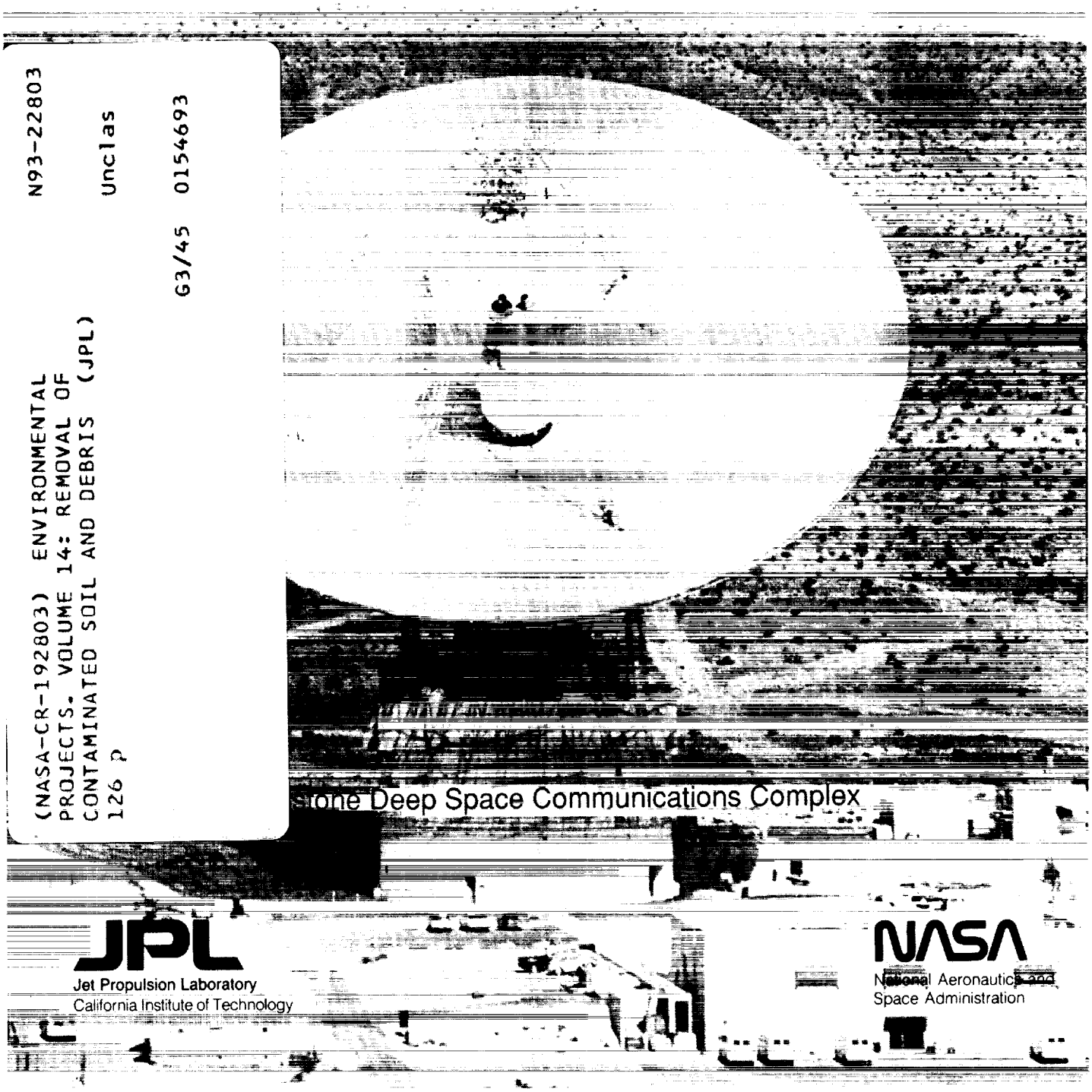
JPL Publication 87-4

March 15, 1992

Environmental Projects: Volume 14

Removal of Contaminated Soil and Debris



JPL
Jet Propulsion Laboratory
California Institute of Technology

NASA
National Aeronautics and
Space Administration

JPL Publication 87-4

March 15, 1992

Environmental Projects: Volume 14

Removal of Contaminated Soil and Debris

Goldstone Deep Space Communications Complex

JPL
Jet Propulsion Laboratory
California Institute of Technology

NASA
National Aeronautics and
Space Administration

The research described in this publication was carried out by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

ABSTRACT

The Goldstone Deep Space Communications Complex (GDSCC), located in the Mojave Desert about 40 miles north of Barstow, California, and about 160 miles northeast of Pasadena, is part of the National Aeronautics and Space Administration's (NASA's) Deep Space Network, one of the world's largest and most sensitive scientific telecommunications and radio navigation networks. The Goldstone Complex is managed, technically directed, and operated for NASA by the Jet Propulsion Laboratory (JPL) of the California Institute of Technology in Pasadena, California.

Numerous diverse activities at the GDSCC are carried out in support of six parabolic dish antennas. Some of these activities can result in possible spills or leakages of hazardous materials and wastes stored both above ground in steel drums and below ground in underground storage tanks (USTs). These possible leaks or spills, along with the past practice of burial of solid debris and waste in trenches and pits, could cause local subsurface contamination of the soil.

