Nevada
Environmental
Restoration
Project

DOE/NV-425

Corrective Action Investigation Plan: Roller Coaster Lagoons and North Disposal Trench, Tonopah Test Range

Controlled Copy No.: _____

Revision: 1

June 1996

Environmental Restoration
Division

U.S. Department of Energy
Nevada Operations Office

**CORRECTIVE ACTION INVESTIGATION PLAN:
ROLLER COASTER LAGOONS
AND NORTH DISPOSAL TRENCH
TONOPAH TEST RANGE**

DOE Nevada Operations Office
Las Vegas, Nevada

Controlled Copy No.: _____

Revision: 1

June 1996

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

**Portions of this document may be illegible
electronic image products. Images are
produced from the best available original
document.**

**CORRECTIVE ACTION INVESTIGATION PLAN:
ROLLER COASTER LAGOONS
AND NORTH DISPOSAL TRENCH
TONOPAH TEST RANGE**

Approved:

Kevin Cabbie
Kevin Cabbie, Technical Manager,
Environmental Restoration Division

Date: 6/27/96

Approved:

Stephen A. Mellington
Stephen A. Mellington, Director,
Environmental Restoration Division

Date: 6/27/96

Table of Contents

List of Figures	iii
List of Tables	iv
List of Acronyms and Abbreviations	v
1.0 Introduction	1-1
1.1 Purpose	1-1
1.2 Scope	1-1
1.3 FFACO Requirements	1-1
2.0 Facility Description	2-1
2.1 Roller Coaster Sewage Lagoons Operational History	2-1
2.2 North Disposal Trench Operational History	2-4
2.3 Investigative Background	2-4
2.4 Waste Inventory	2-4
2.4.1 Miscellaneous Debris	2-4
2.4.2 Liquid Waste	2-7
2.5 Release Information	2-7
3.0 Objectives	3-1
3.1 Conceptual Model	3-1
3.2 Data Quality Objectives	3-6
3.2.1 Problem Statement	3-6
3.2.2 Identification of Decision	3-6
3.2.3 Identification of Inputs to the Decision	3-6
3.2.4 Definition of Study Boundaries	3-7
3.2.5 Development of Decision Rules	3-7
3.2.6 Specifications on Decision Error Limits	3-8
3.2.7 Optimization of Design for Obtaining Data	3-9

Table of Contents (Continued)

3.3 Technical Approach	3-9
3.3.1 Environmental Sample Data Needs	3-9
3.3.2 Field Screening Data Needs	3-9
4.0 Corrective Action Investigation	4-1
4.1 Sampling Approach	4-1
4.1.1 Random Sampling	4-1
4.1.2 Biased Sampling	4-3
4.1.2.1 VCA Spill Area	4-3
4.1.2.2 Outfall Pipe Area	4-3
4.1.2.3 Other Local Areas	4-5
5.0 Waste Management Plan	5-1
5.1 Waste Minimization	5-1
5.2 Potential Waste Streams	5-1
5.3 Waste Determination	5-2
5.4 Waste Management	5-2
6.0 Reporting	6-1
7.0 References	7-1
Appendix A - Voluntary Corrective Action Activities and Sample Results	A-1

List of Figures

<i>Number</i>	<i>Title</i>	<i>Page</i>
1-1	Tonopah Test Range Location Map	1-2
2-1	Location of the Roller Coaster Lagoons and North Disposal Trench CAU at the Tonopah Test Range	2-2
2-2	Roller Coaster Lagoons, North Disposal Trench, and VCA Spill Area Site Map ..	2-3
3-1	Conceptual Model of the Exposure Pathway for the Roller Coaster Lagoons, North Disposal Trench, and VCA Spill Area	3-2
3-2	Plan View of the Area Where Debris Was Concentrated	3-4
4-1	Random Environmental Sampling Locations	4-2
4-2	Schematic of the Split-Barrel Sampler	4-6

List of Tables

<i>Number</i>	<i>Title</i>	<i>Page</i>
2-1	Major Components of Debris Removed from the Roller Coaster Lagoons and North Disposal Trench During Voluntary Corrective Action Activities	2-5
2-2	Summary of Drum Constituents Detected above Detection Limit	2-6
4-1	Summary of Soil Sampling Requirements	4-4

List of Acronyms and Abbreviations

CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
Cd	Cadmium
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DOT	U.S. Department of Transportation
DQO	Data Quality Objective(s)
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Project
FFACO	Federal Facility Agreement and Consent Order
ft	Foot (feet)
HASP	Health and Safety Plan
IDW	Investigation-derived waste(s)
in.	Inch(es)
km	Kilometer(s)
km ²	Square kilometer(s)
LLW	Low-level waste(s)
m	Meter(s)
mi	Mile(s)
mi ²	Square mile(s)
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
PCB	Polychlorinated biphenyl(s)
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SNL	Sandia National Laboratories
SVOC	Semivolatile Organic Compound(s)

List of Acronyms and Abbreviations (Continued)

TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbon(s)
TRU	Transuranic Waste
TTR	Tonopah Test Range
VCA	Voluntary Corrective Action
VOA	Volatile Organic Analysis

1.0 Introduction

The Corrective Action Investigation Plan (CAIP) is developed in accordance with the Federal Facility Agreement and Consent Order (FFACO) agreed to by the U.S. Department of Energy (DOE), Nevada Division of Environmental Protection (NDEP), and the U.S. Department of Defense. The CAIP is a document that provides or references all of the specific information for planning investigation activities associated with Corrective Action Units (CAUs) or Corrective Action Sites (CASs) (FFACO, 1996). This CAIP contains environmental sample collection logic and approach for CAU Number 404, which consists of two CASs: Roller Coaster Lagoons (CAS No. TA-03-001-TA-RC) and Roller Coaster North Disposal Trench (North Disposal Trench) (CAS No. TA-21-001-TA-RC). The Roller Coaster Lagoons and North Disposal Trench are located on the Tonopah Test Range (TTR), which is part of the Nellis Air Force Range in Nye county Nevada (Figure 1-1). This CAIP will be implemented in accordance with the FFACO, the CAU Work Plan for the TTR, and the Industrial Sites Quality Assurance Project Plan (QAPP) (FFACO, 1996; DOE, 1996; DOE, 1994a).

1.1 Purpose

The purpose of this investigation is to collect data to confirm the presence or absence of contamination, evaluate the potential for contaminant migration, and select appropriate closure methods for these sites. The potential closure methods for these sites involve either clean closure, closure in place, or no further action.

1.2 Scope

The scope of this investigation includes collecting surface and subsurface soil samples at the Roller Coaster Lagoons; and collecting surface soil samples at the North Disposal Trench and the small spill area associated with the Voluntary Corrective Action (VCA) that was conducted in 1995.

