Nevada
Environmental
Restoration
Project

DOE/NV--807

Closure Report for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada

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March 2002

Environmental Restoration
Division

U.S. Department of Energy, National Nuclear Security Administration
Nevada Operations Office

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CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 143: AREA 25 CONTAMINATED WASTE DUMPS NEVADA TEST SITE, NEVADA

Prepared for the
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Nevada Operations Office
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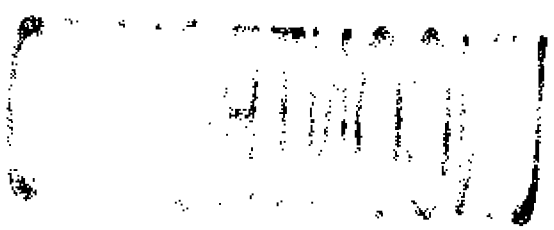

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 143: AREA 25 CONTAMINATED WASTE DUMPS NEVADA TEST SITE, NEVADA

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Nevada Environmental Restoration Project

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ACRONYMS AND ABBREVIATIONS

BN	Bechtel Nevada
BZA	breathing zone apparatus
C	Celsius
CADD	Corrective Action Decision Document
CAP	Corrective Action Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
cm	centimeter(s)
cps	count per second
CR	Closure Report
Cs-137	Cesium-137
CWD	Contaminated Waste Dump
DOE/NV	U.S. Department of Energy, Nevada Operations Office
dpm	disintegrations per minute
dpm/100cm^2	disintegrations per minute per 100 square centimeters
DQO	Data Quality Objective
E-MAD	Engine Maintenance, Assembly, and Disassembly
FFACO	Federal Facility Agreement and Consent Order
FIDLER	Field Instrument to Detect Low-Energy Radiation
ft	feet/foot
ft^3	cubic feet
gal	gallon(s)
GPS	Global Positioning System
HWAA	Hazardous Waste Accumulation Area
IH	Industrial Hygienist
in	inch(s)
kg	kilogram(s)
L	liter(s)
lb	pound(s)
LLW	Low-Level Waste
m	meter(s)
m^3	cubic meters
mR/h	millirem per hour
NDEP	Nevada Division of Environmental Protection
NNSA/NV	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Administration
pCi/gr	picoCuries per gram
RCT	Radiological Control Technician
R-MAD	Reactor, Maintenance, Assembly, and Disassembly
ROTC	Record of Technical Change

ACRONYMS AND ABBREVIATIONS (continued)

RWAP	Radioactive Waste Acceptance Program
RWMS	Radioactive Waste Management Site
Sr-90	Strontium-90
TNT	Transient Nuclear Test
yd^3	cubic yards
yr	year(s)

EXECUTIVE SUMMARY

Corrective Action Unit (CAU) 143 is located in Area 25 of the Nevada Test Site. The unit is listed in the Federal Facility Agreement and Consent Order (FFACO, 1996) as CAU 143 which is comprised of two Corrective Action Sites (CASs):

- CAS 25-23-09, Contaminated Waste Dump #1 at the Reactor Maintenance, Assembly, and Disassembly Facility
- CAS 25-23-03, Contaminated Waste Dump #2 at the Engine Maintenance, Assembly, and Disassembly Facility

The approved corrective action alternative for this unit was closure in place with administrative controls. Closure activities included:

- Earthwork to fill depressions and grade to the natural slope
- The use of additional clean cover soil as excess backfill
- Land use restrictions to minimize access and prevent unauthorized site activities.
- The construction of erosion control structures and placement of a diversion channel berm to divert storm water runon/runoff potential and mitigate channelized erosion.

CAU 143 was closed in accordance with the FFACO and the Nevada Division of Environmental Protection (NDEP)-approved Corrective Action Plan (CAP) for CAU 143: Area 25, Contaminated Waste Dumps, Nevada Test Site, Nevada (U.S. Department of Energy Nevada Operations Office [DOE/NV], 2001). The closure activities specified in the CAP were based on the recommendations presented in the Corrective Action Decision Document (DOE/NV, 2000a).

The proposed post-closure monitoring plan consists of annual site inspections to determine the condition of fencing signage and postings. If any maintenance and repair requirements are identified, funding will be requested and the repairs scheduled. Any repairs will be documented in writing at the time of repair. Results of all inspections and repairs for a given year will be addressed in a single report submitted annually to the NDEP.

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1.0 INTRODUCTION

This Closure Report (CR) has been prepared for the Area 25 Contaminated Waste Dumps (CWD), Corrective Action Unit (CAU) 143 in accordance with the Federal Facility Agreement and Consent Order [FFACO] (FFACO, 1996) and the Nevada Division of Environmental Protection (NDEP)-approved Corrective Action Plan (CAP) for CAU 143: Area 25, Contaminated Waste Dumps, Nevada Test Site, Nevada (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 2001). CAU 143 consists of two Corrective Action Sites (CASs): 25-23-09 CWD #1, and 25-23-03 CWD #2.

The Area 25 CWDs are historic disposal units within the Area 25 Reactor Maintenance, Assembly, and Disassembly (R-MAD), and Engine Maintenance, Assembly, and Disassembly (E-MAD) compounds located on the Nevada Test Site (NTS) (Figure 1). The R-MAD and E-MAD facilities originally supported a portion of the Nuclear Rocket Development Station in Area 25 of the NTS. CWD #1 CAS 25-23-09 received solid radioactive waste from the R-MAD Compound (East Trestle and West Trench Berms) (Figure 2) and 25-23-03 CWD #2 received solid radioactive waste from the E-MAD Compound (E-MAD Trench) (Figure 3).

1.1 PURPOSE

The Area 25 CWDs were identified as CAU 143 by the FFACO (FFACO, 1996). The purpose of this CR is to document that the closure of CAU 143 complied with all of the CAP closure requirements (DOE/NV, 2001).

1.2 SCOPE

The approved closure strategy for CAU 143 was specified in the Corrective Action Decision Document (CADD) for CAU 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, (DOE/NV, 2000a). The approved alternative includes closure in place with administrative controls. The implemented closure strategy consisted of the following activities.

R-MAD

- The soil immediately surrounding the location of the elevated strontium-90 (Sr-90) surface sample was removed prior to moving the Transient Nuclear Test (TNT) Mound (Figure 2).
- Earthwork at the East Trestle consisted of backfilling the trestle depression area with fill from each of the six West Trench berms, the TNT Mound, and from a borrow fill source northwest of the R-MAD facility. The backfill material was placed to an elevation slightly above the existing track grade to eliminate depressions, while the existing slopes were modified to minimize runon/runoff, infiltration, and possible erosion.

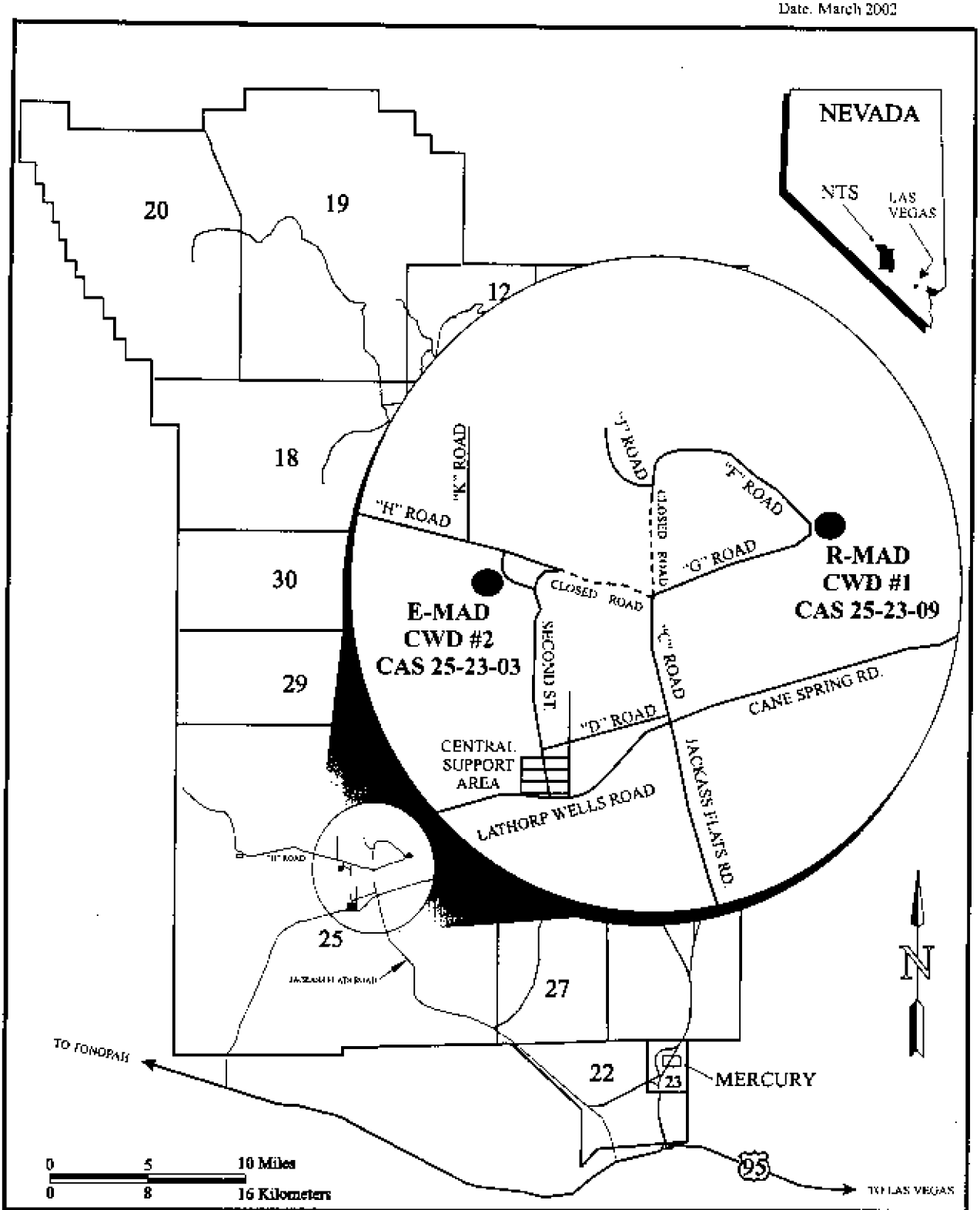


FIGURE 1
LOCATION OF CAU 143 NEVADA TEST SITE, NEVADA

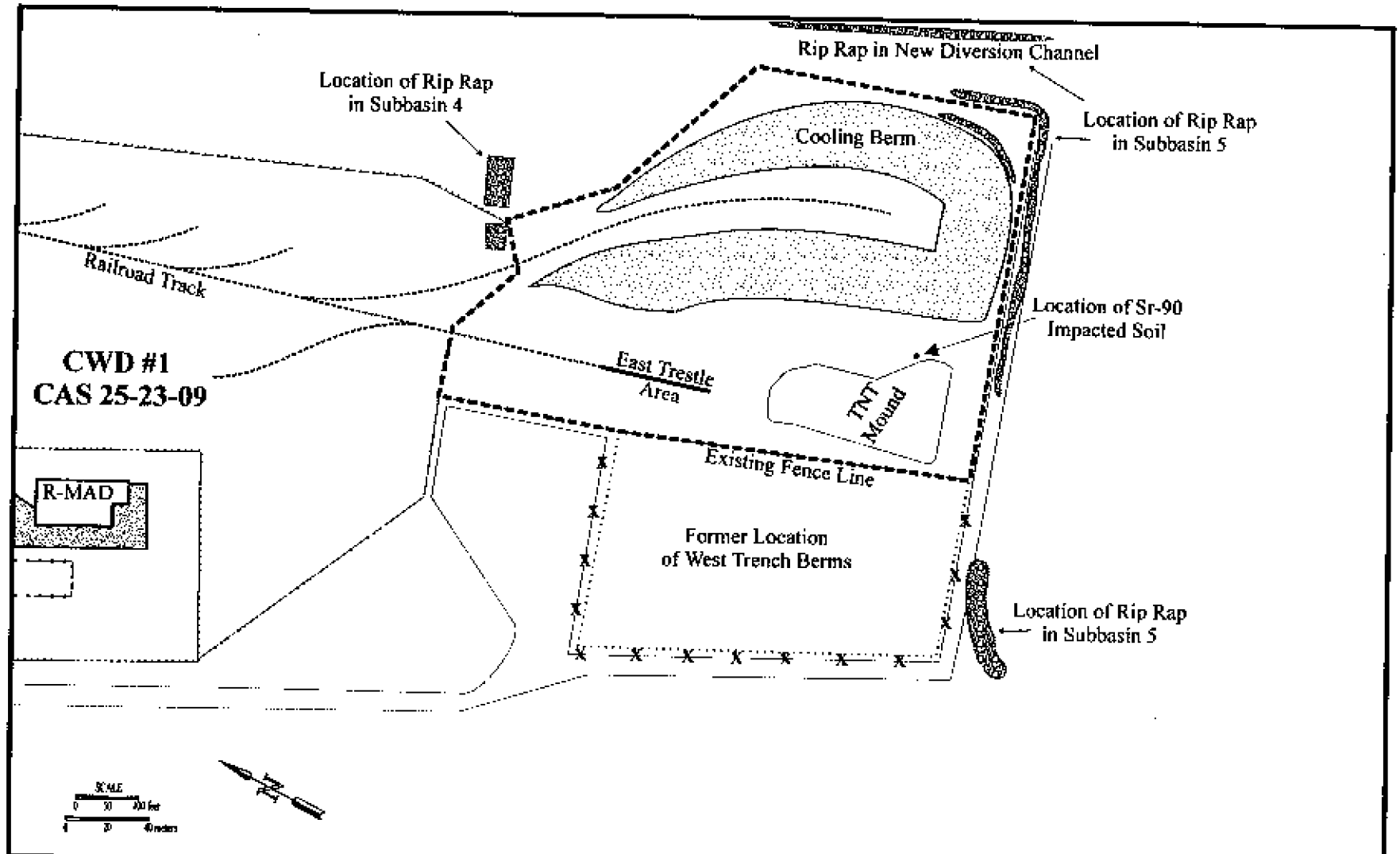


FIGURE 2
R-MAD WASTE DUMP SITE LAYOUT MAP

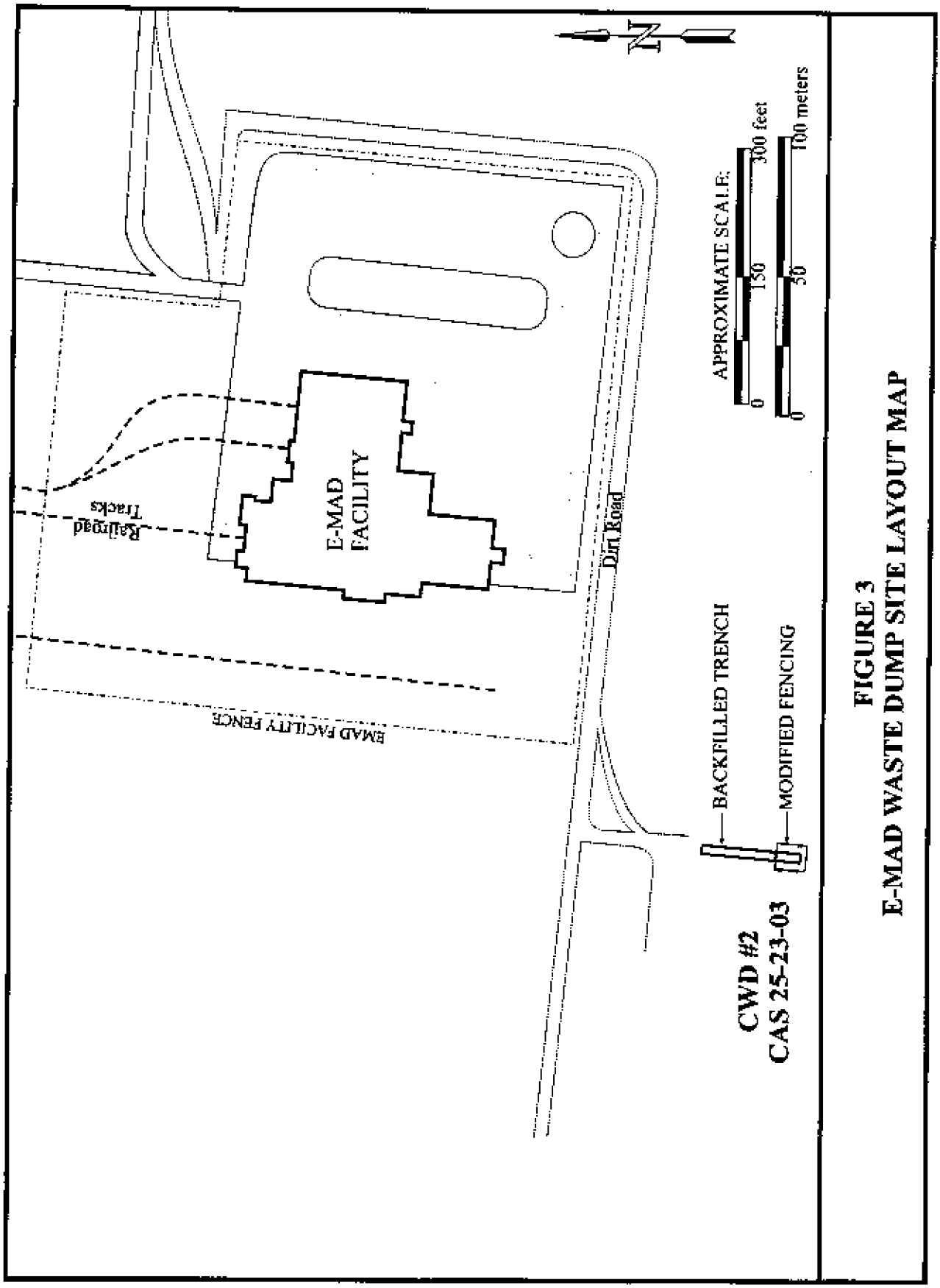


FIGURE 3
E-MAD WASTE DUMP SITE LAYOUT MAP

- Earthwork at the West Trenches consisted of placing additional clean cover material over the trenches, regrading the area to its natural slope, and mitigating the potential for channelized erosion at the south end of the West Trench near the fence line.

- The existing signage and fencing in the vicinity of the R-MAD West Trenches were left intact. New signs and postings were set up along the R-MAD east track and near the cooling berm.

- The cooling berms around the R-MAD East Track were left in place.

E-MAD

- The E-MAD Trench (CWD #2) was backfilled with clean soil from the mound adjacent to the open trench. The trench was backfilled to an elevation slightly greater than existing grade.

- A diversion berm was established around the trench to divert potential storm water runon/runoff potential.

- Signage and fencing were modified to include only the currently filled portion of the trench.

1.3 CLOSURE REPORT CONTENTS

This CR is divided into the following sections:

Section 1.0 - Introduction
Section 2.0 - Closure Activities
Section 3.0 - Waste Disposition
Section 4.0 - Closure Verification
Section 5.0 - Conclusions and Recommendations
Section 6.0 - References

The appendices of this document have been modified from the approved July 2001 FFACO outline. The following FFACO outline appendices have either not been included or revised as indicated below:

- Data Quality Objectives (DQO) as developed in the CADD (DOE/NV, 2000a). DQOs were not developed for closure of the Area 25 CWDs. The earthwork was performed to the criteria specified in the CAP (DOE/NV, 2001).

- Closure Certification is not required. Closure verification and subsequent annual inspections are necessary for fulfilling closure requirements.

- Appendix A, "As-Built" Drawings and Engineering Calculations for CAU 143.

- Appendix B, Confirmation Sampling Test Results (e.g., analytical reports for lead-impacted soil verification samples and Sr-90 impacted soil verification samples).

- Waste Disposition Documentation is pending for four 208-liter [L] (55-gallon [gal]) drums of Sr-90 impacted soil and will be provided in the first Post-Closure Monitoring report.

The following documents were used to develop this CR:

- Corrective Action Investigation Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, Rev. 1, DOE/NV--506 (DOE/NV, 1999).

- Corrective Action Decision Document for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, Rev. 0, DOE/NV--617 (DOE/NV, 2000a).

- Corrective Action Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, Rev. 0, DOE/NV--698 (DOE/NV, 2001).

No DQOs were developed for the closure activities for CAU 143. The earthwork activities were controlled by adherence to the design engineering specifications developed for the CAP (DOE/NV, 2001). Verification of the design is documented in the construction "as-built" drawings included in Appendix A of this document.

2.0 CLOSURE ACTIVITIES

This section of the CR details the specific activities involved in the closure of CAU 143.

2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

Closure of CAU 143 was completed using the approved Corrective Action Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, Revision 0, (DOE/NV, 2001). The CAP was based on the recommendations in the Corrective Action Decision Document for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada (DOE/NV, 2000a). Prior to beginning closure activities, the following pre-field activities were completed:

- Preparation of National Environmental Policy Act documentation (checklist).
- Preparation of the Field Management Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, (Bechtel Nevada [BN], 2001a).
- Preparation of the Site-Specific Health and Safety Plan for Closure Activities at Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, (BN, 2001b).
- Preparation of the DOE/NV Real Estate/Operations Permit.

The following is the scope of the closure actions implemented for CAU 143. Construction activities consisted primarily of earth moving. Figure 4 shows an aerial view of the R-MAD CWD area before the start of remediation activities.

2.1.1 Removal of Sr-90 Impacted Soil

Site characterization, performed by International Technology Corporation in 1999, revealed a surface soil sample at the R-MAD waste dump location that contained Sr-90 above the action level of 3 picoCuries per gram (pCi/gr) (DOE/NV, 2000a). The Sr-90 impacted soil area was located within the East Trestle area fence, directly southeast of the TNT Mound (Figure 2). Approximately 1 cubic meter (m^3) (1.3 cubic yards [yd^3]) of Sr-90 impacted soil was removed and placed into four 208-L (55-gal) drums. The Sr-90 impacted soil removal activities were conducted between November 7, 2001 and November 14, 2001.

A site-specific Cesium (Cs)-137/Sr-90 ratio was not established at CAU 143 because this ratio has been previously established for other Nuclear Rocket Development Station sites. The ratio of Cs-137 to Sr-90 is expected to be 1 to 1. Therefore, detectable levels of Cs-137 indicate that elevated levels of Sr-90 are present. Because Cs-137 emits gamma ionizing radiation, field screening instruments can be used to establish the presence of Sr-90 based on the known Cs-137 and Sr-90 ratio.

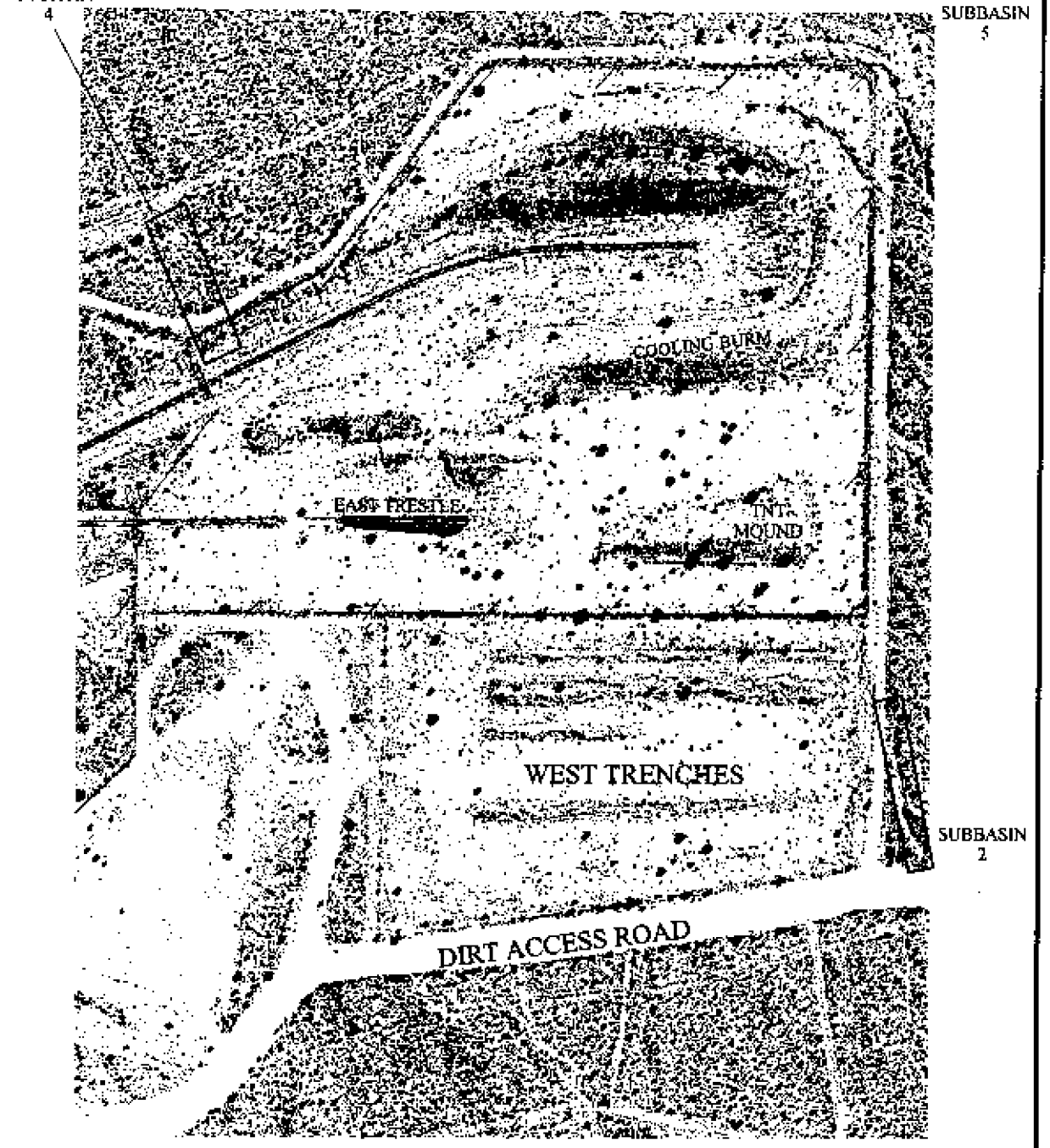


FIGURE 4
R-MAD AERIAL PHOTOGRAPH BEFORE REMEDIAL ACTION

The project health physicist developed a field screening protocol to be used during the excavation to assess the progress in removal of the Sr-90 impacted surface soil area. An Radiological Control Technician (RCT) used a Field Instrument to Detect Low-Energy Radiation (FIDLER) instrument to survey the excavation area for the presence of Cs-137. This instrument had sufficient sensitivity for the Cs-137 to determine when near normal background levels were achieved. The background level for this instrument was approximately 130 counts per second (cps).

The initial gamma activity levels of impacted soil were measured with the FIDLER between a range of 300-400 cps within the general excavation area and higher gamma activity was measured in localized areas of the excavation. The average activity levels gradually decreased as the excavation progressed until they were approximately 120 cps and within the acceptable range of background. The Sr-90 impacted soil was removed from the excavation and placed in four 208 L (55 gal) drums.

A set of verification samples was collected at the bottom of the impacted soil excavation area. A total of five verification samples were collected from the base of the Sr-90 excavation. Four soil samples were collected from the corner of each sidewall and one sample from the center of the excavation. In addition, two quality assurance/quality control samples (1 duplicate and 1 equipment blank) were collected. The sampling activities were recorded in a field logbook which included the following information: (a) dates and times of sampling activities; (b) names of sampling personnel; (c) location of sampling noting the sample identification number; and (d) the volume, weight, and description of the sample taken. A pre-screened analysis of the verification samples was performed at R-MAD using a In Situ Object Counting System. The samples were cooled to approximately 4 degrees Celsius (C) and transported to BN Environmental Technical Services under strict chain-of-custody procedures for a formal laboratory analysis.

Analytical results for the verification samples were received on December 19, 2001. The results showed no radiological constituents above background levels, 3 pCi/gr (DOE/NV, 2000a). The Sr-90 impacted soil excavation area was backfilled on January 14, 2002, with clean fill from the area of excavation. Analytical results for the verification samples are presented in Appendix B. Radiological survey results of the Sr-90 impacted soil area and surrounding areas are presented in Appendix D.

2.1.2 Level the R-MAD West Trench Berms to the Existing Grade

The West Trench berm field activities were conducted between November 5, 2001 and December 4, 2001.

Earthwork at the West Trench Berms consisted of removing the top clean layer of soil from six trench berms, using the soil as backfill material at the East Trestle depression area, and regrading the West Trench area to its natural slope. In addition, channelized erosion at the south end of the West Trench Berms was mitigated by diverting the natural drainage flow to the southwest.

A scraper and front-end loader were used to remove the top clean layer of soil from the West Trench berms. A water truck was also used for dust suppression. The extent of lateral and vertical radiological subsurface contamination in the berms ranged from 2.2 meters (m) (7 feet [ft]) wide to 138 m (450 ft) long to 3.1 m (10 ft) in depth. Approximately 130 m^3 (800 yd^3) of backfill material was removed from the top layer of the West Trench berms. Radiological surveys of the West Trench berm area were performed after the top layer of soil was removed to verify that the remaining soil was not impacted. A goldak/metrotech survey and geophysical survey were conducted within the west trench berm area. The survey detected traces of metal debris 15 to 30 centimeters [cm] (6 to 12 inches [in]) below the surface. The detected areas of metal debris were marked and Global Positioning System (GPS) coordinates were taken to identify the marked areas after additional clean cover material was placed over the trenches during grading. GPS coordinate data were recorded in a field logbook and are provided in Appendix C.

Rusted Metal Frame Debris

Three 1.2-m (4-ft) long connected sections and two separate sections of rusted frame metal were discovered by an operator during West Trench berm removal. The frames were covered with a layer of soil and rust when initially excavated. An RCT surveyed the exposed metal debris with an NE Electra survey instrument. The beta-gamma activity was slightly elevated (<500 disintegrations per minute (dpm) above background), but was well below release limits as given in Table 2-2 of the NV/YMP Radiological Control Manual (DOE/NV, 2000b). Therefore, the excavation was allowed to continue. A front-end loader stockpiled the debris into an isolated area at the edge of the excavation. The metal debris was washed numerous times by the water truck used to support excavation. This removed much of the original soil and rust. The metal debris was later placed into a transportation lugger pending disposal. While performing final release surveys on the metal debris in the lugger, elevated beta-gamma readings were observed. The project health physicist decided that the metal debris should be removed from the lugger so that each piece could be resurveyed. The RCTs performed integrated counts on each piece with detectable beta-gamma activity. All debris averaged less than the 5,000 dpm/100 square centimeters (cm^2) total activity allowed for free release (Table 2-2) (DOE//NV, 2000b). One metal piece had a 100 cm^2 area of approximately 11,000 dpm. This spot was below the 15,000 dpm criteria allowed for free release (DOE/NV, 2000b). All of the metal was returned to the lugger and released to the sanitary waste landfill in Area 23 for disposal.

Radiological-Impacted Pipe

A radiological-impacted pipe reading 150,000 dpm/100 cm^2 was exposed at the surface by a front-end loader during West Trench berm removal. The radiological-impacted pipe was wrapped with a nylon fabric material believed to be a form of asbestos. An Industrial Hygienist (IH) performed a visual inspection of the nylon fabric material and collected samples for laboratory analysis to determine if the material contained asbestos. The laboratory results for three subject samples collected were negative for asbestos.

In addition, the radiological-impacted pipe was attached to a larger network of piping embedded approximately 0.6 m (2 ft) in the subsurface. The area surrounding the radiological-impacted pipe was isolated and roped off with orange fencing to designate the discovery and allow remediation activities to continue within the West Trench berm area. After the top layers of the West Trench berms were removed and 90 percent of grading completed, the exposed rad-

impacted pipe was compacted into the surface using a front-end loader. Compaction was the preferred alternative in lieu of pipe removal, primarily due to the potential risk associated with exposing a larger network of radiological-impacted pipe with unknown levels of radioactivity. A 0.9-m (3-ft)-square section of the area was backfilled with 0.3 m (1 ft) of top soil. The surface compacted area was graded to blend into the natural drainage flow of the West Trench area. GPS coordinate data were recorded in a field logbook and are provided in Appendix C.

Six-Foot Drain Pipe

A 1.8-m (6-ft)-high stainless steel drain pipe was exposed to the surface by a front-end loader during West Trench berm removal. The drain pipe was attached to other segments of pipe embedded in the subsurface. Radiological surveys were performed by an RCT with an Electra instrument to determine if the exposed drain pipe or surrounding area was radiologically impacted. The drain pipe also contained elbow joints that were soldered with a material that appeared to be lead-based. An industrial hygienist performed a survey for lead on the soldered material within the elbow joints of the drain pipe. A Niton XL lead detector instrument was used and placed directly over the soldered joints of the pipe as well as two small pieces of the solder. The Niton detected no lead on the solder material within the elbow joints of the drain pipe. Therefore, the 1.8-m (6-ft) drain pipe was severed using a hand saw at ground surface and placed into a transportation lugger to be disposed of in the Area 23 sanitary waste landfill. GPS coordinate data were recorded in a field logbook and are provided in Appendix C.

Seven-Foot Diameter, 0.5-Inch-Thick Drain Pipe

An open-ended 2.1-m (7-ft)-diameter,1.3-cm (0.5-in)-thick drain pipe was exposed during West Trench removal activities. The drain pipe was attached to a larger segment of pipe embedded in the subsurface. Radiological surveys were conducted by an RCT using an Electra and FIDLER detector. No contamination or elevated gamma activity was detected on the drain pipe or surrounding area. Approximately 15 cm (6 in) of soil was removed from around the drain pipe and a front-end loader was used to break the pipe at the ground surface. Additional radiological surveys were performed on the cut end of the drain pipe prior to placing the pipe into a transportation lugger for disposal in Area 23 as sanitary waste. GPS coordinate data were recorded in a field logbook and are provided in Appendix C.

Former Hazardous Waste Accumulation Area

Debris from a former hazardous waste accumulation area (HWAA) was discovered near the northwest corner of the West Trench area. The HWAA was used to support site characterization work in 1999. An RCT performed a survey of the general area to confirm that the sectioned-off area was not impacted. Remnants of the pad included a black milar, seven pallets, and other miscellaneous debris. Upon receiving documentation to confirm the characterization activities within the area, the pad was cleaned up and the debris disposed of as sanitary waste.

Grading of Site

Final grading was completed in the West Trench berm area and leveled to existing grade using a the grader. The adjacent area outside of the West Trench front gate, near the East Trestle front gate, was also graded to blend into the natural drainage flow of the West Trench area.

Fence Repair and Installation of Warning Signs/Postings

To prevent indiscriminate access of unauthorized personnel to the graded West Trench area, a

damaged fence was repaired. The fence was located along the southeast perimeter of the West Trench area. Approximately 7.5 m (25 ft) of three-strand barb wire were attached between five fence posts. The fence repair activities were conducted between November 20, 2001 and November 21, 2001.

In addition, the access gate to the West Trench area was removed using a front-end loader to allow better access for heavy equipment during remediation activities. After the completion of all remediation activities in the West Trench area, the front access gate was restored and proper signs were posted to maintain adequate administrative access controls.

A total of 17 Underground Radioactive Material signs were posted on the existing fence. Five signs were posted north of the West Trench area, eight signs were posted on the west fence, and four signs were posted on the south fence. Also, the West Trench area will remain designated as a controlled area that requires general employee radiological training for access and entry.

2.1.3 Backfill the R-MAD East Trestle Area

The field activities for backfilling the East Trestle area were conducted between November 5, 2001 and November 28, 2001. Specific construction details are provided below.

Earthwork at the East Trestle consisted of backfilling the large trestle depression area with backfill material from the West Trench berms, the TNT Mound, and a borrow fill pit located northwest of the R-MAD facility. The East Trestle area dimensions were 18 m (60 ft) wide to 42 m (140 ft) long by 6 m (20 ft) in depth. Approximately 5,040 m^3 (6,400 yd^3) of backfill material was distributed at an elevation slightly above the existing track grade to eliminate depressions, while the existing slopes were modified to minimize runon/runoff, infiltration, and possible erosion. In addition, the East Trestle track was backfilled to the north fence boundary with approximately 20 cm (8 in) of excess backfill material from the borrow fill pit.

West Trench Berms
Backfill material was retrieved from the West Trench berms by a front-end loader and scraper. A water truck was used to maintain dust suppression. Approximately 630 m^3 (800 yd^3) of backfill material from the West Trench berms was used to backfill the East Trestle area.

Camel Back
A camel back was located on the terminus of the East Trestle railroad spur attached by two clamps. The camel back was used to tip the rail cars over as they unloaded solid radioactive waste material into the pit area underneath the trestle. The camel back location, weight, and the questionable integrity of the trestle structure created a safety concern for the initial method of removal. Therefore, after a reevaluation of alternatives, a new strategy and approach was developed to facilitate camel back removal. A soil ramp was constructed with West Trench berm material to reach the 900 kilogram (kg) (2,000 pounds [lbs]) camel back. A front-end loader was used to collapse the camel back into the depression area. Subsequently, the trestle tracks, rails, and wooden column structures were demolished to serve as additional backfill for the open depression area. An 2.4- to 3-m (8- to 10-ft) layer of soil provided a protective cover over the

camel back and adjoining structures.