In 1987, JPL retained Engineering-Science, Inc. (E-S), Pasadena, California, to identify the specific local areas within the GDSCC with subsurface soil contamination. The E-S study determined that some of the soils at the Apollo Site and the Mars Site were contaminated with hydrocarbons, while soil at a nonhazardous waste dumpsite at the Mojave Base Site was contaminated with copper. The findings of these subsurface soil contaminations at the GDSCC are discussed in JPL Publication 87-4, Environmental Projects: Volume 5, Part One, Study of Subsurface Contamination, April 15, 1988.

In April 1991, E-S submitted a report (PE 209) to JPL that described the excavation, analyses, and removal of the above-described contaminated soils from the GDSCC. This present volume is a JPL-expanded version of the PE 209 E-S report.

This present volume reports that all subsurface contaminated soils at the GDSCC now have been excavated, removed, and disposed of in an environmentally acceptable way, and the excavations have been backfilled and covered in accordance with accepted Federal, State, and local environmental rules and regulations.

GLOSSARY

BLM	U.S. Bureau of Land Management
Cu	Copper
deg	degree(s)
dia	diameter
DSCC	Deep Space Communications Complex
DSN	Deep Space Network
DSS	Deep Space Station
EO	Electro-optical
EPA	U.S. Environmental Protection Agency (also U.S. EPA)
E-S	Engineering-Science, Inc., Pasadena, California
ft	foot (feet)
GCF	Ground Communications Facility
GDSCC	Goldstone DSCC
HEF	High-Efficiency (Antenna)
in.	inch(es)
JPL	Jet Propulsion Laboratory
kg	kilogram(s)
km	kilometer(s)
m	meter(s)
MBGA	M. B. Gilbert Associates, Long Beach, California
MBS	Mojave Base Site (Goldstone)
mg	milligram(s)
mi	mile(s)
MTF	Microwave Test Facility
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NOCC	Network Operations Control Center
NTC	National Training Center (U.S. Army)
ppm	parts per million
R&D	Research and Development
SBC/DEHS	San Bernardino County/Department of Environmental Health Services
SCANN	Sensor for Control of Arterials and Networks
SETI	Search for Extraterrestrial Intelligence
SPC	Signal Processing Center
STS	Space Transportation System (Space Shuttle)
TDA	Office of Telecommunications and Data Acquisition (JPL)
TDS	Total Dissolved Solids
TRPH	Total Recoverable Petroleum Hydrocarbons
U.S. EPA	see EPA
UST	Underground Storage Tank
VLBI	Very Long Baseline Interferometry

CONTENTS

APPENDIXES

Figures

Figures (Continued)

Table

SECTION I

INTRODUCTION

A. BACKGROUND OF SUBSURFACE SOIL CONTAMINATION AT THE GDSCC

The Goldstone Deep Space Communications Complex (GDSCC), located in the Mojave Desert about 40 miles north of Barstow, California, and about 160 miles northeast of Pasadena, is part of the National Aeronautics and Space Administration's (NASA's) Deep Space Network (DSN), one of the world's larger and most sensitive scientific telecommunications and radio navigation networks. The GDSCC is managed, technically directed, and operated for NASA by the Jet Propulsion Laboratory (JPL) of the California Institute of Technology in Pasadena, California. A detailed description of the GDSCC is presented in Section III of this report.

The GDSCC includes five distinct operational areas named Echo Site, Venus Site, Mars Site, Apollo Site, and Mojave Base Site. Within each of the first four sites is a Deep Space Station (DSS) that consists of at least one parabolic dish antenna and support facilities. Although there are four DSN operational sites at the GDSCC, there now are six operational parabolic dish antennas because two antennas are located at the Mars Site and two are at the Apollo Site. The Mojave Base Site, while it is part of the GDSCC, is not part of the DSN but is operated by the National Oceanic and Atmospheric Administration (NOAA).

Numerous diverse activities at the GDSCC are carried out in support of the six parabolic dish antennas. Some of these activities can result in possible spills or leakages of hazardous materials and wastes that are stored either above ground in steel drums or below ground in underground storage tanks (USTs). In addition, the past practice of burial of solid debris and wastes in trenches and pits possibly could lead to leaching out of hazardous chemicals into the surrounding soil. Both of these storage techniques, therefore, could cause possible subsurface contamination of the soil of local areas within the GDSCC.

B. IDENTIFICATION AND ANALYSES OF SUBSURFACE CONTAMINATED SOILS AT THE GDSCC

In 1987, Engineering-Science, Inc. (E-S), Pasadena, California, was retained by JPL to conduct a survey at the GDSCC to determine the specific local areas that exhibited subsurface soil contamination. The results of this survey were reported in JPL Publication 87-4, Environmental Projects: Volume 5, Part One, Study of Subsurface Contamination, April 15, 1988.

Because of previously observed spills, or because of past solid-waste disposal practices, areas at three sites at the GDSCC were suspected of having subsurface contamination of the soil.

A hand auger, or a CME-75 hollow-stem auger drill rig (Figure 1), was used to drill to various depths down to 15 ft to obtain samples from the suspected

soil. The presence of any organic vapors released during the boring operation was monitored by an HNu photoionization meter (Figure 2).[1]

All equipment used in the collection of soil samples was decontaminated prior to use. The sampling equipment, including a backhoe, was washed with biodegradeable soap and water and rinsed with tap water, methanol, and distilled water, followed by air drying (Figures 3, 4, and 5).

