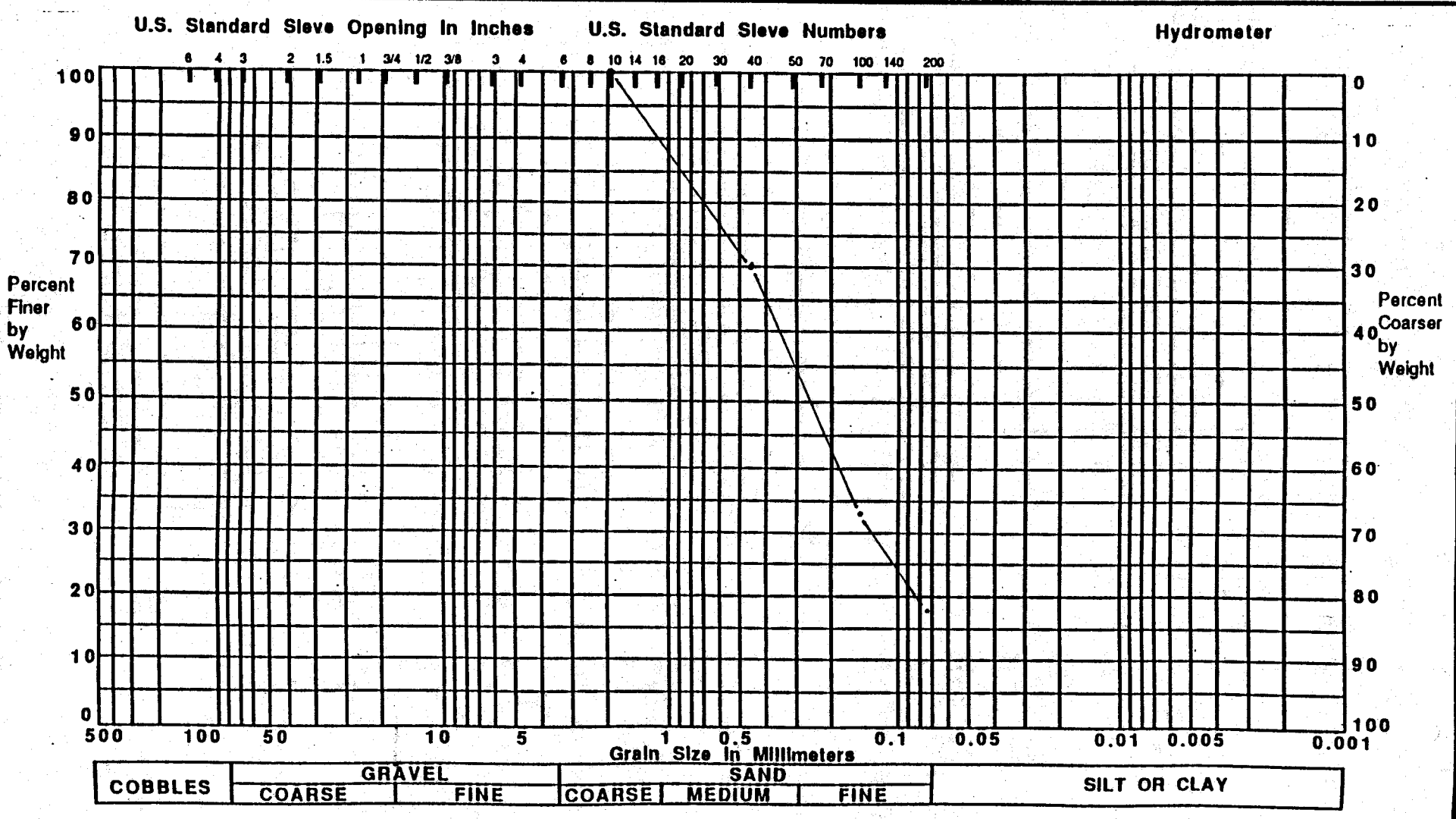
NO EQUIPMENT USED.

GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

LAB NO. 1903
CHARGE # C472C0DE
DATE 08/02/98

PROJECT: TTR AREA 9
CLASSIFICATION: SM
CHECKED BY: D. HERRINGTON
DATE CHECKED: 9-2-98
MATERIAL NATIVE A9/2



NO EQUIPMENT USED.

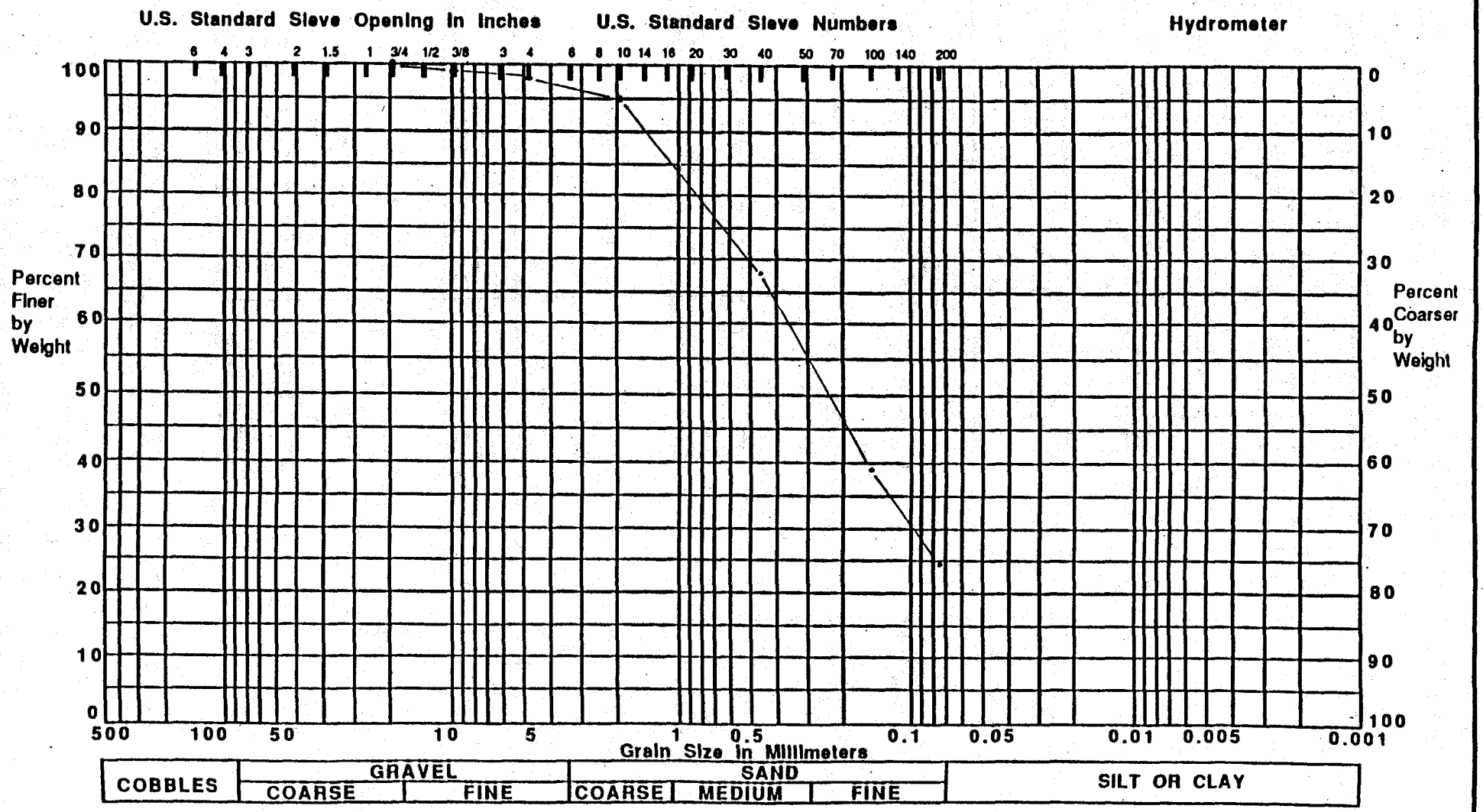
GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

LAB NO. 1904
CHARGE # C472C0DE
DATE 08/02/98

PROJECT: TTR AREA 9 CLASSIFICATION: SM

CHECKED BY: D. HERRINGTON DLH DATE CHECKED: 9-2-98 MATERIAL NATIVE A9/3



NO EQUIPMENT USED.