1.3 FFACO Requirements

The FFACO requires that CAIPs address the following elements: management, technical aspects, quality assurance, health and safety, public involvement, field sampling, and waste management. The managerial aspects of this project are discussed in the U.S. Department of Energy, Nevada Operations Office (DOE/NV) Environmental Restoration Program (ERP) Project Management Plan. The technical aspects of this CAIP are contained in the CAU Work Plan for the TTR and in this document. Field and laboratory Quality Assurance and Quality

Source: DOE/NV, 1992

LEGEND

- Nevada Test Site
- Tonopah Test Range boundary
- Nellis Air Force Range boundary
- State Line
- Road or Highway
- City

3403A17 05/21/96

**Figure 1-1
 Tonopah Test Range Location Map**

Control (QA/QC) are detailed in the QAPP. The methods for implementing these details are provided in approved procedures. The health and safety aspects of this project are documented in the DOE/NV ERP Health and Safety Plan (HASP) (DOE/NV, 1994b) and will also be documented in a site-specific HASP written just prior to commencement of field work. Public involvement is documented in the Public Involvement Plan in Appendix V of the FFACO. Field sampling activities are documented in Section 4.0 of this CAIP. Waste management is discussed in the CAU Work Plan for the TTR and Section 5.0 of this CAIP.

2.0 Facility Description

The CAU, consisting of two separate areas, the Roller Coaster Lagoons and North Disposal Trench, is located at the TTR (Figure 2-1), which is located in Nye County, Nevada, on the northern portion of the Nellis Air Force Range (Figure 1-1). The TTR is approximately 225 kilometers (km) (140 miles [mi]) northwest of Las Vegas by air and approximately 56 km (35 mi) southeast of Tonopah by road. The TTR is bordered on the south, east, and west by the Nellis Air Force Range and on the north by sparsely populated public land administered by the Bureau of Land Management and the U.S. Forest Service. The total area occupied by the TTR is approximately 1,616 square kilometers (km²) (624 square miles [mi²]) (DOE, 1996). A detailed account of the physical setting of the TTR is contained in the CAU Work Plan.

The Roller Coaster Lagoons and North Disposal Trench CAU is located approximately 7 km (4.3 mi) south of Area 3 along the Main Road South (Figure 2-1). Associated with the CAU is an additional area where a small spill occurred during VCA activities (VCA spill area). Additional information on the VCA spill area is presented in Section 2.5. In general, site topography is mostly level with a gentle eastward slope. The CAU Work Plan contains information about the area geology and local groundwater conditions. The lagoons are presently dry and appear to have been dry since the cessation of Operation Roller Coaster.

2.1 Roller Coaster Sewage Lagoons Operational History

The Roller Coaster Lagoons site consists of two large unlined sewage lagoons that received liquid sanitary wastes from the Operation Roller Coaster man camp. The man camp supported up to 600 people for approximately 2 months in 1963 (DOE, 1996). The sanitary sewer system included approximately 610 meters (m) (2,000 feet [ft]) of sewage line and two lagoons, each approximately 120 by 75 by 10 ft in size (Figure 2-2). The sewage line ran in an easterly direction from the man camp to the lagoons and can be identified by the presence of manhole covers. The sewage line entered the primary (westernmost) lagoon from the west by way of an outfall pipe, which is located below the gangway. The two lagoons are connected by a single, 6-inch (in.)-diameter clay overflow pipe. A second overflow drainpipe is connected to the southeast corner of the secondary (easternmost) lagoon and discharges directly on the ground surface east of the lagoon. Subsequent to Operation Roller Coaster, the lagoons received debris from construction and range cleanup activities conducted on the TTR.

LEGEND

- Tonopah Test Range boundary
- Primary roadway
- ▨ Operation Roller Coaster sites
- Area/gate
- ♀ Spring
- BLM Bureau of Land Management
- NAFR Nellis Air Force Range
- TTR Tonopah Test Range

SCALE

Source: Adapted from DOE/AL, 1992

Figure 2-1
Location of the Roller Coaster Lagoons and
North Disposal Trench CAU at the Tonopah Test Range

Figure 2-2
Roller Coaster Lagoons, North Disposal Trench,
and VCA Spill Area Site Map

2.2 North Disposal Trench Operational History

The North Disposal Trench, located north of the eastern-most lagoon (Figure 2-2), was installed in 1963 to receive solid waste and construction debris from the Operation Roller Coaster man camp. Subsequent to Operation Roller Coaster, the trench continued to receive construction debris and range cleanup debris (including ordnance) from Sandia National Laboratories (SNL) and other operators. The base of the trench is approximately 100 by 12 by 10 ft in size.

2.3 Investigative Background

A preliminary site investigation was performed at the Roller Coaster Lagoons and North Disposal Trench, which consisted of: (1) conducting site walkovers, (2) reviewing historical documents, (3) interviewing TTR employees and former site workers, (4) inspecting aerial photographs, and (5) conducting a limited sampling program and waste inventory associated with the VCA performed in 1995.

2.4 Waste Inventory

The Roller Coaster Lagoons received two forms of waste: sanitary wastewater and construction and range cleanup debris (including ordnance). The North Disposal Trench received only miscellaneous debris in the form of construction debris, garbage, and range cleanup debris.

2.4.1 Miscellaneous Debris

Miscellaneous debris was disposed of in the North Disposal Trench from 1963 to approximately 1993. The Roller Coaster Lagoons also received miscellaneous debris after they were no longer used for sewage disposal, beginning in the 1970s until approximately 1993. No inventory was kept to document the types and amounts of materials disposed of in the lagoons or the trench. However, a limited waste inventory was performed during the 1995 VCA.

The VCA operation included the removal of ordnance and other debris from the two lagoons and trench. The debris and waste was segregated into: (1) recyclable ordnance and debris, (2) nonrecyclable debris, (3) hazardous waste, (4) suspected asbestos-containing materials, and (5) hydrocarbon-contaminated material. Table 2-1 lists the major components and current disposition of the solid waste that was removed. All items removed from the lagoons and trench were screened for radiological contamination with hand-held instruments and radiation swipes. No radiation contamination was detected.