Soil samples were collected in California brass-ring samplers. Each sample was wrapped tightly in aluminum foil and the ends were capped with plastic caps. The samples then were placed into plastic bags, the bags sealed to prevent cross-contamination, and finally placed onto ice in coolers. E-S personnel then hand delivered the coolers, containing the soil samples, to the Brown and Caldwell Laboratory, Pasadena, California, for chemical analysis.

The results of this 1987 survey revealed three areas with subsurface contamination at the GDSCC: hydrocarbon-contaminated soils at specific local areas at the Apollo and Mars Sites, and copper-contaminated soil at a specific local area at the Mojave Base Site.

Based upon this survey, JPL decided to excavate and dispose of these contaminated soils in an environmentally approved manner. The excavation and disposal of these contaminated soils were carried out in May and June 1990 and are the subjects of this present report.

[1] The HNu photoionization meter is a device to detect both the presence and amount of volatile organic materials including petroleum hydrocarbons. It is equipped with a small air pump to draw vapors past the sensor. It is useful both as a screening device (to see whether petroleum hydrocarbons are present) and as a measuring device (to indicate how much of the organic volatiles are present). The latter value can indicate to the HNu operator whether protective measures should be taken by personnel in the area.

Figure 1. Typical Drilling Operation for Soil Samples with CME-75 Hollow-Stem Auger Drill

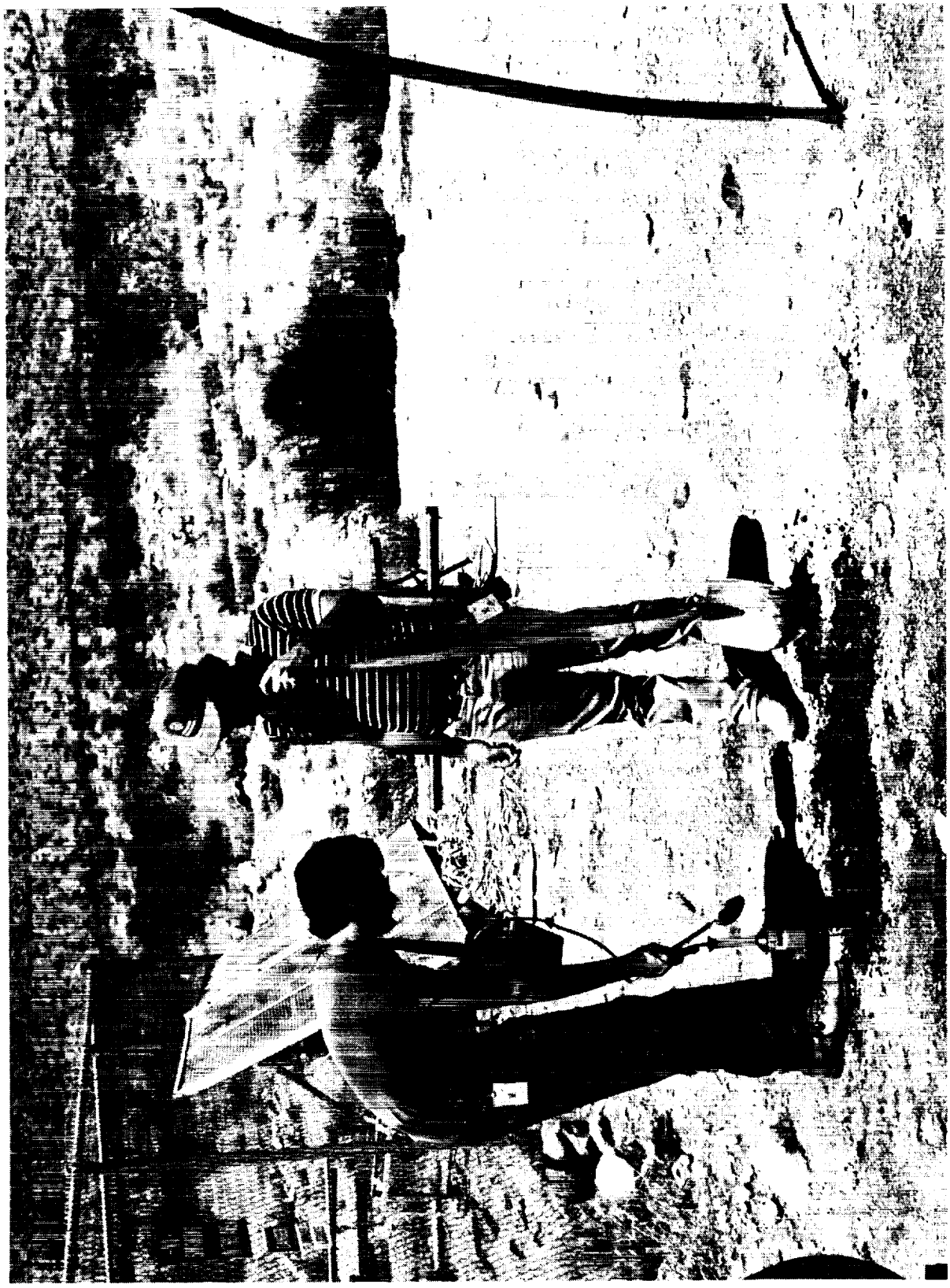


Figure 2. HNu Photoionization Meter "Sniffing" for Volatile Organic Materials at the Hazardous-Materials Storage Area at the Mars Site