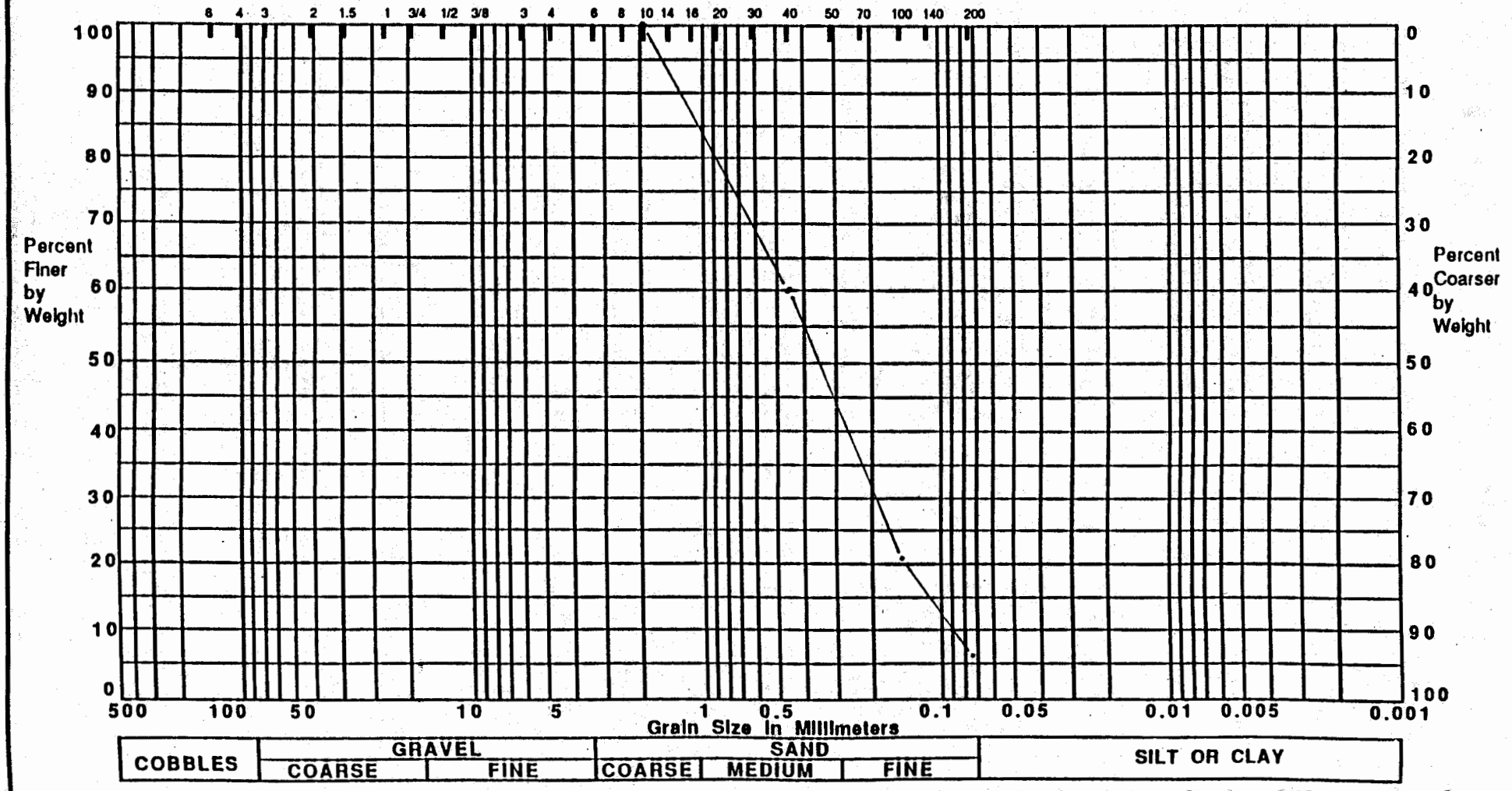
GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193–8521

LAB NO.	1905
CHARGE #	C472C0DE
DATE	08/02/98

PROJECT: TTR AREA 9 CLASSIFICATION: SM / SP

CHECKED BY: D. HERRINGTON D.L.H. DATE CHECKED: 9-2-98 MATERIAL NATIVE A9/4



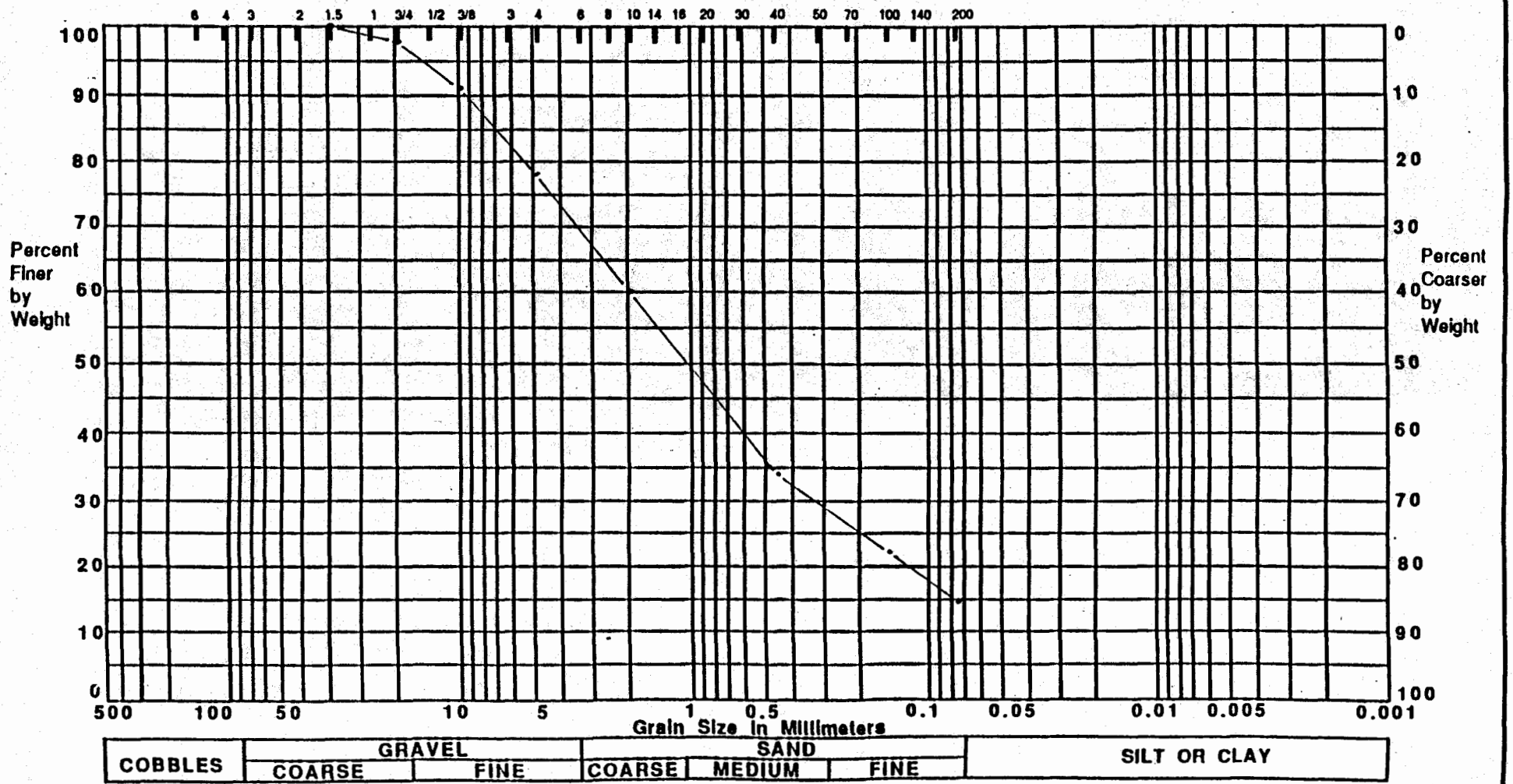
GRADATION CURVES

Bechtel Nevada
MATERIALS TESTING LABORATORY
P. O. BOX 98521
LAS VEGAS, NV 89193-8521