TNT Mound
The TNT Mound, consisting of approximately 3,150 m^3 (4,000 yd^3) of soil, was used as backfill material for the East Trestle area. The mound was located within the southwest corner of the CWD #1 fenced area, east of R-MAD. Backfill material was retrieved from the TNT with a scraper, D-9 dozer, and front-end loader. In addition, a water truck was used for dust suppression during soil removal activities.

R-MAD Borrow Pit
Excess backfill material from the R-MAD borrow pit was used to complete backfill activities in the East Trestle area. Approximately 1,260 m^3 (1,600 yd^3) of backfill material was retrieved from the borrow pit and transported to the trestle area by the scraper. A D-9 dozer was used to load the scraper with borrow fill material while the scraper transported a full 17-m^3 (22-yd^3) load to the east trestle area. Traffic was monitored and controlled to allow free road access for the scraper during transportation to and from the borrow pit.

Grading of the Site
The East Trestle area was completely backfilled with clean soil and leveled to existing grade with the grader. The front-end loader was used to minimize surface obstructions and prevent ponding.

Fence Repair and Installation of Warning Signs/Postings
The existing chain-link fencing remained in place to prevent access of unauthorized personnel into the East Trestle area. A set of new signs was posted in between the TNT Mound and cooling berm to identify elevated levels of radioactive material within the area. Five signs were posted as "Caution- Radioactive Material" within a 15-m (50-ft) by 21-m (70-ft) square area directly south of the East Trestle. The front gate of the East Trestle area has five signs reading "Caution-Underground Radioactive Material" and six additional signs posted along the south end of the chain-link fence. Also, the East Trestle area will remain designated as a controlled area.

Fourteen radioactive material postings have also been placed along the length of the cooling berm eastern railroad track.

2.1.4 Erosion Protection Installation

Erosion protection was necessary within three subbasin areas of the R-MAD CWD based upon a flood assessment and hydraulic analysis and evidence of past erosion. The erosion protection materials included a non-woven, needle-punched geotextile filter fabric, fine aggregate (sand), and rip-rap rock as the final cover. The volume, size, and distribution of erosion protection materials varied in accordance with the approved design specifications (DOE/NV, 2001). The method of installation required that an erosion channel grade be constructed to a specific depth and lined with a geotextile fabric, sand, and rip-rap rock. Approximately 15 cm (6 in) of fine aggregate (sand) was used as a secondary layer for placement of rip-rap rock on top of the fabric layer. Rip-rap rock was used as a final backfill media in the three subbasin areas to maintain control of the natural drainage flow. A grader, front-end loader, backhoe, forklift, and water

truck were used to construct the subbasins.

2.1.4.1 Subbasin 4

Erosion protection was first installed in the Subbasin 4 channelized erosion area. Subbasin 4 is located at the far northeast corner of the R-MAD CWD area. Approximately 213 m^3 (270 yd^3) of rip-rap rock and 134 m^3 (170 yd^3) of fine aggregate were delivered to Subbasin 4 for erosion protection. The erosion channel at Subbasin 4 was excavated to a 3:1 slope depth of 0.9 m (3 ft) and a width of 9 m (30 ft). A rip-rap rock thickness of 0.3 m (1 ft) with a 15-cm (6-in) fine aggregate cushion was required for Subbasin 4. Erosion protection activities for Subbasin 4 were conducted between December 5, 2001 and December 12, 2001.

2.1.4.2 Subbasin 2

Erosion control was established in Subbasin 2 to mitigate channelized erosion. Subbasin 2 is located near the far southwest corner of the R-MAD CWD area. The erosion channel at Subbasin 2 was excavated to a 3:1 slope depth of 0.6 m (2 ft) and a width of 3.6 m (12 ft). A rip-rap rock thickness of 15 cm (6 in) with a 15-cm (6-in) sand cushion was the required erosion control specifications for Subbasin 2. Installation of erosion protection for Subbasin 2 occurred between December 13, 2001 and December 19, 2001. A two-strand yellow wire rope fence was installed around the Subbasin 2 rip-rap area.

Excess rip-rap from Subbasin 2 was used to mitigate other areas of erosion and support radiological control. A front-end loader placed a 77-m (250-ft) linear pile of small rip-rap rock along the exterior south perimeter of chain-link fence to mitigate potential runon between Subbasin 5 and the East Trestle area.

2.1.4.3 Subbasin 5

The last and largest erosion area requiring long-term protection was Subbasin 5. Subbasin 5 is located at the far southeast corner of the R-MAD CWD area. Approximately 842 m^3 (1,070 yd^3) of rip-rap rock and 425 m^3 (540 yd^3) of fine aggregate were delivered to Subbasin 5 for erosion protection. However, a change in the erosion control design for Subbasin 5 was implemented to utilize an existing drainage channel to divert storm water flow away from the CAU site boundary. The existing drainage channel was repaired and extended 138 m (450 ft) to provide long-term erosion protection during periods of high precipitation. The engineer-designed diversion channel at Subbasin 5 was excavated to a 3:1 slope depth of 0.9 m (3 ft), at a flat bottom channel width of 10 m (20 ft). A backhoe was used to position rip-rap along the diversion channel and supported small excavation in the adjacent erosion channel near the cooling berm. The front-end loader was used to construct the diversion channel and transported aggregate and rip-rap material from the stockpile area to existing erosion areas. A grader was used for road maintenance and access to Subbasin 5. The water truck was used to maintain dust suppression and provide compaction for the diversion channel. The diversion channel compaction was accomplished wetting the channel and driving the water truck three times across the top of the berm for stabilization. Erosion protection activities for Subbasin 5 were conducted

between January 10, 2002 and January 23, 2002.

Approximately 54 m (180 ft) of chain-link fencing was removed to support erosion protection activities at Subbasin 5. The chain-link fence was restored after 118 m^3 (150 yd^3) of rip-rap rock was placed in a 0.75-m (2.5-ft) deep erosion channel between January 10, 2002 and January 23, 2002. Eighteen galvanized steel fence posts were driven into the ground at a 3-m (10-ft) linear distance from each post. The chain-link fence was completed on January 24, 2002, to maintain site-access control with the Subbasin 5 area.

Excess rip-rap rock for Subbasin 5 was placed along the west embankment of the 135 m (450 ft) extended diversion channel at a 4.5-m (15-ft) width from the top of the berm to surface grade. The excess rip-rap rock was used to reinforce drainage flow control in case an overflow condition affects the diversion channel. Additional excess rip-rap for CAU 143 has been stockpiled near Subbasin 5 for future use.

2.1.5 Removal and Disposal of Metallic Lead

A lead-impacted soil area was discovered during a topographic survey walk-down for the construction of an engineer-designed diversion channel. The lead- impacted soil area was at the southeast corner of the R-MAD CWD near Subbasin 5. A Niton XL lead detector was used to confirm the presence of lead. An exposure assessment was conducted during remediation activities which consisted of the following:

- The IH monitored the workers for airborne lead dust exposure with a breathing zone air (BZA) monitoring device during lead-impacted soil removal. The BZA sample results for airborne lead were below the Occupational Safety and Health Administration (OSHA, 1999) lead standard of 50 micrograms per cubic meter and further reduced by virtue of the workers' use of full-face respirators with high-efficiency particulate air filtration.

- The IH conducted swipe samples of the construction equipment for lead contamination during excavation of the lead-impacted soil. The construction equipment supporting lead removal was the backhoe, front-end loader, and a 9,090-kg (10-ton) forklift. In addition, the water truck was used to maintain dust suppression and minimize the generation of airborne lead particles. Swipe samples were taken prior to and after use of the equipment. A total of 28 swipe samples were taken, 14 prior to operations and 14 following operations. The Niton XL lead detector was used to detect lead particulates on the swipes. After the completion of lead-impacted soil removal, all 28 swipe samples were negative for lead.

Lead-impacted soil removal activities were conducted between January 8, 2002 and January 9, 2002. A backhoe was used for the excavation while a front-end loader transported the impacted soil to one of four roll-off containers located approximately 21 m (70 ft) from the point of excavation. Limited access due to stockpiled rip-rap and aggregate prevented the roll-off containers from being located closer to the excavation area. The non-recyclable lead was located in a 6-m (20-ft) by 9-m (30-ft) square area to a depth of 0.3 m (1 ft). Approximately 32 m^3

(40 yd^3) of lead-impacted soil was excavated and placed directly into roll-off containers. Following removal of the lead-impacted soil, a series of field screening samples were taken. A total of 19 field screening samples were taken within a 15-cm (6-in) and 0.3-m (1-ft) depth of the excavation area. Results of the field screening confirmed that all lead-impacted soil was removed. Six soil verification samples were then collected and submitted for total lead analysis (Figure 7). The clean-up level used for lead removal was the U.S. Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goal (PRG) of 750 milligrams per kilogram for lead in industrial soils (EPA, 1996). A HWAA was established for the roll-off containers while awaiting analytical results.

The six verification samples were collected from the highest probable lead-impacted areas. The sample locations were selected based upon the distribution of lead in the soil, results from previous walk-through surveys using the Niton XL detector, and process knowledge of contaminated soil areas. Detailed analytical results data for the lead-impacted soil are presented in Appendix B.

BN Waste Management coordinated the disposal of all lead-impacted soil removed from CAU 143 with an approved off-site vendor. The lead-impacted soil containers were transported to a hazardous waste landfill in Grassy, Utah, for disposal. Copies of the waste manifests are included in Appendix F of this report.

2.1.6 Backfill the E-MAD Trench

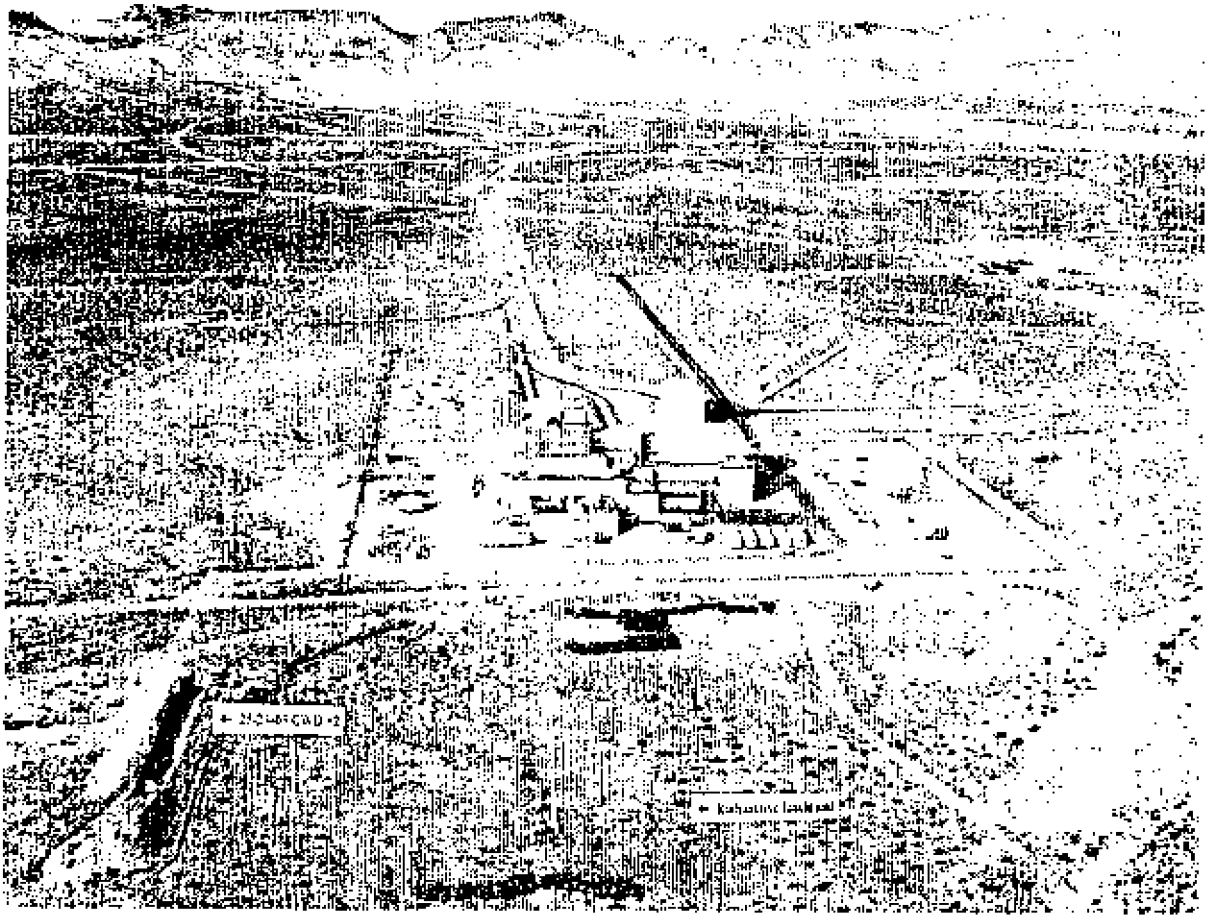
The field activities were conducted at E-MAD between November 28, 2001 and December 4, 2001. Specific construction details are provided below.

Earthwork at the E-MAD Trench consisted of placing an additional 1,575 m^3 (2,000 yd^3) of clean soil cover material into the trench, constructing a diversion berm, general site grading, and modifying existing signs and fencing to include only the backfilled portion of the trench (Figure 5).

The E-MAD Trench measured approximately 4.5 m (15 ft) wide by 18 m (60 ft) long by 4.5 m (15 ft) in depth. The existing open trench was backfilled with clean soil from the mound adjacent to and south end of the trench.

Diversion Berm
A 0.3-m (1-ft)-high 0.75 m (2.5 ft) wide secondary diversion berm was installed at the E-MAD Trench in order to divert storm water runon.

Fence Repair and Installation of Warning Signs/Postings
A fence was installed to prevent unauthorized access to the backfilled sections of the trenches. Site access information and identification signs were installed on the fencing to meet hazard notification requirements. The existing fence at the E-MAD Trench was modified to include a separate enclosure for only the filled portion of the trench that contains legacy waste. A two



Source: EG&G Photograph Number 6811-19-41 taken in 1968 (EG&G, 1968)

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FIGURE 5
E-MAD AERIAL PHOTOGRAPH BEFORE REMEDIAL ACTION

strand barbed wire and tee post fence was constructed around this area on December 4, 2001. The fence was posted as "Caution-Underground Radioactive Material" area.

2.1.7 Demobilization

All equipment, labor, and excess materials supporting CAU 143 were demobilized by January 28, 2002. CAU 143 closure activities warranted no decontamination of heavy equipment.

2.2 DEVIATIONS FROM CAP AS APPROVED

One Record of Technical Change (ROTC) was requested and approved during CAU 143 closure activities. The ROTC identified a change in the erosion control design for Subbasin 5 to utilize an existing drainage channel to divert storm water flow away from the CAU site boundary. The existing drainage channel was repaired and extended to provide long-term erosion protection during periods of high precipitation. Revisions to the original design engineering specifications and drawings are reflected in the final "as-built" drawings found in Appendix A of this report.

During CAU 143 closure activities at the R-MAD CWD Subbasin 5 area, approximately 32 m^3 (40 yd^3) of a Resource Conservation Recovery Act hazardous lead-impacted soil area was discovered in the path of a design engineer recommended diversion channel. Although the lead-impacted soil area was outside the scope of CAU 143 closure activities, it was remediated as a best management practice. Refer back to Section 2.1.5 for a brief description of the lead-impacted soil removal and disposal activities.

2.3 CAU 143 CLOSURE ACTIVITIES SCHEDULE

The completed closure field activities schedule is presented in Figure 6.

2.4 CAU 143 FINAL SURVEY "AS-BUILT" DRAWINGS

The final engineering "as-built" drawings for the CAU 143 Area 25 CWD are provided in Appendix A.

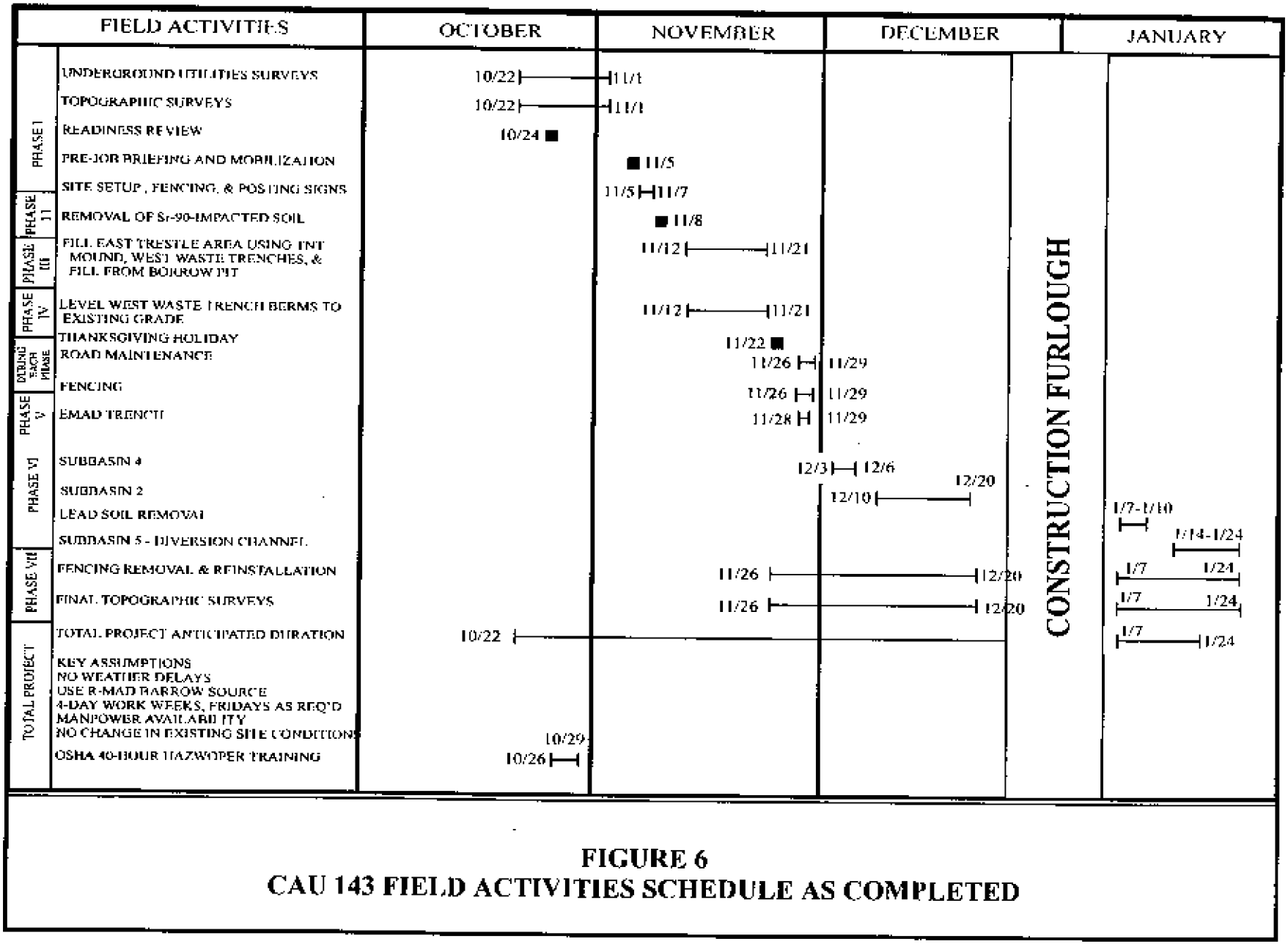

FIGURE 6
CAU 143 FIELD ACTIVITIES SCHEDULE AS COMPLETED

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3.0 WASTE DISPOSITION

Waste generated from CAU 143 closure activities included radiologically impacted soil and particles, hazardous impacted soil, and nonhazardous waste generated from routine and miscellaneous clean-up activities. All waste was surveyed and managed in accordance with state and federal regulations, U.S. Department of Energy orders, and BN procedures. Some waste forms required sampling to determine the appropriate waste disposition. All waste was containerized for proper disposal in the appropriate disposal landfill.

3.1 RADIOACTIVE WASTE (LOW-LEVEL WASTE)

Excavation of the Sr-90 impacted soil area generated 1 m^3 (1.3 yd^3) of low-level radioactive waste (LLW) for disposal. The LLW is currently awaiting waste profile approval from the Radioactive Waste Acceptance Program (RWAP). Pending RWAP approval, the Sr-90 impacted soil will be disposed of as LLW at the Radioactive Waste Management Site in Area 5. Currently, the four 208-L (55-gal) waste containers are temporarily stored in a designated container storage area within the R-MAD East Trestle area fence.

While conducting surveys in support of excavation activities within the R-MAD CWD site, the RCTs reported that numerous areas had elevated gamma readings using the FIDLER instrument or beta-gamma readings using the NE Electra survey instrument. The source of the activity appeared to be extremely small radioactive particles (carbonized fleck particles) dispersed at or just under the soil surface. The RCTs conducted systematic scan surveys over the entire R-MAD CWD site to determine the size of the areas where these surface-deposited radioactive particles were concentrated. The perimeter of these areas were later posted with Radioactive Material signs to meet 10 Code of Federal Regulation 835 guidelines (OSHA, 1999). The areas were within the fenced compound that retained the Underground Radioactive Material postings. The first particle, discovered along the eastern railroad spur inside the cooling berm, measured 2.5 cm (1 in) in length and 1.3 cm (0.5 in) wide. It weighed 5.5 grams (0.01 lb). The open and closed shield readings with an RO-20 instrument were 250 and 10 millirem per hour (mR/hr) at contact, respectively. The instrument readings were 10 and 0.4 mR/hr at 30 cm (12 in), respectively. The particle was placed in a plastic bag and secured inside a small shipping pig. The pig was secured with a security seal and placed inside a Sealand container at the R-MAD radioactive material storage compound. The second discovery involved five smaller particles at the far southwest corner of the R-MAD East Trestle area with an estimated cumulative weight of less than 1 gram (0.002 lb). The open and closed shield readings with an RO-20 instrument were 500 and 8 mR/hr at contact, respectively. The instrument readings were 4 and <0.2 mR/hr at 30 cm (12 in), respectively. The particles were also placed in a plastic bag and secured inside a small shipping pig. The pig was secured with a security seal and placed inside a Sea-land container at the R-MAD radioactive material storage compound.

Detailed radiological survey data and reports are presented in Appendix D.

3.2 HAZARDOUS WASTE

A lead-impacted soil area was discovered during a topographic survey walk-through on top of a berm where an engineer-designed diversion channel was to be constructed. The melted/processed, non-recyclable metal was located in a 6-m (20-ft) by 9-m (30-ft) square area at a depth of 0.3 m (1 ft). Approximately 32 m^3 (40 yd^3) of lead-impacted soil was excavated and placed directly into roll-off containers. All lead-impacted soil was removed and disposed of in three roll-off containers. A approximate 104,890 kg (231,243 lbs) of impacted soil was shipped off site to a permitted hazardous waste landfill in Grassy, Utah, for disposal. Waste disposal documentation is included in Appendix F of this report.

3.3 NONHAZARDOUS WASTE

Nonhazardous waste, such as sanitary trash, personal protective equipment, metal debris, and miscellaneous construction debris was disposed of in the sanitary waste landfill in Area 23. Waste disposal documentation is included in Appendix F of this report.

4.0 CLOSURE VERIFICATION

Site closure was verified by:

- The removal of the Sr-90 impacted soil located near the TNT Mound in the R-MAD East Trestle area was confirmed by collecting and analyzing six verification soil samples (Table 1 and Appendix B). Figure 7 shows the locations of the verification samples. Verification samples showed that remaining soil was below background levels for Sr-90.

- The removal of the lead-impacted soil/material was confirmed by visual inspection of the area and, collecting and analyzing six verification soil samples (Table 2 and Appendix B). Figure 7 shows the locations of the verification samples. Verification samples showed that remaining soil was below the EPA Region IX PRG for lead in industrial soils (EPA, 1996).

- Site backfilling, regrading, and construction of erosion control structures as designed were verified by site "as-built" drawings (Appendix A).

Criterion for verification sampling, backfilling, grading, erosion protection, and design engineering specifications and drawings were provided in the approved CAP (DOE/NV, 2001). The engineering "as-built" drawings included in Appendix A of this report verify that CAU 143 has been closed as specified in the CAP (DOE/NV, 2000b).

4.1 DATA QUALITY ASSESSMENT

The closure of Area 25 CWDs did not require the development of DQOs. The earthwork was performed to the criteria specified in the CAP (DOE/NV, 2001).

4.2 USE RESTRICTIONS

The Area 25 CWDs have been closed in accordance with the approved CAP (DOE/NV, 2001). These CWDs have been fenced and posted with the proper warning signs reading "Caution-Underground Radioactive Material" or in specific areas "Radioactive Material". The future use of any land related to the Area 25 CWDs is restricted from any activity that may alter or modify the containment control as approved by the state of Nevada and identified in this document or any other CAU 143 documentation unless appropriate concurrence from the NDEP is obtained in advance.

The specific location and post-closure monitoring requirements for the Area 25 CWDs were recorded on the CAU Use Restriction Information Form. The information on the completed form was added into the NNSA/NV Facility Information Management System and the Central Data Repository. The original CAU Use Restriction Form was filed within the Area 25 CWD project file. A copy of the CAU use restriction information is included in Appendix E of this report.

TABLE 1 - RADIOANALYTICAL RESULTS FOR CONFIRMATION SOIL SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	STRONTIUM-90 (pCi/g)[a]
Strontium-90 action level established in CAU 143 CADD (DOE/NV, 2000a) = 3 pCi/g		
CWD[b]-S-1	11/14/2001	<MDA[c]
CWD-S-1 (Duplicate)[d]	11/14/2001	0.533
CWD-S-2	11/14/2001	<MDS
CWD-S-3	11/14/2001	0.312
CWD-S-4	11/14/2001	0.162
CWD-S-5	11/14/2001	<MDA
CWD-S-6	11/14/2001	0.120

Notes:
[a]pCi/g = picoCuries per gram
[b]CWD = Contaminated Waste Dump
[c]MDA = Minimum Detectable Activity. See Appendix B for MDA values and sample results.
[d]Duplicate = Duplicate sample collected at the sample location, time and material.

TABLE 2 - ANALYTICAL RESULTS FOR LEAD CONFIRMATION SOIL SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	LEAD (mg/kg)[a]
EPA Region IX PRG for lead[b] - 750 mg/kg		
CAU143Pb-V01	01/09/2002	3.4
CAU143Pb-V02	01/09/2002	81.0
CAU143Pb-V03	01/09/2002	3.4
CAU143Pb-V04	01/09/2002	328.0
CAU143Pb-V05	01/09/2002	292.0
CAU143Pb-V06	01/09/2002	22.8
CAU143Pb-V06 (Duplicate)[c]	01/09/2002	16.4

Notes:
[a]mg/kg = milligrams per kilogram
[b]EPA, 1996.
[c]Duplicate = Duplicate sample collected at the sample location, time and material.

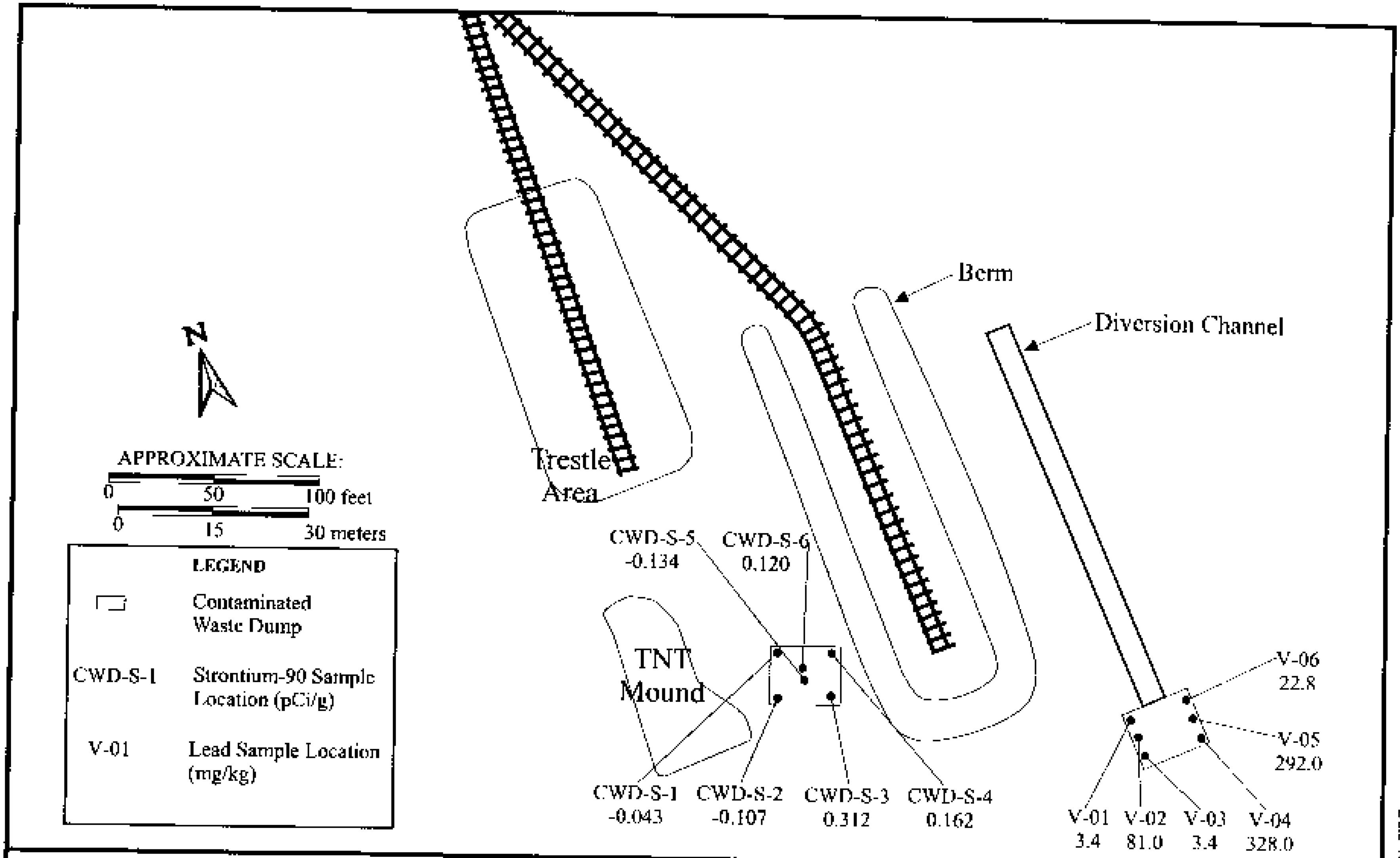

FIGURE 7
CAU 143 SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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5.0 CONCLUSIONS AND RECOMMENDATIONS

Closure of the Area 25 CWDs was accomplished by completing the following tasks:

- Removal of Sr-90 impacted soil at the R-MAD CWD.
- Backfilling topographic depressions in and around the R-MAD West Trenches, E-MAD Trench, and the R-MAD East Trestle area.
- Regrading natural slopes to minimize infiltration, storm water runon/runoff and erosion.
- Installation of erosion protection via rip-rap rock and diversion channel to control the natural drainage flow and mitigate the potential of channelized erosion.
- Installation of a fencing and signage within and around the CWD areas to prevent unauthorized personnel from entering into the remediated areas.

5.1 POST-CLOSURE MONITORING REQUIREMENTS

The components of the Area 25 CWD post-closure monitoring plan are provided below.

5.1.1 Inspections

Inspections will be performed on an annual basis. Inspections will consist of visual observations to verify that the fencing is in good condition, proper signs are in place and are readable, and use restrictions are maintained. If any maintenance and repair requirements are identified, funding will be requested and the repairs scheduled. Any repairs will be documented in writing at the time of repair.

The post-closure inspection will consist of a detailed inspection of the fencing and postings within the R-MAD East Trestle area, around the West Trench area, around the E-MAD Trench area, and the interior and exterior of the R-MAD CWD. The R-MAD and E-MAD perimeter fencing will be walked by the inspector(s) and the condition of the fencing and postings will be documented in a single annual letter report. The letter report will include a discussion of observations and provide a record of maintenance activities. A copy of each annual letter report will be submitted to the NDEP.

5.2 RECOMMENDATIONS

Based upon the completion of site activities, it is requested that a notice of completion be provided by the NDEP for CAU 143. Upon closure approval, CAU 143 will be promoted from Appendix III to Appendix IV of the FFACO, "Closed Corrective Action Units."

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6.0 REFERENCES

BN, see Bechtel Nevada.

Bechtel Nevada, 2001a. Field Management Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, October 2001, Las Vegas, NV.

Bechtel Nevada, 2001b. Site-Specific Health and Safety Plan for Closure Activities at Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, September 2001, Las Vegas, NV.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

EG&G 1968, Photograph Number 6811-19-41.

EPA, see U.S. Environmental Protection Agency.

FFACO, see Federal Facility Agreement and Consent Order.

OSHA, see Occupational Safety and Health Administration.

Federal Facility Agreement and Consent Order (FFACO) of 1996 as amended. Agreed to by the Nevada Division of Environmental Protection, U.S. Department of Energy, and U.S. Department of Defense.

Occupational Safety and Health Administration, 1999. Title 10 Code of Federal Regulations Chapter III, Part 835, "Occupational Radiation Protection," Rev. 1, Washington, D.C.

U.S. Environmental Protection Agency, 1996. Region IX Preliminary Remediation Goals (PRGs), San Francisco, CA.

U.S. Department of Energy, Nevada Operations Office, 1999. Corrective Action Investigation Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada, Rev. 1, DOE/NV--506, Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 2000a. Corrective Action Decision Document for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada; Rev. 0, DOE/NV--617, Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 2000b. NV/YMP Radiological Control Manual, Rev. 4, DOE/NV/11718-079, Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office, 2001. Corrective Action Plan for Corrective Action Unit 143: Area 25 Contaminated Waste Dumps, Nevada Test Site, Nevada; Rev. 0, DOE/NV--698, Las Vegas, NV.

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APPENDIX A

"AS-BUILT" DRAWINGS AND ENGINEERING CALCULATIONS FOR CAU 143: AREA 25 CONTAMINATED WASTE DUMPS

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NATIONAL NUCLEAR SECURITY ADMINISTRATION

NEVADA OPERATIONS OFFICE

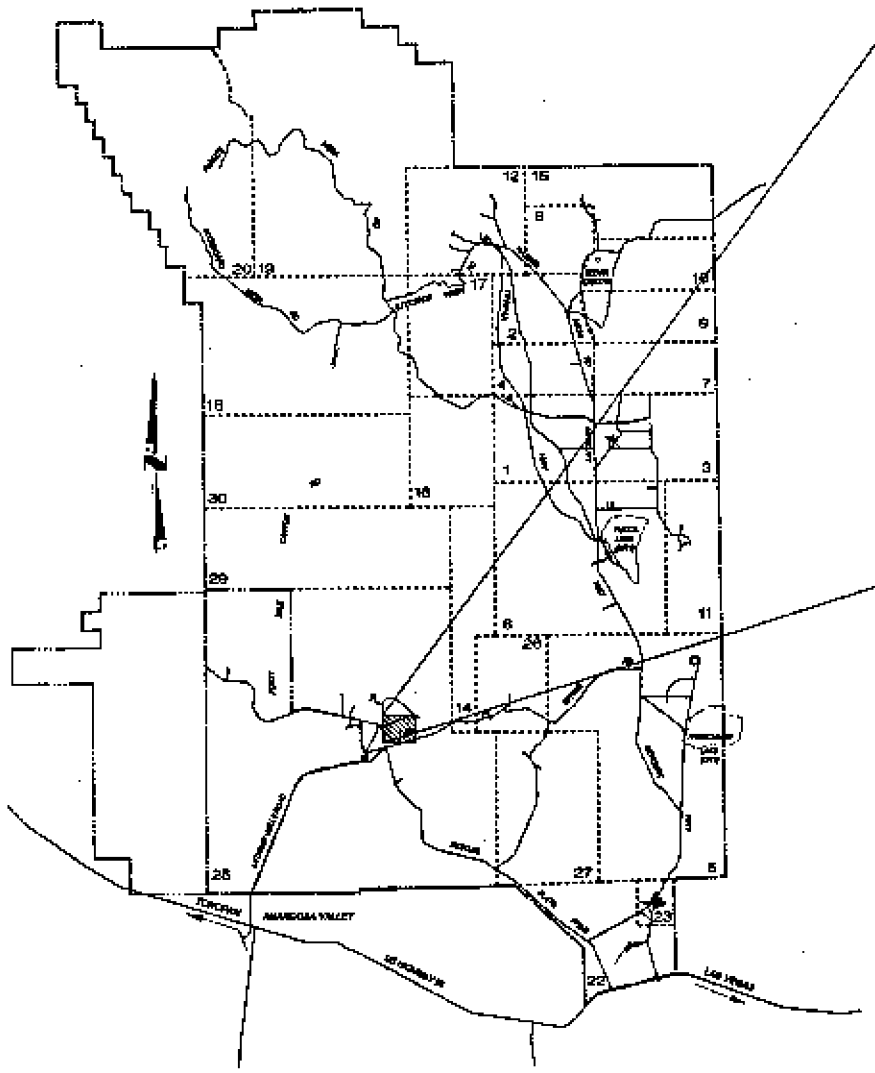
LAS VEGAS, NEVADA

CAU 143 REMEDIATION

AREA 25

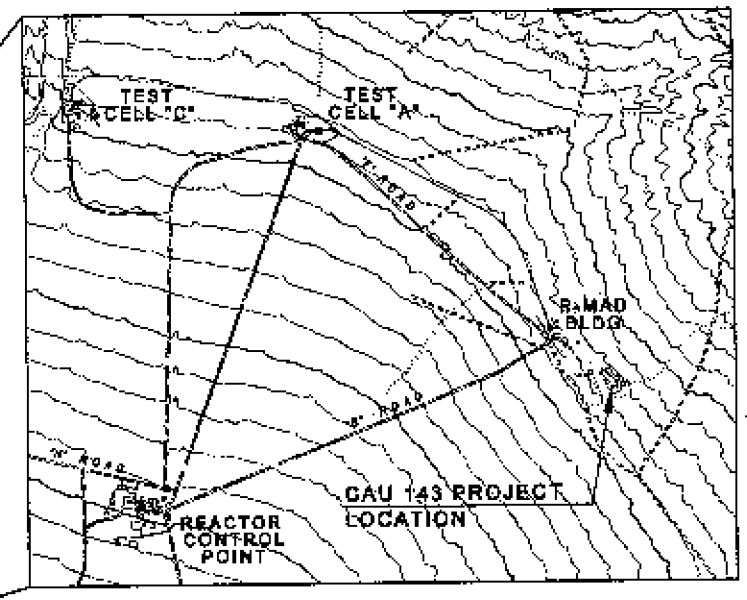
DRAWING INDEX

DRAWING NUMBER		DRAWING TITLE
TITLE		
00090-025-CAU143-T1	REV 1	TITLE SHEET
00090-025-CAU143-T2	REV 1	NOTES, LEGEND & ABBREVIATIONS
CIVIL		
00090-025-CAU143-C1	REV 1	SITE PLAN
00090-025-CAU143-C2	REV 1	SECTIONS
00090-025-CAU143-C3	REV 0	DETAILS
00090-025-CAU143-C4	REV 1	PLAN & PROFILE



NEVADA TEST SITE

NOT TO SCALE



VICINITY MAP

NOT TO SCALE

SCOPE OF WORK

GRADE AND LEVEL AREA EAST OF R-MAD INSIDE OF FENCE. FILL IN DEPRESSION AT TRESTLE AND LEVEL LARGE MOUND SOUTH OF TRESTLE. RIPRAP DESIGNATED CHANNELS FOR EROSION PROTECTION AND CONSTRUCT EXTENSION OF EXISTING DRAINAGE DIVERSION CHANNEL.