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

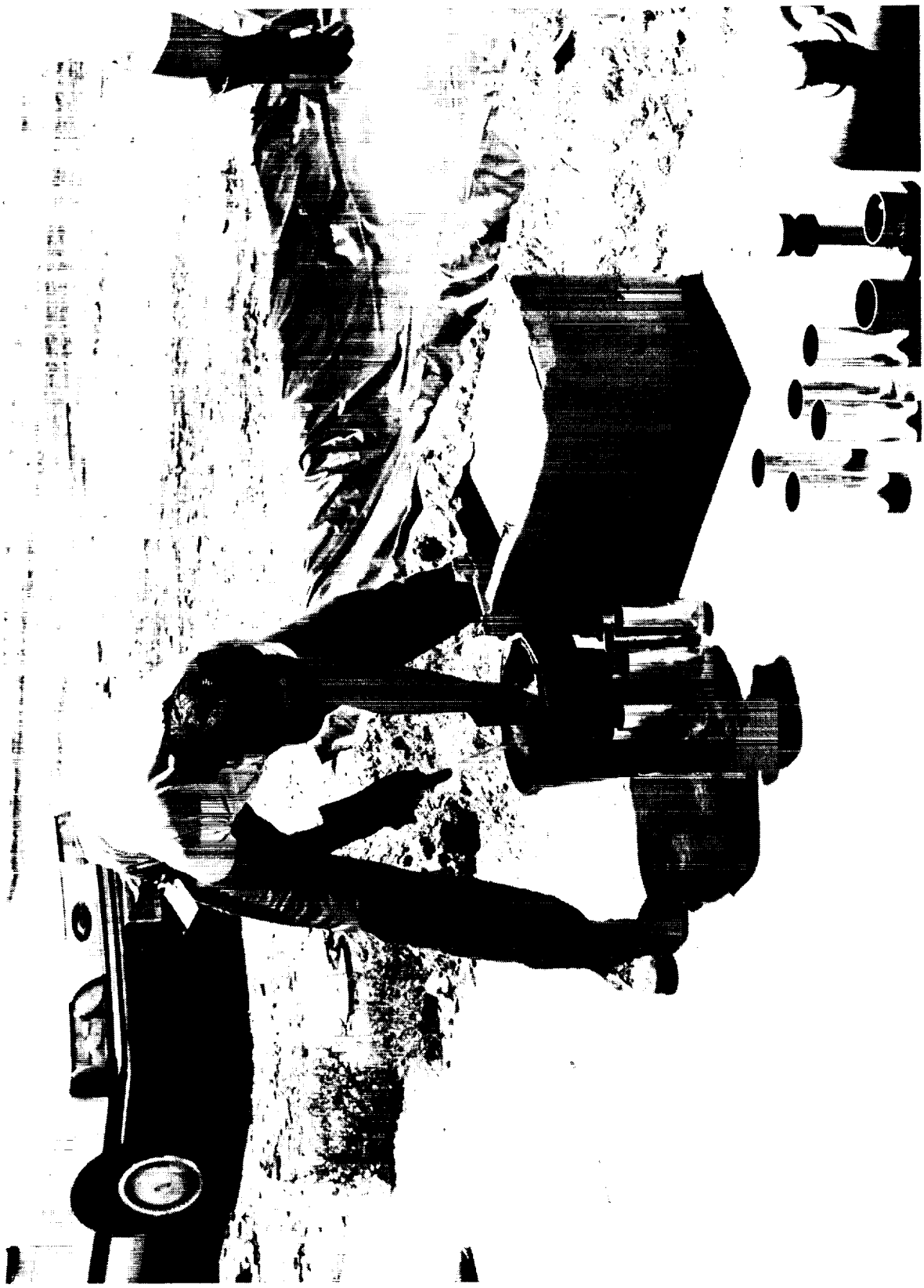


Figure 3. Cleaning and Decontamination of Soil-Sample Tubes Prior to Use

Figure 4. Cleaning and Decontamination of Backhoe Bucket and California Brass-Ring Soil Sample Tubes Prior to Use

Figure 5. Cleaned and Decontaminated Soil-Sample Tubes Stored and Ready for Use

SECTION II

EXCAVATION AND DISPOSAL OF SUBSURFACE CONTAMINATED SOILS AT THE GDSCC

A. INTRODUCTION

During May and June 1990, subsurface contaminated soil was excavated from the specific local areas at the Apollo, Mars, and Mojave Base Sites that previously had been determined to be contaminated (see Section I). The Contractor, who performed the excavation work, is Jenkin Construction Co., Long Beach, California, while the work was overseen by Engineering-Science, Inc. (E-S), Pasadena, California. All soil-sampling procedures were conducted under the supervision of Carol J. Craiglow, employed by E-S as a registered geologist for the State of California.