LAB NO.	1987
CHARGE #	C472C0DE
DATE	08/02/98

PROJECT: TTR AREA 9 CLASSIFICATION: SM

CHECKED BY: D. HERRINGTON DATE CHECKED: 8-2-98 MATERIAL SANDIA BORROW PIT

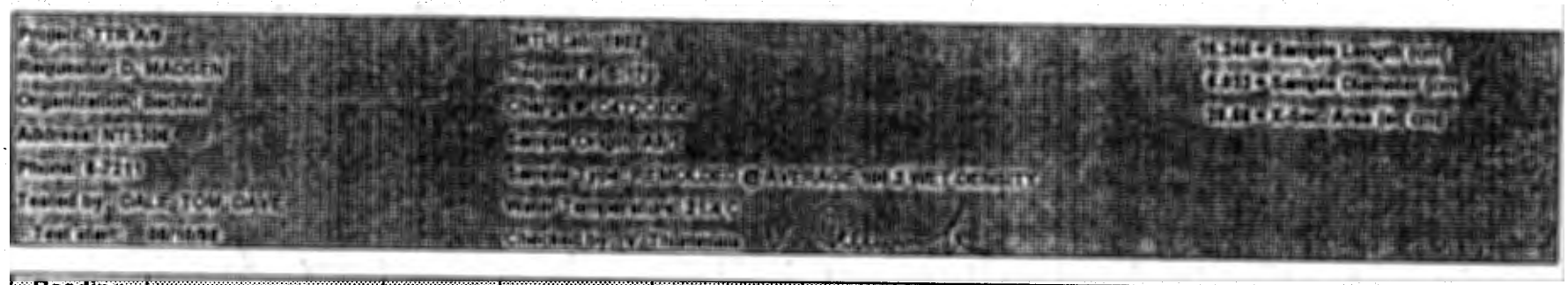


NO EQUIPMENT USED.

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 1.

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)



Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
7	954	55	89.9	10.00	372.0	0.00094053	5.8990	1.55E-04	08/17/98	AM
7	953	55	89.8	10.00	360.0	0.00097188	5.8924	1.60E-04	08/17/98	AM
7	953	57	89.6	10.00	358.0	0.00097731	5.8793	1.61E-04	08/17/98	AM
7	953	57	89.6	10.00	363.0	0.00096385	5.8793	1.59E-04	08/17/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 2.

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

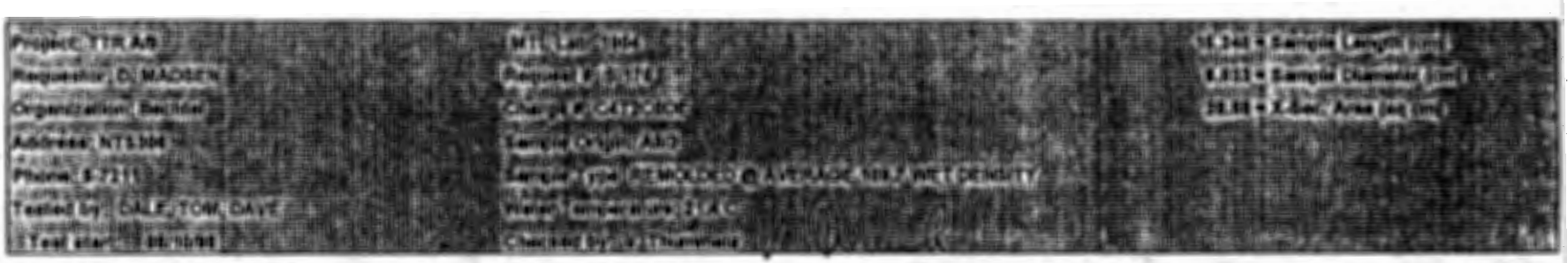
Project: TTR A/9	MTL Lab: 1903	16.240 = Sample Length (cm)
Requestor: D. MADSEN	Request #: S-170	6.033 = Sample Diameter (cm)
Organization: Bechtel	Charge #: C4T2C0DE	28.58 = X-Sec. Area (sq cm)
Address: NTS306	Sample Origin: A9/2	
Phone: 5-7211	Sample Type: REMOLDED @ AVERAGE 101.4 WET DENSITY	
Tested by: DALE, TOM, DAVE	Water Temperature: 21.4 C	
Test start: 08/10/98	Checked by: V. Thummala	

Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
7	955	64	89.1	10.00	454.0	0.00077065	5.8465	1.28E-04	08/17/98	AM
7	955	60	89.5	10.00	396.0	0.00088353	5.8727	1.46E-04	08/17/98	AM
7	955	60	89.5	10.00	389.0	0.00089943	5.8727	1.49E-04	08/17/98	AM
7	955	59	89.6	10.00	377.0	0.00092806	5.8793	1.53E-04	08/17/98	AM
7	955	59	89.6	10.00	367.0	0.00095334	5.8793	1.57E-04	08/17/98	AM
EQUIPMENT USED:	METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99									

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 3

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)



Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	hl	k - 20 C cm/sec	Date Tested	Time Tested
7	953	37	91.6	1.31	2100.0	0.00002183	6.0105	3.52E-06	05/17/98	AM
8	940	38	90.2	1.82	3720.0	0.00001712	5.9186	2.81E-06	05/18/98	AM
9	955	38	91.7	1.90	4920.0	0.00001351	6.0171	2.18E-06	05/19/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 4

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

Project: TTR A/9	MTL Lab: 1905	15.240 = Sample Length (cm)
Requestor: D. MADSEN	Request #: S-170	6.033 = Sample Diameter (cm)
Organization: Bechtel	Charge #: C4T2C0DE	28.58 = X-Sec. Area (sq cm)
Address: NTS306	Sample Origin: A9/4	
Phone: 8-7211	Sample Type: REMOLDED @ AVERAGE 98.7 WET DENSITY	
Tested by: DALE, TOM, DAVE	Water Temperature: 21.4 C	
Test start: 08/10/98	Checked by: V. Thummala	

Reading # Days From Start	Manometers H1 mm	H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
2	925	37	88.8	10.00	12.0	0.02915642	5.8268	4.86E-03	08/12/98	AM
2	925	37	88.8	10.00	12.0	0.02915642	5.8268	4.86E-03	08/12/98	AM
2	925	37	88.8	10.00	12.0	0.02915642	5.8268	4.86E-03	08/12/98	AM
2	925	37	88.8	10.00	12.0	0.02915642	5.8268	4.86E-03	08/12/98	AM
2	963	52	91.1	10.00	11.0	0.03180700	5.9777	5.16E-03	08/12/98	AM
2	963	52	91.1	10.00	11.0	0.03180700	5.9777	5.16E-03	08/12/98	AM
EQUIPMENT USED:	METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99									

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 5

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
3	978	75	90.3	10.00	118.0	0.00296506	5.9252	4.86E-04	05/13/98	AM
3	978	75	90.3	10.00	115.0	0.00304241	5.9252	4.98E-04	05/13/98	AM
3	978	75	90.3	10.00	114.0	0.00306910	5.9252	5.03E-04	05/13/98	AM
3	978	75	90.3	10.00	116.0	0.00301618	5.9252	4.94E-04	05/13/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

Bechtel Nevada
Materials Testing Laboratory
P.O.BOX 98521, M/S NTS 188, LAS VEGAS, NV 89193
(702) 295-6669

Table 6

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
3	977	34	94.3	1.10	2895.0	0.00001329	6.1877	2.08E-06	05/13/98	AM
3	977	34	94.3	1.00	2805.0	0.00001247	6.1877	1.96E-06	05/13/98	AM
3	977	34	94.3	1.20	2940.0	0.00001428	6.1877	2.24E-06	05/13/98	AM
9	972	36	93.6	0.65	2940.0	0.00000774	6.1417	1.22E-06	05/19/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

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(702) 295-6669

Table 7

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
3	977	34	94.3	1.30	4765.0	0.00000955	6.1877	1.50E-06	06/13/98	AM
3	977	34	94.3	1.20	4725.0	0.00000889	6.1877	1.39E-06	06/13/98	AM
9	972	34	93.8	1.34	6180.0	0.00000759	6.1549	1.20E-06	06/19/98	AM
10	971	37	93.4	1.54	7140.0	0.00000755	6.1286	1.19E-06	06/20/98	AM
10	971	37	93.4	1.73	8280.0	0.00000731	6.1286	1.16E-06	06/20/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