PROJECT NOTES

ALL CONSTRUCTION FEATURES, MATERIALS, TESTS AND DETAILS SHALL CONFORM TO "US DOE/NV STANDARD SPECIFICATIONS, DATED DECEMBER 1994", AND THE APPROVED CLOSURE PLAN FOR CAU 143. RIPRAP ROCK AND ROCK INSTALLATION SHALL CONFORM TO CLARK COUNTY UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS.

ORIGINAL MYLAR SIGNED BY:

NEVADA TEST SITE — AREA 25

CAU 143 REMEDIATION

CONTAMINATED WASTE DUMP

TITLE SHEET

Bechtel Nevada

00090-025-CAU143-T1

03/05/02 08:53:14 AM g:\dgn\00090a25csd_data\surveys\exhibits\t1.dgn

CIVIL LEGEND AND SYMBOLS

SYMBOL	DESCRIPTION
(5000)	EXISTING CONTOUR
5000	FINISH CONTOUR
(5434.7)	EXISTING SPOT ELEVATION
5435.0	FINISH GRADE ELEVATION
	CENTER LINE
	LIMIT OF EARTHWORK
	EXISTING DIRT ROAD
	EDGE OF EXISTING ASPHALT PAVING
	EDGE OF NEW ASPHALT PAVING
	CONCRETE
	EARTH
	BACKFILL
	EXISTING FLOW LINE
	NEW FLOW LINE
	CAPPED SEWER OR WATER LINE
	EXISTING SANITARY SEWER CLEANOUT
	NEW SANITARY SEWER CLEANOUT
	EXISTING UTILITY LINE (SIZE & TYPE)
	NEW UTILITY LINE (SIZE & TYPE)
	EXISTING MANHOLE
	NEW MANHOLE
	SURVEY MONUMENT
POH	POWER OVERHEAD
	EXISTING POWER POLE
PUG	EXISTING UNDERGROUND
TOP TOE	EXISTING SLOPE
TOP TOE	NEW SLOPE
	EXISTING GATE VALVE
	NEW GATE VALVE
	EXISTING BUILDING OR STRUCTURE
	NEW BUILDING
	EXISTING FIRE HYDRANT
	NEW FIRE HYDRANT
	EXISTING POST INDICATOR VALVE
	NEW POST INDICATOR VALVE
	EXISTING CULVERT
	NEW CULVERT
	EXISTING FENCE
	NEW FENCE
	SURVEY CONTROL POINT
	PROPOSED RIPRAP AREAS

CIVIL LEGEND AND SYMBOLS

ALUMINUM	AL
AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS	AASHTO
AMERICAN NATIONAL STANDARDS INSTITUTE	ANSI
AMERICAN SOCIETY FOR TESTING & MATERIALS	ASTM
AND	&
APPROVED	APVD
APPROXIMATE	APPROX
AT	@
AVERAGE	AVG
BECHTEL NEVADA	BN
BOTTOM	BOT
BRACING	BRCG
BRACKET	BRKT
BUILDING	BLDG
BURIED CABLE	BC
CEMENT	CEM
CENTER	CTR
CENTER LINE	℄
CENTER TO CENTER	CTOC
CIRCULAR	CIRC
CLEAR	CLR
COMMUNICATION UNDERGROUND	CUG
CONCRETE	CONC
CONSTRUCTION	CONSTR
CONSTRUCTION JOINT	CJ
CONSTRUCTION SPECIFICATION	CONSPEC
CONTINUATION/CONTINUOUS	CONT
CONTROL JOINT	CJ
CORRUGATED METAL PIPE	CMP
CUBIC YARD	CY
DETAIL	DET
DEGREE	DEG
DEPARTMENT OF ENERGY	DOE
DIAGONAL	DIAG
DIAMETER	DIA
DIMENSION	DIM
DOUBLE	DBL
DRAWING	DWG
EACH	EA
EAST	E
ELECTRICAL/ELECTRICAL	ELEC
ELEVATION	EL
ENGINEER	ENGR
ENTRANCE	ENTR
ENVIRONMENTAL	ENVIR
EXISTING	EXIST
EXPOSED	EXP
FEET	FT
FIBER OPTICS	FO
FIELD	FLD
FINISH	FINSH
FINISH GRADE	FG
FLOOR	FL
FOOT	FT
FOOTING	FTG
FOUNDATION	FDN
GAGE OR GAUGE	GA
GALVANIZED	GALV
GATE VALVE	GTV
GENERAL	GENL
GRADE	GR
HIGH	H
HORIZONTAL	HORIZ
INCH	IN
INSIDE DIAMETER	ID
INVERT	INVT
JOINT	JT
LONG	L
MANUFACTURER	MFR
MATERIAL	MATL
MAXIMUM	MAX
MINIMUM	MIN
MISCELLANEOUS	MISC
NEVADA	NV
NEVADA TEST SITE	NTS
NON RISING STEM	NRS
NORTH	N
NOT TO SCALE	NTS
OUTSIDE DIAMETER	OD
OVERHEAD	OVHD
POLYVINYL CHLORIDE	PVC
POWER	P
POWER OVERHEAD	POH
POWER POLE	PP
POWER SURFACE LAID	PSL
POWER UNDERGROUND	PUG
PROJECT ENGINEER	PE
QUANTITY	QTY
RADIATION	RAD
RADIOACTIVE WASTE MANAGEMENT SITE	RWMS
REFERENCE	REF
REINFORCING	REINF
REQUIRED	REQD
REVISION/REVERSE	REV
RIGHT	R
ROAD	RD
SANITARY SEWER	SS
SCHEDULE	SCHED
SECTION	SECT
SOUTH/SEWER	S
SPECIFICATION	SPEC
STEEL	STL
SURFACE	SF
TEMPORARY	TEMP
TOP OF CONCRETE	TOC
TYPICAL	(TYP)
UNDERGROUND	U/GND
UNITED STATES	US
VERTICAL	VERT
WATER/WESTWARD	W
WEIGHT	WT
WITH/WITHOUT	W/ W/O

CIVIL NOTES

1. ALL EXISTING UNDERGROUND UTILITIES WITHIN THE CONSTRUCTION SITE SHALL BE LOCATED BY MEANS OF AN ELECTRONIC METAL DETECTING DEVICE AND MARKED.
2. ALL GRADE ELEVATIONS SHOWN ARE FINISH GRADES, UNLESS OTHERWISE NOTED. SUBGRADE ELEVATIONS MUST BE ESTABLISHED WHERE REQUIRED PRIOR TO FINAL GRADING.
3. IN AREAS OF EXCAVATION REQUIRING FILL, SCARIFY THE TOP SIX INCHES OF EXISTING GROUND.

REFERENCE

TITLE SHEET 00090-025-CAU143-T1

ORIGINAL SIZE/PLOT

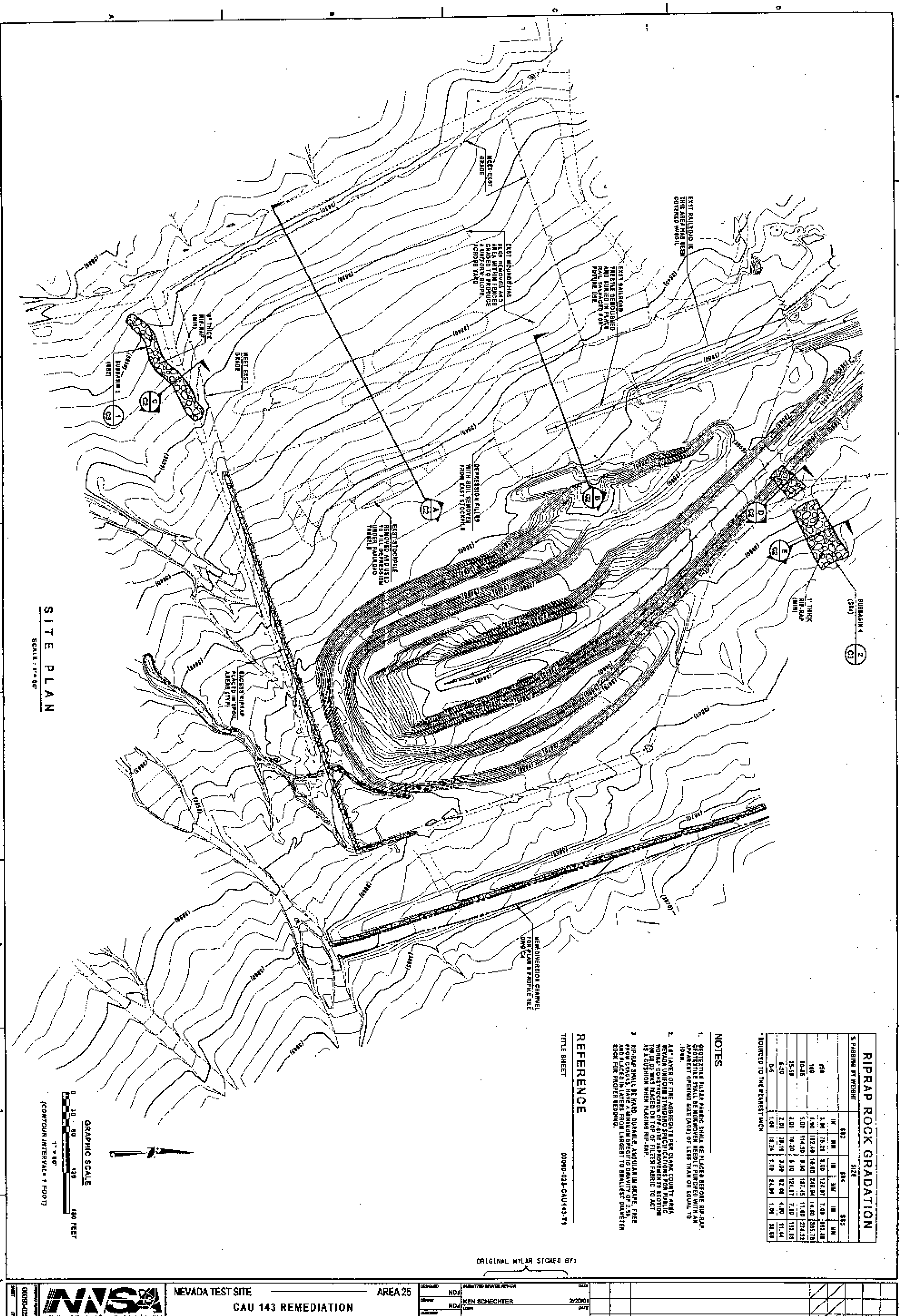
NO.	REVISION AND REDRAWN TO REFLECT AS-BUILT CONDITIONS (SEE DCN)	BY	DATE
0	ISSUED FOR CONSTRUCTION (REF: 101)	JMM	3/21/01

DRAWING NO. 00090-025-CAU143-T2 SHEET NO. 1

NEVADA TEST SITE — AREA 25
CAU 143 REMEDIATION
CONTAMINATED WASTE DUMP
NOTES, LEGEND & ABBREVIATIONS

Bechtel Nevada

03/05/02 08:02:14 AM g:\dgn\00090a25\cad_data\survey\esbuttm2.dgn



RIPRAP ROCK GRADATION

% PASSING BY WEIGHT	SIZE					
	d50		d50		d50	
	IN	MM	IN	MM	IN	MM
d50	3.00	76.21	5.00	124.97	7.00	183.00
100	6.00	152.40	10.00	240.04	14.00	355.70
80-85	5.00	114.30	8.50	187.45	11.00	274.32
35-50	4.00	76.30	6.10	124.17	7.00	133.83
5-20	2.00	38.14	3.00	92.00	4.00	11.44
0-5	1.00	18.24	1.00	24.00	1.00	38.60

* ROUNDED TO THE NEAREST MCH

NOTES

1. GEOTEXTILE FILTER FABRIC SHALL BE PLACED BEFORE RIP-RAP. GEOTEXTILE SHALL BE NONWOVEN NEEDLE PUNCHED WITH AN APPARENT OPENING SIZE (AOS) OF LESS THAN OR EQUAL TO .15MM.
2. A 6" LAYER OF FINE AGGREGATE PER CLARK COUNTY AREA NEVADA UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS SECTION 704.03 WAS PLACED ON TOP OF FILTER FABRIC TO ACT AS A CUSHION WHEN PLACING RIP-RAP.
3. RIP-RAP SHALL BE HARD, DURABLE, ANGULAR IN SHAPE, FREE FROM CRACKS, HAVE A MINIMUM SPECIFIC GRAVITY OF 2.50 AND PLACED IN LAYERS FROM LARGEST TO SMALLEST DIAMETER ROCK FOR PROPER BEDDING.

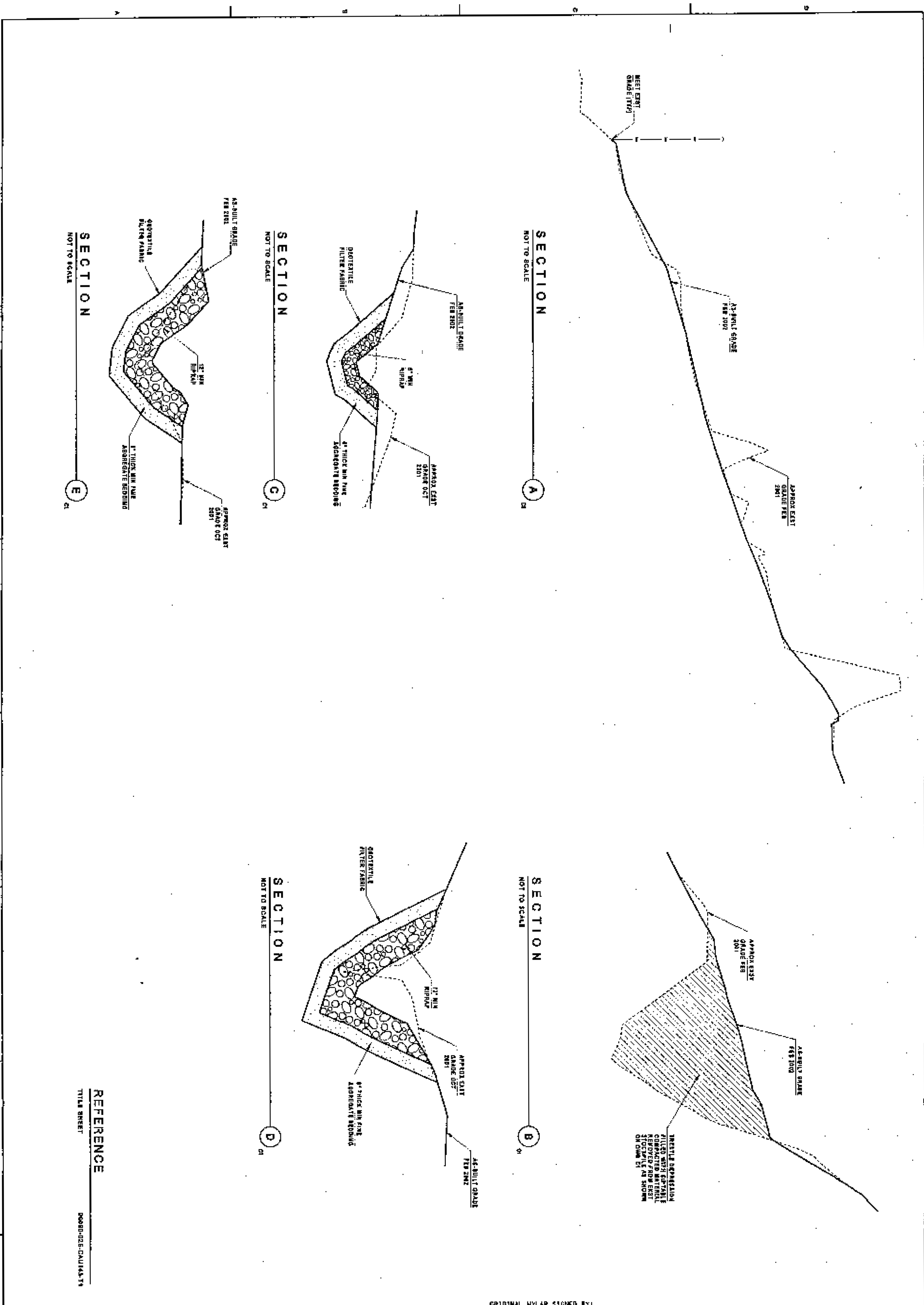
REFERENCE

TITLE SHEET 00090-025-CAU143-T1

ORIGINAL MYLAR SIGNED BY:

NNSA National Nuclear Security Administration, Nevada Operations Office / Bechtel Nevada	NEVADA TEST SITE — AREA 25	NDJ	KEN SCHECHTER	2/20/01	
	CAU 143 REMEDIATION	NDJ			
	CONTAMINATED WASTE DUMP	JAS	STEVE NACHT	2/21/01	1 — REVISED AND REDRAWN TO REFLECT AS-BUILT CONDITIONS 03/07/02
		N/A			
	SITE PLAN	J27	SABINE CURTIS	2/21/01	0 — ISSUED FOR CONSTRUCTION 02/21/01
		N/A	00090.A25 / N/A	SB038D21	

00090-025-CAU143-C1 REV 1



ORIGINAL MYLAR SIGNED BY:

NNSA — National Nuclear Security Administration

Bechtel Nevada

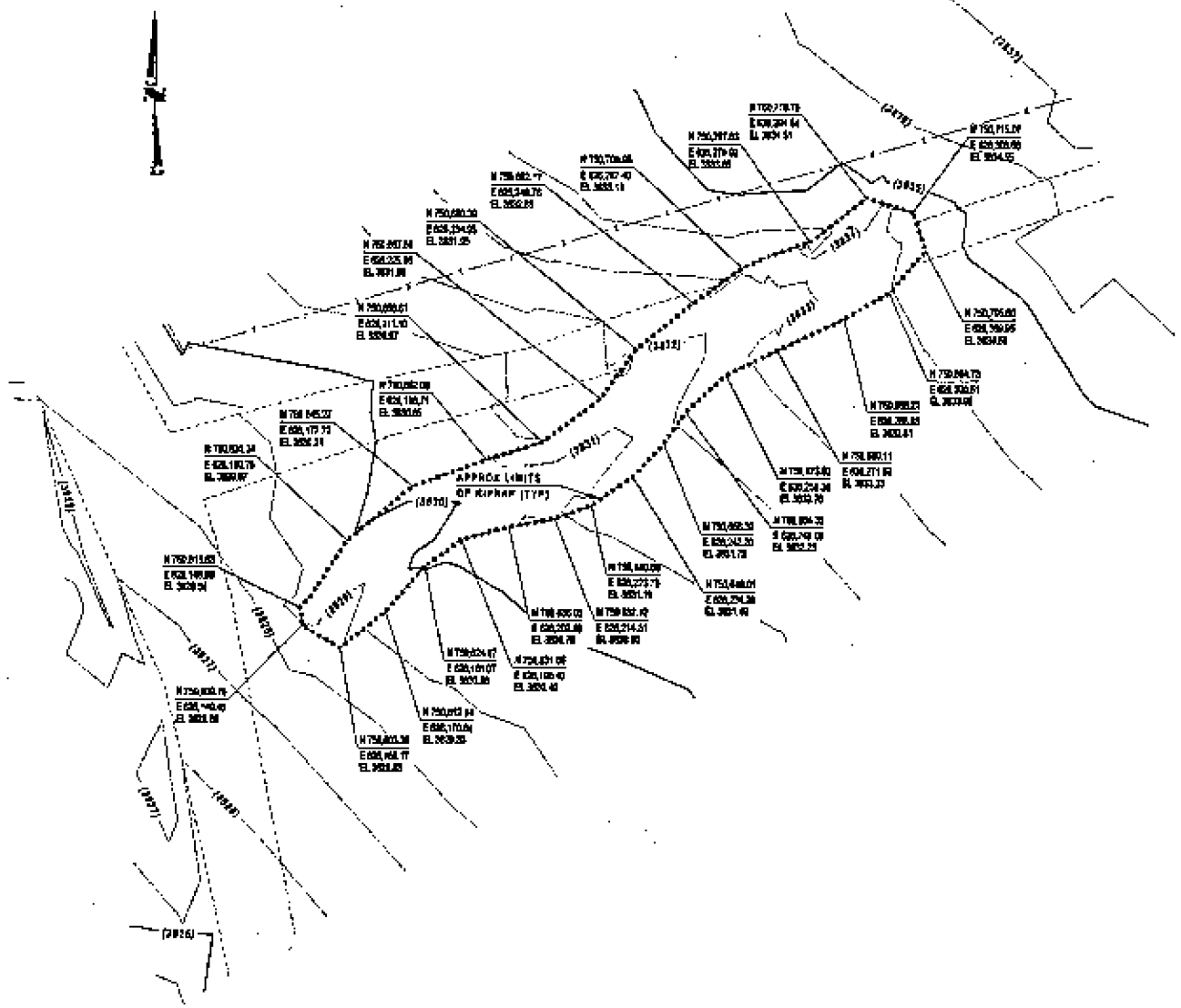
NEVADA TEST SITE — AREA 25

CAU 143 REMEDIATION
CONTAMINATED WASTE DUMP

SECTIONS

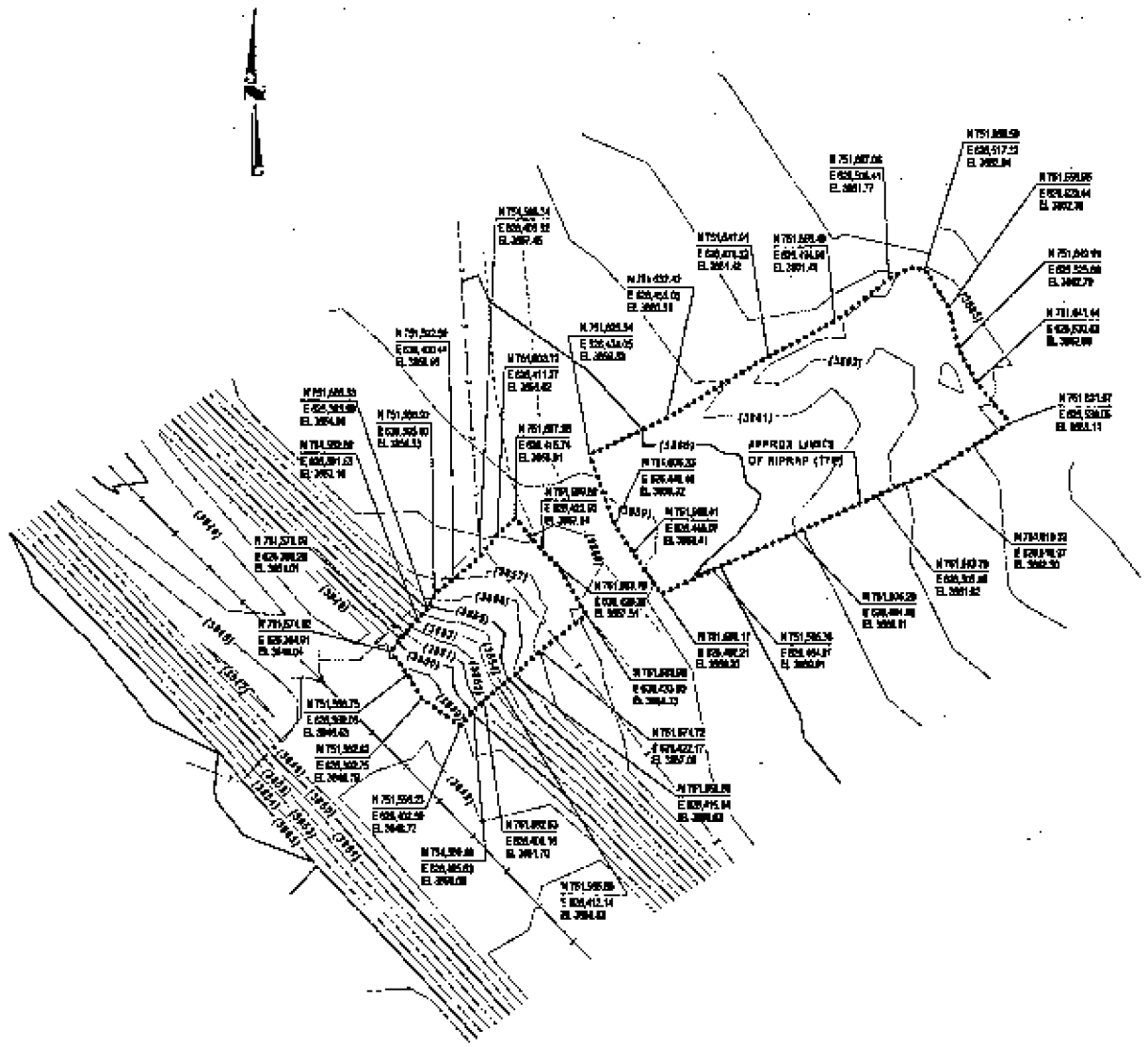
KEN SCHECHTER	2/20/01
STEVE MACHT	2/21/01
SABINE CURTIS	2/21/01

NO	REVISION/DESCRIPTION
1	REVISED AND REDRAWN TO REFLECT AS-BUILT CONDITIONS 03/...
0	ISSUED FOR CONSTRUCTION 02/21/01



DETAIL SUB-BASIN 2

SCALE : 1" = 20'



DETAIL SUB-BASIN 4

SCALE : 1" = 20'

REFERENCE

TITLE SHEET #0090-025-CAU143-T1

GRAPHIC SCALE

0 10 20 40 80 FEET

1" = 20'

ISSUED AS-BUILT DRAWING

NEVADA TEST SITE

CAU 143 REMEDIATION

CONTAMINATED WASTE DUMP

AREA 25

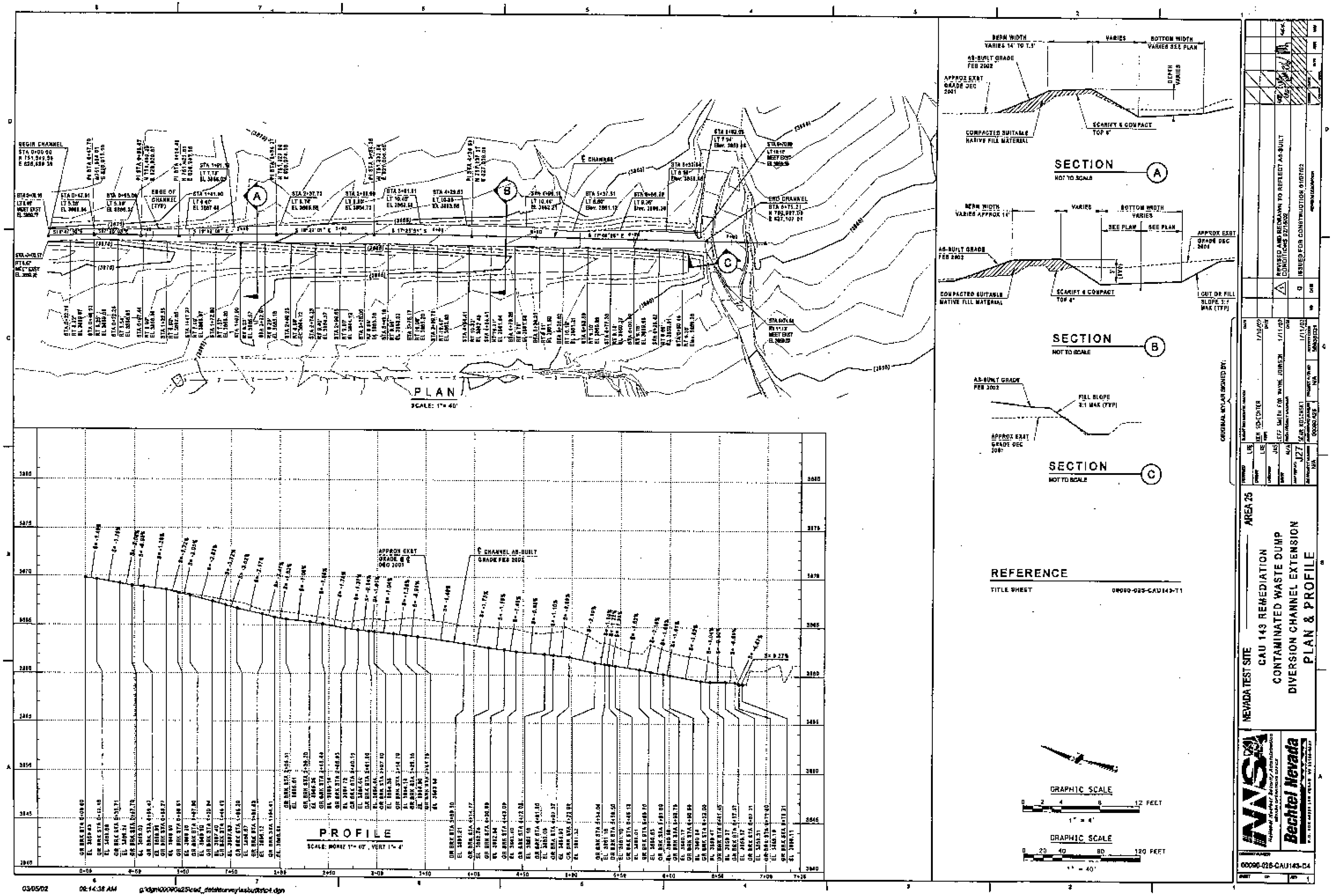
DETAILS

Bechtel Nevada

00090-025-CAU143-CS

0

03/05/02 09:13:56 AM g:\dgn\00090a25\cad_data\survey\asbuilt\cs3.dgn


PLAN
SCALE: 1" = 40'
PROFILE
SCALE: HORIZ 1" = 40', VERT 1" = 4'
SECTION A
NOT TO SCALE
SECTION B
NOT TO SCALE
SECTION C
NOT TO SCALE
BERM WIDTH
VARIES
BOTTOM WIDTH
AS-BUILT GRADE FEB 2002
APPROX EXST GRADE DEC 2001
COMPACTED SUITABLE NATIVE FILL MATERIAL
SCARIFY & COMPACT TOP 6"
FILL SLOPE 3:1 MAX (TYP)
REFERENCE
TITLE SHEET
GRAPHIC SCALE
NEVADA TEST SITE
AREA 25
CAU 143 REMEDIATION
CONTAMINATED WASTE DUMP
DIVERSION CHANNEL EXTENSION
PLAN & PROFILE
Bechtel Nevada
00090-026-CAU143-C4
REVISED AND REDRAWN TO REFLECT AS-BUILT CONDITIONS
ISSUED FOR CONSTRUCTION
03/05/02

ANALYSIS / CALCULATION (A/C) COVER SHEET

Project Title:	Project/Tracking No.:	Analysis/Calculation No.:
CAU 143 R-MAD, Contaminated Waste Dumps	00090A25	CAL-C-281

Subject:
Extension of Existing Diversion Channel

Analysis / Calculation Status Designation: ☐ Preliminary ☒ Final ☐ Superseded

Computer Program / Title	Mainframe / PC	Program No.	Version / Release No.
HEC-RAS	PC		2.2
AFSED	PC		N/A

Purpose:

The purpose of this analysis is to document the hydraulic ability of an extension of the existing channel to direct flood waters as a result of the 100 year, 6 hour storm event away from the southeast corner of Corrective Action Unit (CAU) 143.

Conclusions:

A combination channel/ berm extension of the existing diversion channel is adequate to convey runoff from the 100 year, 6 hour storm event past the extents of the corrective action unit. Channel extension will consist of a minimum 1.5 foot cut and 1.5 foot high berm for a total channel depth of 3 feet. The length of the extension is approximately 540 feet (see page A-3).

Record of Revisions

Revision No.	Reason for Revision	Date	Prepared	Checked	Approval
0	Initial Issue	3/11/02			

ANALYSIS / CALCULATION (A/C) SHEET

Project: CAU 143 R-MAD, Contaminated Waste Dumps	Analysis/Calculation No.: CAL-C-281
Subject: Extension of Existing Diversion Channel	
Date 3/11/02	Prepared [signature] Checked [signature]

Table of Contents

ANALYSIS / CALCULATION (A/C) SHEET

Project: CAU 143 R-MAD, Contaminated Waste Dumps	Analysis/Calculation No.: CAL-C-281
Subject: Extension of Existing Diversion Channel	
Date 3/16/02	Prepared JES Checked LWG

Open Items:

1. None

References:

1. Richard H. French, "*AFSED: A Suite of Models for Estimating Sediment Transport During Flood Events on Alluvial Fans.*" Water Resources Center, Desert Research Institute, Sept. 1996.
2. Clark County Regional Flood Control District (CCRFCD). *Hydrologic Criteria and Drainage Design Manual*, 1999 Edition.
3. U.S. Army Corps of Engineers (COE 1996). River Analysis System (HEC-RAS Computer Program): Davis, California, paginated by section, 1996.
4. Bechtel Nevada. *Calculation A/C-00090.A25-C-189 Revision 0*, February 2001.
5. Bechtel Nevada. *Calculation A/C-00090.A25-C-184 Revision 0*, February 2001, page 22.
6. R. H. French and S. Curtis. *The Precipitation Event of 23-24 February 1998*, Publication No. 45170, Desert Research Institute, June 1999.
7. Bechtel Nevada. *Calculation FD-DA-C-117 Revision 1*, October 1999.
8. Leter to Mr. John Carilli from R;.H. French. *Certification of Flood Mitigation Structures at the Area 5 RWMS*, November 1999.

Assumptions:

1. All cross-section information contained in Reference 4, upstream of available survey data are valid. The entire channel was not surveyed. Cross section information in the HEC-RAS model, upstream of the extension, is based on field measurements. These field measurements were performed by BN hydrologists in 1999 (REF 4).
2. Manning's n value of 0.035 to account for naturally occurring revegetation of the channel extension within the main channel (Same as used in reference 4).
3. Manning's n value of 0.04 in the overbank areas (Same as used in reference 4).
4. For purposes of sediment transport, the inflow of sediment from the upstream basin will occur at the beginning station of the existing channel and will not affect the channel extension.
5. The Kiwi Mesa Alluvial Fan is active. This means that the existing natural channels are not stable and can move back and forth across the fan.

Design Input:

1. Channel discharge of 270 cfs from the 100 year, 6 hour storm event (REF 4).
2. HEC-RAS file:
   G:\dgn\00090a25\engdata\flood\hec-ras\revised\rmad.prj (REF 4)
3. Topographic survey data files:
   G:\dgn\00090a25\caddata\survey\dec01\secoradd.asc
   G:\dgn\00090a25\caddata\survey\dec01\chan2.asc
4. Inroads design data files:
   G:\dgn\00090a25\caddata\survey\dec01\sub_b05a.dtm
   G:\dgn\00090a25\caddata\survey\dec01\channel.alg
   G:\dgn\00090a25\caddata\survey\dec01\finchan.dtm
5. Sediment size data – Reference 5. See attached page A-1.

ANALYSIS / CALCULATION (A/C) SHEET

Project: CAU 143 R-MAD, Contaminated Waste Dumps	Analysis/Calculation No.: CAL-C-281
Subject: Extension of Existing Diversion Channel	
Date 3/14/02	Prepared JWS Checked CY

6. Hydrograph for concentration point CP3 – Reference 4. See attached page A-2 for this data in format required by AFSED.