Table 2-1
Major Components of Debris Removed from the
Roller Coaster Lagoons and North Disposal Trench During
Voluntary Corrective Action Activities

Recyclable Ordnance and Debris	Nonrecyclable Debris	Hazardous Waste	Suspected Asbestos- Containing Material	Hydrocarbon- Contaminated Material
<i>Shipped off the TTR for recycling</i>	<i>Staged at the site awaiting disposal at a Class III landfill operated by the USAF in Area 10, TTR</i>	<i>Shipped off the TTR to a licensed transportation, storage and disposal facility</i>	<i>Staged at site awaiting proper disposal</i>	<i>Staged at site awaiting proper disposal</i>
Inert artillery rounds Practice bombs Spent rocket motors Miscellaneous ordnance parts (i.e., tail fins, pieces of casings) Empty "target" drums Cable Miscellaneous scrap metal Crushed 55-gallon drums	Scrap wood Tires Garbage Concrete Sacks of plaster Galvanized metal debris Nonhazardous cratering dynamics soil samples	One large lead/acid battery Eight used automotive oil filters Two aerosol cans Two starting fluid cans Two propane cylinders Drum #2 ^a	Two sections of transite pipe	Drum #3 ^a Drum #1 ^a Stockpiled soil from VCA spill

^aSee Appendix A.

During the VCA cleanup operations, three 55-gallon drums were encountered in the North Disposal Trench (see Appendix A for details). Two of the drums (Drums #2 and #3) contained an unknown liquid substance and the third drum (Drum #1) contained an unknown solid substance (see Section 2.5 for more discussion on Drum #1). The drums were removed from the trench, staged separately from the rest of the debris, and sampled for laboratory analysis.

Table 2-2 contains a summary of the analytes that were detected in the drums. Because of their

Table 2-2
Summary of Drum Constituents Detected above
Detection Limit

Sample Number			TTR00018		TTR00006		TTR00011	
Sample Matrix			Contents of Drum #1 (Solidified material)		Contents of Drum #2 (Liquid)		Bottom center of stockpiled soil (Represents contents of Drum #3)	
Group	Parameter	Units	Method	DJ ^a	Result	DL	Result	DL
TPH	Diesel	mg/kg ^b	SW-846-8015-m ^c	Na ^d	NA	NA	NA	250
TPH	Gasoline ^e	μg/kg ^f	SW-846-8015-m	NA	NA	NA	NA	500
Semi-VOA	2-Methylnaphthalene	μg/kg	SW-846-8270	520,000	350,000 J ^g	NA	NA	3,300
Semi-VOA	Naphthalene	μg/kg	SW-846-8270	520,000	1,200,000	NA	NA	3,300
Semi-VOA	2-Methylphenol	μg/kg	SW-846-8270	520,000	520,000 U	NA	NA	3,300
TCLP Semi-VOA	2-Methylphenol	mg/L	SW-846-1311/8270	NA	NA	1,000	3,400	NA
VOA	Benzene	μg/kg	SW-846-8240	2,500	2,900	0.50	0.19 J	5
VOA	Xylene	μg/kg	SW-846-8240	2,500	61,000	NA	NA	5
VOA	Ethyl Benzene	μg/kg	SW-846-8240	2,500	5,300	NA	NA	5
TCLP VOA	2-Butanone ⁱ	mg/L	SW-846-1311/8240	NA	NA	1.0	25.0	NA
Pesticides	Aldrin	μg/kg	SW-846-8080	325	1,100	NA	NA	1.3
Pesticides	4,4' - DDE	μg/kg	SW-846-8080	330	330 U	NA	NA	13
Pesticides	Endrin	μg/kg	SW-846-8080	500	500 U	NA	NA	2.0
TCLP Pesticides	Endrin	mg/L	SW-846-1311/8080	NA	NA	0.6	0.98	NA
Pesticides	Endosulfan II	μg/kg	SW-846-8080	325	820	NA	NA	1.3
Pesticides	4,4' - DDD	μg/kg	SW-846-8080	920	920 U	NA	NA	3.7
Pesticides	4,4' - DDT	μg/kg	SW-846-8080	1,000	1000 U	NA	NA	4.0
Pesticides	Heptachlor	μg/kg	SW-846-8080	250	250 U	NA	NA	1.0
TCLP Pesticides	Heptachlor	mg/L	SW-846-1311/8080	NA	NA	0.030	0.30	NA
TCLP Metals	Barium	mg/L	SW-846-1311/6010	0.20	0.24	20	U	NA
TCLP Metals	Selenium	mg/L	SW-846-1311/6010	0.25	0.043 U	0.50	1.5	NA
TCLP Metals	Lead	mg/L	SW-846-1311/6010	0.10	0.075 B ^k	0.30	0.91	NA

^a Minimum Detection Limit
^b Milligrams per kilogram
^c Modified Method (EPA, 1986)
^d Not applicable

^e Result of low boiling hydrocarbons
^f Micrograms per kilogram
^g Compound estimated below the minimum detection limit
^h Compound analyzed for, but not detected

ⁱ Common laboratory contaminant
^j Milligrams per liter
^k Result is above instrument detection level, but below method detection level

presence in the trench, these constituents will be analyzed for in the sampling program. Drum #2 has been moved to a licensed transportation, storage, and disposal facility; Drums # 1 and #3 were containerized in overpack drums and remain at the site awaiting final disposition.

2.4.2 Liquid Waste

Liquid sanitary effluent from the Operation Roller Coaster man camp was discharged into the sewage lagoons. The volume of liquid sewage that was discharged to the lagoons is unknown. Interviews with former Operation Roller Coaster participants indicate two important factors relative to the composition of the sanitary wastewater. According to the interviews, only municipal-type sanitary waste was discharged to the lagoons, and probably no laboratories or other industrial facilities were located at the man camp; thus minimizing the possibility of uncontrolled releases of hazardous waste to the system. For analogy purposes, a 1992 Environmental Monitoring Report that included a study of the nature of liquid sanitary waste discharged at the current TTR lagoon (DOE/AL, 1992) was reviewed. The study revealed that trace levels of metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs) were present in the waste. The study concluded that constituent levels, chemical oxygen demand, total suspended solids, and the radiological data were all within the normal range for liquid sanitary waste. Although there is a significant difference in time frame, the sanitary waste associated with the Roller Coaster Lagoons probably had similar characteristics; therefore, it's likely that the Roller Coaster Lagoons contain trace levels of metals, VOCs, and SVOCs.

2.5 Release Information

The establishment of strict radiological controls during Operation Roller Coaster greatly minimizes the possibility for radioactively contaminated materials being released in the lagoons or trench. Furthermore, no radiation was detected on the various debris removed from the lagoons and trench during the 1995 VCA.

However, the liquid waste and miscellaneous debris that were disposed of in the lagoons, and the miscellaneous debris that was disposed of in the trench may have released unknown quantities of contaminants to the soil. Although releases to the environment from the debris have been mitigated by the removal of the debris during the 1995 VCA, residual contamination may remain in the soil.

Liquid release to the environment could include possible hazardous constituents of the sanitary wastewater that infiltrated into the unsaturated zone through the base of the unlined sewage lagoons. The extent and impact of such a release, however, cannot be determined until further characterization by environmental sampling is conducted.