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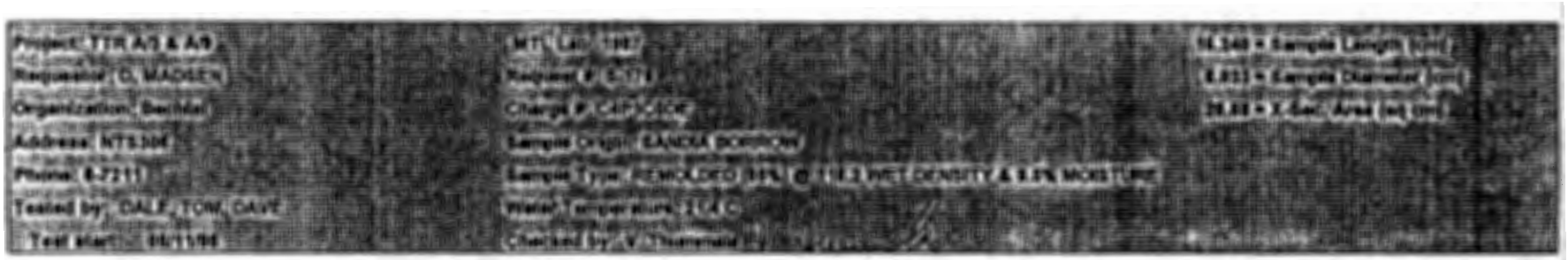
Table 8.

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)



Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
8	958	49	90.9	10.00	80.0	0.00437346	5.9646	7.11E-04	05/18/98	AM
8	958	42	91.6	10.00	87.0	0.00402158	6.0105	6.49E-04	05/18/98	AM
8	958	39	91.9	10.00	68.0	0.00514525	6.0302	8.28E-04	05/18/98	AM
8	958	39	91.9	10.00	61.0	0.00573569	6.0302	9.23E-04	05/18/98	AM
8	958	40	91.8	10.00	63.0	0.00555360	6.0236	8.95E-04	05/18/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

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Table 9.

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)

Project: TTR A/3 & A/8 | MTL Lab: 1987 | 16.240 = Sample Length (cm)
Requestor: D. MADSEN | Request #: S-178 | 6.033 = Sample Diameter (cm)
Organization: Bechtel | Charge #: C4P1C0DE | 28.58 = X-Sec. Area (sq cm)
Address: NTS306 | Sample Origin: SANDIA BORROW
Phone: 5-7211 | Sample Type: REMOLDED (90%) @ 125.2 WET DENSITY & 9.5% MOISTURE
Tested by: DALE, TOM, DAVE | Water Temperature: 21.4 C
Test start: 08/11/98 | Checked by: V Thummala

Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
8	957	38	91.9	0.30	107.0	0.00009810	6.0302	1.58E-05	08/18/98	AM
8	957	38	91.9	0.73	100.0	0.00025541	6.0302	4.11E-05	08/18/98	AM
8	957	40	91.7	0.65	105.0	0.00021659	6.0171	3.49E-05	08/18/98	AM
8	957	40	91.7	0.90	127.0	0.00024794	6.0171	4.00E-05	08/18/98	AM
8	957	42	91.5	0.85	128.0	0.00023234	6.0039	3.75E-05	08/18/98	AM
8	957	40	91.7	0.78	121.0	0.00022554	6.0171	3.64E-05	08/18/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

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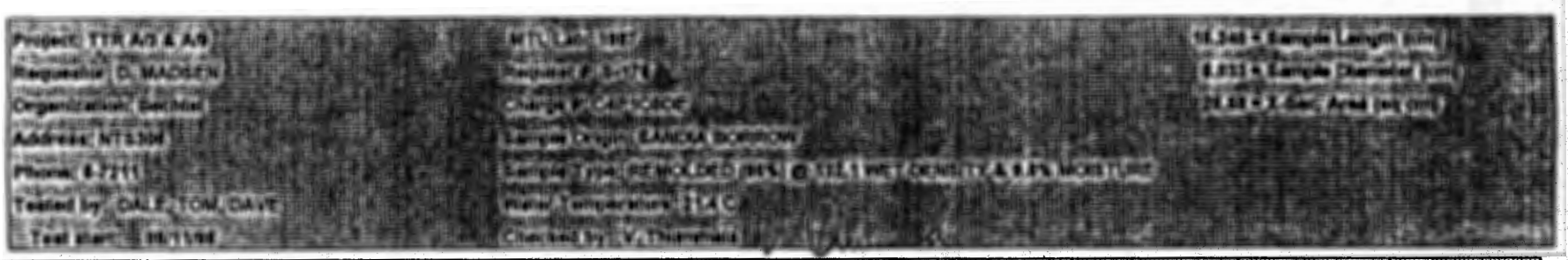
Table 10.

SAMPLE TTR PERMEABILITY TO DI WATER
ASTM D 2434-68 (Reapproved 1974)
Standard Test Method for Permeability of Granular Soils (Constant Head)



Reading # Days From Start	Manometers H1 mm	Manometers H2 mm	Head cm	Q cm^3	t sec.	Q/At	h/l	k - 20 C cm/sec	Date Tested	Time Tested
8	957	36	92.1	0.72	370.0	0.00006808	6.0433	1.09E-05	08/18/98	AM
8	957	40	91.7	0.40	68.0	0.00020581	6.0171	3.32E-05	08/18/98	AM
8	957	40	91.7	1.11	199.0	0.00019516	6.0171	3.15E-05	08/18/98	AM
8	955	38	91.7	0.70	473.0	0.00005178	6.0171	8.35E-06	08/18/98	AM
8	955	36	91.9	0.95	678.0	0.00004902	6.0302	7.89E-06	08/18/98	AM
8	955	40	91.5	0.70	373.0	0.00006566	6.0039	1.06E-05	08/18/98	AM
8	954	37	91.7	0.74	330.0	0.00007846	6.0171	1.27E-05	08/18/98	AM
8	954	37	91.7	0.50	357.0	0.00004900	6.0171	7.90E-06	08/18/98	AM
8	953	38	91.5	0.67	484.0	0.00004843	6.0039	7.83E-06	08/18/98	AM
8	953	38	91.5	0.48	196.0	0.00008568	6.0039	1.38E-05	08/18/98	AM
8	953	38	91.5	0.63	243.0	0.00009071	6.0039	1.47E-05	08/18/98	AM
8	953	38	91.5	1.00	428.0	0.00008175	6.0039	1.32E-05	08/18/98	AM

EQUIPMENT USED: METTLER PM400, PTL # Y1255, Calibration Date: 05/21/98, Calibration Due: 05/21/99

NUCLEAR DENSITY
ASTM D2922–96
CAMPBELL MC–2/MC–3
TROXLER

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521, M/S NTS188
LAS VEGAS, NV 89193–8521

CHARGE #: C4T2CODE
DATE TYPED: 07/31/98
PAGE 1 OF 1

Requested by: D. FINNEY | User/Agency: BECHTEL | Material: SANDIA BORROW

Project: TTR AREA 9 | Location of Tests: OPEN PIT

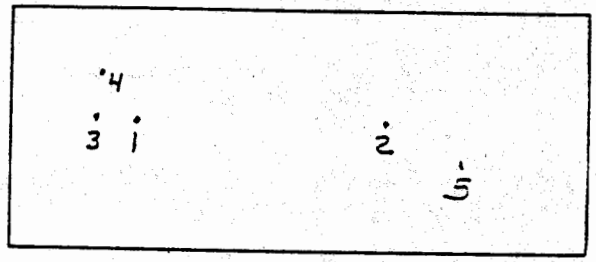
Tested by: D. HERRINGTON | Date Tested: 07/28/98 | Checked by: V. Dennelle

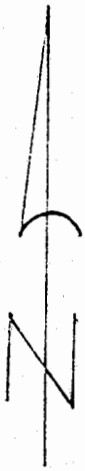
Information given to: CURTIS OBI | By: D. HERRINGTON | How: VERBAL | Date: 07/28/98

LABORATORY NO	1988	1989	1990	1991	1992	N/A
TEST LOCATION	1	2	3	4	5	
DEPTH OF PROBE	12"	12"	8"	12"	12"	
DEPTH OF TESTS Below grade	36"	24"	24"	Subgrade	Subgrade	
DRY DENSITY–PCF	111.9	120.7	111.8	115.5	114.7	
MOISTURE %	7.6	9.1	8.8	7.1	8.6	
MAX DENSITY PCF	127.0	127.0	127.0	127.0	127.0	
OPTIMUM MOISTURE %	9.5	9.5	9.5	9.5	9.5	
PERCENT COMPACTION	88.1	95.0	88.0	90.9	90.3	
REQUIRED COMPACTION %	80.0	80.0	80.0	80.0	80.0	
IN / OUT of SPECIFICATION	WITHIN	WITHIN	WITHIN	WITHIN	WITHIN	

GAUGE NO: 23205 | DATE OF STANDARDIZATION: 07/28/98 | VALUE OF STANDARDIZATION M: 633 D: 2944

PLOT PLAN





REMARKS: TESTS 1 AND 2 WERE TAKEN IN THE MORNING.
TEST 3 WAS TAKEN AFTER PLACING ANOTHER 1'.
TESTS 4 AND 5 WERE TAKEN IN THE AFTERNOON.