Existing Conditions:

On 11/21/01, project management requested an engineering representative to visit the site to assess the current drainage conditions. This site visit occurred on 11/26/01. Of particular concern was the southeast corner where erosion has been occurring inside the fence at the toe of the existing berm. This same erosion pattern was evident in the previous topographic survey that was performed for design 2 years ago.

To the east of the CAU is an existing channel that has not been maintained. The average width of this channel is 20 feet. The average side slopes are approximately 2:1 (H:V). Previous field measurements along this channel indicate depths from 1 (north end) to 3 feet (south end). Average depth is approximately 1.5 feet. It appears that the cut from this construction was placed as a berm on the downstream side.
Field personnel pointed out that this berm had been breached. Many years ago a road had been built through this channel. This road follows an existing drainage wash. Currently, at the location of this road, there is a blockage of the channel. This has caused the flow to back up and overtop the berm. This water then sheet flows towards the berm inside the fence.

The existing grading inside the fence is such that runoff from the berm and the area inside the fence is forced to converge (concentrate) at the point that the erosion cut begins at the toe of the berm. If the channel berm is not repaired and the blockage removed, the extents of the riprap will need to be increased to prevent further erosion inside the fence.

Currently, there is no well-defined outlet for the channel. The area outside the fence has been cleared, following the terrain, for staging of riprap prior to placement. Prior, small drainage features have been obliterated. Aerial photos indicate that the existing channel did not extend far enough south to get the water past the unit. The channel did drain into an existing drainage feature, but this feature drained to the toe of the built up area inside the fence. Most of the water currently impacting the unit appears to be the result of the road built through the existing channel many years ago.

The HEC-RAS analysis of this channel performed during Title I design indicates that the channel extension would need to be approximately 3 feet deep for the existing bottom width of 20 feet. This depth can be accomplished with a combination of a cut depth of 1.5 feet and using the cut material to berm a height of 1.5 feet on the downstream side. Any cut material not required for berms can be used to regrade the area between the CAU and the channel. Currently the channel shows no signs of appreciable erosion. Therefore, the extension should perform equally well for long term protection.

Calculations:

The HEC-RAS file developed during Title I design was revised to reflect the channel extension (no change in Title II). The channel extension is designed to closely approximate the existing channel cross section, i.e., average bottom width and depth. The side slopes were changed to 3:1(H:V) so that the extension would meet the requirements contained in reference 2. The river stations were revised to coincide with the designed extension stationing. Boundary flow conditions remained the same.

River Station (RS) 2657.71 coincides with RS 3000 (REF 4).
RS 1907.71 coincides with RS 2250 (REF 4).
RS 1157.71 coincides with RS 1500 (REF 4).
The remaining RS's are new, with station/ elevation data taken from survey/ Inroads data files.

ANALYSIS / CALCULATION (A/C) SHEET

Project: CAU 143 R-MAD, Contaminated Waste Dumps	Analysis/Calculation No.: CAL-C-281
Subject: Extension of Existing Diversion Channel	
Date 3/16/02	Prepared [illegible] Checked [illegible]

Hydraulic parameters generated during the HEC-RAS computer run (page 11) were used to check the flow stability (page 8), the required freeboard , and the required channel depth per the requirements contained in reference 2 (page 9). The file developed during Title I was run again to calculate the critical water surface elevation at each location along the existing channel. These hydraulic parameters (page 10) were used to check the flow stability (page 6), the required freeboard, and the required channel depth of the existing channel (page 7). These three values had not been previously addressed as the original design criteria did not involve modifications to the existing channel.

The hydraulic and geometric parameters were also used to estimate the deposition in the area of transition from existing to new channel using AFSED (REF 1) (pages 19 to 39). The slope of the existing channel at the transition location is steeper than the design slope of the new extension resulting in deposition rather than scour at this location. A grain Size Distribution curve developed from a sample taken at the southeast corner of the CAU (REF 5) (page A-1) was utilized in the AFSED model. The hydrograph for CP3 (REF 4) (page A-2) was also used in the AFSED model.

Sediment transport was not addressed for the existing channel as the inflow from the basin is assumed to occur at the beginning of the channel and the slope of the channel is assumed to be fairly uniform.

Results: (See pages 6 to 39)

Both the existing channel and new channel extension have areas of flow instability per criteria contained in reference 2.

Neither the existing channel nor the new channel extension has the required depth to meet the minimum freeboard requirements contained in reference 2. However, considering the depth required to contain only the clearwater flow with an estimated deposition depth (maximum) of 0.27 feet (pages 37 to 39), both the existing channel and new channel extension are adequate to contain the flow from the 100 year, 6 hour storm event without overtopping the banks.

Both HEC-RAS analyses indicate two locations where a portion of the flow leaves the channel (pages 12 & 14). Station 2657.71 (3000) is the beginning of the channel and station 1157.71 (1500), which is the midpoint of the channel. The existing drainage patterns at these locations indicate that this flow would not impact CAU 143 at the southeast corner.

In February of 1998, a regional precipitation event of a larger magnitude than the design storm actually occurred over the Nevada Test Site (NTS) (REF6). There is no visual evidence that flow in the existing channel overtopped the banks at any point along its length, except where the road had been cut through the channel. There is also no indication of excessive scour or deposition. The apparent conflict between modeling results and visual observation is due to the conservatism of basin loss rates and not accounting for channel transmission losses within the HEC-HMS and HEC-RAS models.

Even though the existing channel and extension do not meet minimum freeboard or flow stability requirements contained in reference 2 (based on model results), there has been precedence set at the NTS for acceptance of the adequacy of flood control structures under these conditions (REF 7 and REF 8). See page A-5 for copy of letter certifying the Area 5 Flood Control Structures, which also did not meet stability or minimum freeboard requirements contained in reference 2, but did not overtop the banks.

EXISTING CHANNEL

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3000.00	3891.49	3890.00	1.49	1.68	0.75	stable	stable
2250.00	3884.16	3882.50	1.66	1.92	0.80	stable	stable
1500.00	3876.40	3874.50	1.90	2.03	0.83	unstable	stable
750.00	3869.43	3867.50	1.93	2.41	0.70	stable	stable
0.00	3861.65	3860.00	1.65	1.65	1.01	unstable	unstable

(1) Reference 2, page 709.

[illegible]
Analysis Calc. #: [illegible]
Prepared By: [illegible]
Checked By: [illegible]
Rev.#: 0 Page 9 of 23

EXISTING CHANNEL

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3000.00	5.17	1.68	0.75	0.92	1.00	3.01
2250.00	5.75	1.92	0.80	1.01	3.00	3.45
1500.00	5.94	2.03	0.83	1.05	1.50	3.63
750.00	5.44	2.41	0.70	0.96	2.50	3.83
0.00	6.79	1.65	1.01	1.20	3.00	3.57

(1) Reference 2, pages 769 and 773
(2) Available depth from HEC-RAS Cross Sections
(3) Required depth is sum of Velocity Head ($V^2/2g$) + Hyd Depth + Req'd Freeboard

Analysis Calc. #: [illegible]
Prepared By: [illegible]
Checked By: [illegible]
Rev.#: 0 Page 7 of 32

CHANNEL EXTENSION

Invert Station	Critical WS Elev	Min Chan Elev	Critical Depth	Hyd Depth	Froude No	Flow Stability based on Flow Depth (1)	Flow Stability based on Froude No (1)
2657.71	3890.65	3890.00	0.65	1.11	0.52	stable	stable
1907.71	3884.16	3882.50	1.66	1.80	1.01	unstable	unstable
1157.71	3875.56	3874.50	1.06	1.45	0.62	stable	stable
534.53	3869.28	3867.68	1.60	1.60	0.99	unstable	unstable
399.37	3866.86	3865.31	1.55	1.62	0.86	unstable	unstable
207.71	3863.95	3862.34	1.61	1.62	1.02	unstable	unstable
0.00	3860.81	3859.43	1.38	1.38	0.95	unstable	unstable

(1) Reference 2, page 709.

8

Analysis Calc. # CHEC-251
Prepared By: CES
Checked By: [signature]
Rev.#: 0 Page 8 of 32

CHANNEL EXTENSION

River Station	Chan Vel	Hyd Depth	Froude No.	Req'd Freeboard (1)	Avail. Depth (2)	Req'd Depth (3)
2657.71	2.81	1.11	0.52	0.62	1.00	2.00
1907.71	6.82	1.80	1.01	1.21	3.00	3.28
1157.71	3.55	1.45	0.62	0.70	1.50	2.42
534.53	6.30	1.60	0.99	1.12	2.43	2.99
399.37	5.93	1.62	0.86	1.05	3.00	2.94
207.71	6.72	1.62	1.02	1.20	3.00	3.09
0.00	6.03	1.38	0.95	1.06	3.00	2.71

(1) Reference 2, pages 769 and 773
(2) Available depth from HEC-RAS Cross Sections
(3) Required depth is sum of the Hyd Depth + Req'd Freeboard + Maximum Estimated Deposition (see pages 27 to 29)

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Analysis Calc. #: 022-E-281
Prepared By: EMS
Checked By: VV
Rev.#: 0 Page 9 of 22

EXST CHANNEL

HEC-RAS Plan: RMAD-divert River: RMAD diversion Reach: RMAD diversion

	270.00	3890.00	3891.68	3891.49	3892.09	0.009086	5.17	56.13	51.11	0.75
	100.00	3890.00	3890.96	3890.83	3891.20	0.012021	3.89	25.69	33.46	0.78
	270.00	3882.50	3884.42	3884.16	3884.93	0.009970	5.75	46.98	28.96	0.80
	100.00	3882.50	3883.65	3883.38	3883.86	0.009050	3.83	26.09	25.37	0.67
	270.00	3874.50	3876.53	3876.40	3877.05	0.011054	5.94	47.98	41.18	0.83
	100.00	3874.50	3875.72	3875.63	3876.04	0.014051	4.49	22.27	26.05	0.86
	270.00	3867.50	3869.91	3869.43	3870.37	0.007364	5.44	49.62	26.23	0.70
	100.00	3867.50	3868.93	3868.65	3869.16	0.006503	3.82	26.20	21.67	0.61
	270.00	3860.00	3861.55	3861.55	3862.36	0.016708	6.79	39.77	28.24	1.01
	100.00	3860.00	3860.88	3860.88	3861.29	0.019713	5.10	19.60	24.41	1.00

* RERUN TO CALCULATE CRIT W.S AT ALL LOCATIONS

10

Analysis Calc. #: EHC-CC-281
Prepared By: [illegible]
Checked By: [illegible]
Rev.#: 2 Page 12 of 31

EXTENSION

HEC-RAS Plan: rmaddivert2 River: RMAD diversion Reach: RMAD diversion

River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
2857.71	270.00	3890.00	3891.11	3890.65	3891.23	0.005044	2.91	97.36	96.72	0.52
2857.71	100.00	3890.00	3890.53	3890.24	3890.60	0.005309	1.63	47.40	73.15	0.48
1907.71	270.00	3882.50	3884.16	3884.16	3884.88	0.016617	6.82	39.57	27.74	1.01
1907.71	100.00	3882.50	3883.39	3883.39	3883.79	0.019038	5.07	19.74	24.17	0.99
1157.71	270.00	3874.50	3875.95	3875.56	3876.11	0.006925	3.65	85.31	86.17	0.62
1157.71	100.00	3874.50	3875.39	3875.11	3875.47	0.006710	2.41	42.48	65.16	0.58
547.71	270.00	3867.68	3869.28	3869.28	3869.78	0.016167	6.30	51.03	50.93	0.99
547.71	100.00	3867.68	3868.64	3868.64	3868.97	0.019688	4.99	28.15	35.89	0.98
207.71	270.00	3865.31	3866.93	3866.88	3867.40	0.011971	5.99	52.91	48.81	0.86
207.71	100.00	3865.31	3866.18	3866.18	3866.53	0.017510	4.88	22.15	33.65	0.95
207.71	270.00	3862.94	3863.96	3863.95	3864.66	0.017125	6.72	40.20	29.71	1.02
207.71	100.00	3862.94	3863.33	3863.23	3863.63	0.012921	4.39	22.79	25.95	0.83
0	270.00	3859.43	3860.81	3860.81	3861.25	0.015068	6.03	55.65	62.97	0.95
0	100.00	3859.43	3860.24	3860.24	3860.53	0.017590	4.67	25.06	44.26	0.94

Analysis Calc. #: 2857.0 - 2.51

Prepared By: [illegible]

Checked By: [illegible]

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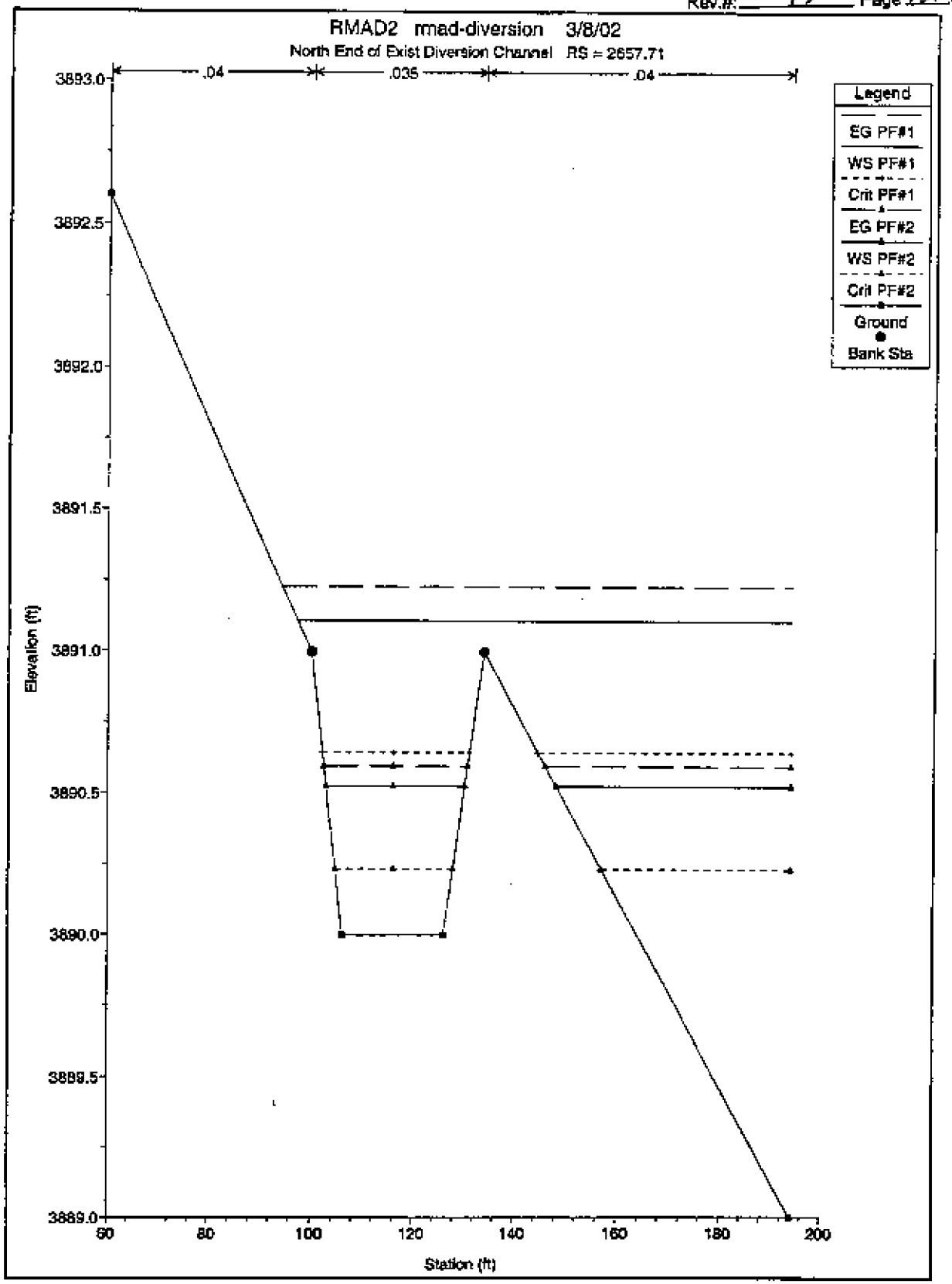
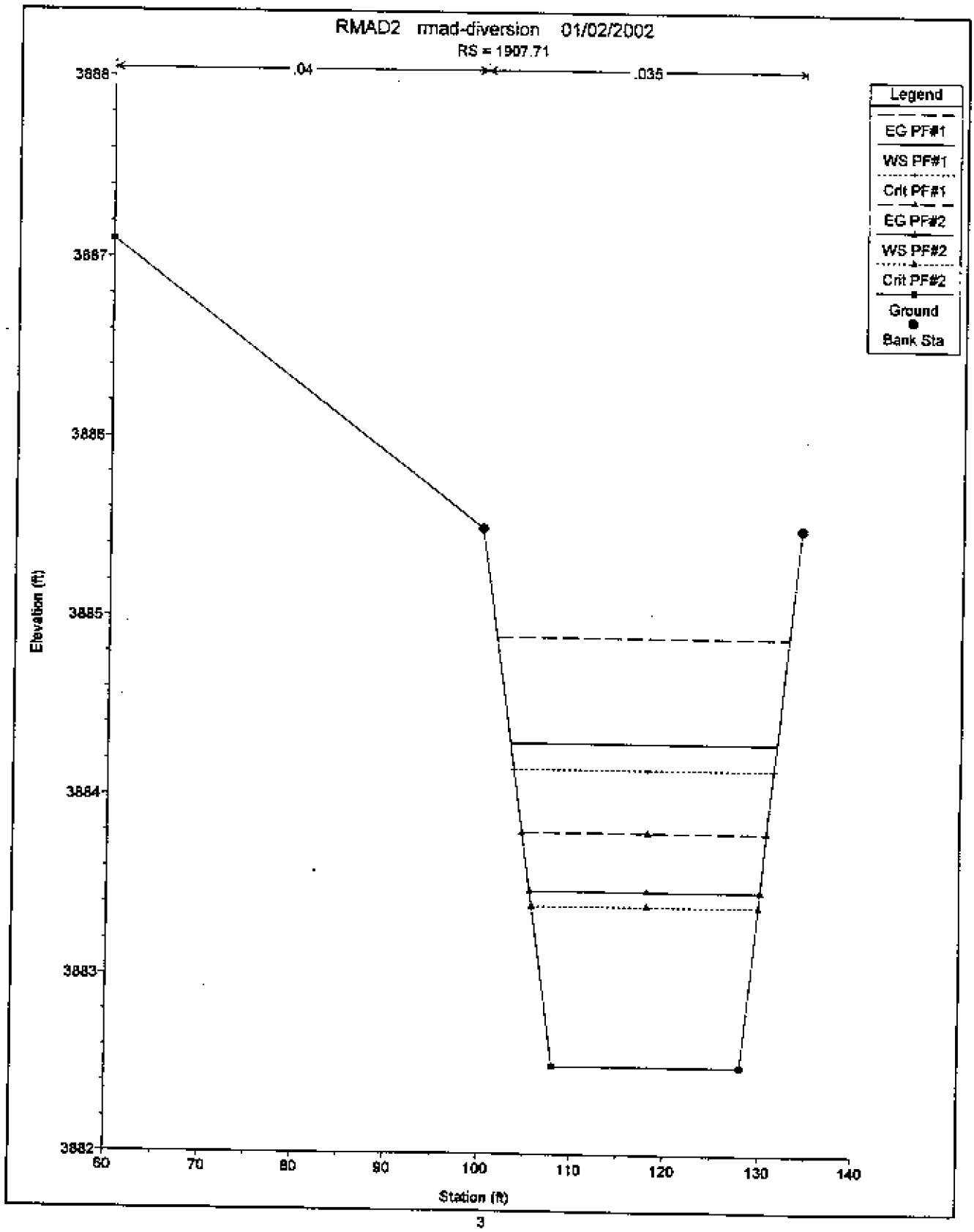
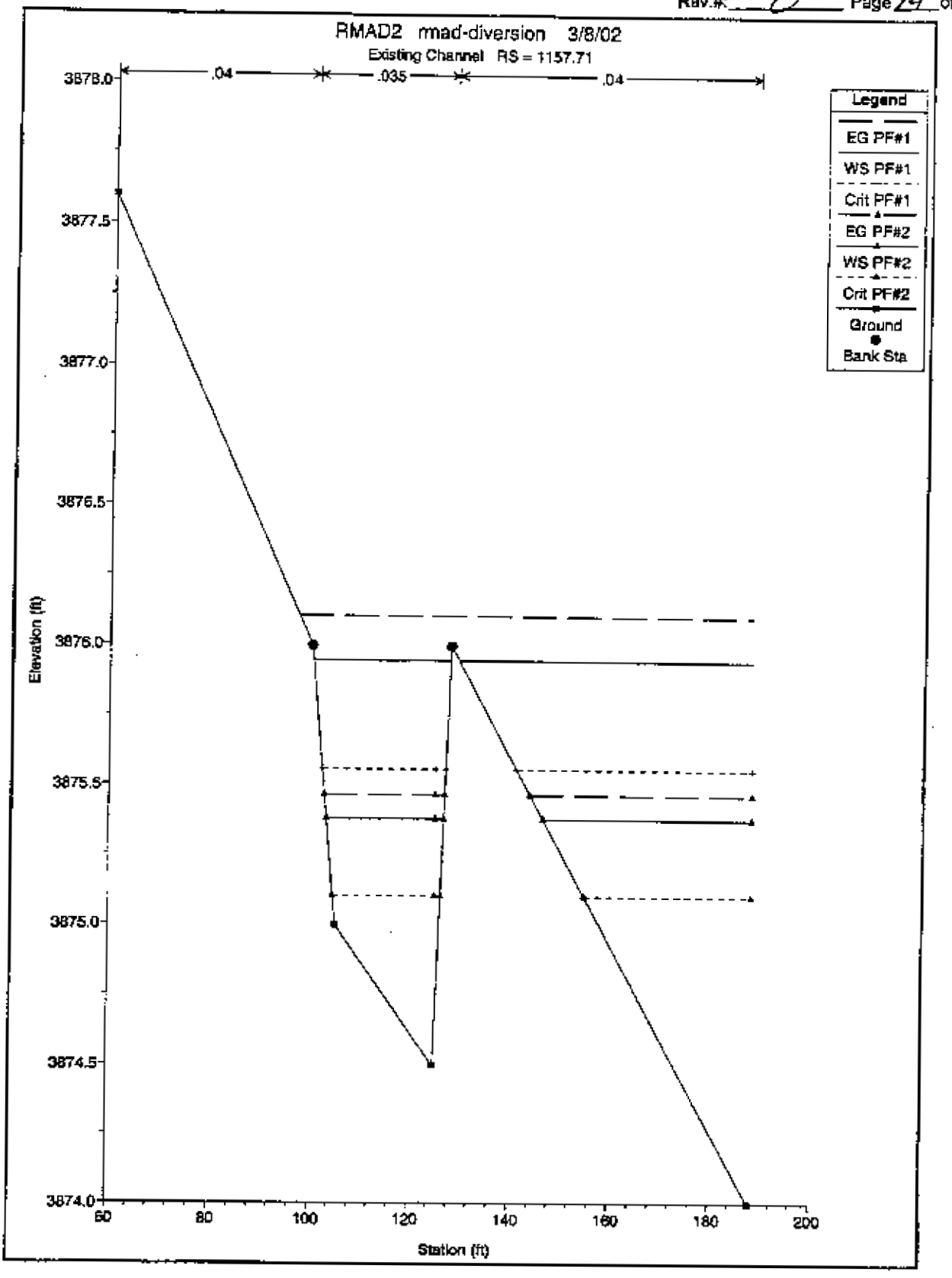
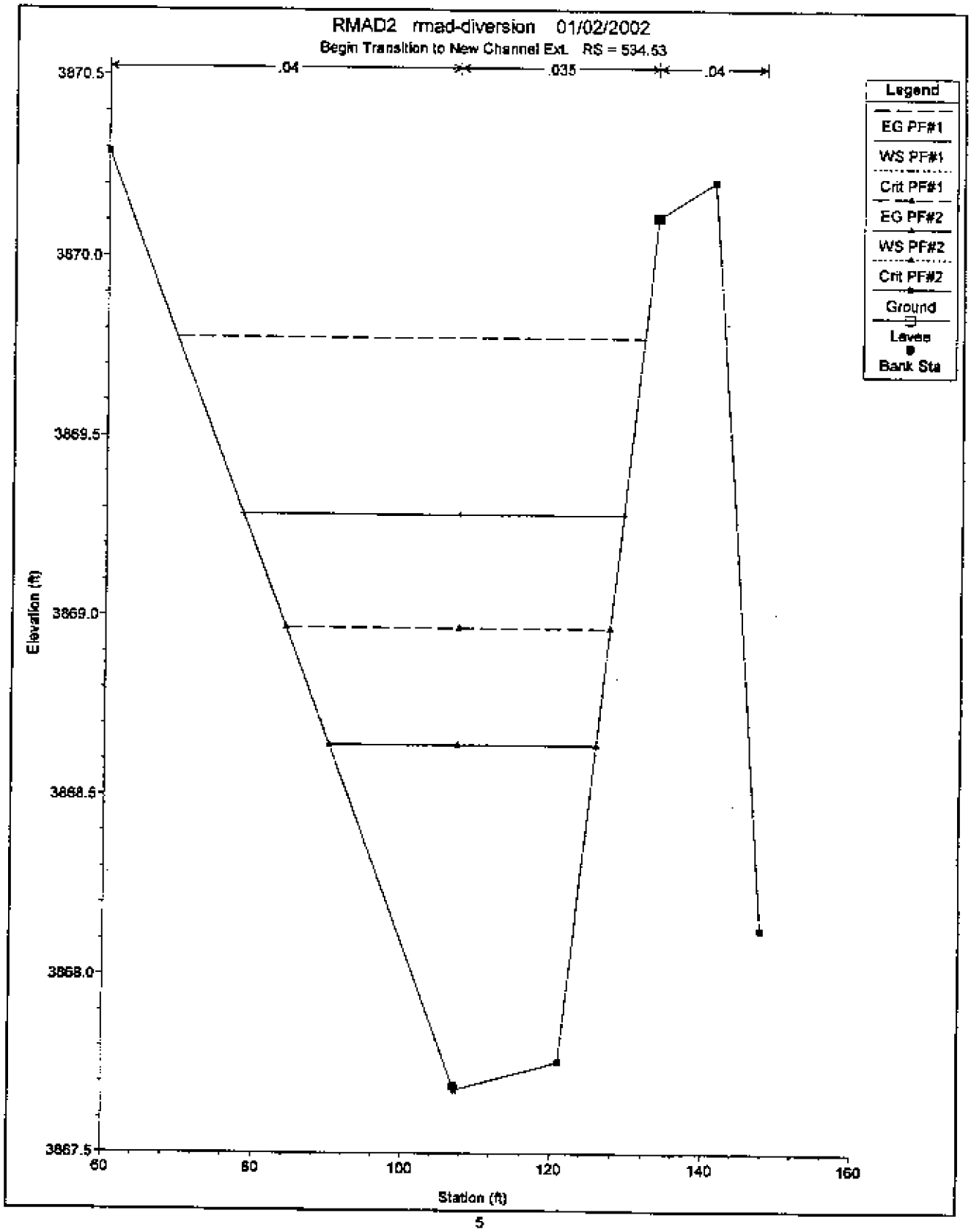
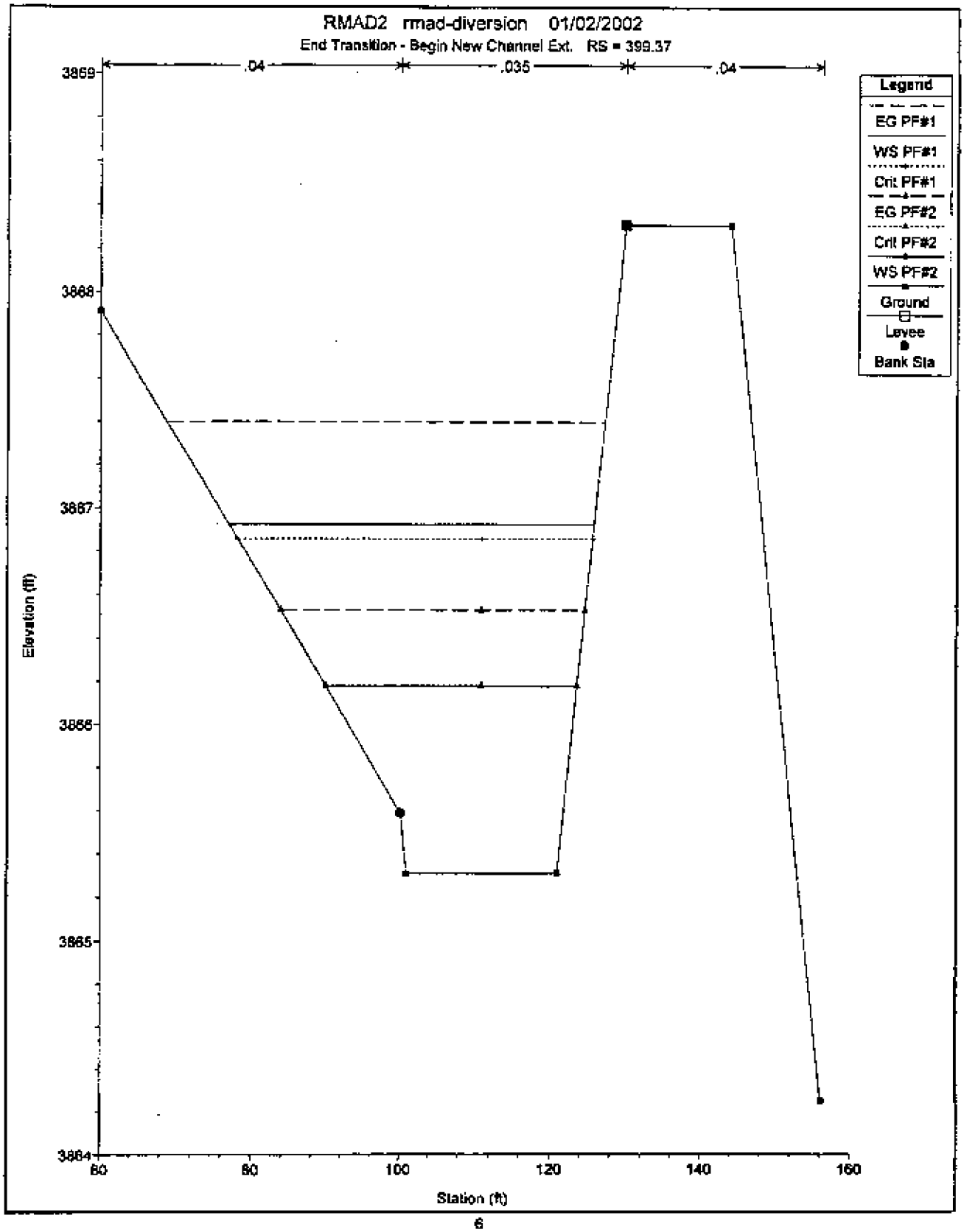
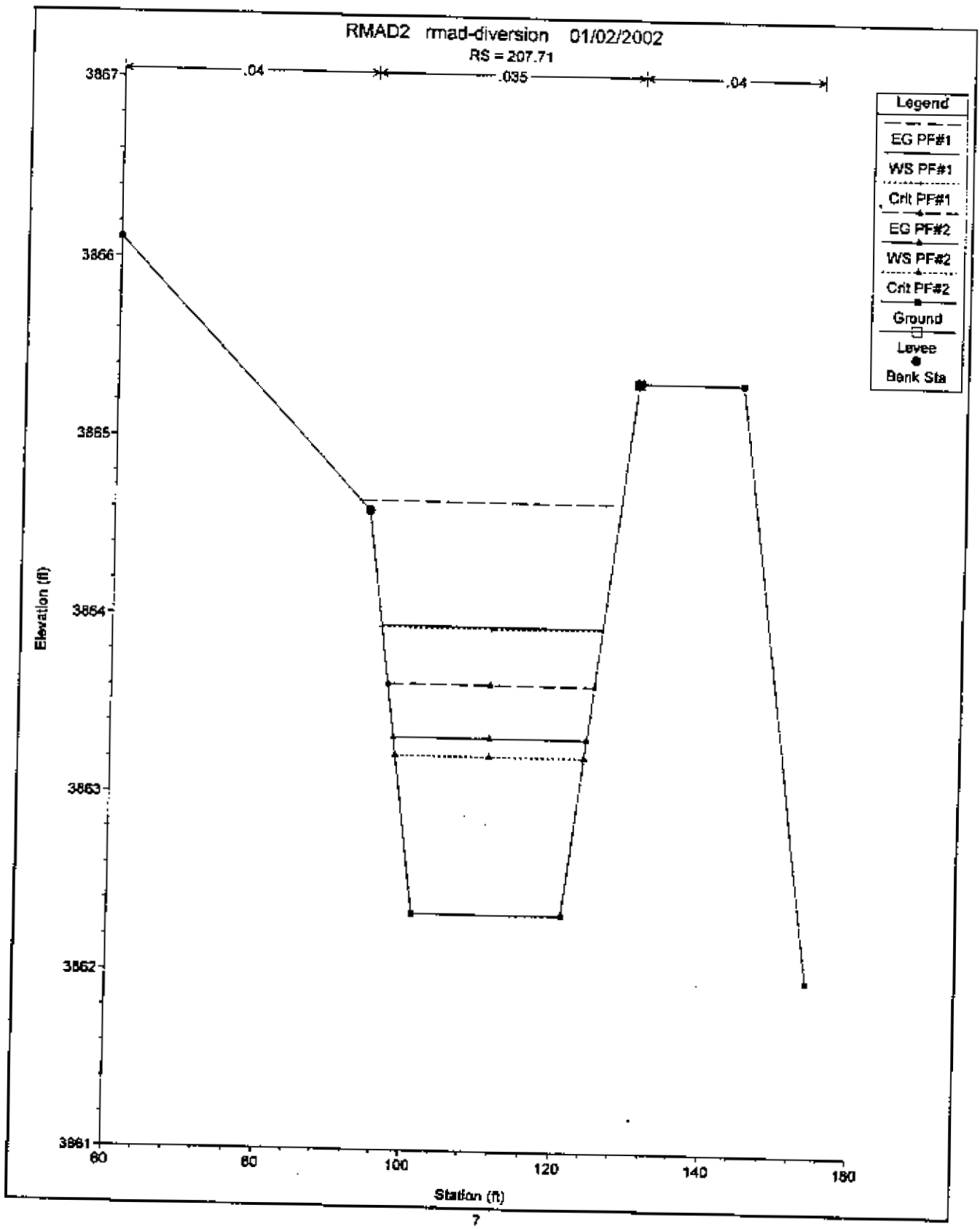

RMAD2 rmad-diversion 3/8/02
North End of Exist Diversion Channel RS = 2657.71
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Bank Sta
Elevation (ft)
3893.0
3892.5
3892.0
3891.5
3891.0
3890.5
3890.0
3889.5
3889.0
60
80
100
120
140
160
180
200
Station (ft)

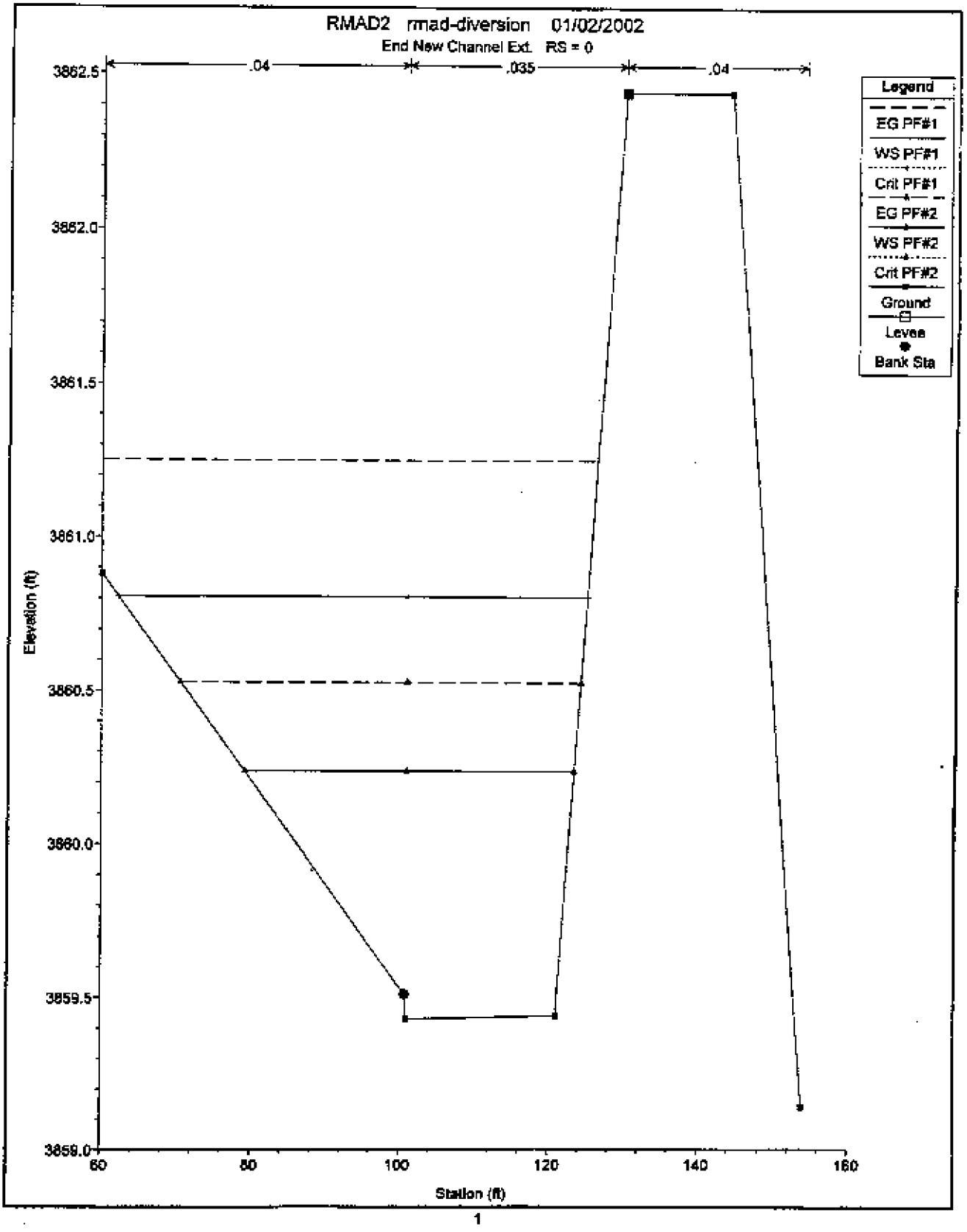

RMAD2 rmad-diversion 01/02/2002
RS = 1907.71
.04
.035
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Bank Sta
Elevation (ft)
3888
3887
3886
3885
3884
3883
3882
60
70
80
90
100
110
120
130
140
Station (ft)