There is also the potential for small releases associated with the hazardous waste that was discovered in the trench and lagoons (e.g., oil filters). These releases would be in the form of localized contaminated areas on the bottom of the trench or lagoons.

During the VCA cleanup, one of the two drums (Drum #3) containing liquid was discovered to have a small leak (total volume below reportable quantity) after being removed (see Appendix A for details). The stained soil was removed and four environmental samples were collected from the excavated area to confirm cleanup levels. The laboratory analysis indicated one sample had TPH concentrations above NDEP action levels for hydrocarbon releases. Currently, Drum #3 and approximately 8 cubic yards of soil excavated during the VCA spill cleanup remain staged at the site. At the time when the drum and soil are shipped for disposal, one additional lift of soil will be excavated from the area to complete the cleanup process. The VCA spill area is indicated in Figure 2-2.

Also during the VCA cleanup operation, one of the three 55-gallon drums (Drum #1) was found to contain an unknown solid substance that appeared to have leaked while in the trench (Appendix A). The drum was removed from the trench, staged separately from the rest of the debris, and sampled for laboratory analysis. Table 2-2 contains a summary of the analytes that were detected in Drum #1. The soil within the spill site was excavated, placed on plastic sheeting and covered. Drum #1 was containerized and is currently staged at the site awaiting final disposal.

3.0 Objectives

The sampling objectives were determined using the data quality objective (DQO) process outlined by the Environmental Protection Agency (EPA) (1994). DQOs are qualitative and quantitative statements that specify the quality and type of data required to support proposed potential courses of actions for the lagoons and trench. The DQOs were developed to clearly define the purpose(s) for which environmental data will be used and to design a data collection program that will satisfy these goals. One tool used in the DQO process is the formulation of site conceptual models.

3.1 Conceptual Model

A conceptual model has been developed to postulate potential exposure pathways from likely contaminant sources at the sites (Figure 3-1). The following assumptions were considered in developing the model:

- The sanitary waste primarily infiltrated (as opposed to evaporated) because the lagoons are known to be unlined and the underlying soil type, a sandy loam, is permeable and conducive to infiltration.
- The vertical extent of infiltration is unknown.
- The duration of the liquid sanitary waste disposal was short, less than 1 year.
- Laboratories and industrial facilities were probably not located at the man camp; therefore, components of the sanitary waste are primarily residential.
- No radioactive wastewater was discharged to the lagoons.
- Based on the analogy of the current TTR wastewater system, the primary constituents of concern in the sanitary waste are trace levels of metals, VOCs, and SVOCs.
- The concentrations of the sanitary waste constituents are probably low.
- Some of these constituents are likely to have volatilized when they were discharged to the lagoons, thereby lowering the concentrations further.
- All sanitary waste constituents are uniformly distributed laterally (the lagoons are flat), and decrease in concentration vertically.

t:\wordprocttr\roller\fig_3-1a.pre

Figure 3-1
 Conceptual Model of the Exposure Pathway for the Roller Coaster Lagoons,
 North Disposal Trench, and VCA Spill Area

- The low precipitation associated with the area constrains the downward migration of contamination.
- If contamination is in the subsurface, it is unlikely that it could reach a receptor because (1) concentrations are at trace levels, (2) the depth to groundwater is extensive, and (3) there is no driving force (hydrostatic head).
- Contamination from the debris is expected to be present in the form of multiple residual hot spots, or contaminated localized areas from spills of liquid from the debris (e.g., oil or battery acid).
- If hot spots from the debris are present, they will be visible and extend between the surface and 1 ft in depth.
- There are very few (less than 10) areas of concern from the debris (e.g., stained soil and former locations of hazardous waste) in the lagoons and trench.

The following are known facts (rather than assumptions) that were considered regarding the debris disposed of in the lagoons:

- The debris in the lagoons was primarily concentrated along the edges and in the center near the gangway. The debris in the trench occupied the entire trench area (see Figure 3-2).
- The debris was physically removed piece by piece; therefore, there is a good understanding of what was disposed.
- The contents of the drums, have been sampled and analyzed. The drums' contents include TPH, pesticides, SVOCs, VOCs, and inorganics. The TPH was above state regulatory limits.
- All of the debris and drums have been removed from the lagoons and trench, along with the contamination source.
- There are no radioactive materials associated with the debris removed from the trench and lagoons.

These factors were considered in the development of the conceptual model. Based on these factors, there are two potential sources for contamination at the site. The first is associated with the sanitary wastewater that was discharged to the lagoons. Because the constituents of the sanitary wastewater are largely unknown, further characterization is necessary to ascertain the

3403A18 05/16/96

Figure 3-2
Plan View of the Area Where Debris Was Concentrated

presence and nature of potential contamination. The characterization area would be composed of the bottoms of the lagoons. The second source of concern is from potential residue associated with debris spills. The contents of the drums and the limited quantity of hazardous waste materials present the possibility for localized contamination on the bottom of the trench and lagoons. The debris spills, or hot spots, are primarily local in extent and impact the soil from the surface to approximately 1 ft in depth. The most likely location for contamination from the debris spills would be where the debris was most concentrated. This would include the edges and near the center (along the gangway) of the lagoons, and along the bottom of the trench (see Figure 3-2). If contamination not directly associated with debris spills is discovered through sampling, the source will be attributed to the sanitary wastewater, and further characterization to define the vertical boundaries will be necessary at a later date.

For the conceptual model, each site is thought to have only two potential exposure routes: inhalation of dust and ingestion of soil. The first viable contamination release mechanism is the suspension of potentially contaminated surface soil to the air. If the surface soil is contaminated, inhalation of dust could be a potentially harmful exposure route. High winds and dust devils have been documented at the TTR and could cause the suspension of contaminated surface soil (DOE, 1996). The second viable contamination release mechanism could occur with intrusion into the site. If the surface soil is contaminated, ingestion of soil could be a potentially harmful exposure route. Site access is not posted with signs or restricted by fences, and the potential for disturbance exists. The groundwater migration pathway is not considered a viable exposure pathway in the conceptual model based on assumptions already presented.

If, after sampling, it is determined that contamination exists at the surface above action levels, the NDEP will be notified, the site rescoped, and the groundwater pathway will be investigated at a later date. The site, however, is not anticipated to contain contamination at levels high enough to impact groundwater. In addition, contamination, if present, is anticipated to be removed through further corrective actions until complete removal or containment of the source has occurred.