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

NUCLEAR DENSITY
ASTM D2922–96
CAMPBELL MC–2/MC–3
TROXLER

BECHTEL NEVADA
MATERIALS TESTING LABORATORY
P. O. BOX 98521, M/S NTS188
LAS VEGAS, NV 89193–8521

CHARGE #: C4T2CODE
DATE TYPED: 09/23/98
PAGE: 1 OF 2

Requested by: D. MADSEN | User/Agency: BECHTEL | Material: SANDIA BORROW

Project: TTR AREA 9 | Location of Tests: OPEN PIT

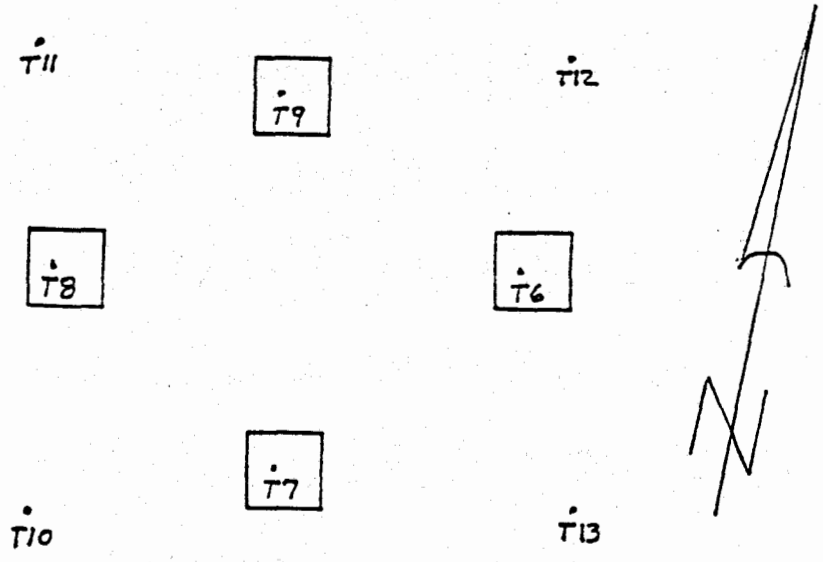
Tested by: D. HERRINGTON | Date Tested: 09/22/98 | Checked by: L. D. Johnson

Information given to: CURTIS OBI | By: D. HERRINGTON | How: VERBAL | Date: 09/22/98

LABORATORY NO	2504	2505	2506	2507	2508	2509
TEST LOCATION	A9/T6	A9/T7	A9/T8	A9/T9	A9/T10	A9/T11
DEPTH OF PROBE	8"	8"	8"	8"	8"	8"
DEPTH OF TESTS Below grade	12"	12"	12"	12"	Subgrade	Subgrade
DRY DENSITY–PCF	115.7	110.2	112.1	108.3	113.1	113.0
MOISTURE %	6.5	7.6	8.2	7.4	4.5	4.6
MAX DENSITY PCF	127.0	127.0	127.0	127.0	127.0	127.0
OPTIMUM MOISTURE %	9.5	9.5	9.5	9.5	9.5	9.5
PERCENT COMPACTION	91.1	86.8	88.3	85.3	89.1	89.0
REQUIRED COMPACTION %	80.0	80.0	80.0	80.0	80.0	80.0
IN / OUT of SPECIFICATION	WITHIN	WITHIN	WITHIN	WITHIN	WITHIN	WITHIN

GAUGE NO: 23205 | DATE OF STANDARDIZATION: 09/22/98 | VALUE OF STANDARDIZATION: M 634, D 2958

PLOT PLAN



REMARKS: THE 1" HOLES HAD BEEN PREVIOUSLY DUG.

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

NUCLEAR DENSITY ASTM D2922–96 CAMPBELL MC–2/MC–3 TROXLER	BECHTEL NEVADA MATERIALS TESTING LABORATORY P. O. BOX 98521, M/S NTS188 LAS VEGAS, NV 89193–8521	CHARGE #: C4T2CODE DATE TYPED 09/23/98 PAGE 2 OF 2

Requested by D. MADSEN User/Agency BECHTEL Material SANDIA BORROW

Project TTR AREA 9 Location of Tests OPEN PIT

Tested by D. HERRINGTON Date Tested 09/22/98 Checked by R.D. Johnson

Information given to CURTIS OBI By D. HERRINGTON How VERBAL Date 09/22/98

LABORATORY NO	2510	2511	N/A	N/A	N/A	N/A
TEST LOCATION	A9/T12	A9/T13				
DEPTH OF PROBE	8"	8"				
DEPTH OF TESTS Below grade	Subgrade	Subgrade				
DRY DENSITY–PCF	109.4	113.5				
MOISTURE %	5.2	5.3				
MAX DENSITY PCF	127.0	127.0				
OPTIMUM MOISTURE %	9.5	9.5				
PERCENT COMPACTION	86.1	89.4				
REQUIRED COMPACTION %	80.0	80.0				
IN / OUT of SPECIFICATION	WITHIN	WITHIN				

GAUGE NO 23205 DATE OF STANDARDIZATION 09/22/98 VALUE OF STANDARDIZATION M 634 D 2958

PLOT PLAN SEE PAGE ONE FOR TEST LOCATIONS.

REMARKS: THE 1' HOLES HAD BEEN PREVIOUSLY DUG.

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

NUCLEAR DENSITY ASTM D2922-96 CAMPBELL MC-2/MC-3 TROXLER	BECHTEL NEVADA MATERIALS TESTING LABORATORY P. O. BOX 98521, M/S NTS166 LAS VEGAS, NV 89193-8521	CHARGE #: C4P1CODE DATE TYPED 07/31/98 PAGE 1 OF 1

Requested by D. FINNEY User/Agency BECHTEL Material SANDIA BORROW

Project TTR AREA 3 Location of Tests TRENCH

Tested by D. HERRINGTON Date Tested 07/28/98 Checked by R. D. Johnson

Information given to CURTIS OBI By D. HERRINGTON How VERBAL Date 07/28/98

LABORATORY NO	1993	1994	1995	1996	N/A	N/A
TEST LOCATION	A3-1A/T1	A3-1A/T2	A3-1/T3	A3-1/T4		
DEPTH OF PROBE	12"	12"	12"	12"		
DEPTH OF TESTS Below grade	36"	24"	24"	24"		
DRY DENSITY-PCF	121.5	118.0	124.7	117.5		
MOISTURE %	7.2	8.5	8.2	9.1		
MAX DENSITY PCF	127.0	127.0	127.0	127.0		
OPTIMUM MOISTURE %	9.5	9.5	9.5	9.5		
PERCENT COMPACTION	95.7	92.9	98.2	92.5		
REQUIRED COMPACTION %	80.0	80.0	80.0	80.0		
IN / OUT of SPECIFICATION	WITHIN	WITHIN	WITHIN	WITHIN		

GAUGE NO 23205 DATE OF STANDARDIZATION 07/28/98 VALUE OF STANDARDIZATION M 633 D 2944

PLOT PLAN

REMARKS: A SAMPLE OF THE BORROW MATERIAL FROM THE SANDIA PIT WAS TAKEN AND A NEW PROCTOR WAS RUN. THE NEW PROCTOR RESULTS ARE SHOWN ABOVE.