B. GENERAL EXCAVATION AND DISPOSAL PROCEDURES

Because of the conglomeratic nature of the soil at the contaminated sites, a manual-drive soil sampler could not be used. Thus, soil samples were obtained from a backhoe bucket and placed into clean, stainless-steel sleeves (2-in. dia, 3-in. length, Figure 6). The samples were packed firmly to prevent headspaces. The sleeve ends then were covered with Teflon tape and capped with plastic endcaps.

During the excavations, a Gastech Model 1314 Hydrocarbon Surveyor was used to determine both the lateral and vertical extents of the excavations. Excavations were deemed complete when soil sample analyses showed hydrocarbon levels to be below 1000 mg/kg.

For copper-contaminated soils, excavations were deemed complete when the soil sample analyses revealed copper levels to be below 150 mg/kg.

After being labeled with pertinent sample identification information, the sample sleeves were placed into reclosable plastic bags and placed on ice for shipment for analyses to Edward S. Babcock & Sons, Inc., Riverside, California, a California state-certified laboratory (Figure 7). Analyses were carried out in accordance with laboratory methods prescribed by the U.S. Environmental Protection Agency (EPA).

The chain-of-custody records and the results of the analyses for both hydrocarbons and metals in the GDSCC samples are presented in Appendix A.

With approval from Ronald A. Ripley, Inspector for the San Bernardino County Department of Environmental Health Services (SBC/DEHS), the excavated hydrocarbon-contaminated soils from both the Apollo and Mars Sites were transported to a designated storage area at the Echo Site.

On March 8, 1991, these soils were incorporated into a desert-mix base material that was used in the asphalt paving of an 1800-ft paved road that leads to the entrance of the GDSCC landfill. Correspondence with Mr. Ripley, concerning the removal and disposal of the hydrocarbon-contaminated soils excavated from the Apollo and Mars Sites, is presented in Appendix B.

Figure 6. Packing Soil Sample into a Brass Sleeve from a Backhoe Bucket

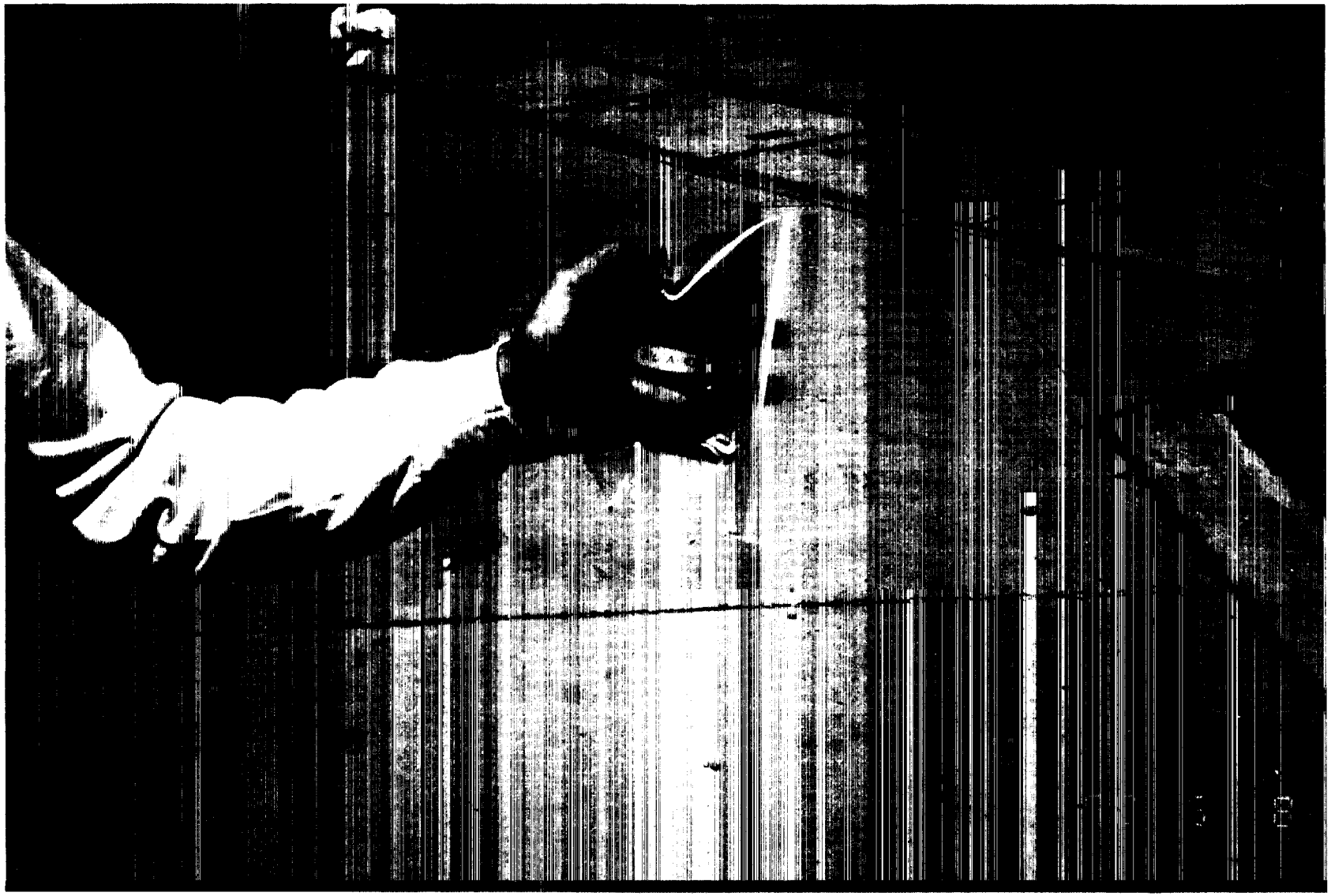


Figure 7. Typical Soil Sample Ready to be Placed on Ice for Transport to a State-Certified Analytical Laboratory