RMAD2 rmad-diversion 3/8/02
Existing Channel RS = 1157.71
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Bank Sta
3878.0
3877.5
3877.0
3876.5
3876.0
3875.5
3875.0
3874.5
3874.0
Elevation (ft)
60
80
100
120
140
160
180
200
Station (ft)


RMAD2 rmad-diversion 01/02/2002
Begin Transition to New Channel Ext. RS = 534.53
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Levee
Bank Sta
Elevation (ft)
3870.5
3870.0
3869.5
3869.0
3868.5
3868.0
3867.5
60
80
100
120
140
160
Station (ft)


RMAD2 rmad-diversion 01/02/2002
End Transition - Begin New Channel Ext. RS = 399.37
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
Crit PF#2
WS PF#2
Ground
Levee
Bank Sta
Elevation (ft)
3869
3868
3867
3866
3865
3864
60
80
100
120
140
160
Station (ft)


RMAD2 rmad-diversion 01/02/2002
RS = 207.71
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Levee
Bank Sta
3867
3866
3865
3864
3863
3862
3861
Elevation (ft)
60
80
100
120
140
160
Station (ft)


RMAD2 rmad-diversion 01/02/2002
End New Channel Ext. RS = 0
.04
.035
.04
Legend
EG PF#1
WS PF#1
Crit PF#1
EG PF#2
WS PF#2
Crit PF#2
Ground
Levee
Bank Sta
3862.5
3862.0
3861.5
3861.0
3860.5
3860.0
3859.5
3859.0
Elevation (ft)
60
80
100
120
140
160
Station (ft)

Upgeo.txt

```
    3
0.175000E-01
0.400000E-01
 3.00000      3.00000
 20.0000
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.00
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.08
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.17
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.25
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.33
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.42
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.50
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.58
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.67
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.75
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.83
 0.  0.00  0.0    0.0   0.0   0.0  0.00  0.92
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.00
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.08
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.17
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.25
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.33
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.42
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.50
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.58
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.67
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.75
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.83
 0.  0.00  0.0    0.0   0.0   0.0  0.00  1.92
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.00
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.08
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.17
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.25
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.33
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.42
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.50
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.58
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.67
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.75
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.83
 0.  0.00  0.0    0.0   0.0   0.0  0.00  2.92
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.00
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.08
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.17
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.25
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.33
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.42
 0.  0.00  0.0    0.0   0.0   0.0  0.00  3.50
 1.  0.06 20.3    1.2   0.9  20.4  0.06  3.58
 3.  0.10 20.6    2.0   1.4  20.6  0.10  3.67
 7.  0.18 21.1    3.7   1.8  21.1  0.18  3.75
14.  0.30 21.8    6.2   2.2  21.9  0.28  3.83
25.  0.44 22.6    9.3   2.7  22.8  0.41  3.92
```

42.	0.59	23.5	12.8	3.3	23.7	0.54	4.00
65.	0.76	24.5	16.8	3.8	24.8	0.68	4.08
92.	0.93	25.6	21.3	4.3	25.9	0.82	4.16
123.	1.11	26.6	25.8	4.8	27.0	0.96	4.25
156.	1.27	27.6	30.2	5.2	28.0	1.08	4.33
188.	1.41	28.4	34.1	5.5	28.9	1.18	4.41
216.	1.52	29.1	37.5	5.8	29.6	1.26	4.50
239.	1.62	29.7	40.2	6.0	30.2	1.33	4.58
256.	1.68	30.1	42.1	6.1	30.6	1.37	4.66
266.	1.72	30.3	43.2	6.2	30.9	1.40	4.75
270.	1.73	30.4	43.6	6.2	31.0	1.41	4.83
268.	1.73	30.4	43.4	6.2	30.9	1.41	4.91
262.	1.70	30.2	42.7	6.1	30.8	1.39	5.00
253.	1.67	30.0	41.7	6.1	30.6	1.37	5.08
241.	1.62	29.7	40.4	6.0	30.3	1.33	5.16
229.	1.58	29.5	39.0	5.9	30.0	1.30	5.25
216.	1.53	29.2	37.5	5.8	29.7	1.26	5.33
204.	1.48	28.9	36.1	5.7	29.3	1.23	5.41
193.	1.43	28.6	34.8	5.5	29.0	1.20	5.50
182.	1.38	28.3	33.4	5.5	28.8	1.16	5.58
173.	1.34	28.1	32.2	5.4	28.5	1.13	5.66
164.	1.30	27.8	31.2	5.3	28.2	1.10	5.75
157.	1.27	27.6	30.2	5.2	28.0	1.08	5.83
150.	1.24	27.4	29.4	5.1	27.8	1.06	5.91
144.	1.21	27.2	28.5	5.0	27.6	1.03	6.00
138.	1.18	27.1	27.8	5.0	27.5	1.01	6.08
133.	1.16	26.9	27.1	4.9	27.3	0.99	6.16
129.	1.13	26.8	26.5	4.9	27.2	0.98	6.25
125.	1.11	26.7	26.0	4.8	27.0	0.96	6.33
121.	1.09	26.6	25.4	4.8	26.9	0.95	6.41
117.	1.08	26.5	25.0	4.7	26.8	0.93	6.50
114.	1.06	26.3	24.5	4.6	26.7	0.92	6.58
111.	1.04	26.2	24.1	4.6	26.6	0.91	6.66
108.	1.02	26.1	23.6	4.6	26.5	0.89	6.75
104.	1.00	26.0	23.1	4.5	26.3	0.88	6.83
101.	0.98	25.9	22.5	4.5	26.2	0.86	6.91
97.	0.96	25.8	21.9	4.4	26.1	0.84	7.00
92.	0.93	25.6	21.3	4.3	25.9	0.82	7.08
87.	0.90	25.4	20.5	4.3	25.7	0.80	7.16
81.	0.87	25.2	19.7	4.1	25.5	0.77	7.25
75.	0.83	25.0	18.6	4.0	25.2	0.74	7.33
68.	0.78	24.7	17.5	3.9	24.9	0.70	7.41
62.	0.73	24.4	16.3	3.8	24.6	0.66	7.50
55.	0.69	24.1	15.1	3.6	24.3	0.62	7.58
48.	0.64	23.8	14.0	3.4	24.0	0.58	7.66
42.	0.58	23.5	12.7	3.3	23.7	0.54	7.75
36.	0.53	23.2	11.5	3.1	23.4	0.49	7.83
31.	0.49	22.9	10.5	2.9	23.1	0.45	7.91
26.	0.45	22.7	9.6	2.8	22.8	0.42	8.00
22.	0.40	22.4	8.5	2.6	22.5	0.38	8.08
19.	0.36	22.2	7.6	2.5	22.3	0.34	8.16
16.	0.33	22.0	6.8	2.4	22.1	0.31	8.25
14.	0.30	21.8	6.2	2.2	21.9	0.28	8.33

12.	0.27	21.6	5.6	2.1	21.7	0.26	8.41
10.	0.25	21.5	5.2	1.9	21.6	0.24	8.50
8.	0.22	21.3	4.5	1.9	21.4	0.21	8.58
7.	0.19	21.1	3.9	1.8	21.2	0.18	8.66
6.	0.16	21.0	3.4	1.8	21.0	0.16	8.75
5.	0.14	20.9	3.0	1.7	20.9	0.14	8.83
4.	0.13	20.8	2.6	1.6	20.8	0.13	8.91
4.	0.11	20.7	2.3	1.6	20.7	0.11	9.00
3.	0.10	20.6	2.1	1.5	20.6	0.10	9.08
3.	0.09	20.5	1.8	1.4	20.6	0.09	9.16
2.	0.08	20.5	1.7	1.3	20.5	0.08	9.25
2.	0.07	20.4	1.5	1.2	20.5	0.07	9.33
2.	0.07	20.4	1.4	1.1	20.4	0.07	9.41
1.	0.06	20.4	1.3	1.0	20.4	0.06	9.50
1.	0.06	20.4	1.2	0.9	20.4	0.06	9.58
1.	0.06	20.3	1.1	0.8	20.3	0.05	9.66
1.	0.05	20.3	1.0	0.7	20.3	0.05	9.75
0.	0.00	0.0	0.0	0.0	0.0	0.00	9.83
0.	0.00	0.0	0.0	0.0	0.0	0.00	9.91
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.00
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.08
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.16
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.25
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.33
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.41
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.50
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.58
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.66
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.75

THIS COMPUTER CODE WAS DEVELOPED BY R.H. FRENCH,
WATER RESOURCES CENTER, DESERT RESEARCH INSTITUTE,
LAS VEGAS, NEVADA FOR THE U.S. DEPARTMENT OF ENERGY,
LAS VEGAS, NEVADA.

THE DATE OF THIS VERSION IS 03/1996 AND SUPERSEDES
ALL PREVIOUS VERSIONS.

Input water temperature (deg F) 70.0

Interpolated kinematic viscosity
of water (ft**2/s) 0.00001059

Interpolated fluid density (sl/ft**3) 1.9360

Input specific gravity of sediment 2.55

Input name of file containing sediment data rmadsize.dat

Do you want summaries of the input data printed?
Input 1 to have summaries printed
Input 999 to have no summaries printed 999

Input name of file containing hydraulic data upgeo.txt

Do you wish to make an empirical correction for channel shape,
flow rate and the lack of a silt load?
Enter 1 to make this correction
Enter 999 to not make a correction 999

Trapezoidal Channel

At this point either sediment fall velocity
data can be input from a file or it will be computed
using Rubey-s equation. Enter 1 to input the data
from a file or 999 to have it computed 999

This program has the option of adjusting the
kinematic viscosity to take into account
the sediment (sand + gravel) load
Input 1 to adjust the kinematic viscosity
Input 999 to not adjust the kinematic viscosity 999

Do you want detailed summaries of the sediment
transport calculations for each time increment printed
or only a summary?
Input 1 to receive details

Input 999 to receive overall summary 999

1HYDROGRAPH-SEDIGRAPH SUMMARY

Time (hr)	Q (cfs)	y (ft)	u (ft/s)	dt (hr)	Rate (T/day)	Cum Vol (ft**3)	Cum Vol (ac-ft)
0.00	0.	0.0	0.00	0.08	0.	0.	0.00
0.08	0.	0.0	0.00	0.09	0.	0.	0.00
0.17	0.	0.0	0.00	0.08	0.	0.	0.00
0.25	0.	0.0	0.00	0.08	0.	0.	0.00
0.33	0.	0.0	0.00	0.09	0.	0.	0.00
0.42	0.	0.0	0.00	0.08	0.	0.	0.00
0.50	0.	0.0	0.00	0.08	0.	0.	0.00
0.58	0.	0.0	0.00	0.09	0.	0.	0.00
0.67	0.	0.0	0.00	0.08	0.	0.	0.00
0.75	0.	0.0	0.00	0.08	0.	0.	0.00
0.83	0.	0.0	0.00	0.09	0.	0.	0.00
0.92	0.	0.0	0.00	0.08	0.	0.	0.00
1.00	0.	0.0	0.00	0.08	0.	0.	0.00
1.08	0.	0.0	0.00	0.09	0.	0.	0.00
1.17	0.	0.0	0.00	0.08	0.	0.	0.00
1.25	0.	0.0	0.00	0.08	0.	0.	0.00
1.33	0.	0.0	0.00	0.09	0.	0.	0.00
1.42	0.	0.0	0.00	0.08	0.	0.	0.00
1.50	0.	0.0	0.00	0.08	0.	0.	0.00
1.58	0.	0.0	0.00	0.09	0.	0.	0.00
1.67	0.	0.0	0.00	0.08	0.	0.	0.00
1.75	0.	0.0	0.00	0.08	0.	0.	0.00
1.83	0.	0.0	0.00	0.09	0.	0.	0.00
1.92	0.	0.0	0.00	0.08	0.	0.	0.00

2.00	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.08	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.17	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.25	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.33	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.42	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.50	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.58	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.67	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.75	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.83	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.92	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.00	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.08	0.	0.0	0.00	0.	0.	0.00
			0.09			
3.17	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.25	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.33	0.	0.0	0.00	0.	0.	0.00
			0.09			
3.42	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.50	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.58	1.	0.1	0.90	15.	0.	0.00
			0.09			
3.67	3.	0.1	1.40	93.	3.	0.00
			0.08			
3.75	7.	0.2	1.80	295.	11.	0.00
			0.08			
3.83	14.	0.3	2.20	735.	33.	0.00
			0.09			
3.92	25.	0.4	2.70	1633.	88.	0.00
			0.08			
4.00	42.	0.6	3.30	3421.	194.	0.00
			0.08			
4.08	65.	0.8	3.80	6079.	393.	0.01
			0.08			
4.16	92.	0.9	4.30	9696.	724.	0.02

			0.09			
4.25	123.	1.1	4.80	14401.	1292.	0.03
			0.08			
4.33	156.	1.3	5.20	19663.	2005.	0.05
			0.08			
4.41	188.	1.4	5.50	24887.	2938.	0.07
			0.09			
4.50	216.	1.5	5.80	30086.	4234.	0.10
			0.08			
4.58	239.	1.6	6.00	34257.	5582.	0.13
			0.08			
4.66	256.	1.7	6.10	37171.	7078.	0.16
			0.09			
4.75	266.	1.7	6.20	39200.	8878.	0.20
			0.08			
4.83	270.	1.7	6.20	39706.	10531.	0.24
			0.08			
4.91	268.	1.7	6.20	39412.	12188.	0.28
			0.09			
5.00	262.	1.7	6.10	37882.	14010.	0.32
			0.08			
5.08	253.	1.7	6.10	36735.	15573.	0.36
			0.08			
5.16	241.	1.6	6.00	34544.	17066.	0.39
			0.09			
5.25	229.	1.6	5.90	32325.	18642.	0.43
			0.08			
5.33	216.	1.5	5.80	30086.	19950.	0.46
			0.08			
5.41	204.	1.5	5.70	27968.	21166.	0.49
			0.09			
5.50	193.	1.4	5.50	25427.	22424.	0.51
			0.08			
5.58	182.	1.4	5.50	24209.	23464.	0.54
			0.08			
5.66	173.	1.3	5.40	22630.	24445.	0.56
			0.09			
5.75	164.	1.3	5.30	21089.	25476.	0.58
			0.08			
5.83	157.	1.3	5.20	19789.	26332.	0.60
			0.08			
5.91	150.	1.2	5.10	18523.	27134.	0.62
			0.09			
6.00	144.	1.2	5.00	17460.	27983.	0.64
			0.08			
6.08	138.	1.2	5.00	16823.	28701.	0.66
			0.08			
6.16	133.	1.2	4.90	15871.	29386.	0.67
			0.09			
6.25	129.	1.1	4.90	15437.	30123.	0.69
			0.08			
6.33	125.	1.1	4.80	14635.	30753.	0.71
			0.08			

Upsed2.txt

6.41	121.	1.1	4.80	14208.	31358.	0.72
			0.09			
6.50	117.	1.1	4.70	13435.	32009.	0.73
			0.08			
6.58	114.	1.1	4.60	12756.	32558.	0.75
			0.08			
6.66	111.	1.0	4.60	12457.	33086.	0.76
			0.09			
6.75	108.	1.0	4.60	12194.	33667.	0.77
			0.08			
6.83	104.	1.0	4.50	11435.	34162.	0.78
			0.08			
6.91	101.	1.0	4.50	11174.	34636.	0.80
			0.09			
7.00	97.	1.0	4.40	10478.	35146.	0.81
			0.08			
7.08	92.	0.9	4.30	9696.	35568.	0.82
			0.08			
7.16	87.	0.9	4.30	9229.	35965.	0.83
			0.09			
7.25	81.	0.9	4.10	8138.	36374.	0.84
			0.08			
7.33	75.	0.8	4.00	7362.	36699.	0.84
			0.08			
7.41	68.	0.8	3.90	6541.	36990.	0.85
			0.09			
7.50	62.	0.7	3.80	5842.	37282.	0.86
			0.08			
7.58	55.	0.7	3.60	4887.	37507.	0.86
			0.08			
7.66	48.	0.6	3.40	4005.	37693.	0.87
			0.09			
7.75	42.	0.6	3.30	3421.	37868.	0.87
			0.08			
7.83	36.	0.5	3.10	2749.	37997.	0.87
			0.08			
7.91	31.	0.5	2.90	2197.	38101.	0.87
			0.09			
8.00	26.	0.4	2.80	1779.	38195.	0.88
			0.08			
8.08	22.	0.4	2.60	1384.	38261.	0.88
			0.08			
8.16	19.	0.4	2.50	1157.	38314.	0.88
			0.09			
8.25	16.	0.3	2.40	936.	38363.	0.88
			0.08			
8.33	14.	0.3	2.20	735.	38398.	0.88
			0.08			
8.41	12.	0.3	2.10	596.	38426.	0.88
			0.09			
8.50	10.	0.3	1.90	433.	38450.	0.88
			0.08			
8.58	8.	0.2	1.90	356.	38467.	0.88

			0.08			
8.66	7.	0.2	1.80	295.	38481.	0.88
			0.09			
8.75	6.	0.2	1.80	259.	38494.	0.88
			0.08			
8.83	5.	0.1	1.70	202.	38503.	0.88
			0.08			
8.91	4.	0.1	1.60	148.	38511.	0.88
			0.09			
9.00	4.	0.1	1.60	153.	38518.	0.88
			0.08			
9.08	3.	0.1	1.50	105.	38523.	0.88
			0.08			
9.16	3.	0.1	1.40	95.	38527.	0.88
			0.09			
9.25	2.	0.1	1.30	57.	38531.	0.88
			0.08			
9.33	2.	0.1	1.20	50.	38533.	0.88
			0.08			
9.41	2.	0.1	1.10	43.	38535.	0.88
			0.09			
9.50	1.	0.1	1.00	18.	38536.	0.88
			0.08			
9.58	1.	0.1	0.90	15.	38537.	0.88
			0.08			
9.66	1.	0.1	0.80	12.	38538.	0.88
			0.09			
9.75	1.	0.1	0.70	9.	38538.	0.88
			0.08			
9.83	0.	0.0	0.00	0.	38538.	0.88
			0.08			
9.91	0.	0.0	0.00	0.	38538.	0.88
			0.09			
10.00	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.08	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.16	0.	0.0	0.00	0.	38538.	0.88
			0.09			
10.25	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.33	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.41	0.	0.0	0.00	0.	38538.	0.88
			0.09			
10.50	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.58	0.	0.0	0.00	0.	38538.	0.88
			0.08			
10.66	0.	0.0	0.00	0.	38538.	0.88
			0.09			
10.75	0.	0.0	0.00	0.	38538.	0.88

Dngeo.txt

```
    3
0.158000E-01
0.400000E-01
 3.00000     3.00000
 20.0000
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.00
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.08
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.17
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.25
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.33
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.42
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.50
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.58
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.67
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.75
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.83
 0.  0.00  0.0   0.0  0.0  0.0  0.00  0.92
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.00
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.08
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.17
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.25
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.33
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.42
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.50
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.58
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.67
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.75
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.83
 0.  0.00  0.0   0.0  0.0  0.0  0.00  1.92
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.00
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.08
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.17
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.25
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.33
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.42
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.50
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.58
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.67
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.75
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.83
 0.  0.00  0.0   0.0  0.0  0.0  0.00  2.92
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.00
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.08
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.17
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.25
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.33
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.42
 0.  0.00  0.0   0.0  0.0  0.0  0.00  3.50
 1.  0.06 20.4   1.2  0.9 20.4  0.06  3.58
 3.  0.10 20.6   2.1  1.4 20.6  0.10  3.67
 7.  0.19 21.1   3.9  1.7 21.2  0.18  3.75
14.  0.31 21.8   6.4  2.2 21.9  0.29  3.83
25.  0.45 22.7   9.6  2.6 22.9  0.42  3.92
```

42.	0.61	23.6	13.2	3.2	23.8	0.55	4.00
65.	0.78	24.7	17.4	3.7	24.9	0.70	4.08
92.	0.96	25.8	22.0	4.2	26.1	0.84	4.16
123.	1.14	26.8	26.7	4.6	27.2	0.98	4.25
156.	1.30	27.8	31.2	5.0	28.2	1.10	4.33
188.	1.45	28.7	35.3	5.3	29.2	1.21	4.41
216.	1.57	29.4	38.8	5.6	29.9	1.30	4.50
239.	1.66	30.0	41.6	5.7	30.5	1.36	4.58
256.	1.73	30.4	43.5	5.9	30.9	1.41	4.66
266.	1.77	30.6	44.7	6.0	31.2	1.43	4.75
270.	1.78	30.7	45.2	6.0	31.3	1.44	4.83
268.	1.78	30.7	45.0	6.0	31.2	1.44	4.91
262.	1.75	30.5	44.2	5.9	31.1	1.42	5.00
253.	1.72	30.3	43.1	5.9	30.9	1.40	5.08
241.	1.67	30.0	41.8	5.8	30.6	1.37	5.16
229.	1.62	29.7	40.4	5.7	30.3	1.33	5.25
216.	1.57	29.4	38.8	5.6	29.9	1.30	5.33
204.	1.52	29.1	37.3	5.5	29.6	1.26	5.41
193.	1.47	28.8	36.0	5.4	29.3	1.23	5.50
182.	1.43	28.6	34.6	5.3	29.0	1.19	5.58
173.	1.38	28.3	33.4	5.2	28.7	1.16	5.66
164.	1.34	28.1	32.2	5.1	28.5	1.13	5.75
157.	1.31	27.8	31.2	5.0	28.3	1.11	5.83
150.	1.27	27.6	30.4	4.9	28.1	1.08	5.91
144.	1.25	27.5	29.6	4.9	27.9	1.06	6.00
138.	1.22	27.3	28.8	4.8	27.7	1.04	6.08
133.	1.19	27.1	28.1	4.7	27.5	1.02	6.16
129.	1.17	27.0	27.4	4.7	27.4	1.00	6.25
125.	1.14	26.9	26.8	4.6	27.2	0.98	6.33
121.	1.12	26.7	26.3	4.6	27.1	0.97	6.41
117.	1.11	26.6	25.8	4.5	27.0	0.96	6.50
114.	1.09	26.5	25.3	4.5	26.9	0.94	6.58
111.	1.07	26.4	24.9	4.5	26.8	0.93	6.66
108.	1.05	26.3	24.4	4.4	26.7	0.92	6.75
104.	1.03	26.2	23.9	4.4	26.5	0.90	6.83
101.	1.01	26.1	23.3	4.3	26.4	0.88	6.91
97.	0.99	25.9	22.7	4.3	26.3	0.87	7.00
92.	0.96	25.8	22.0	4.2	26.1	0.84	7.08
87.	0.93	25.6	21.2	4.1	25.9	0.82	7.16
81.	0.89	25.4	20.3	4.0	25.7	0.79	7.25
75.	0.86	25.1	19.3	3.9	25.4	0.76	7.33
68.	0.81	24.8	18.1	3.8	25.1	0.72	7.41
62.	0.76	24.5	16.9	3.7	24.8	0.68	7.50
55.	0.71	24.2	15.6	3.5	24.5	0.64	7.58
48.	0.66	23.9	14.5	3.3	24.2	0.60	7.66
42.	0.60	23.6	13.1	3.2	23.8	0.55	7.75
36.	0.55	23.3	11.9	3.0	23.5	0.51	7.83
31.	0.50	23.0	10.8	2.9	23.2	0.47	7.91
26.	0.46	22.8	9.9	2.7	22.9	0.43	8.00
22.	0.42	22.5	8.8	2.5	22.6	0.39	8.08
19.	0.37	22.2	7.9	2.4	22.4	0.35	8.16
16.	0.34	22.0	7.1	2.3	22.1	0.32	8.25
14.	0.30	21.8	6.4	2.1	21.9	0.29	8.33

Dngeo.txt

12.	0.28	21.7	5.8	2.0	21.8	0.27	8.41
10.	0.26	21.5	5.3	1.8	21.6	0.25	8.50
8.	0.23	21.4	4.7	1.8	21.4	0.22	8.58
7.	0.20	21.2	4.0	1.7	21.2	0.19	8.66
6.	0.17	21.0	3.5	1.7	21.1	0.17	8.75
5.	0.15	20.9	3.1	1.6	21.0	0.15	8.83
4.	0.13	20.8	2.7	1.6	20.8	0.13	8.91
4.	0.12	20.7	2.4	1.5	20.7	0.12	9.00
3.	0.10	20.6	2.1	1.4	20.7	0.10	9.08
3.	0.09	20.6	1.9	1.3	20.6	0.09	9.16
2.	0.08	20.5	1.7	1.3	20.5	0.08	9.25
2.	0.08	20.5	1.6	1.2	20.5	0.08	9.33
2.	0.07	20.4	1.4	1.1	20.4	0.07	9.41
1.	0.06	20.4	1.3	1.0	20.4	0.06	9.50
1.	0.06	20.4	1.2	0.9	20.4	0.06	9.58
1.	0.06	20.3	1.1	0.8	20.4	0.06	9.66
1.	0.05	20.3	1.1	0.7	20.3	0.05	9.75
0.	0.00	0.0	0.0	0.0	0.0	0.00	9.83
0.	0.00	0.0	0.0	0.0	0.0	0.00	9.91
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.00
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.08
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.16
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.25
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.33
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.41
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.50
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.58
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.66
0.	0.00	0.0	0.0	0.0	0.0	0.00	10.75

Dnsed2.txt

THIS COMPUTER CODE WAS DEVELOPED BY R.H. FRENCH, WATER RESOURCES CENTER, DESERT RESEARCH INSTITUTE, LAS VEGAS, NEVADA FOR THE U.S. DEPARTMENT OF ENERGY, LAS VEGAS, NEVADA.

THE DATE OF THIS VERSION IS 03/1996 AND SUPERSEDES ALL PREVIOUS VERSIONS.

Input water temperature (deg F) 70.0

Interpolated kinematic viscosity
of water (ft**2/s) 0.00001059

Interpolated fluid density (sl/ft**3) 1.9360

Input specific gravity of sediment 2.55

Input name of file containing sediment data rmadsize.dat

Do you want summaries of the input data printed?
Input 1 to have summaries printed
Input 999 to have no summaries printed 999

Input name of file containing hydraulic data dngeo.txt

Do you wish to make an empirical correction for channel shape, flow rate and the lack of a silt load?
Enter 1 to make this correction
Enter 999 to not make a correction 999

Trapezoidal Channel

At this point either sediment fall velocity data can be input from a file or it will be computed using Rubey-s equation. Enter 1 to input the data from a file or 999 to have it computed 999

This program has the option of adjusting the kinematic viscosity to take into account the sediment (sand + gravel) load
Input 1 to adjust the kinematic viscosity
Input 999 to not adjust the kinematic viscosity 999

Do you want detailed summaries of the sediment transport calculations for each time increment printed or only a summary?
Input 1 to receive details

Input 999 to receive overall summary 999
1HYDROGRAPH-SEDIGRAPH SUMMARY

Time (hr)	Q (cfs)	y (ft)	u (ft/s)	dt (hr)	Rate (T/day)	Cum Vol (ft**3)	Cum Vol (ac-ft)
0.00	0.	0.0	0.00	0.08	0.	0.	0.00
0.08	0.	0.0	0.00	0.09	0.	0.	0.00
0.17	0.	0.0	0.00	0.08	0.	0.	0.00
0.25	0.	0.0	0.00	0.08	0.	0.	0.00
0.33	0.	0.0	0.00	0.09	0.	0.	0.00
0.42	0.	0.0	0.00	0.08	0.	0.	0.00
0.50	0.	0.0	0.00	0.08	0.	0.	0.00
0.58	0.	0.0	0.00	0.09	0.	0.	0.00
0.67	0.	0.0	0.00	0.08	0.	0.	0.00
0.75	0.	0.0	0.00	0.08	0.	0.	0.00
0.83	0.	0.0	0.00	0.09	0.	0.	0.00
0.92	0.	0.0	0.00	0.08	0.	0.	0.00
1.00	0.	0.0	0.00	0.08	0.	0.	0.00
1.08	0.	0.0	0.00	0.09	0.	0.	0.00
1.17	0.	0.0	0.00	0.08	0.	0.	0.00
1.25	0.	0.0	0.00	0.08	0.	0.	0.00
1.33	0.	0.0	0.00	0.09	0.	0.	0.00
1.42	0.	0.0	0.00	0.08	0.	0.	0.00
1.50	0.	0.0	0.00	0.08	0.	0.	0.00
1.58	0.	0.0	0.00	0.09	0.	0.	0.00
1.67	0.	0.0	0.00	0.08	0.	0.	0.00
1.75	0.	0.0	0.00	0.08	0.	0.	0.00
1.83	0.	0.0	0.00	0.09	0.	0.	0.00
1.92	0.	0.0	0.00	0.08	0.	0.	0.00

2.00	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.08	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.17	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.25	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.33	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.42	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.50	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.58	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.67	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.75	0.	0.0	0.00	0.	0.	0.00
			0.08			
2.83	0.	0.0	0.00	0.	0.	0.00
			0.09			
2.92	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.00	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.08	0.	0.0	0.00	0.	0.	0.00
			0.09			
3.17	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.25	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.33	0.	0.0	0.00	0.	0.	0.00
			0.09			
3.42	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.50	0.	0.0	0.00	0.	0.	0.00
			0.08			
3.58	1.	0.1	0.90	13.	0.	0.00
			0.09			
3.67	3.	0.1	1.40	81.	2.	0.00
			0.08			
3.75	7.	0.2	1.70	237.	9.	0.00
			0.08			
3.83	14.	0.3	2.20	646.	28.	0.00
			0.09			
3.92	25.	0.4	2.60	1368.	75.	0.00
			0.08			
4.00	42.	0.6	3.20	2913.	165.	0.00
			0.08			
4.08	65.	0.8	3.70	5210.	335.	0.01
			0.08			
4.16	92.	1.0	4.20	8379.	620.	0.01

			0.09			
4.25	123.	1.1	4.60	12168.	1104.	0.03
			0.08			
4.33	156.	1.3	5.00	16727.	1709.	0.04
			0.08			
4.41	188.	1.5	5.30	21220.	2504.	0.06
			0.09			
4.50	216.	1.6	5.60	25700.	3610.	0.08
			0.08			
4.58	239.	1.7	5.70	28741.	4750.	0.11
			0.08			
4.66	256.	1.7	5.90	31881.	6020.	0.14
			0.09			
4.75	266.	1.8	6.00	33727.	7566.	0.17
			0.08			
4.83	270.	1.8	6.00	34167.	8989.	0.21
			0.08			
4.91	268.	1.8	6.00	33914.	10415.	0.24
			0.09			
5.00	262.	1.8	5.90	32564.	11982.	0.28
			0.08			
5.08	253.	1.7	5.90	31571.	13325.	0.31
			0.08			
5.16	241.	1.7	5.80	29588.	14606.	0.34
			0.09			
5.25	229.	1.6	5.70	27710.	15957.	0.37
			0.08			
5.33	216.	1.6	5.60	25700.	17076.	0.39
			0.08			
5.41	204.	1.5	5.50	23910.	18115.	0.42
			0.09			
5.50	193.	1.5	5.40	22228.	19202.	0.44
			0.08			
5.58	182.	1.4	5.30	20636.	20100.	0.46
			0.08			
5.66	173.	1.4	5.20	19262.	20936.	0.48
			0.09			
5.75	164.	1.3	5.10	17923.	21812.	0.50
			0.08			
5.83	157.	1.3	5.00	16794.	22539.	0.52
			0.08			
5.91	150.	1.3	4.90	15735.	23221.	0.53
			0.09			
6.00	144.	1.3	4.90	15181.	23950.	0.55
			0.08			
6.08	138.	1.2	4.80	14226.	24566.	0.56
			0.08			
6.16	133.	1.2	4.70	13400.	25144.	0.58
			0.09			
6.25	129.	1.2	4.70	13065.	25768.	0.59
			0.08			
6.33	125.	1.1	4.60	12366.	26301.	0.60
			0.08			

35

6.41	121.	1.1	4.60	12002.	26811.	0.62
			0.09			
6.50	117.	1.1	4.50	11299.	27360.	0.63
			0.08			
6.58	114.	1.1	4.50	11070.	27829.	0.64
			0.08			
6.66	111.	1.1	4.50	10808.	28287.	0.65
			0.09			
6.75	108.	1.0	4.40	10232.	28783.	0.66
			0.08			
6.83	104.	1.0	4.40	9909.	29205.	0.67
			0.08			
6.91	101.	1.0	4.30	9384.	29609.	0.68
			0.09			
7.00	97.	1.0	4.30	9038.	30043.	0.69
			0.08			
7.08	92.	1.0	4.20	8379.	30408.	0.70
			0.08			
7.16	87.	0.9	4.10	7715.	30745.	0.71
			0.09			
7.25	81.	0.9	4.00	7011.	31092.	0.71
			0.08			
7.33	75.	0.9	3.90	6332.	31372.	0.72
			0.08			
7.41	68.	0.8	3.80	5615.	31622.	0.73
			0.09			
7.50	62.	0.8	3.70	5004.	31872.	0.73
			0.08			
7.58	55.	0.7	3.50	4172.	32065.	0.74
			0.08			
7.66	48.	0.7	3.30	3406.	32223.	0.74
			0.09			
7.75	42.	0.6	3.20	2913.	32372.	0.74
			0.08			
7.83	36.	0.6	3.00	2319.	32482.	0.75
			0.08			
7.91	31.	0.5	2.90	1937.	32571.	0.75
			0.09			
8.00	26.	0.5	2.70	1495.	32652.	0.75
			0.08			
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			0.08			
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			0.09			
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			0.08			
8.41	12.	0.3	2.00	486.	32844.	0.75
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8.50	10.	0.3	1.80	350.	32864.	0.75
			0.08			
8.58	8.	0.2	1.80	286.	32877.	0.75

			0.08			
8.66	7.	0.2	1.70	235.	32888.	0.76
			0.09			
8.75	6.	0.2	1.70	206.	32899.	0.76
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8.83	5.	0.2	1.60	159.	32906.	0.76
			0.08			
8.91	4.	0.1	1.60	130.	32912.	0.76
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9.00	4.	0.1	1.50	119.	32918.	0.76
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			0.08			
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			0.08			
9.58	1.	0.1	0.90	13.	32934.	0.76
			0.08			
9.66	1.	0.1	0.80	10.	32934.	0.76
			0.09			
9.75	1.	0.1	0.70	8.	32935.	0.76
			0.08			
9.83	0.	0.0	0.00	0.	32935.	0.76
			0.08			
9.91	0.	0.0	0.00	0.	32935.	0.76
			0.09			
10.00	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.08	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.16	0.	0.0	0.00	0.	32935.	0.76
			0.09			
10.25	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.33	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.41	0.	0.0	0.00	0.	32935.	0.76
			0.09			
10.50	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.58	0.	0.0	0.00	0.	32935.	0.76
			0.08			
10.66	0.	0.0	0.00	0.	32935.	0.76
			0.09			
10.75	0.	0.0	0.00	0.	32935.	0.76

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Transum2.txt

THIS COMPUTER CODE WAS ORIGINALLY DEVELOPED BY
R.H. FRENCH, HYDRAULIC & HYDROLOGIC CONSULTING
ENGINEER FOR THE CLARK COUNTY (NEVADA) REGIONAL
FLOOD CONTROL DISTRICT, THE CITY OF NORTH LAS
(NEVADA) AND THE CITY OF HENDERSON (NEVADA).

THIS VERSION WAS DEVELOPED BY R.H. FRENCH,
WATER RESOURCES CENTER, DESERT RESEARCH INSTITUTE
LAS VEGAS, NEVADA FOR THE U.S. DEPARTMENT OF
ENERGY, LAS VEGAS, NEVADA.
THE DATE OF THIS VERSION IS 11/1995 AND SUPERSEDES
ALL PREVIOUS VERSIONS

SLOPE TRANSITION DEPOSITION (SCOUR) PROGRAM

Input the volume of sediment to be deposited (scoured) in acre-feet 0.12

Input width of upstream channel 50.