CC: D. MADSEN BECHTEL
MTL BECHTEL FILES

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APPENDIX D

POST-CLOSURE INSPECTION CHECKLIST

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AREA 9 UXO LANDFILL, POST-CLOSURE INSPECTION CHECKLIST

Date of Last Inspection:	Reason for Last Inspection:
Responsible Agency:	Project Manager:
Inspection Date:	
Inspector (name, title, organization):	
Assistant Inspector (name, title, organization):	

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
3. Any checklist line item marked by an inspector in a SHADED BOX, must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, annotated site maps.
4. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
5. A standard set of color 35mm photographs (or equivalent) is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.			
2. Previous inspection reports reviewed.			
a. Were anomalies or trends detected on previous inspections?			
b. Was maintenance performed?			
3. Site maintenance and repair records reviewed.			
a. Has site repair resulted in a change from as-built conditions?			
b. Are revised as-builts available that reflect repair changes?			

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?			
b. Are there any new roads or trails?			
c. Has there been a change in the position of nearby washes?			
d. Has there been lateral excursion or erosion/deposition of nearby washes?			
e. Are there new drainage channels?			
f. Change in surrounding vegetation?			
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?			
b. Have any signs been damaged or removed? (Number of signs replaced: _____)			
c. Were gates locked?			

AREA 9 UXO LANDFILL, POST-CLOSURE INSPECTION CHECKLIST

3. Waste Unit cover.	YES	NO	EXPLANATION
a. Is there evidence of settling?			
b. Is there cracking?			
c. Is there evidence of erosion around the cap (wind or water)?			
d. Is there evidence of animal burrowing?			
e. Have the site markers been disturbed by man or natural processes?			
f. Is vegetation present?			
g. Do natural processes threaten to integrity of any cover or site marker?			
h. Other?			
4. Photo Documentation			
a. Has a photo log been prepared?			
c. Number of photos exposed ( )			

D. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)			
Person/Agency to whom report made:			
2. Are more frequent inspections required?			
3. Are existing maintenance/repair actions satisfactory?			
4. Is other maintenance/repair necessary?			
5. Is current status/condition of vegetative cover satisfactory?			

6. Rationale for field conclusions:

E. CERTIFICATION

I have conducted an inspection of the Area 9 UXO Landfill, CAU 453, at the TTR in accordance with the Post-Closure Inspection Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature:	Printed Name:
Title:	Date:

APPENDIX E

NDEP DOCUMENT REVIEW SHEET

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DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 453: Area9 UXO Landfill, Tonopah Test Range, Nevada, December 1998
2. Document Date: December 1998
3. Revision Number: 0
4. Originator/Organization: Curtis Obi, Bechtel Nevada Environmental Restoration
5. Date Comments Due: January 7, 1999
6. Reviewer/Organization: Nevada Division of Environmental Protection (NDEP)

7. Comment Number/ Location	8. Type[a]	9. Comment	10. Comment Response	11. Accept
1	M	Page 13, DOE needs to prepare a discussion of the permeability results and how they justify not having to do any runoff control.	Section 4 has been revised to include discussion of permeability results which indicate the native soil is more permeable than both the existing landfill cover soils and the borrow material. Therefore, preferential infiltration through the existing landfill covers is not expected.	Yes
2	M	Appendix C, A map showing the sampling locations also needs to be included to be able to understand the geotechnical results.	The geotechnical results are now summarized in Table 1 and the sampling and test locations are shown in Figure 2.	Yes

a. Comment Types: M=Mandatory S=Suggested

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David D. Madsen Bechtel Nevada P. O. Box 98521, M/S NTS306 Las Vegas, NV 89193-8521	1* (Uncontrolled)
Steve J. Nacht Bechtel Nevada P. O. Box 98521, M/S NTS306 Las Vegas, NV 89193-8521	1* (Uncontrolled)
Curtis M. Obi Bechtel Nevada P. O. Box 98521, M/S NTS306 Las Vegas, NV 89193-8521	1* (Uncontrolled)

IT Corporation

Rosa Silver, Coordinator, FFACO Public Reading Room IT Corporation P. O. Box 93838, M/S 439 Las Vegas, NV 89193-3838	1 (Controlled)

U. S. Air Force

Eloisa V. Hopper 99 ABW/EM 4349 Duffer Drive Suite 1601 Nellis AFB, NV 89191-7007	3* (Controlled)
Major Roger Schofield AWFC RMO/RML 3770 Duffer Drive Nellis AFB, NV 89191-7001	1* (Controlled)

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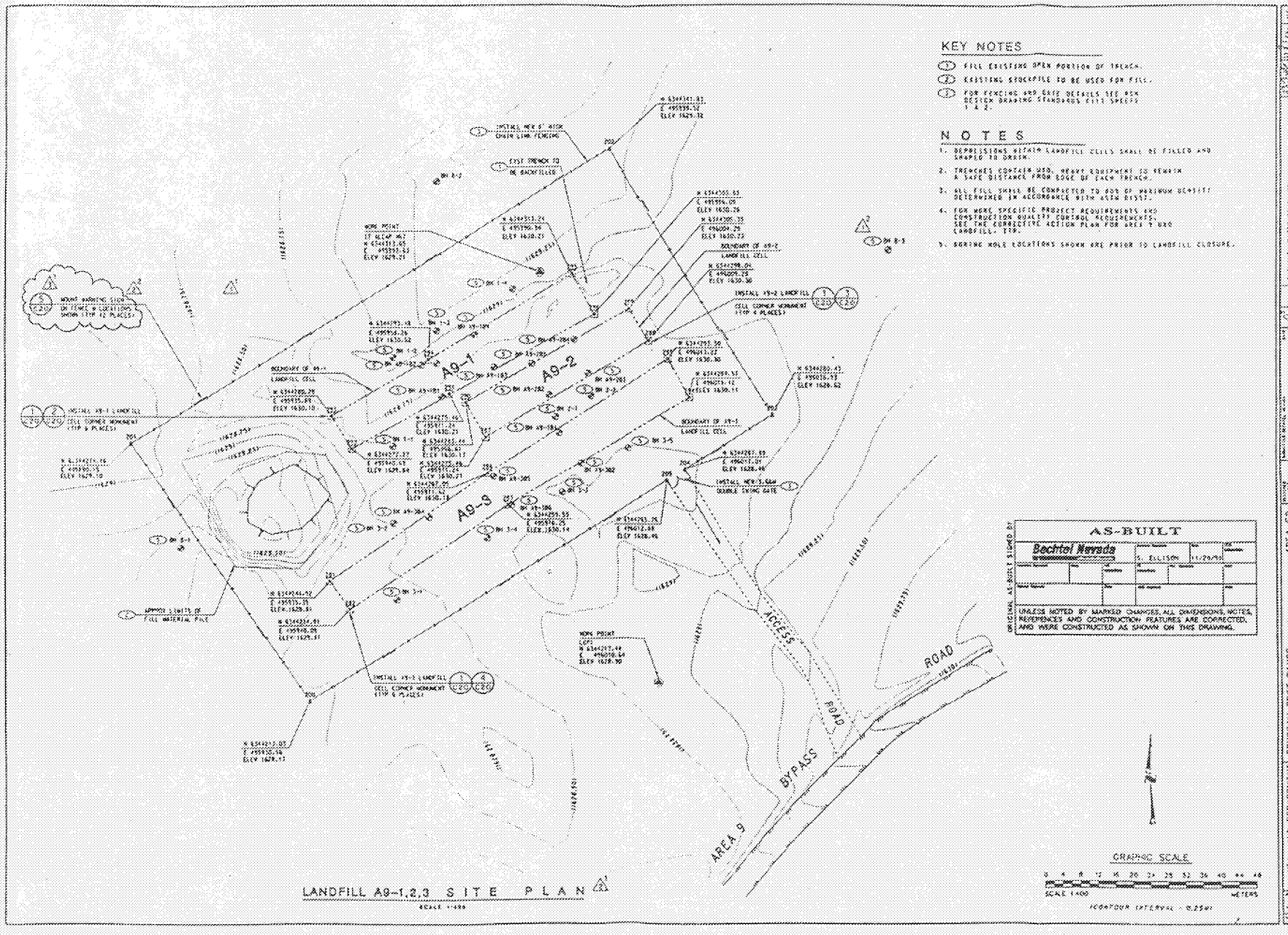
ERRATA SHEET

This errata sheet corrects two errors in Appendix A "As-Built Engineering Drawings" in the Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, Revision No. 0, July 1999 (DOE/NV/11718--284).

- In the fourth drawing of Appendix A (No. JS-052-133-C19 "Landfill A9-1,2,3 Site Plan"), a notation in the upper lefthand quadrant indicating warning signs mounted on the perimeter fence was incorrectly deleted. The warning signs do exist and are installed as shown. A replacement drawing with the error corrected is attached to this errata sheet.