The copper-contaminated soil from the Mojave Base Project physically was removed from the GDSCC and trucked to the U.S. Ecology hazardous-material disposal site at Beatty, Nevada. The hazardous-waste manifests for the removal of the copper-contaminated soils from the GDSCC are presented in Appendix C.

C. SPECIFIC LOCATIONS OF EXCAVATIONS AND ANALYSES OF THE EXCAVATED SOILS

The following is a detailed report about the excavations of contaminated soils at the Apollo, Mars, and Mojave Base Sites.

1. Apollo Site

Figure 8 is a plot plan of the Apollo Site showing the location of the Hazardous-Materials Storage Area.

During the 1987 survey, seven borehole samples were removed from specific locations around the Hazardous-Materials Storage Area (Figure 9). In May and June 1990, these areas were excavated around the concrete storage pad that lies about 120 ft east of DSS 16, the 26-m (85-ft) antenna (Figure 10).

The first excavation area, named A-EX-1, lies along the western edge of the concrete pad. The excavation was 60 x 14 ft in size and had an average depth of 5 ft below grade (Figures 11 and 12).

On May 8, 1990, under the direction of Ronald A. Ripley, Inspector for the SBC/DEHS, six samples were obtained, as indicated in Figure 10. The locations of the six soil samples are as follows: Samples 2, 3, 5, and 6 were taken at the intersection of the concrete sidewall and the bottom of the excavation, while samples 1 and 4 were obtained from the bottom of the excavation.

The second excavation area, named A-EX-2 (see Figure 10), was adjacent to the northeast section of the concrete pad. The excavation was about 30 x 27 ft in size and had an average depth of 5 to 6 ft below grade (Figures 13 and 14).

On May 8, 1990, also under the direction of Mr. Ripley, three soil samples were taken: two from the intersection of the concrete sidewall with the bottom of the excavation and one from the bottom of the excavation.

The third and final excavation, named AP-EX-1, lies about 25 ft south of the concrete pad and measures 94 x 32 ft in size with an average depth of 7 ft below grade. On May 23, 1990, as depicted in Figure 10, nine soil samples were taken from this excavation.

EPA Method 418.1 for Total Recoverable Petroleum Hydrocarbons (TRPH) was the laboratory method used to analyze the 18 soil samples obtained from the Apollo Site. The TRPH level of each of the 18 Apollo soil samples is shown in Figure 10. Of the 18 samples analyzed, 17 had TRPH levels below 41 mg/kg. One sample, number 9 of the AP-EX-1 excavation, had a much higher level of 700 mg/kg. But even this very high TRPH value is still below the 1000 mg/kg TRPH level at which further action must be taken according to the SBC/DEHS.

The chain-of-custody records and analytical results of the TRPH levels for the Apollo Site soil samples are presented in Appendix A.