Input width of downstream channel 47.

Input signed slope of upstream channel -0.01750

Input signed slope of downstream channel -0.01580

Input elevation of hinge point 300.00

Input trial length over which deposition (scour) occurs 2000.0
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.32 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.42 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.43 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1000
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.08 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.21 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.21 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1500
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.18 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.32 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.32 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1400
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.15 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.30 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.30 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1300
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.13 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.28 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.28 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1200
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.11 acre-feet
BED SURFACE ELEVATION AT HINGE POINT = 300.26 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.26 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 1250
Input zero to stop.
SEDIMENT VOLUME TO BE DEPOSITED (SCOURED) = 0.12acre-feet
SEDIMENT VOLUME DEPOSITED (SCOURED) = 0.12 acre-feet

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Transum2.txt

BED SURFACE ELEVATION AT HINGE POINT = 300.27 ft
MAXIMUM DEPTH OF DEPOSITION (SCOUR) = 0.27 ft

Input a non-zero trial length over which deposition (scour) occurs to continue. 0
Input zero to stop.

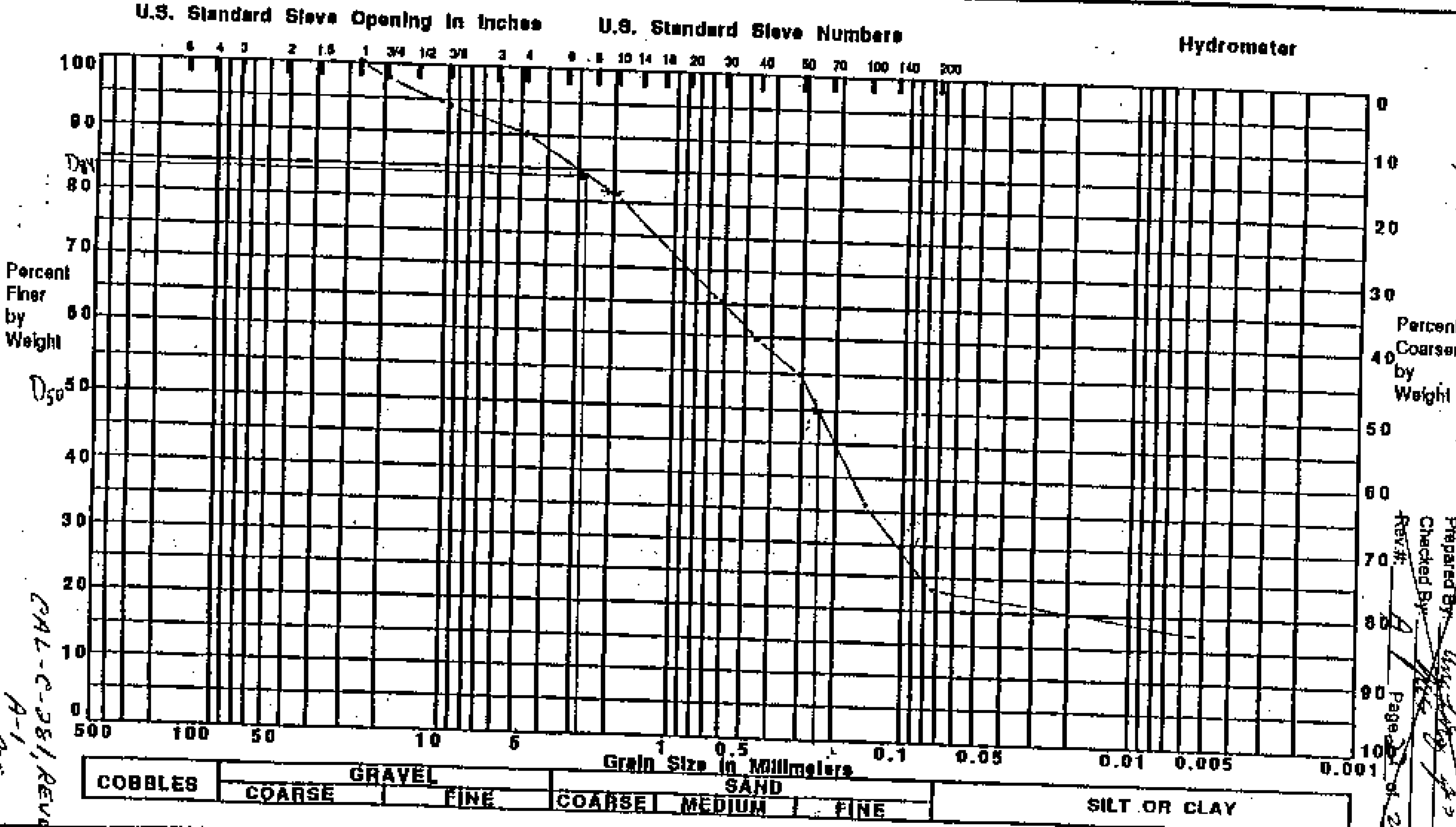
GRADATION CURVES

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

LAB NO. 2234
CHARGE # C7C113BB
DATE 08/02/2000

PROJECT: R-MAD WASTE TRENCHES (CAU143) PROJECT #: N/A CLASSIFICATION: SM

CHECKED BY: D. HERRINGTON DATE CHECKED: 8-2-2000 MATERIAL SOUTHEAST SIDE



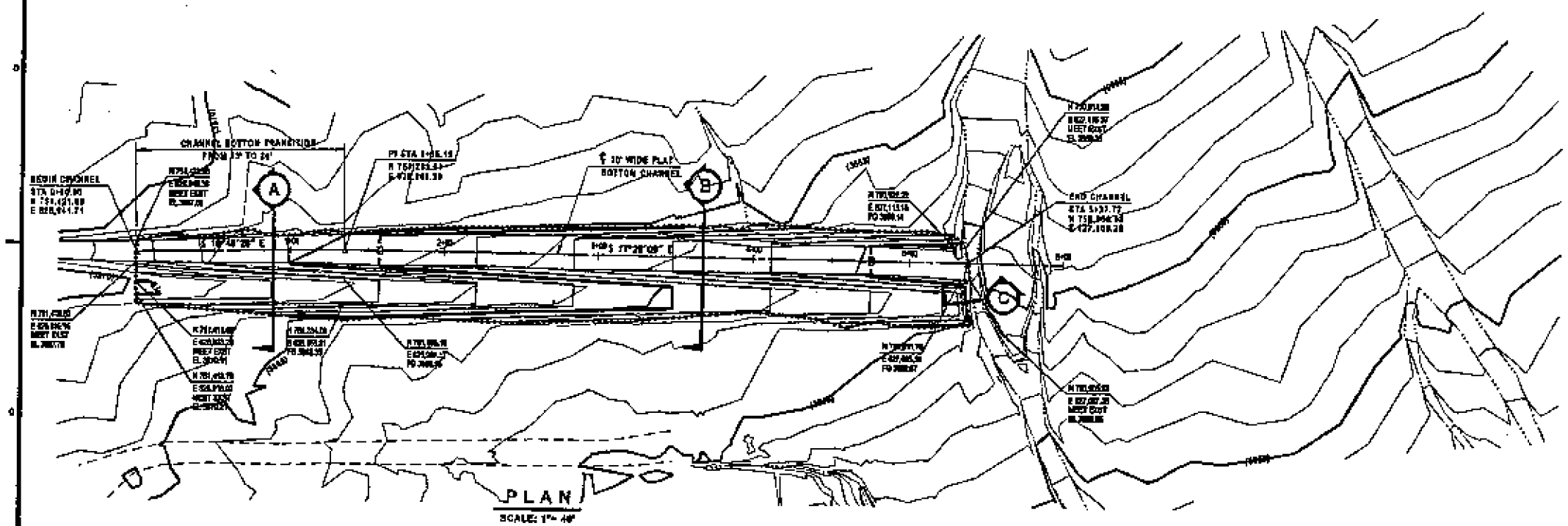
A-1

Analysis Calc. #: CAL-C-281
Prepared By:
Checked By:
Rev.#: A-1
Page 20 of 26

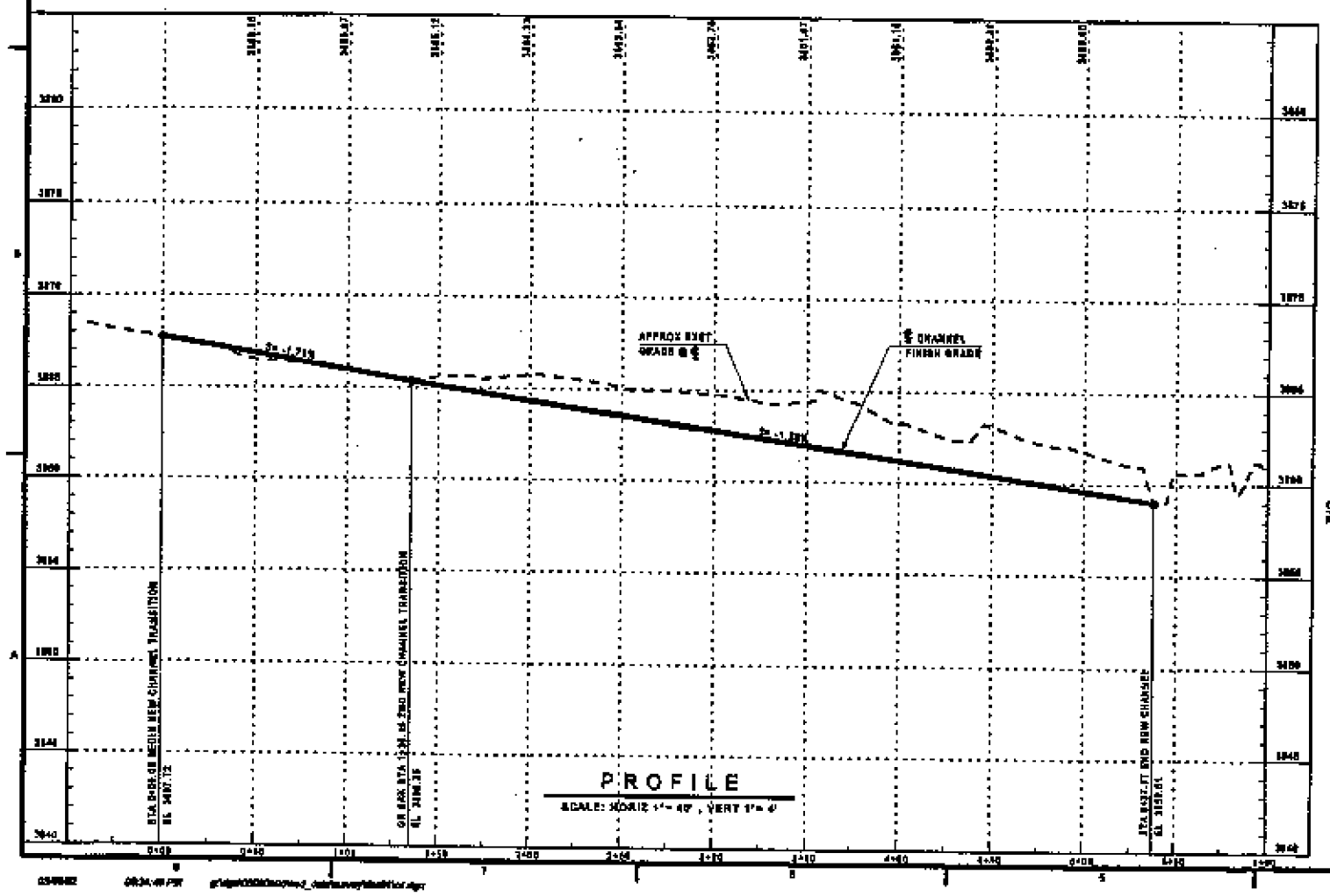
NO EQUIPMENT USED.

CAL-C-281, REV A-1

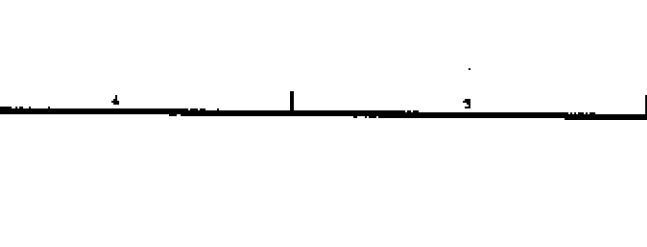
CAL-C-261
REV 0
A-3
gms



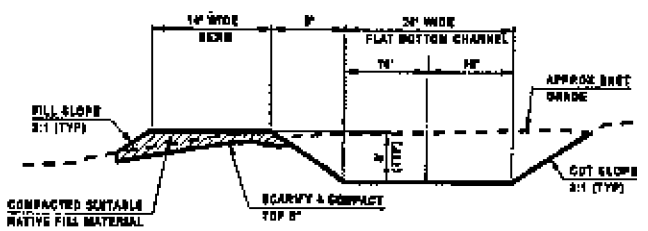
PLAN
SCALE: 1" = 40'



PROFILE
SCALE: HORIZ 1" = 40' , VERT 1" = 4'



SECTION A
NOT TO SCALE



SECTION B
NOT TO SCALE

SECTION C
NOT TO SCALE

GRAPHIC SCALE
0 2 4 8 12 FEET
1" = 4'

GRAPHIC SCALE
0 20 40 80 120 FEET
1" = 40'

NO	DATE	ISSUED FOR CONSTRUCTION 8/07/02
0		

U.S. DEPARTMENT OF ENERGY
Bechtel Nevada
N/A
AREA 25
NEVADA TEST SITE
CAU 143 REMEDIATION
CONTAMINATED WASTE DUMP
DIVERSION CHANNEL EXTENSION
PLAN & PROFILE
DOE/NV--025-CAU143-CA

A-3

A-2

CAL-C-251 REVO
A-2
JRS

CP3

rmadhyd.txt

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.080	0.320	1.050	2.870	6.720	13.780	25.260	42.110	64.640
92.250	123.440	156.020	187.560	215.830	239.040	256.040	266.380	270.250	268.420
262.070	252.520	241.050	228.690	216.210	204.120	192.750	182.260	172.750	164.190
156.550	149.730	143.650	138.200	133.270	128.790	124.680	120.880	117.340	114.000
110.790	107.610	104.330	100.800	96.840	92.330	87.180	81.410	75.090	68.400
61.520	54.670	48.050	41.820	36.100	30.960	26.440	22.490	19.090	16.180
13.700	11.600	9.810	8.300	7.020	5.940	5.020	4.240	3.580	3.020
2.550	2.150	1.810	1.520	1.280	1.070	0.900	0.750	0.620	0.510
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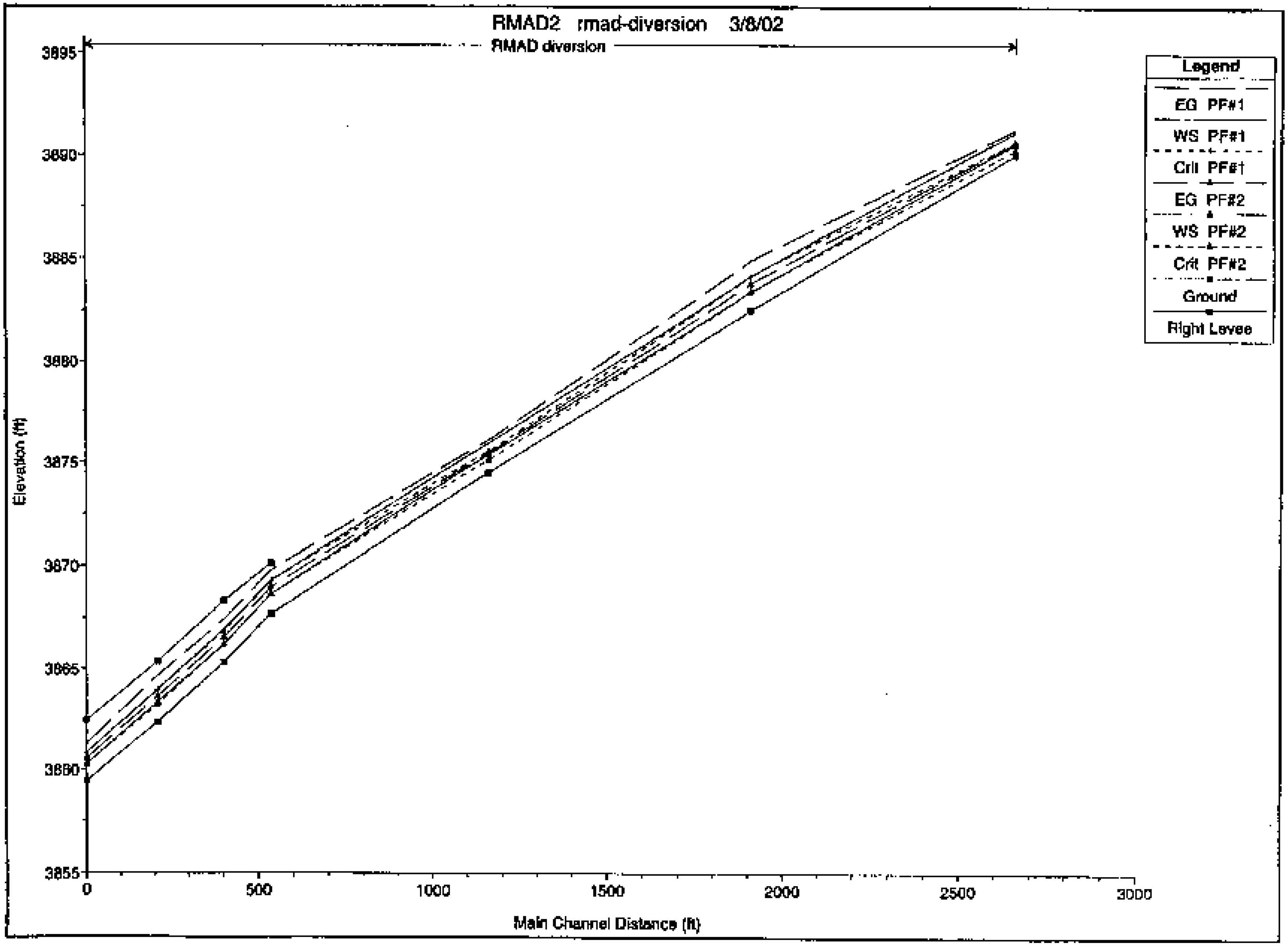

A-4

CAL-C-231
REV 0
A-4 of 4 pages

DRI Institute
Water Resources Center

University and Community
College System of Nevada

A-5

CAL-C-281
REJO
A-5 JAS

November 5, 1999

Mr. Jhon Carilli, RCRA Program Manager
Waste Management Division
DOE Nevada Operations Office
P.O. Box 98518
Las Vegas, NV 89193-8518

SUBJECT: Certification of Flood Mitigation Structures at the Area 5 RWMS

Dear Mr. Carilli:

I have been involved with flood hazard identification and mitigation at the Department of Energy, Nevada Test Site, Area 5 Radioactive Waste Management Site (RWMS) since flood hazard was identified as a concern during the site characterization process. As an independent reviewer, I examined the documents and maps identifying flood hazard zones at the RWMS (Schmeltzer *et al.*, 1993), and the overall design process that led to construction of the flood mitigation structures (dike-channel system) in 1995-1996. Further, faculty at Desert Research Institute, Division of Hydrologic Sciences, closely examined the precipitation event of February 23-24, 1998, which approximated the 25-year, 24-hour precipitation event for which the dike-channel system at the Area 5 RWMS was designed (French and Curtis, 1999a,b; French *et al.*, 1999).

My review of Bechtel Nevada (1999) and the supporting documentation leads me to conclude that the dike-channel system around the RWMS in Area 5 provides adequate run-on protection from the 25-year, 24-hour precipitation event. Further, based on my inquiry of the persons who prepared Bechtel Nevada (1999), the data and information provided in this document are to the best of my knowledge and belief, true, accurate and complete.

If you have questions, please do not hesitate to contact me. Thank you.

Sincerely,

Richard H. French

Richard H. French, Ph.D., P.E.
Research Professor

cc: *E. Frank Di Sanzo, DOE/NV*
Wendy Clayton, DOE/NV
Gary Pyles, DOE/NV
Central Files, DOE/NV
Herb Bensinger, BN
Ken Schechter, BN
Patrick Matthews, BN

2215 Raggio Parkway
Reno, NV 89512-1095
(775) 673-7361
Fax (775) 673-7363

H-6

CAL-C-281
RENO
A-6
2 of 5

REFERENCED DOCUMENTS

Bechtel Nevada, 1999. As-built design analysis for the 25-year, flood protection system, Area 5, Radioactive Waste Management Site, Nevada Test Site.

French, R.H. and S. Curtis, 1999a. The precipitation event of 23-24 February 1998. Publication No. 45170, Desert Research Institute, Division of Hydrologic Sciences, Reno, NV.

French, R.H. and S. Curtis, 1999b. Serendipity: capturing a design level precipitation event. *Proceedings of the ASCE Water Resources Engineering Division Conference*, American Society of Civil Engineers, Seattle, Washington (in press).

French, R.H., T.L. Buchanan, S. Hokett, and S. Curtis, 1999. Calibration of a hybrid rainfall-runoff model in an arid environment. *Proceedings of the XXVIII IAHR Congress*, International Association for Hydraulic Research, Graz, Austria (on CD Rom).

Schmeltzer J.S., J.J. Miller, D.L. Gustafson, 1993. Flood assessment at the Area 5 Radioactive Waste Management Site and the proposed hazardous waste storage unit, DOE/Nevada Test Site, Nye County, Nevada. U.S. Department of Energy, Las Vegas, Nevada.

APPENDIX B

CONFIRMATION SAMPLING TEST RESULTS

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COVER PAGE

Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code: SCA Contract Number: 30025

Laboratory Report Identification Code: 2694, 2695 SDG: V1349

Sample Matrix: Soil

Site Sample Numbers	Laboratory Sample Number
	Tritium
CWD-S-1	NTS01-2694-01
CWD-S-2	NTS01-2694-02
CWD-S-3	NTS01-2694-03
CWD-S-4	NTS01-2694-04
CWD-S-5	NTS01-2694-05
CWD-S-6	NTS01-2694-06
Laboratory Control Sample (LC)	SCAQC-2694-LC1
Duplicate (LD)	SCAQC-2694-LD1
Preparation Blank (PB)	SCAQC-2694-PB

Sample Matrix: Water

Site Sample Numbers	Laboratory Sample Number
	Tritium
CWD-EB-1	NTS01-2695-01
Laboratory Control Sample (LC)	SCAQC-2695-LC1
Duplicate (LD)	SCAQC-2695-LD1
Preparation Blank (PB)	SCAQC-2695-PB

Comments: There were no problems encountered during sample receiving.

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature."

Signature

Joe Stinson	Laboratory Manager	12-19-01
Name	Title	Date

Bechtel Nevada

ANALYTICAL SERVICES LABORATORY
SERVICES REQUEST & CHAIN OF CUSTODY RECORD

PROJECT/ CLIENT INFORMATION

Project: CAU 143 BN Org#: 2156
Charge No.: SBO3BD71 ASL Prog.:
Project Manager: WAYNE JOHNSON
Phone: 5-0573 Fax: 5-7761 M/S: NTS306

REPORT INFORMATION

Send Report to: DAN TOBIASON
Phone: 5-6169 Fax: 5-7761 M/S: NTS306
Turnaround: ( ) Standard - 30 days Non-rad, 60 Days Rad, Other: ____ (X) Rush Preliminary by: 12/28/01 Final by: ____
Final report format: (X) Standard ( ) NTS-WAC ( ) Other: ____

SAMPLE INFORMATION

Sampling Site: CAU 143
The samples submitted contain (check). ( ) Hazardous ( ) Radioactive (X) Unknown contamination. If known, attach a brief narrative summary identifying contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

LAB USE ONLY

Rad SDG: V1349 Non-Rad SDG:
Rad Packet: Non-Rad Packet:
Client Services Representative:
Will these analyses be performed under a signed SOW? ( ) YES ( ) NO
If so, do analyses entered here agree with the SOW? ( ) YES ( ) NO ( ) N/A
If not, identify the variation ____
CSR initials indicating review and approval: ____ Date: ____

ANALYSES & METHOD: Sr-90 PAY ITEM: GPC-A-013; Sr-90 PAY ITEM: GPC-A-009

SAMPLE RECEIPT INFORMATION

Are all sample containers received intact (X) Yes ( ) No
Comments:
Do the labels agree with this form? (X) Yes ( ) No
Comments:
Was a Material Clearance Tag submitted? (X) Yes ( ) No
Comments:

ITEM	ID / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	Sr-90 (GPC-A-013)	Sr-90 (GPC-A-009)		COMMENTS (Preservative, size/volume, MS/MSD, special analysis, rad matrix code, count time, etc.)
0	CWD-S-1	11/14/01	11:30AM	Soil	X		NTS01-2694-01	500 mL Nalgene 4°C
1	CWD-S-2	↓	↓	↓	↓		02	↓
2	CWD-S-3	↓	↓	↓	↓		03	INCLUDE MS + MSD
3	CWD-S-4	↓	↓	↓	↓		04	↓
4	CWD-S-5	↓	↓	↓	↓		05	↓
5	CWD-S-6	↓	↓	↓	↓		06	↓
6	CWD-ED-1	↓	↓	WATER	↓	X	NTS01-2695-01	↓
7	LAST ITEM							NO RAD THIS PROCESS
8								KNOWLEDGE MK7
9								

Side note: Called client - Wayne Johnson and explained that it was not customary to do MS & MSD in Radiological testing. He agreed and instructed that SC&A did not need to include a MS & MSD. MSC 11-21-01 1500

Transfer of samples submitted for analyses

Sampled/Relinquished (Signature/Organization)	DATE / TIME	Received by (Signature/Organization)
M. S. [signature] E.R	11/14/01 5:15P	E.R Lockard Coolse
E.R. Lockard Coolse	11/19/01 3:00P	M. S. [signature] E.R
M. S. [signature]	11/19/01 15:28	CD Castaneda

Complete for samples shipped to an OFF-SITE Subcontract Laboratory: SC&A

Relinquished (BN Representative Signature)	DATE / TIME	Received (Courier & Tracking Info.)
CD Castaneda	11/20/01 1310	FED EX # 791710511084
Relinquished (Courier & Tracking Info.)	**DATE / TIME**	**Received (1st tier Subcontractor Rep)**
Fed Ex 791710511084	11/21/01 1000	KB Condon SC&A
Relinquished (1st tier Subcontractor Rep)	**DATE / TIME**	**Received (2nd tier Subcontractor Rep)**

Distribution: Original - To be retained by laboratory performing final analysis
Copy 1 - To be retained by laboratory performing intermediate analysis
Copy 2 - To be retained by Analytical Services Laboratory
Copy 3 - To be retained by sampler

BN-0732 (02/98)

CASE NARRATIVE
SDG V1349
Laboratory Report Identification Number: 2694, 2695

December 19, 2001

I. Introduction

On November 21, 2001, one water sample and six soil samples were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The samples were requested to be analyzed within 28 days of receipt at the laboratory. The samples were analyzed in accordance with the Bechtel Nevada Services Subcontract Task Order Agreement Form, Exhibit B, Statement of Work and Specifications, Rev 1, 1/23/01.

II. Analytical Methodology

The radioanalytical results reported for these samples include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. The Samples were analyzed in accordance with the following method.

Radionuclide	Method Number	Method Name	Counting Method
Sr-90	SRW01	Eichrom Industries Extraction Chromatography	Gas Proportional Counting

III. Analytical Results

Deficiencies

None.

Matrix Interferences

There were no indications of matrix interference.

Dilutions

No dilutions were required.

Detection Limits

The required detection limit (RDL) was not met for the water sample (NTS01-2695-01) because of the limited volume of sample available and the necessity to run the sample in duplicate. All other RDLs were met for the remaining analyses.

Reanalysis

There were no reanalyses.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

MS and MSD were indicated on the COC. A call was made to Mr. Wayne Johnson to confirm that these were not required. Accordingly they were not performed.

IV. Quality Control

Site Samples Used for Quality Control Samples: Soils

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-2694-LC1	Laboratory Control Sample
Preparation Blank	SCAQC-2694-PB	Preparation Blank
CWD-S-1	SCAQC-2694-LD1	Laboratory Duplicate Sample

Site Samples Used for Quality Control Samples: Waters

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-2695-LC1	Laboratory Control Sample
Preparation Blank	SCAQC-2695-PB	Preparation Blank
CWD-EB-1	SCAQC-2695-LD1	Laboratory Duplicate Sample

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,

Joe Stinson
Laboratory Manager

12/19/01
Date

Sample and QC Sample Results Summary

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-1

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-01	-0.043	0.256	0.256	0.489

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0437

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-2

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-02	-0.107	0.191	0.191	0.399

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-3

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-03	0.312	0.290	0.292	0.454

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-4

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-04	0.152	0.272	0.273	0.461

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-5

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-05	-0.134	0.234	0.234	0.469

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil

Site Sample ID: CWD-S-6

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2694 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	NTS01-2694-06	0.120	0.253	0.254	0.436

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Water

Site Sample ID: CWD-EB-1

Other Sample ID: Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Batch Number: 2695 Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
SRW01	SR-90	NTS01-2695-01	0.069	0.750	0.750	1.36

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2695-LC1	SCAQC-2695-LD1		SCAQC-2695-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: V1349

Project Name:	Bechtel Nevada	Chain-of-Custody Number:	None	Matrix:	Soil
Site Sample ID:	N/A				
Other Sample ID:	LC1	Collection Date:	11/21/01 10:00:00 AM	Date Received	11/21/01
				Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	SCAQC-2694-LC1	833	16.7	84.9	0.822

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Laboratory Control (LC1)

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: None Matrix: Water

Site Sample ID: N/A

Other Sample ID: LC1 Collection Date: 11/21/01 10:00:00 AM Date Received: 11/21/01

Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
SRW01	SR-90	SCAQC-2695-LC1	1670	33.3	170	1.78

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2695-LC1	SCAQC-2695-LD1		SCAQC-2695-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Soil
Site Sample ID: CWD-S-1
Other Sample ID: LD1 Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01
Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	SCAQC-2694-LD1	0.533	0.320	0.324	0.456

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
SR-90	SCAQC-2694-LD1	NTS01-2694-01

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Duplicate (LD1)

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: NONE Matrix: Water

Site Sample ID: CWD-EB-1

Other Sample ID: LD1 Collection Date: 11/14/01 4:30:00 PM Date Received: 11/21/01

Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
SRW01	SR-90	SCAQC-2695-LD1	0.747	0.773	0.777	1.24

Laboratory Samples for Duplicates

Radionuclide	Laboratory Sample ID	Duplicate of Sample ID
SR-90	SCAQC-2695-LD1	NTS01-2695-01

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2695-LC1	SCAQC-2695-LD1		SCAQC-2695-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: V1349

Project Name:	Bechtel Nevada	Chain-of-Custody Number:	None	Matrix:	Soil
Site Sample ID:	N/A				
Other Sample ID:	PB	Collection Date:	11/21/01 10:00:00 AM	Date Received:	11/21/01
				Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
SRW01	SR-90	SCAQC-2694-PB	0.009	0.127	0.127	0.234

Quality Control Samples

Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2694-LC1	SCAQC-2694-LD1		SCAQC-2694-PB

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Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: V1349

Project Name: Bechtel Nevada Chain-of-Custody Number: None Matrix: Water

Site Sample ID: N/A

Other Sample ID: PB Collection Date: 11/21/01 10:00:00 AM Date Received: 11/21/01

Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	2 σ Counting Error (pCi/L)	Total Error (pCi/L)	MDA (pCi/L)
SRW01	SR-90	SCAQC-2695-PB	0.305	0.352	0.353	0.572

Quality Control Samples				
Radionuclide	Laboratory Control (LC)	Laboratory Duplicate (LD)	Matrix Spike (MS)	Preparation Blank (PB)
Sr	SCAQC-2695-LC1	SCAQC-2695-LD1		SCAQC-2695-PB

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Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: V1349

Project Name: Bechtel Nevada
Matrix: Soil
Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/g)	(OV) Laboratory Control Sample Activity (pCi/g)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
SRW01	SR-90	SCAQC-2694-LC1	666 ± 43.3	633 ± 84.9	96.2	0.445

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
SRW01	SR-90	SCAQC-2694-LD1	-0.043 ± 0.256	0.533 ± 0.324	0.577	1.39

Laboratory Contol Sample (PB) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	MDA (pCi/g)	RDL (pCi/g)	All Samples Detected	All Samples > RDL	All Samples < RDL	Accept PB
SRW01	SR-90	SCAQC-2694-PB	0.009	0.234	1.00	No	No	Yes	Yes

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample Evaluation

Report Identification Number: V1349

Project Name: Bechtel Nevada
Matrix: Water
Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (pCi/L)	(OV) Laboratory Control Sample Activity (pCi/L)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
SRW01	SR-90	SCAQC-2695-LC1	1730 ± 86.6	1670 ± 170	96.3	0.440

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/L)	Duplicate Sample Activity (pCi/L)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
SRW01	SR-90	SCAQC-2695-LD1	0.069 ± 0.750	0.747 ± 0.777	0.678	0.628

Laboratory Contol Sample (PB) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/L)	MDA (pCi/L)	RDL (pCi/L)	All Samples Detected	All Samples > RDL	All Samples < RDL	Accept PB
SRW01	SR-90	SCAQC-2695-PB	0.305	0.572	1.00	No	No	Yes	Yes

1000 Montcastle Court * Montgomery, Alabama * 36117 * 334.272.2294 * FAX 334.213.0407

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Chemical Recovery

Report Identification Number: V1349

Project Name: Bechtel Nevada

Laboratory Code: SCA

Laboratory Sample ID	Sr-90
NTS01-2694-01	92.01
NTS01-2694-01	92.01
NTS01-2694-02	100.69
NTS01-2694-02	100.69
NTS01-2694-03	92.01
NTS01-2694-03	92.01
NTS01-2694-04	95.49
NTS01-2694-04	95.49
NTS01-2694-05	98.09
NTS01-2694-05	98.09
NTS01-2694-06	102.43
NTS01-2694-06	102.43
NTS01-2695-01	86.81
NTS01-2695-01	86.81
SCAQC-2694-LC1	90.28
SCAQC-2694-LC1	90.28
SCAQC-2694-LD1	92.88
SCAQC-2694-LD1	92.88
SCAQC-2694-PB	90.28
SCAQC-2694-PB	90.28
SCAQC-2695-LC1	85.07
SCAQC-2695-LC1	85.07
SCAQC-2695-LD1	90.28
SCAQC-2695-LD1	90.28
SCAQC-2695-PB	85.94
SCAQC-2695-PB	85.94

Bechtel Nevada

ANALYTICAL SERVICES LABORATORY

SERVICES REQUEST & CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT/ CLIENT INFORMATION

Project: CAU 143 | BN Org#: 2156
Charge No.: 58030 | ASL Prog.:
Project Manager: Wayne Johnson
Phone: 295-0573 | Fax: 295-7761 | MS: NTS 306

REPORT INFORMATION

Send Report to: Ogn Tobiason
Phone: 215-6165 | Fax: 295-7761 | MS: NTS 306
Turnaround: ( ) Standard - 30 days Non-rad, 60 Days Rad, Other: ____
(X) Rush Preliminary by: 01-14-02 Final by: ____
Final report format: (X) Standard ( ) NTS-WAC ( ) Other: ____

SAMPLE INFORMATION

Sampling Site: R-MAD Waste Trenches
The samples submitted contain (check):
( ) Hazardous ( ) Radioactive (X) Unknown contamination. If known, attach a brief narrative summary identifying contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

LAB USE ONLY

Rad SDG: | Non-Rad SDG: V1388
Rad Packet: | Non-Rad Packet:
Client Services Representative:

Will these analyses be performed under a signed SOW? ( ) YES ( ) NO
If so, do analyses entered here agree with the SOW? ( ) YES ( ) NO ( ) N/A
If not, identify the variation ____
CSR initials indicating review and approval: ____ Date: ____

ANALYSES & METHOD

Pb total

ITEM	ID / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	
0	CAU143Pb-V001	1/9/02	11:52	soil	X
1	CAU143Pb-V002	1/9/02	11:54	soil	X
2	CAU143Pb-V003	1/9/02	11:55	soil	X
3	CAU143Pb-V004	1/9/02	11:57	soil	X
4	CAU143Pb-V005	1/9/02	11:59	soil	X
5	CAU143Pb-V006	1/9/02	12:02	soil	X
6	CAU143Pb-V006D	1/9/02	12:02	soil	X
7	-LAST ITEM-				
8					
9					

SAMPLE RECEIPT INFORMATION

Are all sample containers received intact (X) Yes ( ) No
Comments: ____

Do the labels agree with this form? (X) Yes ( ) No
Comments: ____

Was a Material Clearance Tag submitted? (X) Yes ( ) No
Comments: ____

COMMENTS
(Preservative, size/volume, MS/MSD, special analysis, rad matrix code, count time, etc.)