Environmental sample data will be used to determine a course of action for the two CASs and VCA spill area. The course of action may differ for each site, depending on the results. If environmental sample data indicate no analytes are above the Toxicity Characteristic Leaching Procedure limits, 100 times the Maximum Concentration Level, or Subpart S criteria (as specified by NDEP Corrective Action Regulations); and no beta/gamma radiation is detected by

field screening, then no further action will be recommended and the site will be clean-closed. If laboratory data detect analytes that exceed the criteria, NDEP will be notified and corrective action may be recommended for NDEP approval in order to remove or remediate the contaminants and possibly clean-close the site.

Closure in place or reassessment of the site is considered an option, depending on the depth and type of contamination.

3.2 Data Quality Objectives

The DQO process is a systematic planning tool for establishing criteria for data quality and for developing data collection programs. It is an iterative, seven-step process that results in a design to collect the right type, quality, and amount of data needed to support a course of action for these sites. The DQOs were developed to clearly define the purpose(s) for which environmental data will be used and to design a data collection program that will satisfy these goals. The seven steps and their applications to the Roller Coaster Lagoons, the North Disposal Trench, and the 1995 VCA spill area are as follows.

3.2.1 Problem Statement

The Roller Coaster Lagoons received potentially contaminated sanitary wastewater and various forms of solid debris; the North Disposal Trench received various forms of solid debris, some of which contained Total Petroleum Hydrocarbon (TPH) constituents above NDEP hydrocarbon levels. The soil may have been contaminated from the disposal activity conducted at these sites.

3.2.2 Identification of Decision

This CAIP has been designed to facilitate generation of sufficient data to: (1) identify the presence of contaminants and their constituents, (2) ascertain the extent of contamination, and (3) determine the appropriate closure recommendation.

3.2.3 Identification of Inputs to the Decision

The potential contamination from the sanitary wastewater will be evaluated by collecting random environmental samples along the bottom of the lagoons, and acquiring one biased subsurface sample at the outfall pipe located in the western-most trench (Figure 2-2). Contamination associated with debris spills will be evaluated by collecting biased environmental samples in areas of concern (e.g., stained soil). These areas are located on the bottoms of the lagoons and trench, and at the surface of the VCA spill area. The biased sample locations will be field

screened for volatiles using headspace, TPH using a colorimetric method, and beta/gamma radiation (although not suspected). If contamination is found, samples will be collected from the surface to below the impacted soil as indicated by headspace screening for volatile organic analyses (VOAs) or to 1 ft in depth. All the environmental samples will be laboratory analyzed for VOCs, SVOCs, TPH, pesticides, and Resource Conservation and Recovery Act (RCRA) metals (gamma spectroscopy will only be analyzed if field screening detects radioactivity).

3.2.4 Definition of Study Boundaries

The physical definition of the investigation boundaries are:

- The sides and bottom of the Roller Coaster Lagoons
- The base of the North Disposal Trench
- From the surface to 1 ft in depth within the lagoons and trench
- From the surface to approximately 30 ft in depth in the vicinity of the outfall pipe at the western lagoon
- The surface of the VCA spill area

These boundaries may change depending on the results of the environmental sample analytical data.

3.2.5 Development of Decision Rules

The results of the environmental laboratory analytical data will determine whether a decision is made for either no further action or closure of the site. If environmental sample data indicate analytes are not above the Toxicity Characteristic Leaching Procedure (TCLP) limits, 100 times the Maximum Concentration Level, and Subpart S criteria, and if no beta/gamma radiation is detected by field screening, then no further action will be recommended. If environmental data indicate that analytes exceed the aforementioned criteria, and/or radiation is detected, clean closure will be recommended for the site.

Decisions depend foremost on an accurate interpretive model (Section 3-1). The conceptual model dictates the sampling approach and ultimately the course of action that will be taken for the site. The conceptual model will be tested by two methods of sampling; random environmental sampling and field screening with environmental sampling at biased sample

locations. If field screening indicates contamination is more than anticipated, the field investigation will be replanned.

3.2.6 Specifications on Decision Error Limits

There are two types of decision errors possible in implementing this CAIP. These errors are described as a false positive (judging a clean area to be contaminated), and a false negative (judging a contaminated area to be clean). This CAIP has been designed to minimize both types of errors.

The consequences of a false positive are (1) remedial activities may encompass a greater quantity of media than is necessary; and (2) media incorrectly judged to be contaminated may be disposed of as regulated waste instead of unregulated waste. Both of these consequences may lead to increased remediation and disposal costs.

The consequences of a false negative are (1) regulated contaminants may not be appropriately addressed by remedial or treatment activities; (2) contamination may remain in place; and (3) contaminated media may be disposed of improperly. These consequences may lead to unacceptable risks to human health and the environment and to potential fines from regulatory agencies.

The sampling program for the Roller Coaster Lagoons and North Disposal Trench CAU has been designed to provide preliminary data to allow statistical determination of whether a proper number of samples were collected to sufficiently characterize the site. This determination will be made using the procedures described in Chapter 9 of the EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA, 1986). The mean concentration (or activity) and standard deviation of each targeted analyte in the soils will be used to calculate the number of samples necessary to make that determination at the 90 percent confidence level. Based on the existing information about the likely contaminants of concern in the lagoons and trench soils, it was decided by the DQO process participants that nine, random samples for each lagoon, six random samples from the trench, and no more than ten biased samples would be sufficient for the initial statistical determination. The samples will be collected in a systematic fashion using grids to ensure adequate coverage of the lagoons and trench (see Section 4.0).

3.2.7 Optimization of Design for Obtaining Data

The sampling approach outlined in Section 4.0 was developed to optimize the design for obtaining data.

3.3 Technical Approach

Historical knowledge of the site and the conceptual model indicates the need for additional data from the lagoons and trenches. In order to address these data needs, environmental sampling and field screening will be conducted. Based on historical site knowledge (described in Section 2.0), the potential contaminants of concern for the sites are anticipated to be the following: RCRA metals, VOCs, SVOCs, pesticides, and petroleum hydrocarbons.

3.3.1 Environmental Sample Data Needs

Environmental sample data are necessary to determine whether and/or to what extent VOCs, SVOCs, RCRA metals, petroleum hydrocarbons, or pesticides are present in the surface soil at the sites. Therefore, random surface soil samples will be collected from the surface to 1 ft and analyzed for total VOCs, total SVOCs, RCRA metals, total petroleum hydrocarbons, and total pesticides.

3.3.2 Field Screening Data Needs

Field screening is necessary to determine if VOCs or petroleum hydrocarbons are present in stained soil. Therefore, field screening for VOCs using headspace testing and TPH using colorimetric methods will be implemented. Beta/gamma screening will also be used during field screening.

4.0 Corrective Action Investigation

This corrective action investigation defines the program for investigating the Roller Coaster Lagoons, the North Disposal Trench, and the VCA spill area. All sampling activities shall be conducted in compliance with the Industrial Sites QAPP (DOE, 1994a), and all applicable, approved procedures.