- In the fifth drawing of Appendix A (No. JS-052-133-C20 "Monument Details"), the incorrectly worded warning sign was deleted but was not replaced with a correctly worded warning sign, which should read, "Danger, buried hazards including unexploded ordnance. Contact Security at 295-8285 prior to entry or any work at this site." A replacement drawing with the error corrected is attached to this errata sheet.



KEY NOTES

1. FILL EXISTING OPEN PORTION OF TRENCH.
2. EXISTING STOCKPILE TO BE USED FOR FILL.
3. FOR FENCING AND GATE DETAILS SEE NSN DESIGN DRAWING STANDARDS CIVIL SHEETS 1 & 2.

NOTES

1. DEPRESSIONS WITHIN LANDFILL CELLS SHALL BE FILLED AND SHAPED TO DRAIN.
2. TRENCHES CONTAIN GAS. HEAVY EQUIPMENT TO REMAIN A SAFE DISTANCE FROM EDGE OF EACH TRENCH.
3. ALL FILL SHALL BE COMPACTED TO 90% OF MAXIMUM DENSITY DETERMINED IN ACCORDANCE WITH ASTM D1557.
4. FOR MORE SPECIFIC PROJECT REQUIREMENTS AND CONSTRUCTION QUALITY CONTROL REQUIREMENTS, SEE THE CORRECTIVE ACTION PLAN FOR AREA 9 UXO LANDFILL, ETR.
5. BORING HOLE LOCATIONS SHOWN ARE PRIOR TO LANDFILL CLOSURE.

AS-BUILT

Bechtel Nevada — C. ELLISON — 11-20-01

UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES AND CONSTRUCTION FEATURES ARE CORRECTED, AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.

GRAPHIC SCALE

0 4 8 12 16 20 24 28 32 36 40 44 48 METERS

SCALE 1:400

CONTOUR INTERVAL = 0.25m

U.S. DEPARTMENT OF ENERGY

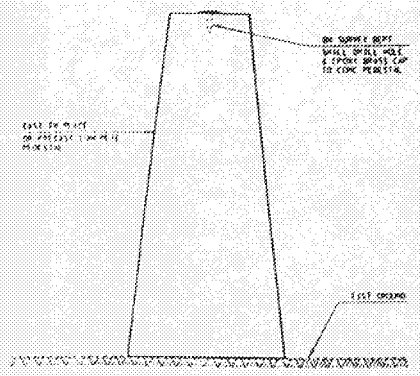
Bechtel Nevada

TONOPAH TEST RANGE — AREA 9 UXO LANDFILL — CAU 453

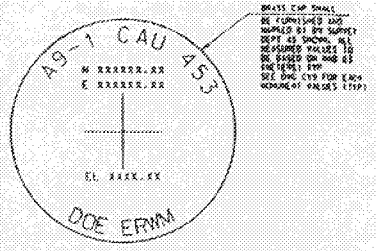
LANDFILL A9-1,2,3 SITE PLAN

AS-052-1335-C19

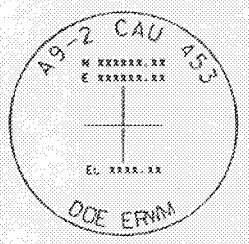
AS-BUILT, DATED 08/31/99
AS-BUILT, DATED 3/7/00
AS-BUILT, DATED 11/20/01
ISSUED FOR CONSTRUCTION, DATED 3/17/99



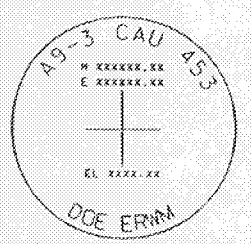
MONUMENT DETAIL
NOT TO SCALE
1 C19



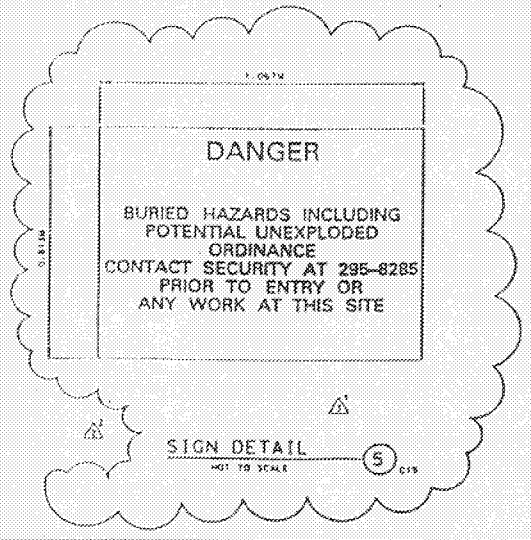
MARKER DETAIL
NOT TO SCALE
2 C19



MARKER DETAIL
NOT TO SCALE
3 C19



MARKER DETAIL
NOT TO SCALE
4 C19



SIGN DETAIL
NOT TO SCALE
5 C19

AS-BUILT
Bechtel Nevada
C. ELLISON 11/20/98
UNLESS NOTED BY MARKED CHANGES, ALL DIMENSIONS, NOTES, REFERENCES, AND CONSTRUCTION FEATURES ARE CORRECTED AND WERE CONSTRUCTED AS SHOWN ON THIS DRAWING.

U.S. DEPARTMENT OF ENERGY
Bechtel Nevada
TONOPAH TEST RANGE — AREA 52
AREA 9 UXO LANDFILL
CAU 453
MONUMENT DETAILS
45-052-133-C20

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 453
CAU Description: Area 9 UXO Landfill (TTR)
CAU Owner: Industrial Sites - Environmental Restoration (ER)

ROTC No. DOE/NV/11718--284-ROTC 1 **Page** 1 of 9

Document Type Closure Report (CR) **Date** 11/19/2019

The following technical changes (including justification) are requested by:

Tiffany Gamero
Requestor Name

Long-Term Monitoring Activity Lead
Requestor Title

Description of Change:

1. This ROTC replaces the Use Restriction (UR) information listed in the documentation for CAU 453.

   UR forms have been updated to list all UR requirements, including but not limited to: post-closure site controls (signs, fencing, etc.), inspection and maintenance requirements, and Geographic Information Systems (GIS) coordinate information. The UR requirements and form(s) included in this ROTC represent the current corrective action requirements for each Corrective Action Site (CAS) in this CAU and supersede information concerning corrective action and post-closure requirements in existing documentation.

2. Removed requirements for monuments and fencing from CAS 09-55-001-0952.

Justification:

1. Some changes in the UR requirements from those found in closure documents have been subsequently modified in letters, memos, and inspection reports. This has resulted in difficulty in determining current post-closure requirements. A review of the post-closure requirements for this CAU has been conducted to ensure that all requirements have been identified and documented on the new UR form. The new UR form was developed to be inclusive of all requirements for long-term monitoring and standardize information contained in the URs consistent with current protocols.

2. Monuments and fencing were used to hold UR signs. Signs will be secured using any means necessary to meet the requirement that signs are present and legible. Also, fencing is not needed to prevent inadvertent exposure to contamination as the surface of the site is not contaminated.

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 453
CAU Description: Area 9 UXO Landfill (TTR)
CAU Owner: Industrial Sites - Environmental Restoration (ER)

ROTC No. DOE/NV/11718--284-ROTC 1 **Page** 2 of 9

Document Type Closure Report (CR) **Date** 11/19/2019

Schedule Impacts:
No impacts to schedule.

ROTC applies to the following document(s):

- U.S. Department of Energy, Nevada Operations Office. 1999. Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, Rev. 0, DOE/NV/11718--284. Las Vegas, NV.

FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
RECORD OF TECHNICAL CHANGE (ROTC)

Corrective Action Unit (CAU) Number: 453
CAU Description: Area 9 UXO Landfill (TTR)
CAU Owner: Industrial Sites - Environmental Restoration (ER)

ROTC No. DOE/NV/11718--284-ROTC 1 **Page** 3 of 9

Document Type Closure Report (CR) **Date** 11/19/2019

Approvals:

Tiffany Gamero
Activity Lead
Environmental Management (EM) Nevada Program
Date 12/5/2019

Bill Wilborn
Deputy Program Manager, Operations
Environmental Management (EM) Nevada Program
Date 12/9/19

FOR Christine Andres
Chief, Bureau of Federal Facilities
Nevada Division of Environmental Protection (NDEP)
Date 12/18/19

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

General Information

Use Restriction (UR) Type(s): FFACO Only

Corrective Action Unit (CAU) Number & Description: 453 - Area 9 UXO Landfill (TTR)

Corrective Action Site (CAS) Number & Description: 09-55-001-0952 - Area 9 Landfill

CAU/CAS Owner: Industrial Sites - ER

Note: N/A

Section I. *Federal Facility Agreement and Consent Order* (FFACO) UR

Basis for FFACO UR

Summary Statement: This FFACO UR is established to protect workers from inadvertent exposure to chemical contaminants that were released at this site. Unexploded ordnance (UXO) is assumed to be present.

FFACO UR Physical Description

Surveyed Area (UTM, Zone 11, NAD 83, meters):

UR Boundary	UR Point[1]	Easting[2]	Northing[2]
FFACO Boundary	1	525,256	4,189,467
	2	525,216	4,189,528
	3	525,325	4,189,596
	4	525,362	4,189,535
	5	525,256	4,189,467

[1]UR Points are listed clockwise beginning at the southernmost point. If multiple points share the southernmost Northing coordinate, the easternmost point is listed as Point 1.

[2]UR Coordinate values presented herein were captured in North American Datum of 1983, and rounded to the nearest meter when necessary; due to that rounding, coordinates may not reflect the original precision of values contained within the source GIS data set.

Boundary Applies to: Subsurface

Starting Depth: 20 **Ending Depth:** 300

Depth Unit: Centimeters

Survey Source: GPS

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

FFACO UR Requirements

Site Controls:

This FFACO UR is recorded as described in **Section IV. Recordation Requirements** to restrict activities within the area by the coordinates listed above and depicted in the attached figure without prior notification of NDEP unless the activities are conducted under the provisions of 10 CFR, Part 835, Occupational Radiation Protection and 10 CFR, Part 851, Worker Safety and Health Program.

Control	Criteria
Signage	Present and legible.
Soil Cover	Must completely cover waste material.

Inspection Frequency: Annual

Additional Considerations:

Consideration	Criteria
None	None

Requirements Comments: Surface is uncontaminated.

Section II. Administrative UR

An Administrative UR is not identified for this site.

Section III. Supporting Documentation

UR Source Document(s)

ROTC 1 for CAU 453 CR (DOE/NV/11718--284), dated 11/19/2019.

Murphy, T.H., Nevada Division of Environmental Protection, Bureau of Federal Facilities. 2006. Letter to J.B. Jones (NNSA/NSO) titled NNSA/NSO Request to Reduce the Frequency of Post-Closure Monitoring of Corrective Action Units (CAU) 400, 404, 407, 423, 424, 426, 427, 453, and 487 at Tonopah Test Range (TTR), Nevada, 5 December. Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999. Closure Report for Corrective Action Unit 453: Area 9 UXO Landfill, Tonopah Test Range, Nevada, Rev. 0, DOE/NV/11718--284. Las Vegas, NV.

U.S. Department of Energy, Environmental Management Nevada Program
Use Restriction Information

Attachments

- FFACO UR Boundary Map (UTM, Zone 11, NAD 83 meters)
- Supplemental Information Figure (UTM, Zone 11, NAD 83 meters)

Section IV. Recordation Requirements

Recordation:

The above UR(s) are recorded in the:

- FFACO Database
- NNSA M&O Contractor GIS
- USAF (Nellis Air Force Base Range Operations) GIS
- EM Nevada Program CAU/CAS Files

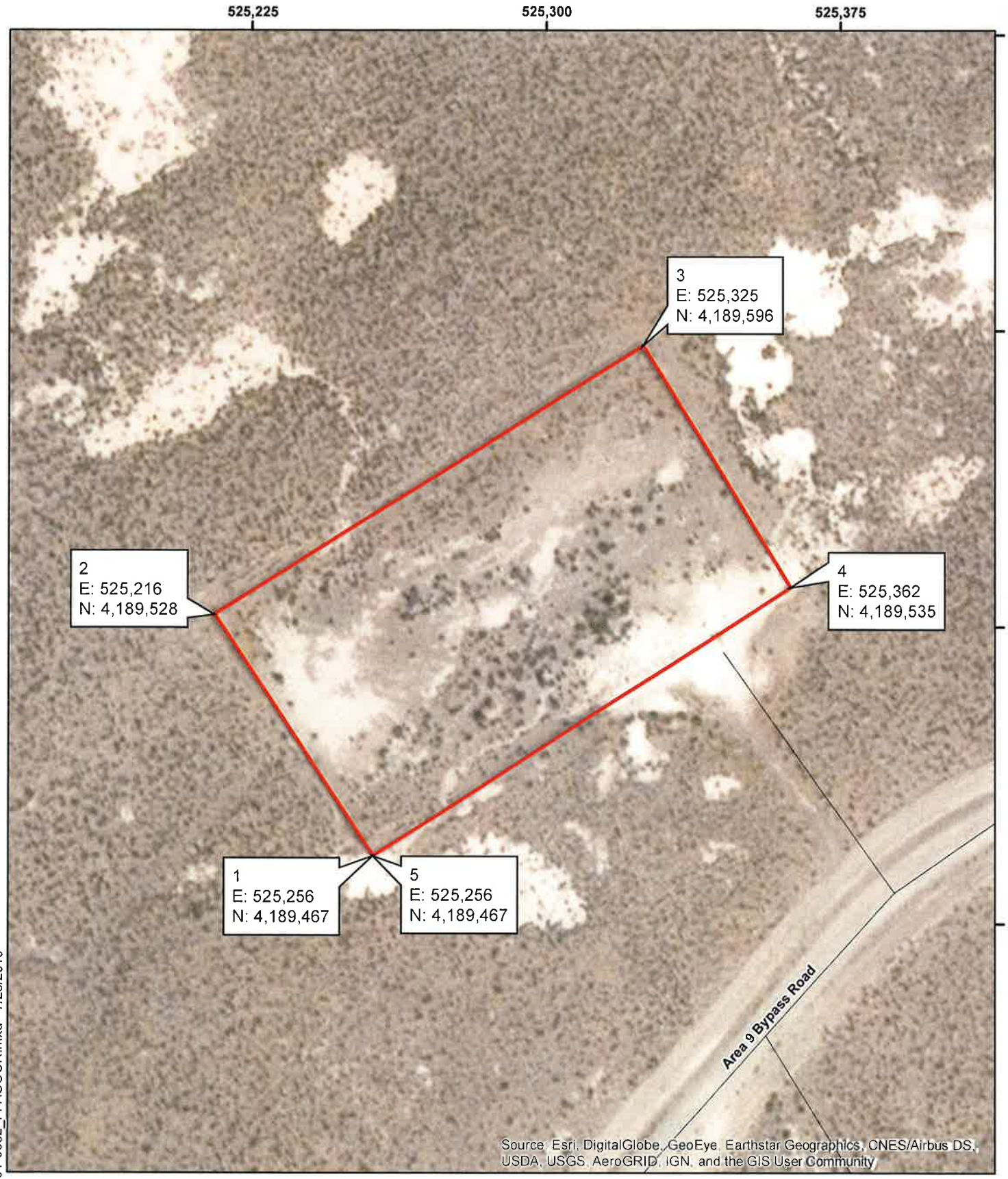
Section V. EM Nevada Program Approval

Date: 12/5/2019

Tiffany Gamero

Activity Lead

EM Nevada Program



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CAU 453, CAS 09-55-001-0952
Area 9 Landfill
FFACO UR Boundary

Explanation

FFACO UR

Unimproved Road

0 10 20 40 Meters

0 40 80 160 Feet

N

Source: Navarro GIS, 2019

Coordinate System: NAD 1983 UTM Zone 11N, Meter

Supplemental Information Figure

The attached supplemental information figure(s) are included to capture site feature information that was available in previous iterations of this Use Restriction (UR) to prevent loss of that information.

H:\453\GPS\CAS09-55-001-0952_SUPP.mxd - 7/9/2019

Source: Navarro GIS, 2019

CAU 453, CAS 09-55-001-0952
Area 9 Landfill
Supplemental Information
General Location of Site Features

0 15 30 60 Meters

0 50 100 200 Feet

N

NOTE: Size and location of features are approximated

Coordinate System: NAD 1983 UTM Zone 11N, Meter