1-250mL wide mouth clear jar
1- "
1- "
1- "
1- "
1- " Run duplicate
Site was checked and no radioactivity was seen. not expected in samples

Transfer of samples submitted for analyses

Sampled/Relinquished (Signature/Organization)	DATE / TIME	Received by (Signature/Organization)
Kay Kyger, BN	1-9-02/1253	CA Castanon

Complete for samples shipped to an OFF-SITE Subcontract Laboratory LIONVILLE

Relinquished (BN Representative Signature)	DATE / TIME	Received (Courier & Tracking Info.)
Relinquished (Courier & Tracking Info.)	DATE / TIME	Received (1st tier Subcontractor Rep)
Relinquished (1st tier Subcontractor Rep)	DATE / TIME	Received (2nd tier Subcontractor Rep)

Distribution: Original - To be retained by laboratory performing final analysis
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BN-0732 (02/98)

U.S. EPA

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

ab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___

ab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.:V01___

OW No.: SW846

EPA Sample No.	Lab Sample ID
V01	0201L765-001
V02	0201L765-002
V03	0201L765-003
V03D	0201L765-003D
V03S	0201L765-003S
V04	0201L765-004
V05	0201L765-005
V06	0201L765-006
V06D	0201L765-007

ere ICP interelement corrections applied ? Yes/No YES

ere ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO

omments:

certify that this data package is in compliance with the terms and nditions of the contract, both technically and for completeness, for her than the conditions detailed above. Release of the data contained this hardcopy data package and in the computer-readable data submitted floppy diskette has been authorized by the Laboratory Manager or the nager's designee, as verified by the following signature.

ignature: [signature] Name: Patricia E Feldman

te: 01-16-02 Title: Data Mgt Unit Leader

COVER PAGE - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V01

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_ Lab Sample ID: 0201L765-00
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _97.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	3.4		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V01

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V02

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_ Lab Sample ID: 0201L765-002
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	81.0		*	P

olor Before: _____ Clarity Before: _____ Texture: _____
olor After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V02

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V03

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_ Lab Sample ID: 02011765-0C_
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _97.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	3.4		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V03

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V04

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_ Lab Sample ID: 0201L765-004
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _96.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	328		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V04

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V05

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_ Lab Sample ID: 0201L765-003
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _96.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	292		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V05

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V06

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI__ Case No.: V1388 SAS No.: _____ SDG No.: V01__
Matrix (soil/water): SOIL_ Lab Sample ID: 0201L765-006
Level (low/med): LOW__ Date Received: 01/11/02
% Solids: _97.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	22.8		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V06

FORM I - IN

U.S. EPA

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

V06D

Lab Name: LIONVILLE_LABORATORY_____ Contract: 60052-1___
Lab Code: LVLI___ Case No.: V1388 SAS No.: _____ SDG No.: V01___
Matrix (soil/water): SOIL_
Level (low/med): LOW__
% Solids: _96.9

Lab Sample ID: 0201L765-07
Date Received: 01/11/02

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	16.4		*	P

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CAU143PB-V06D

FORM I - IN

APPENDIX C

CAU 143 GLOBAL POSITIONING SYSTEM COORDINATES FOR GEOPHYSICS MARKINGS

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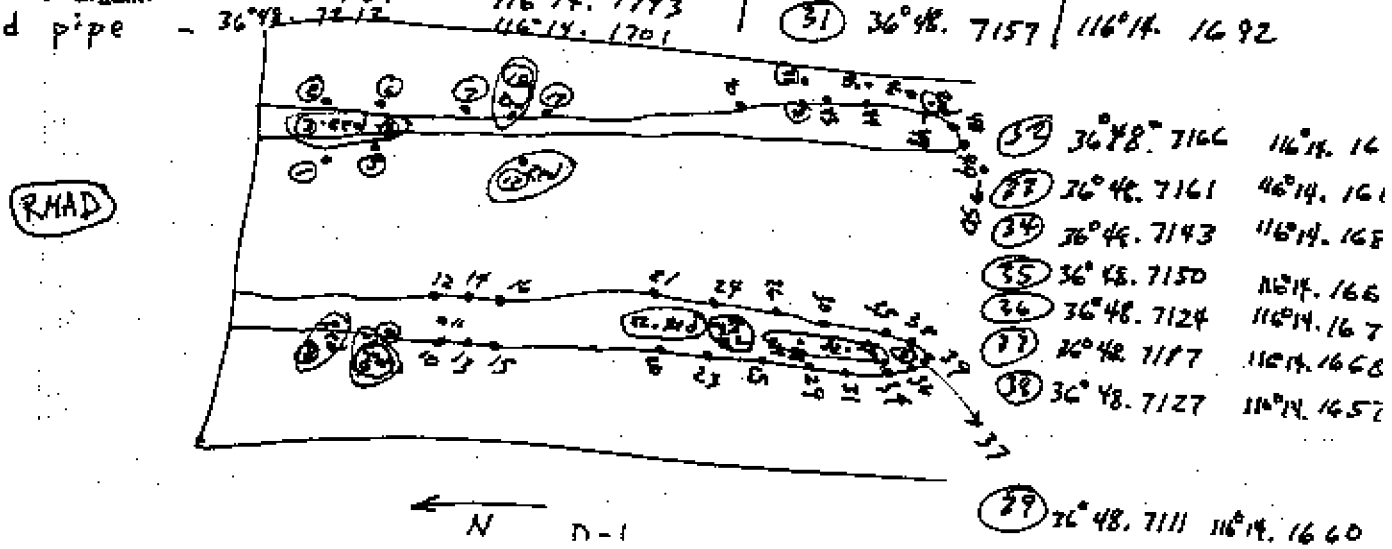
CAU 143 GPS Coordinates for Geophysics Markings

		N	W	Elevation
	①	36° 48. 7502	116° 14. 1857	1168. 50
	②	36° 48. 7507	116° 14. 1744	
Red	③	36° 48. 7496	116° 14. 1747	
Red	④	36° 48. 7486	116° 14. 1742	
	⑤	36° 48. 7475	116° 14. 1746	
	⑥	36° 48. 7473	116° 14. 1731	
	⑦	36° 48. 7407	116° 14. 1703	
Red	⑧	36° 48. 7391	116° 14. 1764	
	⑨	36° 48. 7363	116° 14. 1763	
	⑩	36° 48. 7343	116° 14. 1778	
	⑪	36° 48. 7346	116° 14. 1770	
	⑫	36° 48. 7350	116° 14. 1763	
	⑬	36° 48. 7334	116° 14. 1769	
	⑭	36° 48. 7341	116° 14. 1754	
	⑮	36° 48. 7324	116° 14. 1762	
	⑯	36° 48. 7330	116° 14. 1749	
		6ft high drain pipe - 36° 48. 7439	116° 14. 1789	
		open ended 8" diameter - 36° 48. 7437	116° 14. 1793	
		rad pipe - 36° 48. 7212	116° 14. 1701	

		N	W
	⑰	36° 48. 7337	116° 14. 170
Red	⑱	36° 48. 7346	116° 14. 168
	⑲	36° 48. 7343	116° 14. 1683
	⑳	36° 48. 7234	116° 14. 1714
	㉑	36° 48. 7239	116° 14. 1702
Red	㉒	36° 48. 7232	116° 14. 1703
	㉓	36° 48. 7225	116° 14. 1706
	㉔	36° 48. 7231	116° 14. 1692
	㉕	36° 48. 7196	116° 14. 1706
	㉖	36° 48 7200	116° 14. 1689
	㉗	36° 48 7193	116° 14. 1693
	㉘	36° 48. 7186	116° 14. 1689
	㉙	36° 48. 7176	116° 14. 1699
	㉚	36° 48. 7182	116° 14. 1680
	㉛	36° 48. 7157	116° 14. 1692



	㉜	36° 48. 7166	116° 14. 16
	㉝	36° 48. 7161	116° 14. 161
	㉞	36° 48. 7143	116° 14. 168
	㉟	36° 48. 7150	116° 14. 166
	㊱	36° 48. 7124	116° 14. 167
	㊲	36° 48. 7117	116° 14. 1668
	㊳	36° 48. 7127	116° 14. 1657
	㊴	36° 48. 7111	116° 14. 1660

	N	W
(40)	36° 48. 7230	116° 14. 1639
(41)	36° 48. 7207	116° 14. 1625
(42)	36° 48. 7211	116° 14. 1605
(43)	36° 48. 7205	116° 14. 1617
(44)	36° 48. 7185	116° 14. 1612
(45)	36° 48. 7186	116° 14. 1598
(46)	36° 48. 7143	116° 14. 1588
Red (47)	36° 48. 7138	116° 14. 1583
(48)	36° 48. 7118	116° 14. 1581
(49)	36° 48. 7106	116° 14. 1580
(50)	36° 48. 7095	116° 14. 1601

APPENDIX D

CAU 143 RADIATION SURVEY REPORTS

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Bechtel Nevada

RADIATION SURVEY REPORT

Number 23688 Page 1 of 1

RCT(S): Ole Peterson | SIGNATURE: | DATE: 11-7-01

HEALTH PHYSICIST: C. Lyons / C. Lyons 11-8-01 | SUPERVISOR: P. Worley | EVENT/ RWP NO: N/A | PROJECT / WORK ORDER: CAU 143

COUNTING EQUIPMENT USED IN COLUMN	COUNTING EQUIPMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN 1 + 2	INSTRUMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
INSTRUMENT / NUMBER	INSTRUMENT / NUMBER	INSTRUMENT / NUMBER: Electra 1193	INSTRUMENT USED IN COLUMN N/A	INSTRUMENT USED IN COLUMN N/A
ALPHA EFFICIENCY N / BETA EFFICIENCY A	ALPHA EFFICIENCY N / BETA EFFICIENCY A	COUNTING EQUIPMENT USED IN COLUMN N/A	COUNTING EQUIPMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
MDA	MDA	INSTRUMENT / NUMBER	INSTRUMENT / NUMBER	INSTRUMENT / NUMBER
CONVERSION FACTOR	CONVERSION FACTOR	ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? N/A ☐ YES ☐ NO		
COUNT TIME	COUNT TIME			

PURPOSE: Survey of Material at 143

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1 α☒ β☐ γ☐ OTHER UNIT dpm/100cm² FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 2 α☐ β☒ γ☐ OTHER UNIT dpm/100cm² FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 3 α☐ β☐ γ☐ OTHER UNIT FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 4 α☐ β☐ γ☐ OTHER UNIT FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 5 α☐ β☐ γ☐ OTHER UNIT FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐
1500	**BACKGROUND** (Gross)	N/A	0.0	1900			
	Mis. Fence Posts	20	0.0	150			
	Mis. Signs metal	10	0.0	150			
	Metal Frame	10	0.0	300		N/A	
	Last Item						
			N/A				

COMMENTS: None

FOLLOW UP REQUIRED? YES ☐ NO ☑ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

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Bechtel Nevada RADIATION SURVEY REPORT Number 23678 Page 1 of 1

RCT(S): Ole Petersen Withers | SIGNATURE: [illegible] | DATE: [illegible]

HEALTH PHYSICIST: [illegible] 12-18-01 | SUPERVISOR: P. Warren | EVENT/RWP NO: N/A | PROJECT / WORK ORDER: CAU [illegible]

COUNTING EQUIPMENT USED IN COLUMN		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN 1, 2		INSTRUMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT [illegible]	NUMBER 3376	INSTRUMENT USED IN COLUMN N/A	INSTRUMENT USED IN COLUMN N/A
ALPHA EFFICIENCY N/A	BETA EFFICIENCY	ALPHA EFFICIENCY N/A	BETA EFFICIENCY	COUNTING EQUIPMENT USED IN COLUMN N/A		COUNTING EQUIPMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
MDA	MDA	MDA	MDA	INSTRUMENT	NUMBER N/A	INSTRUMENT NUMBER	INSTRUMENT NUMBER
CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR				
COUNT TIME		COUNT TIME					

ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? ☐ YES ☒ NO

PURPOSE: Investigation of a Fuel Particle

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1 α ☐ β ☒ γ ☒ OTHER; UNIT: [illegible]; N/A ☒	COLUMN 2 α ☐ β ☐ γ ☒ OTHER; UNIT: [illegible]; N/A ☒	COLUMN 3 α ☐ β ☐ γ ☐ OTHER; UNIT	COLUMN 4 α ☐ β ☐ γ ☐ OTHER; UNIT	COLUMN 5 α ☐ β ☐ γ ☐ OTHER; UNIT
0900	**BACKGROUND** (Gross)	1	0	0			
1100	Contact	1	250	10			
1200	@ 30 cm	1	10	0.4			
	Count Time					N/A	
	N/A						

COMMENTS: Fuel 1" ½ dia [illegible] 5.5 grams Note: Particle [illegible] a [illegible] <0.2 [illegible] @ 1530. [illegible]

Colorado [illegible]

FOLLOW UP REQUIRED? YES ☐ NO ☒ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

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Bechtel Nevada

RADIATION SURVEY REPORT

Number 23677 Page 1 of 4

RCT(S): Ole Peterson Wishon

SIGNATURE: [illegible]

HEALTH PHYSICIST: C. Lyons / C. Hynn [illegible]

SUPERVISOR: [illegible]

EVENT/ RWP NO: N/A

DATE: 12-[illegible]

PROJECT / WORK ORDER: [illegible]

COUNTING EQUIPMENT USED IN COLUMN		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN 1, 2		INSTRUMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN	
INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT RO-20	NUMBER 3376	INSTRUMENT USED IN COLUMN N/A		INSTRUMENT USED IN COLUMN N/A	
ALPHA EFFICIENCY N	BETA EFFICIENCY A	ALPHA EFFICIENCY N	BETA EFFICIENCY A	COUNTING EQUIPMENT USED IN COLUMN N/A		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN	
MDA	MDA	MDA	MDA	INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT	NUMBER
CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR						
COUNT TIME		COUNT TIME							

ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? ☐ YES ☒ NO

PURPOSE: Characterize Rad Material For Removal from Controlled Area

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1 α ☐ β ☐ γ ☒ OTHER; UNIT mR/hr; FIXED + REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 2 α ☐ β ☒ γ ☒ OTHER; UNIT mrad/hr; FIXED + REMOVE ☒ SWIPE ☐ N/A ☐	COLUMN 3 α ☐ β ☐ γ ☐ OTHER; UNIT; FIXED + REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 4 α ☐ β ☐ γ ☐ OTHER; UNIT; FIXED + REMOVE ☐ SWIPE ☐ N/A ☐	COLUMN 5 α ☐ β ☐ γ ☐ OTHER; UNIT; FIXED + REMOVE ☐ SWIPE ☐ N/A ☐
1515	**BACKGROUND** (Gross)	N/A	-0-	-0-			
1600	Contact Particles (5 total)	1	4.0	500			
↓	@ 20 cm	1	<0.2	8.0			
	Last Item						
	N/A					N/A	

COMMENTS: 5 total bagged and put into pig @ RMAD WAC. Column 2 open window Reading; <0.2 mR/hr @ contact C.R.R.

FOLLOW UP REQUIRED? YES ☐ NO ☒

ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

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Bechtel Nevada — RADIATION SURVEY REPORT

Number 23689 Page 1 of 1

RCT(S): Ole Peterson | SIGNATURE: | DATE: 12-19-01

HEALTH PHYSICIST: C. Lyons 12-19-01 | SUPERVISOR: P. Worley | EVENT/ RWP NO: N/A | PROJECT / WORK ORDER: CAU 143

COUNTING EQUIPMENT USED IN COLUMN		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN 1 + 2	INSTRUMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT Electra	NUMBER 3590	INSTRUMENT USED IN COLUMN N/A	INSTRUMENT USED IN COLUMN N/A
ALPHA	BETA	ALPHA	BETA	COUNTING EQUIPMENT USED IN COLUMN N/A		COUNTING EQUIPMENT USED	INSTRUMENT USED IN COLUMN
EFFICIENCY N/A	EFFICIENCY N/A	EFFICIENCY N/A	EFFICIENCY N/A	INSTRUMENT	NUMBER	INSTRUMENT NUMBER	INSTRUMENT NUMBER
MDA	MDA	MDA	MDA				
CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR	CONVERSION FACTOR	ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? N/A ☐ YES ☐ NO			
COUNT TIME		COUNT TIME					

PURPOSE: Survey for Release to landfill

	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
	α ☑ β ☐ γ ☐ OTHER	α ☐ β ☑ γ ☐ OTHER	α ☐ β ☐ γ ☐ OTHER	α ☐ β ☐ γ ☐ OTHER	α ☐ β ☐ γ ☐ OTHER
UNIT	dpm/100cm²	dpm/100cm²	UNIT	UNIT	UNIT
	FIXED + ☑ REMOVE ☐ SWIPE ☐ N/A	FIXED + ☑ REMOVE ☐ SWIPE ☐ N/A	FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A	FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A	FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A

TIME	DESCRIPTION OF SURVEY	No. of Points		
1545	**BACKGROUND** (Gross)	N/A	93.3	2100
1550	Metal Frame	1	0.0	6000
↓	↓	1	0.0	11,000
↓	↓	1	0.0	7000
	Last Item			
	N/A			

COMMENTS: Luggers Posted RMA

FOLLOW UP REQUIRED? YES ☑ NO ☐ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

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Bechtel Nevada — RADIATION SURVEY REPORT

Number 02-A25-023 Page 1 of 3 4

RCT(S): Ole Peterson	SIGNATURE:	DATE: 1-17-02	
HEALTH PHYSICIST: C. Lyons	SUPERVISOR: P. Worley R. Mueller KCA	EVENT/ RWP NO: N/A	PROJECT / WORK ORDER: CAU 143

COUNTING EQUIPMENT USED IN COLUMN 1 + 2		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN 3 + 4		INSTRUMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN	
INSTRUMENT: Tennelec	NUMBER: 7942737	INSTRUMENT	NUMBER	INSTRUMENT: Electra	NUMBER: 3582	INSTRUMENT USED IN COLUMN N/A		INSTRUMENT USED IN COLUMN N/A	
ALPHA	BETA	ALPHA	BETA	COUNTING EQUIPMENT USED IN COLUMN N/A		COUNTING EQUIPMENT USED IN COLUMN		INSTRUMENT USED IN COLUMN	
EFFICIENCY .313	EFFICIENCY .438	EFFICIENCY N/A	EFFICIENCY	INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT	NUMBER
MDA 1.68	MDA 3.94	MDA	MDA						
CONVERSION FACTOR N/A	CONVERSION FACTOR N/A	CONVERSION FACTOR	CONVERSION FACTOR						
COUNT TIME 1min		COUNT TIME							

ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? ☒ YES ☐ NO

PURPOSE: Survey of Roll off Boxes (lead Soil from CAU 143)

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1 α☐ β☐ γ☐ OTHER UNIT dpm/100cm² FIXED + ☐ REMOVE ☐ SWIPE ☒ N/A ☐	COLUMN 2 α☐ β☒ γ☐ UNIT dpm/100cm² FIXED + ☐ REMOVE ☐ SWIPE ☒ N/A ☐	COLUMN 3 α☒ β☐ γ☐ UNIT dpm/100cm² FIXED + ☐ REMOVE ☒ SWIPE ☐ N/A ☐	COLUMN 4 α☐ β☒ γ☐ UNIT dpm/100cm² FIXED + ☐ REMOVE ☒ SWIPE ☐ N/A ☐	COLUMN 5 α☐ β☐ γ☐ UNIT FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A ☐
0800	**BACKGROUND** (Gross)	N/A	0.1	1.1	42.4	2063	
0845	B 929 1-10 see map	10	2.87	11.15	47.3	175	
0855	B 1116 11-20 see map	10	6.06	15.72	18.2	342	
	B 951 21-30 see map	10	2.87	29.42	12.1	321	N/A
	Last Item						
	N/A						

COMMENTS: none

FOLLOW UP REQUIRED? YES ☐ NO ☒ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

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BN-0106a 10/98

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Bechtel Nevada — RADIATION SURVEY REPORT

Number 02-A25-033 Page 1 of 3

RCT(S): Ole Petersen	SIGNATURE:	DATE: 1-22-02	
HEALTH PHYSICIST: C. Lyons	SUPERVISOR: K. McNeil	EVENT/ RWP NO: N/A	PROJECT / WORK ORDER: CAU 143

COUNTING EQUIPMENT USED IN COLUMN	1 + 2			INSTRUMENT USED IN COLUMN	3 + 4		
INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT	NUMBER	INSTRUMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
Tennelec	7842737			Eberline	2124	N/A	N/A
ALPHA	BETA	ALPHA	BETA	COUNTING EQUIPMENT USED IN COLUMN	N/A	COUNTING EQUIPMENT USED IN COLUMN	INSTRUMENT USED IN COLUMN
EFFICIENCY 0.313	EFFICIENCY 0.438	EFFICIENCY N/A	EFFICIENCY N/A	INSTRUMENT	NUMBER	INSTRUMENT NUMBER	INSTRUMENT NUMBER
MDA 1.68	MDA 3.94	MDA	MDA				
CONVERSION FACTOR N/A	CONVERSION FACTOR N/A	CONVERSION FACTOR	CONVERSION FACTOR				
COUNT TIME 1 min	1 min	COUNT TIME					

ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? ☑ YES ☐ NO

PURPOSE: Survey of (Empty) Rolloff Boxes

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1 α☒ β☐ γ☐ OTHER	COLUMN 2 α☐ β☒ γ☐ OTHER	COLUMN 3 α☒ β☐ γ☐ OTHER	COLUMN 4 α☐ β☒ γ☐ OTHER	COLUMN 5 α☐ β☐ γ☐ OTHER
			UNIT dpm/100cm² FIXED + REMOVE ☐ SWIPE ☒ N/A ☐	UNIT dpm/100cm² FIXED + REMOVE ☐ SWIPE ☒ N/A ☐	UNIT dpm/100cm² FIXED + REMOVE ☒ SWIPE ☐ N/A ☐	UNIT dpm/100cm² FIXED + REMOVE ☒ SWIPE ☐ N/A ☐	UNIT FIXED + REMOVE ☐ SWIPE ☐ N/A ☐
0850	**BACKGROUND** (Gross)	N/A	0.1	1.1	38.2	2169	
0900	B544 (see map)	10	0.0	15.82	14.2	0.0	
	Last Item						
							end
		N/A					

COMMENTS: none

FOLLOW UP REQUIRED? YES ☐ NO ☒ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

DISTRIBUTION: Original - NSO Records Center MS 456
Copy - CPB MS 4

BN 0108-(01/98)

Bechtel Nevada — RADIATION SURVEY REPORT

Number 02-A25-052 Page 1 of 2

RCT(S): Michael Withers, Ole Peterson	SIGNATURE:		DATE: 1-28-02
HEALTH PHYSICIST: Craig Lyons	SUPERVISOR:	EVENT / RWP NO: N/A	PROJECT / WORK ORDER: CAU 143

COUNTING EQUIPMENT USED IN COLUMN NA	COUNTING EQUIPMENT USED IN COLUMN NA	INSTRUMENT USED IN COLUMN 1	INSTRUMENT USED IN COLUMN NA	INSTRUMENT USED IN COLUMN NA
INSTRUMENT NA / NUMBER NA	INSTRUMENT NA / NUMBER NA	INSTRUMENT Fidler / NUMBER 000698	INSTRUMENT USED IN COLUMN NA	INSTRUMENT USED IN COLUMN NA
ALPHA: EFFICIENCY NA, MDA NA, CONVERSION FACTOR NA, COUNT TIME NA	BETA: EFFICIENCY NA, MDA NA, CONVERSION FACTOR NA	ALPHA: EFFICIENCY NA, MDA NA, CONVERSION FACTOR NA, COUNT TIME NA	BETA: EFFICIENCY NA, MDA NA, CONVERSION FACTOR NA	COUNTING EQUIPMENT USED IN COLUMN NA	COUNTING EQUIPMENT USED IN COLUMN NA	INSTRUMENT USED IN COLUMN NA
				INSTRUMENT NA / NUMBER NA	INSTRUMENT NA / NUMBER NA	INSTRUMENT NA / NUMBER NA

PURPOSE: ~~Release and postings of contamined waste dump remediation in A25~~

ALL READINGS MEET UNRESTRICTED RELEASE LIMITS? ☐ YES ☒ NO

	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
	α ☐ β ☐ γ ☒ OTHER	α ☐ β ☐ γ ☐ OTHER NA	α ☐ β ☐ γ ☐ OTHER NA	α ☐ β ☐ γ ☐ OTHER NA	α ☐ β ☐ γ ☐ OTHER NA
	UNIT cps; FIXED + ☐ REMOVE ☐ SWIPE ☒ N/A	UNIT NA; FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A	UNIT NA; FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A	UNIT NA; FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A	UNIT NA; FIXED + ☐ REMOVE ☐ SWIPE ☐ N/A

TIME	DESCRIPTION OF SURVEY	No. of Points	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
------	**BACKGROUND** (Gross)	———	--------	NA	NA	NA	NA
0800	See attached map for survey results and locations	———	90-1.5M	NA	NA	NA	NA
	Last item	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA

COMMENTS:

Walk-over survey performed over several days of the contaminated waste dump in A25. All reading are gross counts.

FOLLOW UP REQUIRED? YES ☐ NO ☒ ALL READINGS ARE NET ABOVE BACKGROUND UNLESS NOTED

DISTRIBUTION: Original - HPD Records Center M/S 450; Copy - HPD CP6-872 File, M/S 450; Copy - Requesters Copy

BN-0108a (01/98)

B-7

APPENDIX E

CAU 143 USE RESTRICTION INFORMATION

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CAU Use Restriction Information

CAU Number/Description: **CAU 143: Area 25 Contaminated Waste Dumps**

Applicable CAS Numbers/Descriptions: **CAS 25-23-09Contaminated Waste Dump#1; and CAS 25-23-03, Contaminated Waste Dump#2**

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

Surveyed Area (UTM coordinates; Zone 11, NAD 27): **R-MAD and E-MAD**

The site is defined by the following NAD 27 coordinates:

R1 36.488473, -116.141429 4074328.21-Northing 568248.56-Easting - R-MAD

R2 36.488263, -116.141168 4074289.70-Northing 568287.67-Easting - R-MAD

R3 36.488096, -116.140620 4074259.47-Northing 568369.38-Easting - R-MAD

R4 36.487394, -116.140323 4074130.04-Northing 568414.57-Easting - R-MAD

R5 36.486956, -116.142033 4074047.02-Northing 568161.01-Easting - R-MAD

R6 36.487772, -116.142550 4074197.28-Northing 568082.95-Easting - R-MAD

R7 36.487952, -116.141854 4074231.38-Northing 568186.15-Easting - R-MAD

R8 36.488409, -116.142046 4074315.65-Northing 568156.94-Easting - R-MAD

R9 36.488461, -116.141838 4074325.51-Northing 568187.58-Easting - R-MAD

R10 36.488378, -116.141555 4074310.50-Northing 568229.97-Easting - R-MAD

R11 36.482823, -116.184032 4073235.34-Northing 561923.02-Easting - E-MAD

R12 36.482808, -116.183921 4073232.68-Northing 561939.55-Easting - E-MAD

R13 36.482676, -116.183952 4073208.24-Northing 561935.11-Easting - E-MAD

R14 36.482695, -116.184068 4073211.63-Northing 561917.84-Easting - E-MAD

Survey Date: **February 5, 2002** Survey Method (GPS, etc.): **GPS**

Site Monitoring Requirements: **Visual Inspections**

Required Frequency (quarterly, annually?): **Annually**

If Monitoring Has Started, Indicate Last Completion Date: **N/A**

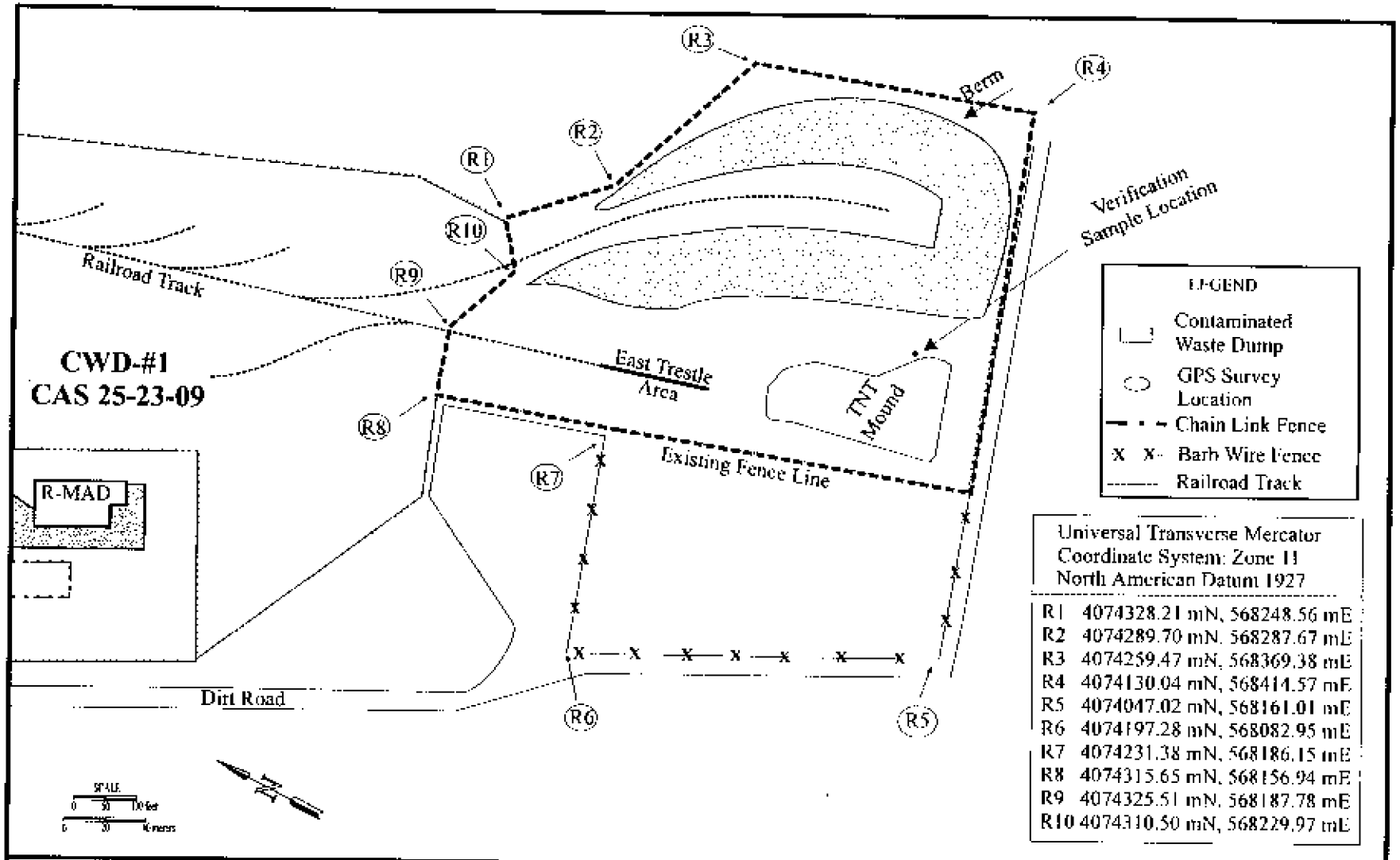
Use Restrictions

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.

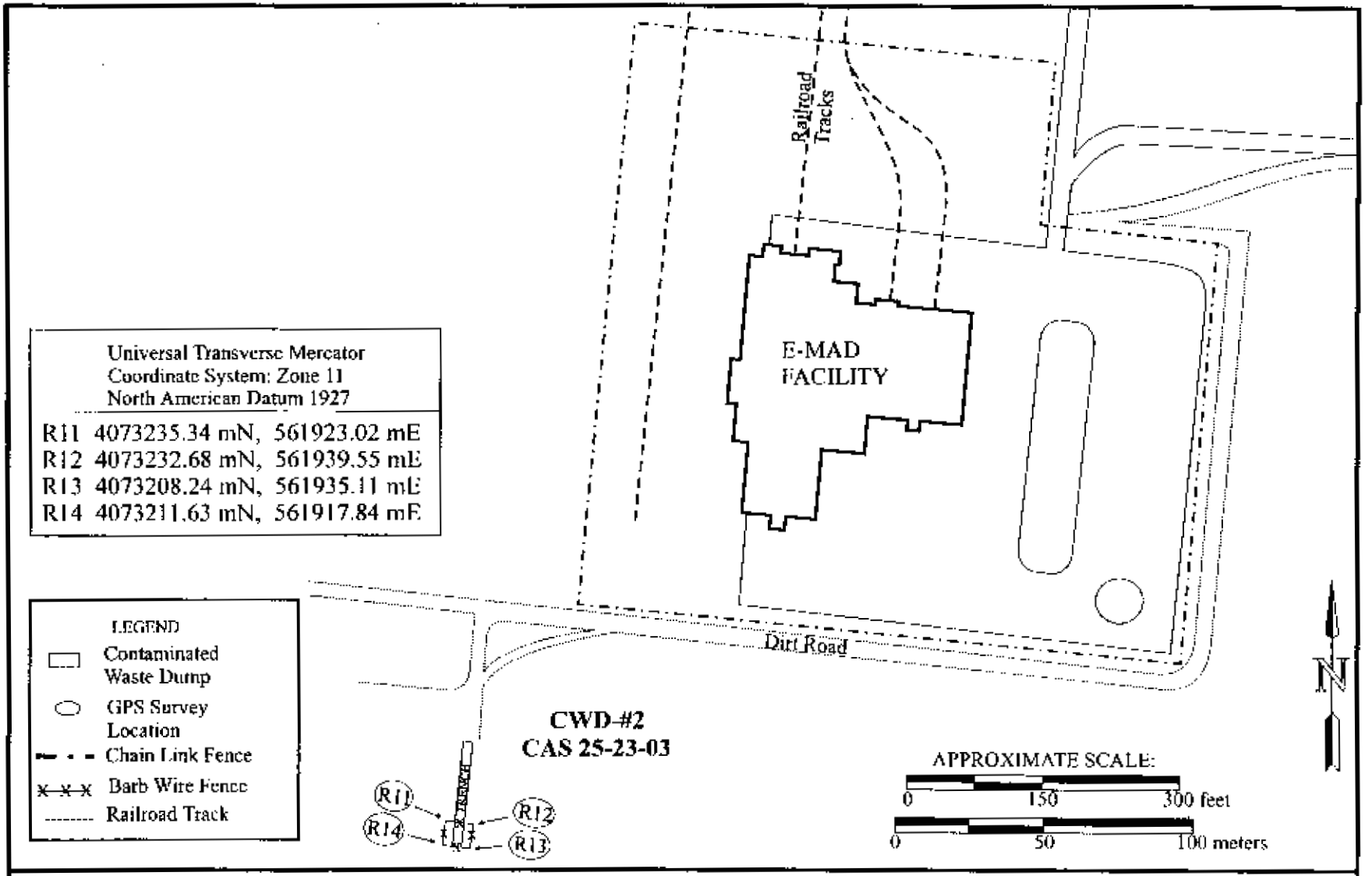
Comments: See the Closure Report for additional information on the condition of the site and any inspection requirements.

Submitted By: _____ **Date:** 3/8/02

Attachments: Survey Map:
CAU Files (2 copies)



CORRECTIVE ACTION UNIT 143: AREA 25 CONTAMINATED WASTE DUMP #1, CAS 25-23-03
R-MAD WASTE DUMP SITE USE RESTRICTION SURVEY COORDINATES
NEVADA TEST SITE, NEVADA



CORRECTIVE ACTION UNIT 143: AREA 25 CONTAMINATED WASTE DUMP #2, CAS 25-23-03
E-MAD WASTE DUMP SITE USE RESTRICTION SURVEY COORDINATES
NEVADA TEST SITE, NEVADA

APPENDIX F

CAU 143 WASTE DISPOSITION DOCUMENTATION

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#11676

Bechtel Nevada **NTS Landfill Load Verification**

(Waste definitions are available on page 2)

SWO USE (Circle One Area) AREA 23 6 9 LANDFILL

For waste characterization, approval, and/or assistance, contact Solid Waste Operation (SWO) at 5-7585.

REQUIRED: WASTE GENERATOR INFORMATION

(This form is for cutoffs, dump trucks, and other onsite disposal of materials.)

Waste Generator: Paul Brown Phone Number: 295-4891

Location / Origin: Area 25 / CAU-143 Contaminated Waste Trenches

Waste Category: (check one)		☐ Commercial	☒ Industrial	
Waste Type: (check one)	☐ NTS	☐ Putrescible	☒ RFACO-onsite	☐ WAC Exception
	☐ Non-Putrescible	☐ Asbestos Containing Material	☐ RFACO-offsite	☐ Historic DOE/NV
Pollution Prevention Category: (check one)	☒ Environmental management	☐ Offsites Projects		
Pollution Prevention Category: (check one)	☒ Clean-Up	☐ Routine		
Method of Characterization: (check one)	☐ Sampling & Analysis	☒ Process Knowledge	☐ Combine	

Prohibited Waste at all three NTS landfills: Radioactive waste; RCRA waste; Hazardous waste; Free liquids; PCBs above TSCA regulatory levels; and Medical waste (needles, sharps, bloody clothing).

Additional Prohibited Waste at the Area 9 U10c Landfill: Sludge; Sludge; Animal carcasses; Wet garbage (food waste); and Friable asbestos

REQUIRED: WASTE CONTENTS ALLOWABLE WASTES

Check all allowable wastes that are contained within this load:

NOTE: Waste disposed at the Area 9 Hydrocarbon Landfill must have come into contact with petroleum hydrocarbons or coolants such as: gasoline (no kerosene, jet) jet fuel; diesel fuel; lubricants and hydraulics; kerosene; asphaltic petroleum hydrocarbons; and ethylene glycol.