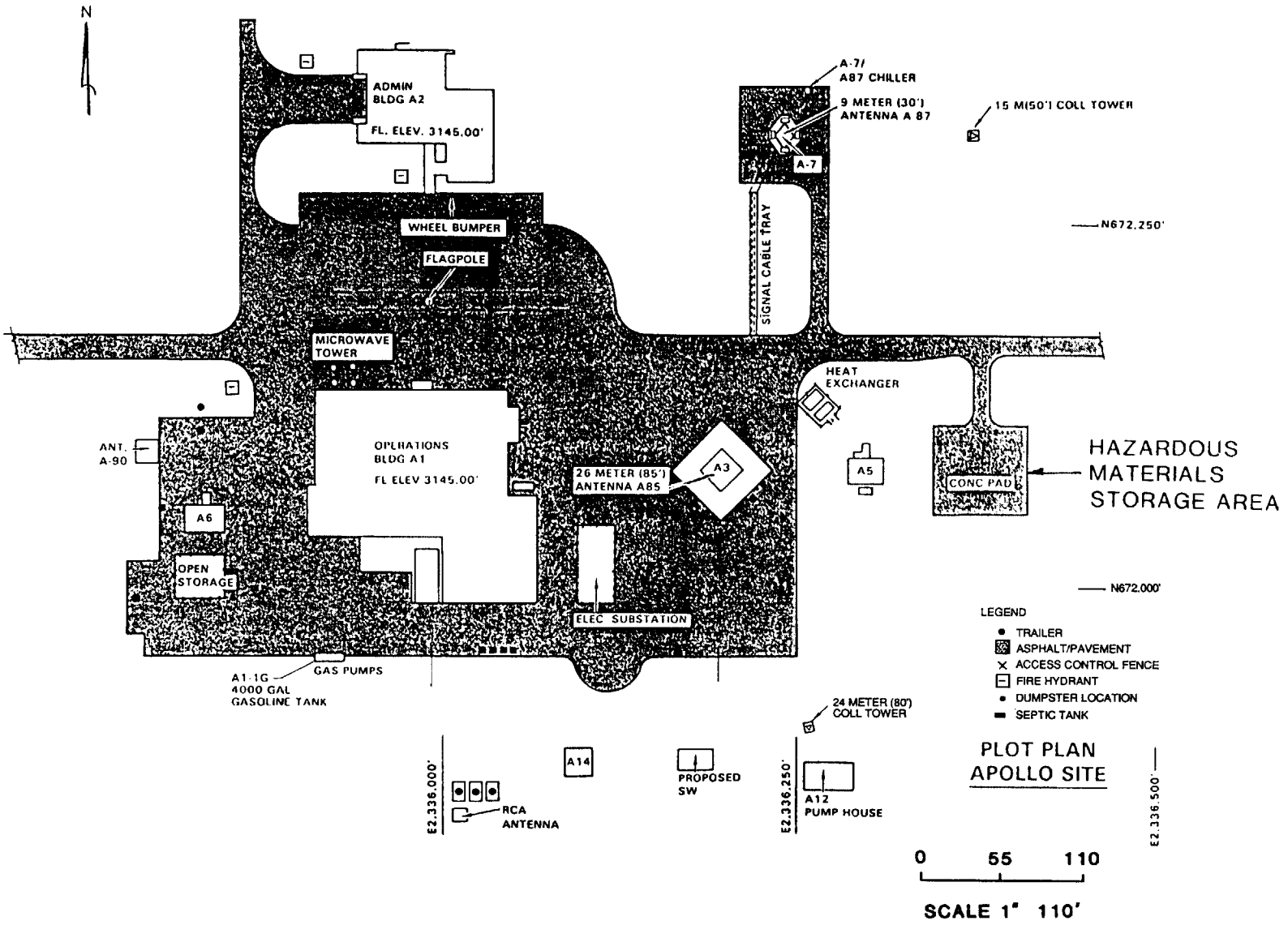


Figure 8. Apollo Site: Plot Plan Showing Location of Hazardous-Materials Storage Area