4.1 Sampling Approach

The sampling approach will consist of two techniques. First, random sampling will be conducted to characterize the bottoms of the two sewage lagoons and disposal trench. Second, biased sampling will be conducted to determine the nature of possible contamination associated with surface soil stains and debris spills. The surface sample from each sampling location (biased and random) will be composited; the required volume for each sample analysis will be collected from the composite sample. All sampling will be performed in conjunction with field screening.

All equipment that contacts the soil will be decontaminated prior to screening and sampling at each location, using approved procedures, which will minimize the potential for cross contamination between sample locations. All samples collected for laboratory analysis will be sample aliquots of fresh sample media (rather than reusing the sample aliquot used for field screening). Collection of the samples to be submitted for total VOC laboratory analysis will be collected first to minimize the escape of VOCs. Records will be kept of the soil description, field screening measurements, and all other relevant data. The date, time, and sample interval (depth) will be recorded in log books, on screening forms, and on sample containers. If hot spots are located, they will be mapped and assigned boundaries for future reference.

4.1.1 Random Sampling

The random environmental sampling will be conducted at the locations shown on Figure 4-1. The sample locations were selected by first assigning a sequence of numbers to the nodes of an equally spaced grid covering the base of the lagoon or trench site. Then, a random number chart was used to select numbers to represent the designated sample locations. A total of nine sample locations were selected for each lagoon and six for the disposal trench. Each sample will be collected from the surface to 1 ft in depth. Sample material from each location will be field screened for the following: (1) VOAs using headspace, (2) TPH using a colorimetric method, and (3) beta/gamma radiation.

Random sample area:
 Grid size = 15 ft by 15 ft
 Field screening locations = 9
 Number of analytical samples = 9

Random sample area:
 Grid size = 15 ft by 15 ft
 Field screening locations = 9
 Number of analytical samples = 9

Random sample area:
 Grid size = 6 ft by 12 ft
 Field screening locations = 6
 Number of analytical samples = 6

Total field screening locations = 24
 Total analytical samples = 24

LEGEND

- Grid nodes
- ⊙ Randomly selected environmental sample locations

Figure 4-1
Random Environmental Sampling Locations

The soil samples will be analyzed at the laboratory for total VOCs, total SVOCs, TPH, total pesticides, and RCRA metals. Samples for gamma spectroscopy will only be submitted for laboratory analysis if beta/gamma radiation is detected by field screening. Table 4-1 presents a summary of the sampling requirements.

4.1.2 Biased Sampling

Biased environmental sampling will be conducted at the following areas:

- VCA spill area
- Vicinity of the outfall pipe
- Other local areas (hot spots) throughout the trench and lagoons

4.1.2.1 VCA Spill Area

A confirmation sample will be collected from the surface to 1 ft in depth at the VCA spill area to verify that cleanup levels were achieved. The sample will be collected from approximately the same location as the initial confirmation sample that was collected in 1995. Prior to collecting the sample, the sample location will be field screened for TPH using a colorimetric method. The confirmation sample will be analyzed at the laboratory for TPH.

4.1.2.2 Outfall Pipe Area

A biased environmental subsurface sample will be collected in the vicinity of the outfall pipe that is located below the gangway in the westernmost trench (Figure 2-2). Field screening will be used to provide qualitative data and guide the investigation deeper, if necessary. The following process is used for field screening and sampling.

Sampling will entail collecting soil samples and field screening samples from the subsurface. The subsurface soil will be investigated using a drill rig equipped with a hollow-stem auger. Samples will be collected from soil borings using a stainless steel, 2-ft-long split-barrel (split-spoon) sampler. The soil will be field screened and sampled beginning at the surface and continuing every 5 ft for a minimum of 20 ft. After reaching 20 ft, the boring will continue to be advanced; samples will be collected every 5 ft until two consecutive negative field screening measurements are reported. The samples will be field screened for volatiles using headspace, TPH using a colorimetric method, and beta/gamma radiation (although not suspected). All samples from the 5-ft intervals will be submitted for laboratory analysis. Table 4-1 summarizes the analytical requirements.

Table 4-1
Summary of Soil Sampling Requirements

Sample Analyte ^a	Sample Location	Analytical Method	Minimum Detectable Concentrations
Total VOCs	Roller Coaster Lagoons North Disposal Trench	8240 ^b	Analyte-specific estimated quantitation limits ^c
Total SVOCs	Roller Coaster Lagoons North Disposal Trench	8270 ^b	Analyte-specific estimated quantitation limits ^c
RCRA metals Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	Roller Coaster Lagoons North Disposal Trench	ICP except Hg ^d = CVAA 1311/6010	1 mg/kg 20 mg/kg 0.5 mg/kg 1 mg/kg 0.3 mg/kg 0.05 mg/kg 0.5 mg/kg 1 mg/kg
Total petroleum hydrocarbons	Roller Coaster Lagoons North Disposal Trench VCA Spill Area	8015 modified ^d	Gasoline - 25 mg/kg Diesel - 0.5 mg/kg
Total pesticides	Roller Coaster Lagoons North Disposal Trench	8080 ^b	Analyte-specific estimated quantitation limits ^c
Gamma Spectroscopy	Roller Coaster Lagoons North Disposal Trench	HASL 300, 4.5.2.3 ^e	1 pCi/g

^a All sample matrices are soil.

^b EPA Test Methods for Evaluating Solid Waste, 3rd Edition, Parts 1-4 SW-846 (EPA, 1986).

^c Estimated Quantitation Limit (EQL) as given in SW846 Method, U.S. EPA

^d 28 days for mercury

^e Environmental Measurements Laboratory Procedure Manual, HASL-300, U.S. Department of Energy

CVAA - Cold Vapor Atomic Absorption Spectroscopy

HASL - Health and Safety Laboratory

ICP - Inductively Coupled Plasma Spectroscopy

mg/kg - Milligrams per kilogram

pCi/g - Picocuries per gram

Figure 4-2 is a generalized schematic of a split-barrel sampler. As shown in Figure 4-2, soil within the 2-ft split-spoon sample will be retained for both sample collection and field screening. Starting at the nose of the split-spoon, the first two portions will be retained for total VOCs and total SVOCs analysis. The next portion of the sample will be retained for field screening using the volatiles headspace method and colorimetric testing for TPH. The remaining four portions of

the sample will be retained for TPH, pesticides, RCRA metals, and gamma spectroscopy analysis. Two successive split-spoon samples may have to be collected in order to obtain sufficient sample aliquot for the analytical laboratory.