Acceptable waste at any NTS landfill:

☐ Asphalt	☒ Metal	☒ Wood	☒ Soil	☐ Rubber (excluding tires)	☐ Empty containers	
☐ Plastic	☐ Wire	☒ Cable	☐ Cloth	☐ Insulation (non-Asbestos form)	☐ Demolition debris	
☐ Manufactured items: (ovens, coolers, furniture, rugs, carpet, electronic components, PPE, etc.)				☒ Paper	☒ Rocks / unaltered geologic materials	☐ Cement & concrete

Additional waste accepted at the Area 23 Mercury Landfill: ☐ Office waste ☐ Food Waste ☐ Animal Carcasses

☐ Asbestos: ☐ Friable ☐ Non-Friable (contact SWO if regulated load) Quantity: _____

Additional waste accepted at the Area 9 U10c Landfill:

☐ Non-friable asbestos	☐ Drained automobiles and military vehicles	☐ Solid fractions from sand/oil/water separators
☐ Light ballasts (contact SWO)	☐ Drained fuel filters (gas & diesel)	☐ Decommed Underground and Above Ground Tanks
☐ Hydrocarbons (contact SWO)		

Additional waste accepted at the Area 9 Hydrocarbon Landfill:

☐ Septic sludge ☐ Rags	☐ Drained fuel filters (gas & diesel)	☐ Crushed non-terne plated oil filters
☐ Plants	☐ Sludge from sand/oil/water separators	☐ PCBs below 50 parts per million

REQUIRED: WASTE GENERATOR SIGNATURE

Initials _____ *(if initialed, no radiological clearance is necessary.)*

The above mentioned waste was generated outside of a Controlled Waste Management Area (CWMA) and to the best of my knowledge, does not contain radiological materials.

To the best of my knowledge, the waste described above contains only the site. I have verified this through the waste characterization method identifi prohibited and allowable waste items.

Print Name: Craig Lyons

Signature: Craig Lyons Date: 12-19-01

Note: Food waste, office trash, and/or animal carcasses are considered not to co require a radiological clearance.

Radiation Survey Release for Waste Disposal

RWT Initials

☒ This container/load is free of external radioactive contamination.

☐ This container/load is exempt from survey due to process knowledge and origin.

☐ This container/load is free of radioactive contamination based on random survey.

SIGNATURE: Craig Lyons DATE: 12-19-01

SWO USE ONLY

Load Weight (net from scale or estimate): 1140 Signature of Certifier: Keith Kenyon

E-1

Nevada

LANDFILL DAILY ACCESS REGISTER (4) 1/22/02

DATE: 1-17-2 (check one) ☐ Area 9 - U10c ☐ Area 6 Hydrocarbon ☒ Area 23 Landfill

WASTE GENERATOR Name, Phone #	WASTE ORIGIN Area, Building	WASTE CODE*	TICKET NUMBER	NET WEIGHT (lbs)	TIME IN	TIME OUT	DRIVER Last Name, Initials
BN	CP Cafes	P	11670	640	7 45	8 00	Carlson
Paul Brown	A25 CAU 143	C	11676	1140	15:00	15:20	Kaczmarek, Keith
BN	CP Cafes	P	11680	1060	15 30	15 45	Carlson
BN	ALL	NP	11674	21,900	15 45	16 00	Carlson

*Waste Codes: ASB - Asbestos; C - Construction; H - Hydrocarbon; P - Putrescible; NP - Non-Putrescible; S - Sewage Sludge; F - FFACO

INSPECTION INFORMATION

Site Conditions:

Do berms/walls need repair? ☐ No ☐ Yes

Does cover need repair / evidence of settling? ☐ No ☐ Yes

Does fence need repair? ☐ No ☐ Yes

Does road(s) need repair? ☐ No ☐ Yes

Has litter accumulated? ☐ No ☐ Yes

Has water accumulated? ☐ No ☐ Yes

Corrective Actions Needed:

Corrective Actions Taken: (description, name, date):

INSPECTED BY (date/time):

Random Load Inspection: Ticket Number: _____

☐ No prohibited waste was found

☐ Yes, the prohibited waste(s) identified below were found.

- ☐ Putrescible waste (prohibited in U10c and Area 6 Landfills).
- ☐ Hazardous waste per NAC 444.580
- ☐ PCB waste regulated by TSCA
- ☐ Waste containing free liquids
- ☐ TSCA-regulated
- ☐ Waste failing the "no added radioactivity" per the POC requirement.
- ☐ Friable asbestos (prohibited in U10c and Area 6 Landfills)
- ☐ Hydrocarbon soil at >100 ppm TPH (prohibited in 23, allowed in U10c provided less than 50 cubic yards/week are disposed)

Corrective Actions Taken: (description, name, date, who notified):

INSPECTED BY (date/time):

DAR-0017 (12/00)

Actions Edit Records Fields Keyboard Query Windows Help

Landfill ID	Date Of Receipt	Waste Category	Type Of Waste	EM or DP	Routine or Clean-up	Weight Pounds	Origin Of Waste: Area No.	Origin Of Waste: Building No.	
AREA 9	22-JAN-2002	I	NTS	DP	CLEAN-UP	16000	25	YMP	Comments
AREA 23	17-JAN-2002	I	FFACO-ONSITE	EM	CLEAN-UP	1140	25	CAU143	Comments
AREA 9	08-JAN-2002	I	NTS	DP	CLEAN-UP	38000	25	YMP	Comments
AREA 9	08-JAN-2002	I	NTS	DP	CLEAN-UP	29000	25	YMP	Comments
									Comments
									Comments
									Comments
									Comments
									Comments
									Comments

If you Save data, a report on records that have been changed today will be printed to your default printer when you Exit.

Bechtel Nevada | << | < | > | >> | Query | Save | Exit | Bechtel Nevada

Form 4

SK REFERENCE NO: 8031024

MATERIAL PROFILE

Safety-Kleen (SK) Use Only	If applicable, Intercompany Billing Facility #	Customer Number:	SK Line Of Business #:	Facility Profile #:

A. GENERATOR INFORMATION

☐ Check if Billing Information is same as Generator Information

Generator Name: Bechtel Nevada for USDOE
Billing Company: Bechtel Nevada
Facility Address (No P.O. Box): Nevada Test Site
Billing Address: P.O. Box 98521
City/State/Zip: Mercury, Nevada 89023
City/State/Zip: Las Vegas, NV 89193-8521
Technical Contact: Shannon Parsons-DePry
Billing Contact: Linda Fletcher
Phone: (702) 295-0645 Fax: (702) 295-4815
Phone: (702) 295-3173 Fax:
E-mail: Parsonsm@nv.doe.gov
Generator Location (If different from above):
SIC Code: 9711 ☐ CESQG ☐ SQG US EPA ID #: NV3890090001 State Generating ID #:

B. SHIPPING INFORMATION

☐ DOT Assistance Requested ☒ Check if SK Transportation Services are requested

US DOT Proper Shipping Name: RQ Hazardous waste, solid, n.o.s. (lead)
Hazard Class / Division #: 9 ID # (UN / NA): NA3077 Packing Group (PG): III RQ: Lead = 10 lb.

Non-Bulk Shipping Containers

Size	Steel	Poly	Fiber	Quantity & Frequency
___ Gal	☐	☐	☐	
___ Gal	☐	☐	☐	
___ Gal	☐	☐	☐	
___ Gal	☐	☐	☐	

Bulk Shipping Containers

Container Type	Quantity, Size & Frequency
☐ Yd.³ Box or ☐ Super Sack	
☐ Hard Top or ☒ Tarped Bin	4, 20 y - one time
☐ End Dump (Tarped) Trailer	
☐ Tank or ☐ Vacuum	

C. GENERAL MATERIAL & REGULATORY INFORMATION

Name of Material: Lead Contaminated Soil
Process Generating The Material: Site Remediation
Odor: ☒ None ☐ Mild ☐ Strong; Describe

Yes	No		Yes	No	
☐	☒	Regulated or Licensed Radioactive Waste	☐	☒	Meets LDR Standards or ☐ Partially Meets (Landfill Only)
☐	☒	Regulated Medical / Infectious Waste	☐	☒	Commingled Waste (2 or more hazardous wastes mixed as one)
☐	☒	Regulated Benzene NESHAP Waste	☐	☒	Sorbent Added; If Yes, Is sorbent biodegradable? ☐ Yes ☐
☐	☒	TSCA Regulated PCB Waste (List any PCB level in Sec.D)	☐	☒	Exempt Waste; If Yes, list reference, 40 CFR
☐	☒	Regulated Subpart CC Waste (VOs ≥ 500 ppm)	☐	☒	State Hazardous Waste; State Code
☐	☒	Regulated Ozone Depleting Substance	☒	☐	EPA Hazardous Waste
☐	☒	CERCLA Regulated (Superfund) Waste			EPA Waste Codes (including any LDR subcategories, e.g., D003 Water Reactive):
☐	☒	Hazardous Debris (Subject to alternative LDR treatment standards)			D008
☐	☒	Waste Contains UHCs/Constituents Of Concern			
		If Yes, list in ☐ Sec. D or ☐ Constituent Addendum			

EPA Haz Waste Only Origin Code: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ Source Code: A 69 Form Code: B 302 System Code: M

D. MATERIAL COMPOSITION

1. Chemical/Physical Constituents: List all detectable components by chemical name, including physical material, e.g., sorbent, debris.

Material Components & Composition	ppm	☐ wt % ☒ vol %	Material Components & Composition	ppm	☐ wt % ☐ vol %
soil, dirt, sand, rocks		50-80			
elemental lead pieces		20-50			
paper, rags, PPE, plastic		0-10			

Section D continues on the next page for Elemental Constituents * Range Total: >= 100 %

E-4

SAFETY-KLEEN MATERIAL PROFILE (continued):

SK REFERENCE NO: 8031024

Note: Completion of Sections D.2 & F is optional for: ☐ Analytical Profile (representative sample submitted; test results used to complete D.2 & F)

Completion of Sections D.2, E, & F is optional for: ☒ Standard Industry Profile (Safety-Kleen historical data utilized to complete D.2, E, & F)

D. MATERIAL COMPOSITION *(Continued)*

2. Elemental Constituents ☐ *Check if this waste contains No Detectable Elements / Metals, unless listed below.*

Check either: ☐ Total Analysis *or* ☐ TCLP Method *or* ☒ Generator Knowledge, then enter data below.

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	ppm
Aluminum		Cadmium		Fluorine		Nickel		Sodium	
Antimony		Chlorine		Lead	50k - 200k - 500k	Phosphorous		Sulfur	
Arsenic		Chromium		Lithium		Potassium		Thallium	
Barium		Cobalt		Manganese		Selenium		Titanium	
Beryllium		Copper		Mercury		Silicon		Vanadium	
Bromine		Iodine		Molybdenum		Silver		Zinc	

E. REACTIVE CHARACTERISTICS ☒ *Check if this waste exhibits No Reactive Characteristics*

Yes	No		Yes	No		Yes	No		
☐	☐	Explosive	☐	☐	Oxidizer	☐	☐	Reactive Cyanide	ppm
☐	☐	Shock Sensitive	☐	☐	Water Reactive	☐	☐	Reactive Sulfide	ppm
☐	☐	Pyrophoric	☐	☐	Air Reactive	☐	☐	Polymerizable	

Other Incompatibles; Describe

F. MATERIAL PHYSICAL CHARACTERISTICS @ 70 °F.

# of Phases	1	Color varies	Flash Point n/a °F (if < 73°F)	pH ☐ Liquids >20% H_2O *or* pH ☐ Non-Aqueous
Liquid %	0	Specific Gravity 2-3	☐ 73 - <100°F ☐ 100 - 141°F	☐ ≤ 2 pH ☒ > 2 - 4 pH ☒ > 4 - 10 pH
Sludge %	0	Viscosity cps	☐ 142°F. - <200°F ☐ ≥200°F	☒ > 10 - < 12.5 pH ☐ ≥ 12.5 pH
Solid %	100	Density	Boiling Point (if < 130°F)	BTU's / lb. or Range
Powder %	0	☐ lbs./ gal. ☐ lbs./ cu. ft.	Ash % (Bridgeport Only)	
Gas %	0	Comments		

G. GENERATOR PROFILE CERTIFICATION

I hereby certify that I am an authorized agent of the generator, and warrant on behalf of the generator that the information supplied on this form and on any attachments or supplements hereto is complete and accurate, and that all known or suspected hazards of the material(s) described herein have been disclosed. I agree that if the sample test results indicate a discrepancy with any information supplied on this form, that either Safety-Kleen or the generator may initiate further testing and evaluation in accordance with the terms and conditions of the contract between Safety-Kleen and the generator and that this profile certification may be amended accordingly.

Generator's Authorized Signature | *Troy S. Belka/ Senior Scientist* Name & Title (Printed or Typed) | 12 / 19 / 2001 Date

Comments

SK Use only ☐ SKOS ☐ SKVS ☐ Non-haz Evaluation ☐ Standard Industry Profile: SIP Index #

SK Sales Rep. Name | Employee # | Territory/Branch #

Process Approval # | Product Code or Part # | TRI Flowpath # | Pricing

Waste Approval & Certification

We certify acceptability of this waste stream and that all appropriate permits have been obtained, as indicated by Safety-Kleen's facility approval below:

SK Authorized Facility Signature | Name & Title (Printed or Typed) | Date

Received 1/29/02

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-95

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NV3890090001 — Manifest Document No. 02008

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

GENERATOR

3. Generator's Name and Mailing Address
Bechtel Nevada for U.S. DOE
P.O. Box 98521 M/S NTS110
Las Vegas, NV 89193
4. Generator's Phone ( ) 702 295-6400 Attn: Troy Belka

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: TRIAD Transport, Inc — 6. US EPA ID Number: OKD981588791

C. State Transporter's ID

D. Transporter's Phone: 800-324-1139

7. Transporter 2 Company Name — 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Safety-Kleen Grassy Mountain Facility
3 miles east, 7 miles north of exit 41 off I-80
Knolls, UT 84029
10. US EPA ID Number: UTD991301748

G. State Facility's ID: 801-323-8900

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ Hazardous waste, solid, n.o.s. (lead), 9, NA3077, III		1	CM	18	Y	D008
b.				1/22/02		
c.						
d.						

J. Additional Descriptions for Materials Listed Above
A: ERG 171, BN-NTS-02-0041, GM01-0879

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24-hour emergency contact # (702) 295-6400 Collect
Use Proper PPE when handling containers
Certificate of Destruction is required

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Shannon M. Parsons-DePry — Signature: Shannon M. Parsons-DePry — Month 01 Day 22 Year 02

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Gene J. Peterson — Signature: Gene J. Peterson — Month 01 Day 22 Year 02

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

FACILITY

19. Discrepancy Indication Space
RWP002443

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name: Mike Lewis — Signature: Mike Lewis — Month 01 Day 24 Year 02

Style F16 REV-8 Labelmaster, An American Labelmark Co., Chicago, IL 60646 (800)621-5808

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

safety-kleen.

❑ Deact.
❑ Neut
❑ Micro

LOAD SUMMARY RECORD

GM 057999

DESTINATION ❑ STAB ❑ RCRA ____ ❑ TSCA ____

Arrived	Reconciled	Departed	Dropped	Reviewed	Billing	Manifest Mailed
✓	1/24	✓			1/24	1/24

Date	Order No.	Load No.
1/23/02	1353A9	2000028

9:06 AM 01
77780

Generator	Hauler
Safety-Kleen	MWD

Truck No.	Container No. (s)/ Railcar No.
1128	RCMD

Container Type:	Load Count (Rail Only):
ED G TT FB V Other	1 2 3 4

Operator Signature	Count	Date

11:08 01 23 (
77780 lb (H)
42540 lb
35240 lb

Load Washout Information

(Washout Stamp)

Washout:	Type:
Yes No	Interior Exterior

Washout Signature	Date
[signature]	1/23/02

Driver Signature	Date
Gene D Peterson	1-23-02

Item	Comments	Name	Date

Tracking Information	Time	Initials	Comments
Arrival Complete:			
TSD Complete:			
Disposal Complete:			
Washout Complete:			
Departure Complete:			

Received 1/29/02

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NV3890090001 | Manifest Document No. 02005 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Bechtel Nevada for U.S. DOE
P.O. Box 98521 M/S NTS110
Las Vegas, NV 89193

4. Generator's Phone ( ) 702 295-6400 Attn: Troy Belka

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: TRIAD Transport, Inc | 6. US EPA ID Number: OKD981588791

C. State Transporter's ID

D. Transporter's Phone 800-324-1139

7. Transporter 2 Company Name | 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Safety-Kleen Grassy Mountain Facility
3 miles east, 7 miles north of exit 41 off I-80
Knolls, UT 84029

10. US EPA ID Number: UTD981301748

G. State Facility's ID 801-323-8900

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ Hazardous waste, solid, n.o.s. (lead), 9, NA3077, III		1	CM	15	Y	D008
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
A: ERG 171, BN-NTS-02-0040, GM01-0879
Box # B-951

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24-hour emergency contact # (702) 295-6400 Collect
Use Proper PPE when handling containers
Certificate of Destruction is required

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

GENERATOR

Printed/Typed Name: Shannon M. Parsons-DePoy | Signature: Shannon M. Parsons-DePoy | Month Day Year: 01 17 02

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Greg T Peterson | Signature | Month Day Year: 01 17 02

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space
ANOMALY #5

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: Linda Cairns | Signature: Linda Cairns | Month Day Year: 01 17 02

Style F15 REV-6 Labelmaster, An American Labelmark Co., Chicago, IL 60648 (800)621-5808

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

PRINTED ON RECYCLED PAPER

safety-kleen.

☐ Deact.
☐ Neut
☐ Micro

LOAD SUMMARY RECORD

GM 057924

DESTINATION: ☑ STAB ☐ RCRA ______ ☐ TSCA ______

Arrived	Reconciled	Departed	Dropped	Reviewed	Billing	Manifest Mailed

Date	Order No.	Load No.
1-18-02	43527	

Generator	Hauler

Truck No.	Container No. (s)/ Railcar No.

Container Type: ED (G) TT FB V Other	Load Count (Rail Only): 1 2 3 4

Operator Signature	Count	Date

7:24
801

9:30 01
80180 lb
42420 lb
37760 lb

Load Washout Information

(Washout Stamp)

Washout: (Yes) No	Type: (Interior) Exterior
Washout Signature Shawn	**Date** 1-18-02
Driver Signature	**Date** 1-18-02

Item	Comments	Name

Tracking Information	Time	Initials	Comments
Arrival Complete:			
TSD Complete:			
Disposal Complete:			
Washout Complete:			
Departure Complete:			

Safety-Kleen, Grassy Mountain Facility, Tooele County, Utah

WHITE - Facility CANARY - Generator PINK GREEN - Receiving GOLD -

F-9

APPENDIX G

FIELD PHOTOGRAPHS

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CAU 143 FIELD PHOTOGRAPH LOG

PHOTO NUMBER	DATE	DESCRIPTION
1	09/18/2001	R-MAD East Trestle Area before demolition and backfilling activities.
2	12/05/2001	R-MAD East Trestle Area after demolition and backfilling activities.
3	09/18/2001	R-MAD West Trench Berms before remediation.
4	01/24/2002	R-MAD West Trench Berms after remediation.
5	12/05/2001	Metal debris discovered in the West Trench Berm area during remediation.
6	12/05/2001	Subbasin 4 before erosion protection installation.
7	01/10/2002	Subbasin 4 placement of sand over geotextile material.
8	01/10/2002	Subbasin 4 placement of rip rap rock material.
9	01/10/2002	Rip rap rock placement in erosion channel area.
10	01/24/2002	Completion of erosion protection for Subbasin 4
11	12/05/2001	Strontium-90 (Sr-90) impacted soil excavation area
12	12/05/2001	Container storage area for Sr-90 impacted soil
13	01/24/2002	Completion of erosion protection for Subbasin 5
14	01/24/2002	Demobilization of the site and equipment

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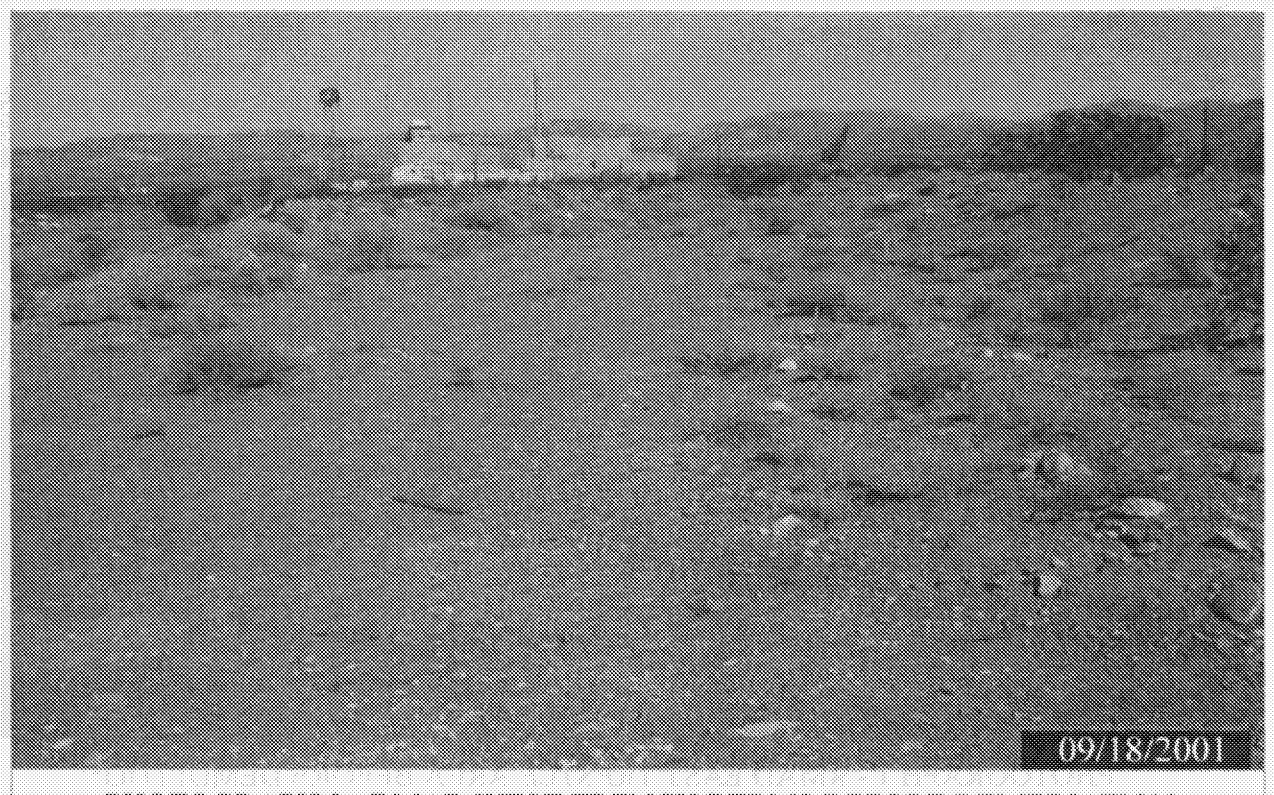
PHOTOGRAPH 1 - RMAD EAST TRESTLE AREA BEFORE DEMOLITION

PHOTOGRAPH 2 - RMAD EAST TRESTLE AREA AFTER DEMOLITION

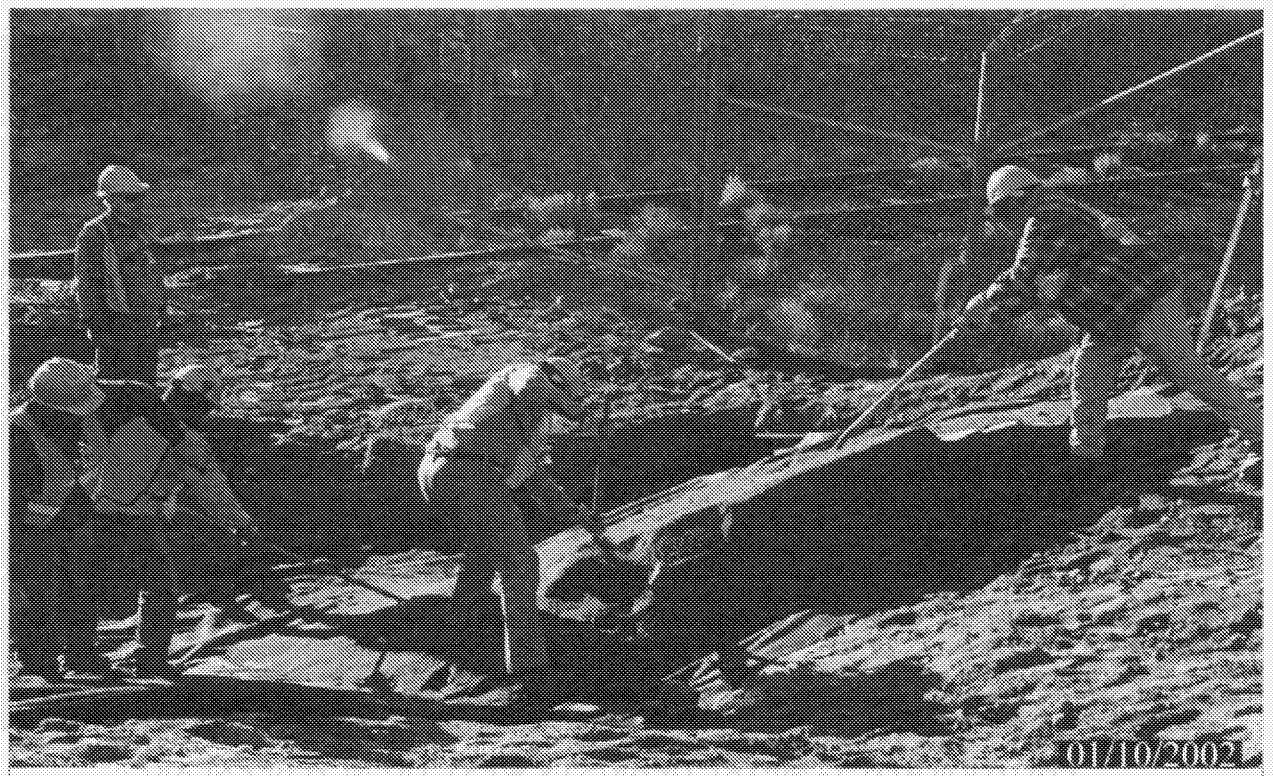


PHOTOGRAPH 3 - RMAD WEST TRENCH BERMS BEFORE REMEDIATION

PHOTOGRAPH 4 - RMAD WEST TRENCH BERMS AFTER REMEDIATION

PHOTOGRAPH 5 - METAL DEBRIS IN WEST TRENCH BERM AREA

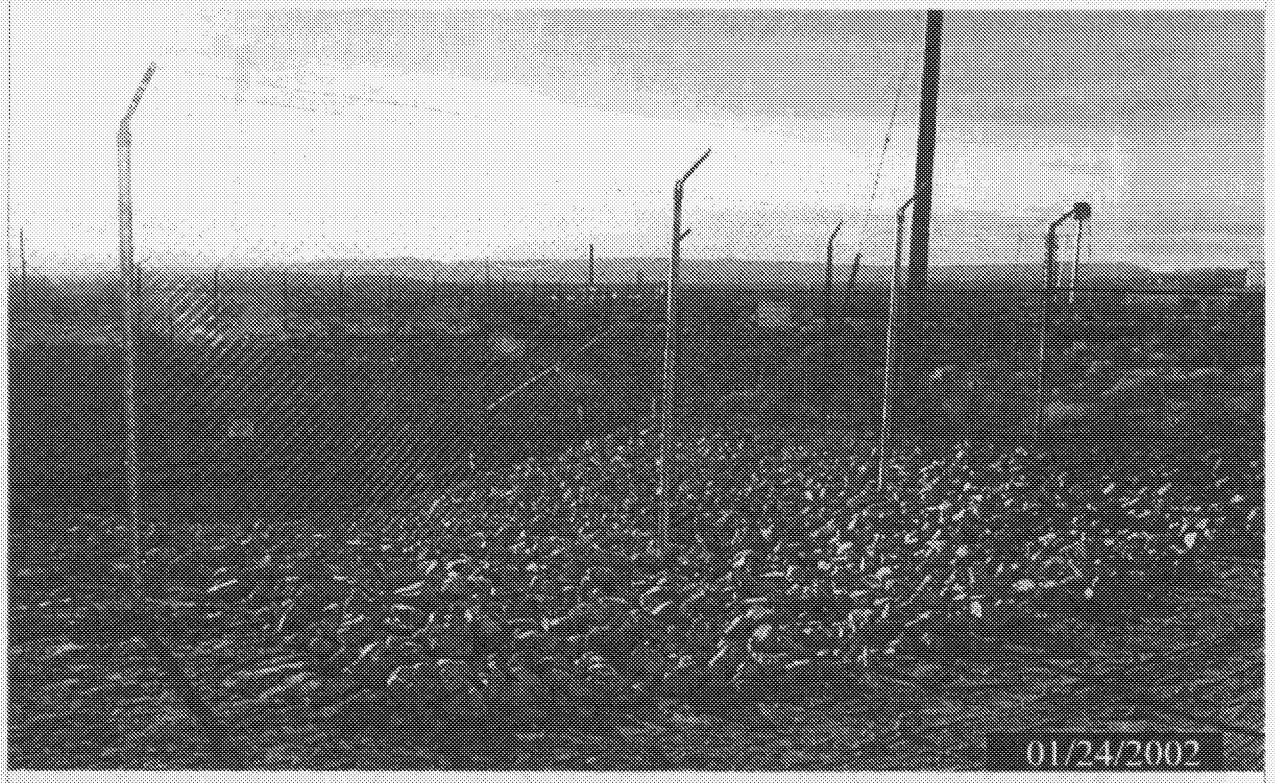
PHOTOGRAPH 6 - SUBBASIN 4 BEFORE EROSION PROTECTION INSTALLATION



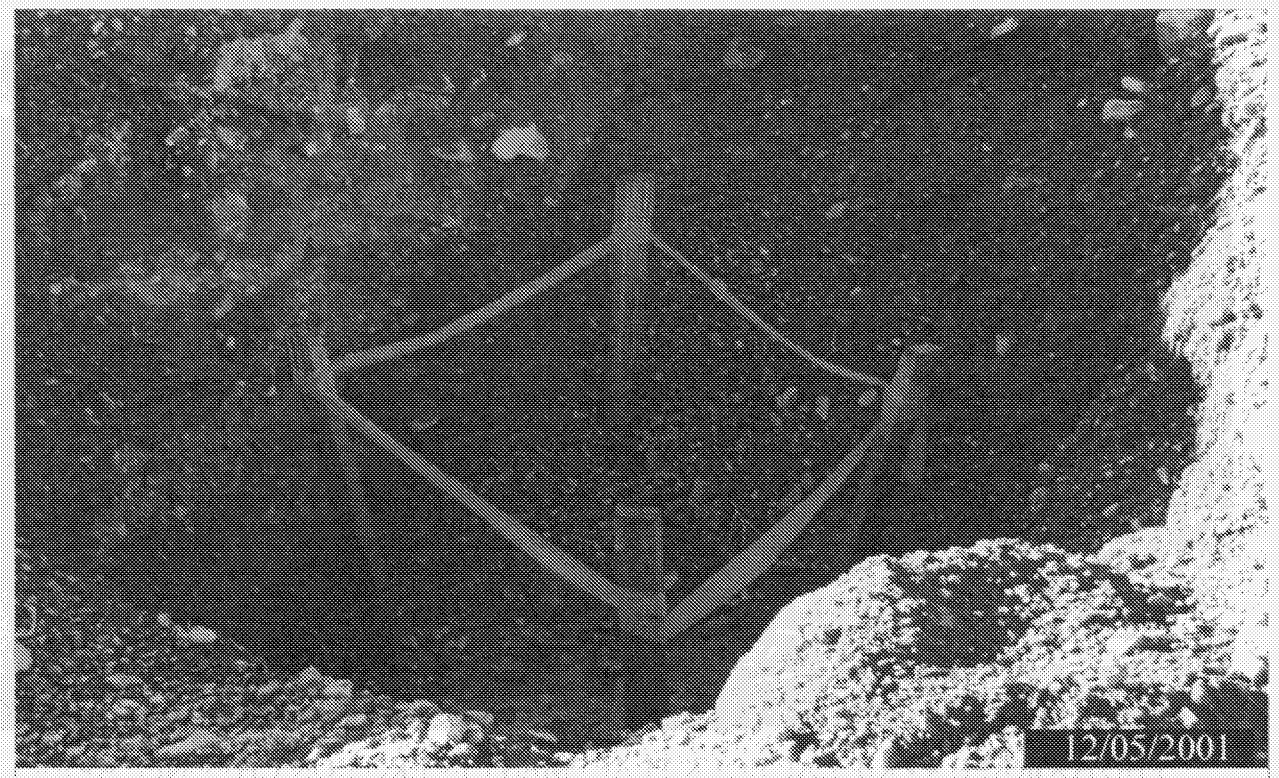
PHOTOGRAPH 7 - SUBBASIN 4 PLACEMENT OF SAND OVER GEOTEXTILE MATERIAL

PHOTOGRAPH 8 - SUBBASIN 4 PLACEMENT OF RIP RAP ROCK MATERIAL

PHOTOGRAPH 9 - RIP RAP ROCK PLACEMENT IN EROSION CHANNEL AREA



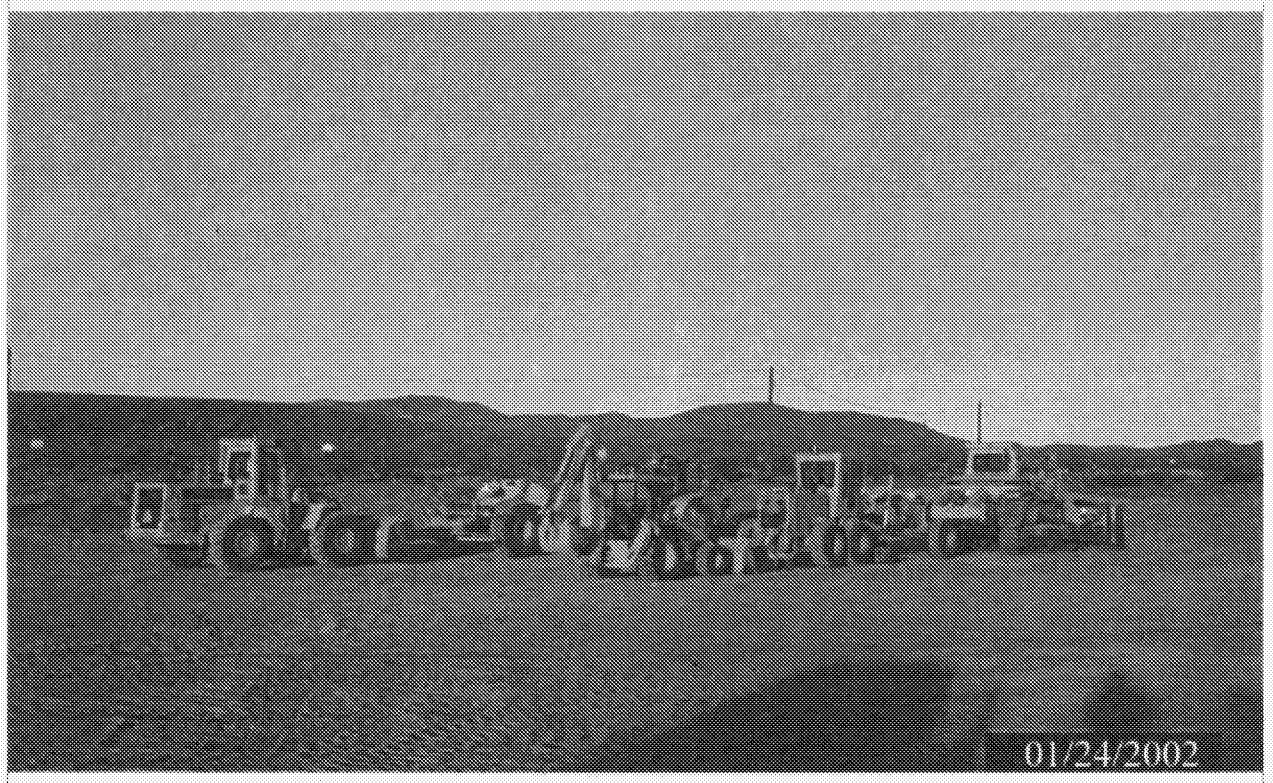
PHOTOGRAPH 10 - COMPLETION OF EROSION PROTECTION FOR SUBBASIN 4



PHOTOGRAPH 11 - STRONTIUM-90 (Sr-90) IMPACTED SOIL EXCAVATION AREA

PHOTOGRAPH 12 - CONTAINER STORAGE AREA FOR Sr-90 IMPACTED SOIL

PHOTOGRAPH 13 - COMPLETION OF EROSION PROTECTION FOR SUBBASIN 5



PHOTOGRAPH 14 - SITE DEMOBILIZATION

APPENDIX H

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION COMMENT RESOLUTION FORM

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NEVADA ENVIRONMENTAL RESTORATION PROJECT
DOCUMENT REVIEW SHEET

1. Document Title/Number Closure Report for CAU 143
2. Document Date March 2002
3. Revision Number 0
4. Originator/Organization Tobiason, Dan, BN
5. Responsible DOE/NV ERP Project Mgr. Janet Appenzeller-Wing
6. Date Comments Due
7. Review Criteria FFACO
8. Reviewer/Organization/Phone No.
9. Reviewer's Signature

10. Comment Number/ Location	11. Type[a]	12. Comment	13. Comment Response	14. Accept

[a] Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to DOE/NV Environmental Restoration Division, Attn: QAC, M/S 505.

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