4.1.2.3 Other Local Areas

Biased soil samples will be collected at areas where surface-soil stains from debris spills are visible, and where hazardous materials were located prior to the VCA removal process. The biased sample locations will be selected in the field based on the results of field screening. Field screening will include headspace testing for volatiles, colorimetric testing for TPH, and beta/gamma screening. Up to 10 samples will be collected from the surface to 1 ft in depth. The samples will be analyzed at the laboratory for total VOCs, total SVOCs, TPH, total pesticides, and RCRA metals. Samples for gamma spectroscopy will only be submitted for laboratory analysis if beta/gamma radiation is detected by field screening. Table 4-1 presents a summary of the sampling requirements.

Enlargement of split-barrel sampler

NOT TO SCALE

NOTE

The steps are subject to change if field screening detects contamination.

3403A21 05/17/96

Figure 4-2
Schematic of the Split-Barrel Sampler

5.0 Waste Management Plan

The requirements for management of the wastes derived from the characterization will be determined based on regulatory requirements, field observations, and the results of on-site and off-site laboratory analysis of site characterization samples. Administrative controls (e.g., decontamination procedures and characterization strategies) will minimize hazardous waste generated during site investigation activities. Hazardous and/or mixed waste, if it is generated, shall be managed in accordance with DOE Orders and U.S. Department of Transportation (DOT) and RCRA regulations. Decontamination activities shall be performed in accordance with approved procedures as specified in the field sampling instructions and will be designed according to the contaminants of concern present at the site.

5.1 Waste Minimization

The characterization activities have been designed to minimize the amount of investigation-derived waste (IDW) produced. Waste segregation will be implemented to the waste stream. One source of contamination, the debris, has already been removed from the lagoons and trenches. This will help to minimize the contamination of investigation equipment entering the sites, which may result in the production of lesser amounts of decontamination rinsate.

5.2 Potential Waste Streams

Based on preliminary sampling results and process knowledge, no radioactive wastes or mixed wastes are anticipated. It is also unlikely that hazardous wastes will be produced from the lagoons and trenches. It is anticipated that all hazardous constituent concentrations, if present, will be low. The reagents used in colorimetric testing for TPH will produce small quantities of hazardous waste. This small (volume) waste stream will be segregated and managed separately from the other waste streams.

Wastes generated during the characterization activities may include, but are not limited to, the following:

- Decontamination rinsate
- Contaminated disposable sampling equipment (e.g., plastic, paper, aluminum foil, and sample containers)
- Personal protective equipment (PPE)

- Contaminated soil
- Soil contaminated by colorimetric TPH testing

5.3 Waste Determination

The results of the characterization studies will determine the status of the IDW.

Solid materials other than soil wastes are waste only by virtue of contact with contaminated media. The same is true of decontamination rinsate. Therefore, sampling and analysis of the IDW, separate from site characterization analyses, will not be required.

5.4 Waste Management

The data generated as a result of contaminant characterization will be used to assign the appropriate waste type (i.e., hazardous, mixed, low-level waste [LLW], TPH, or unregulated) to the IDW. If mixed waste is produced, the appropriate waste status data must also be obtained or developed in accordance with the Transuranic Waste (TRU) Pad waste acceptance criteria. The number of samples necessary to satisfy the various mixed waste management requirements (e.g., RCRA and NVO-325) will depend on the volume of IDW produced and/or the variability in the analytical values for the IDW produced.

Administrative controls will ensure that no additional contaminants are added to the waste. For administrative purposes, the waste will be managed as at least three waste streams: soil, PPE, and decontamination rinsate. Each waste stream will be segregated, and additional segregation may occur within each waste stream. For example, the soil waste and decontamination rinsate produced from each separate study area will be segregated. Wastes will be managed on site within the defined site boundaries until analytical results are received to determine the disposition of the waste. Liquid low-level or mixed wastes, if present, will be absorbed or solidified prior to disposal or storage. Access to wastes temporarily staged at the project site will be controlled through placing the waste packages or waste soil piles within an access-controlled area. All waste containers will be covered and/or locked (e.g., drums), and appropriately labeled. Waste containers shall be periodically inspected while awaiting laboratory results to ensure that the waste containers are not leaking or damaged.

Most IDW streams will be placed in waste containers, such as DOT-approved drums. The contents of each container will be recorded and each container shall be appropriately marked and labeled in accordance with RCRA and DOE requirements.

6.0 Reporting

Following approval of this CAIP, a tentative schedule of activities (in working days) is as follows:

- Day 0: Preparation for field work will begin.
- Day 5: Notify NDEP of upcoming field operations.
- Day 15: Field work will begin.
- Day 55: Validated laboratory analytical sample data will be received.
- Day 100: The Corrective Action Decision Document (CADD) will be written.

The following information will be reported in the CADD:

- Introduction, including purpose, scope, an FFACO cross walk, and a discussion on the need for further action
- The results of the corrective action investigation
- A corrective measure study including initial screening of alternatives, evaluation of alternatives, and comparison of alternatives
- Recommended alternative

7.0 References

DOE/AL. See U.S. Department of Energy, Albuquerque Operations Office.

EPA. See U.S. Environmental Protection Agency.

Federal Facilities Agreement and Consent Order (FFACO) of 1996. Prepared by the Nevada Division of Environmental Protection, U.S. Department of Energy, and U.S. Department of Defense.

DOE. See U.S. Department of Energy.

U.S. Department of Energy, Albuquerque Operations Office. 1992. *Environmental Monitoring Plan for the Tonopah Test Range, Nevada.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1996. *Corrective Action Unit Work Plan, Tonopah Test Range, Nevada, Draft Report.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1994a. *Resource Conservation and Recovery Act Industrial Sites Quality Assurance Plan, Nevada Test Site, Nevada, Rev. 0.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1994b. *Environmental Restoration Project Health and Safety Plan, Rev. 1.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1992a. *Tonopah Test Range Tour.* April 28, 1992. Las Vegas, NV.

U.S. Environmental Protection Agency. 1994. *Guidance for the Data Quality Objectives Process (EPA QA/G4).* Washington, DC.

U.S. Environmental Protection Agency. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd edition.* Washington, DC.

Appendix A
Voluntary Corrective Action Activities and
Sample Results

INTERNATIONAL
TECHNOLOGY
CORPORATION

September 15, 1995

Project No.: 760491.02010000

Kevin Cabble
Environmental Restoration Division
U.S. Department of Energy
Nevada Operations Office
P.O. Box 98518
Las Vegas, Nevada 89193-8518

Contract No. DE-AC08-92NV10972

Summary of Information Regarding Waste from Roller Coaster Sewage Lagoons

Dear Mr. Cabble,

The following is a summary of information regarding three drums discovered during unexploded ordnance removal at the North Trench at the Roller Coaster Sewage Lagoons.

Suspected Contamination in Soils: The North Trench at this site contained many weathered sacks of plaster and Portland cement. An eight-foot diameter, open-top steel vessel was lying on its side in the trench. Many cardboard boxes containing plastic-wrapped soil samples were contained within this steel vessel. UXO and debris removal ceased upon discovery of these soil samples. Four composite samples were collected from the soils in the packages and analyzed for TCLP metals, explosives, and radionuclides. These parameters were selected based on the markings on the boxes indicating "crater" or "shot" numbers. Field observations and radiological screening do not indicate any contamination. It is surmised that these soil samples were collected as part of the Plowshare Program cratering dynamics experiments in the 1950's and 1960's. The samples might have resulted from ejecta particle size studies from conventional blasts. In any event, no contamination was found as interpreted from the analytical data on these samples. Debris removal activities resumed after the data were reviewed.

North Trench Drums: *Drum #1* - After resuming activities subsequent to the soil package data results, a drum was discovered lying on its side on a mound of soil near the center of the trench. It was obvious that the drum had leaked, although it could not be determined when this leak had occurred. This drum will be hereafter named "*Drum #1*." It was suspected that this drum contained paint or paint thinner. Work was immediately halted, as an "unknown" substance had been encountered. It was determined that a "HAZCAT" (hazardous materials

Regional Office

4330 South Valley View, Suite 114 • Las Vegas, Nevada 89103-4047 • 702-295-5543
LV/9-15-95/G:\TTR\ORDNANCE\DRUMEXT.WPD

IT Corporation is a wholly owned subsidiary of International Technology Corporation

categorization) should be performed and samples collected in EPA Level B (supplied air). The results of the HAZCAT indicated a concentration of approximately 300 ppm of organic vapors in drum #1. A sample of the solid orange material was collected as there was no liquid in the drum. The sample was analyzed for TCLP volatiles, TCLP semivolatiles, and TCLP metals. According to analytical results received on July 24, 1995, only barium and cadmium were measured above the detection limit, but both were far below the regulatory threshold. Volatiles, semivolatiles and other metals were not detected.

Drum #2 - After debris removal continued, another drum was discovered in the trench. This drum (drum #2), was found intact and was packaged into an overpack. While in the overpack, a HAZCAT was performed in EPA Level C (full-face air purifying respirator) on the contents of this drum. According to the analytical results received on July 28, 1995, the sample was found to contain 2-methylphenol, 4-methylphenol, heptachlor, endrin, and selenium above the respective regulatory thresholds. Other volatiles, semivolatiles, and pesticides/PCB may have been present in the sample above the regulatory threshold, but were not seen because of an extremely high detection limit for these substances. The high detection limit resulted from the fact that the sample consisted of a oily substance. Oils contain many organic substances that can mask particular analytes. A special analytical procedure was conducted on the remaining sample in the laboratory. A gel permeation chromatography (GPC) cleanup procedure was attempted to reduce the effects of the matrix interference. This proved to be unsuccessful. The overpack containing drum #2 has been moved to the SNL hazardous waste accumulation facility at Area 3.

Drum #3 - A third drum was identified in a pile of debris removed from the trench. After the front end loader bucket emptied its contents on the ground outside of the trench, workers noticed the drum leaking liquid from its seam on the ground. This drum was containerized in an overpack drum and a liquid sample was collected from the contents at the same time as drum #2. The drum was analyzed for the same parameters as drum #2. According to analytical results received on July 28, 1995, no substances were reported above the regulatory threshold, but the same problem with high detection limits was encountered as this liquid is an oily substance. A GPC cleanup procedure was also attempted on this sample with no improvement of detection limits. The stained soil on the ground from this leaking drum was scooped up and placed on visqueen. This drum remains at the Roller Coaster Sewage Lagoons pending placement in a larger overpack drum, as the top of the overpack was dented so as to prevent a lid from being secured. A drum liner was placed upside down over the top of the overpack drum to prevent precipitation from getting in the drum.

Current Status: As tabulated in the enclosed memorandum from Cheryl Swaton to Randy Dubiskas, five drums of waste were transferred to Sandia National Laboratories waste management facility at TTR. Among these drums were Drum #2, all the soil from the spill site of Drum #1, a small quantity of the soil from the spill site of Drum #3, and associated personal protective equipment (i.e. Tyvek®, gloves, and booties). Sandia will dispose of the

K. Cabble

3

September 15, 1995

waste through their generator ID number.

The remaining waste at the North Trench consists of Drum #1, which has been placed in a double plastic drum liner. This drum contains no liquid. Drum #3 is still contained within an 85-gallon salvage drum with a drum liner over the top of the salvage drum. This drum contains approximately 20 gallons of oily liquid. Approximately eight cubic yards of soil has been scraped from a stained area caused by liquid from Drum #3. This soil was placed on visqueen and covered with visqueen.

As for the waste remaining staged at the North Trench, additional characterization efforts will be conducted in the next week or two. This characterization effort will involve sampling the soil stockpiled on visqueen for TCLP volatiles, TCLP semivolatiles, TCLP pesticides, and total petroleum hydrocarbons. Three composite samples will be collected from approximately uniformly spaced points on the pile. One grab sample will be collected in a biased manner from a point near the base of the pile with visible staining. This sample will be analyzed for total volatiles, total semivolatiles, and total pesticides. In addition, the scraped area will be sampled for the same TCLP parameters and TPH to verify complete removal of the spill. Another solid sample will be collected from the residue from within Drum #1, and analyzed for total volatiles, total semivolatiles, total pesticides/PCBs. If RCRA constituents are detected in the stockpiled soil at any level, then it will be assumed that those concentrations are present in Drum #3 above regulatory limits. This should yield sufficient data for proper disposal. Drum #3 will then be placed into a larger overpack drum, so as to secure a lid on the contents, as will Drum #1. After full characterization of these wastes, arrangements will be made to ship all of the stockpiled soil, Drum #1, and Drum #3 as hazardous waste, or petroleum hydrocarbon contaminated soils, or as nonhazardous waste depending on the analytical results.

Any soil contamination resulting from the original use of the sewage lagoons for sewage treatment and the contaminants disposed in the North Trench will be addressed in a subsequent characterization plan. A full site characterization of the Roller Coaster Sewage Lagoons is planned for fiscal year 1996.

Please call me at (702)794-1700 if you have any questions or need more information regarding the contents of this report.

Sincerely,
IT CORPORATION

Richard A. "Randy" Dubiskas
Project Manager

K. Cabbie

4

September 15, 1995

RAD:rad

cc: Pete Sanders, EPD
Roger Smith, SNL