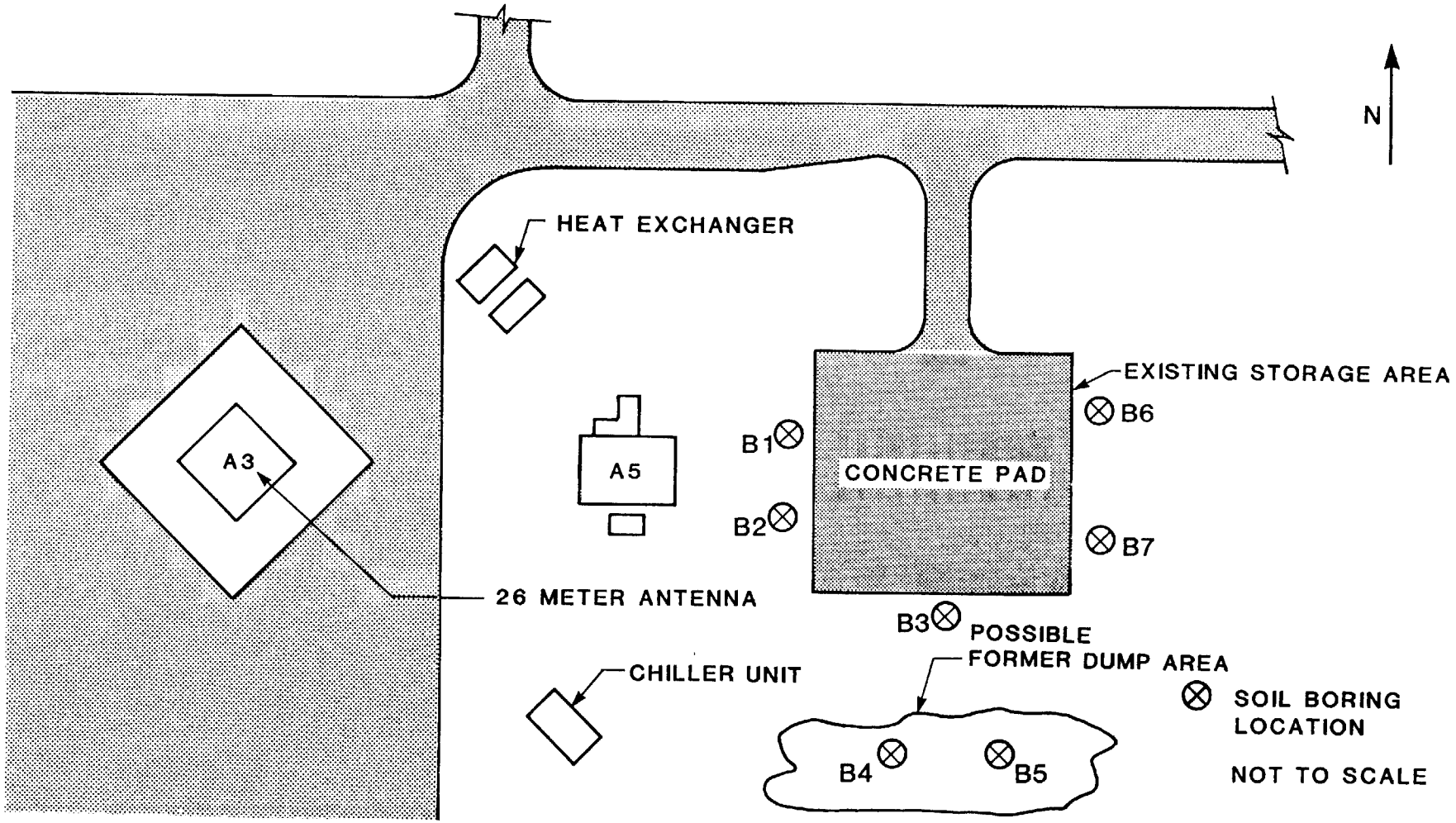


Figure 9. Apollo Site: Borehole Locations in both Existing Hazardous-Materials Storage Area and in Possible Former Dumpsite

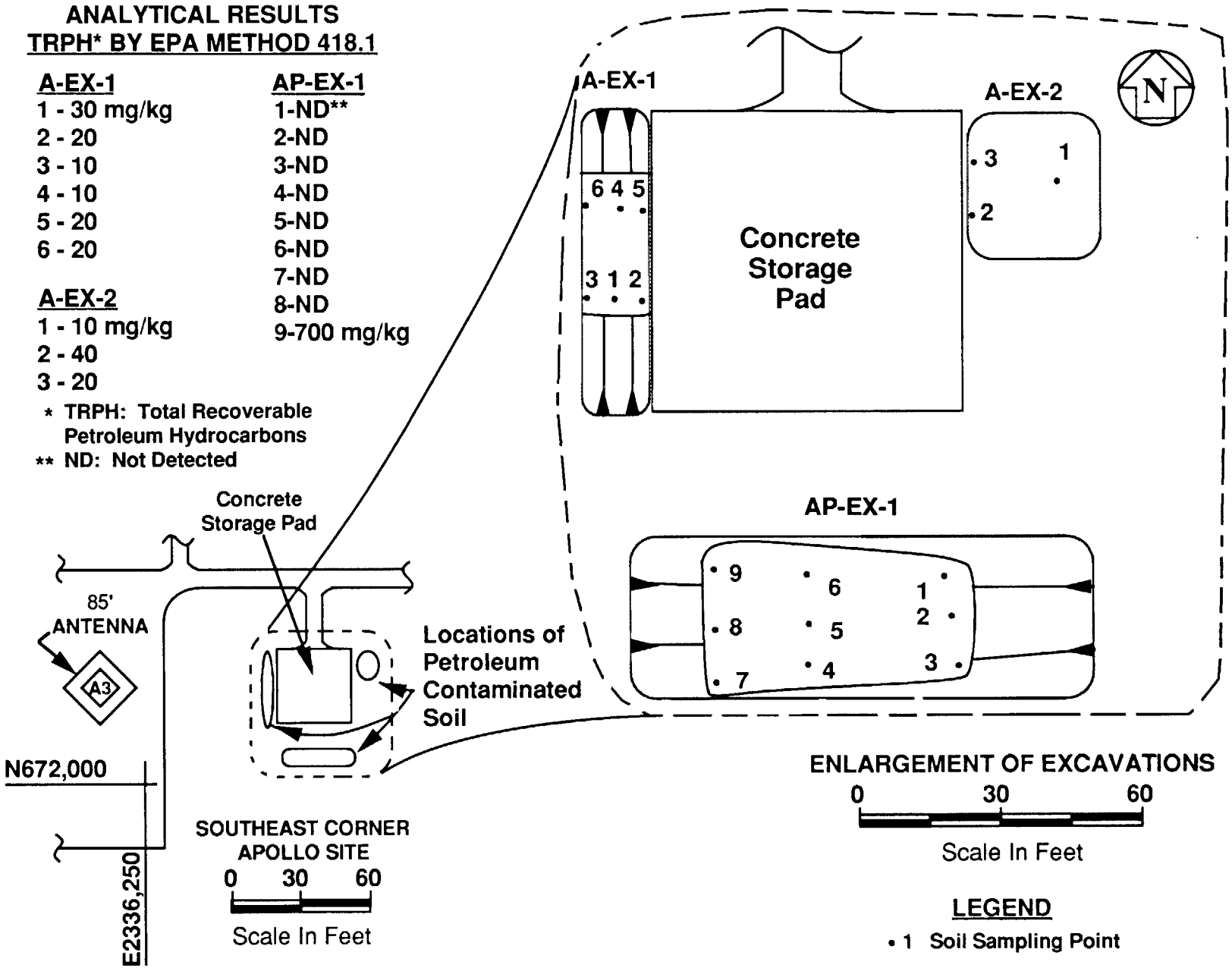


Figure 10. Apollo Site: Diagram of Excavations of Petroleum-Contaminated Soil

Figure 11. Apollo Site: View Looking North of A-EX-1 Excavation

Figure 12. Apollo Site: View Looking South of A-EX-1 Excavation

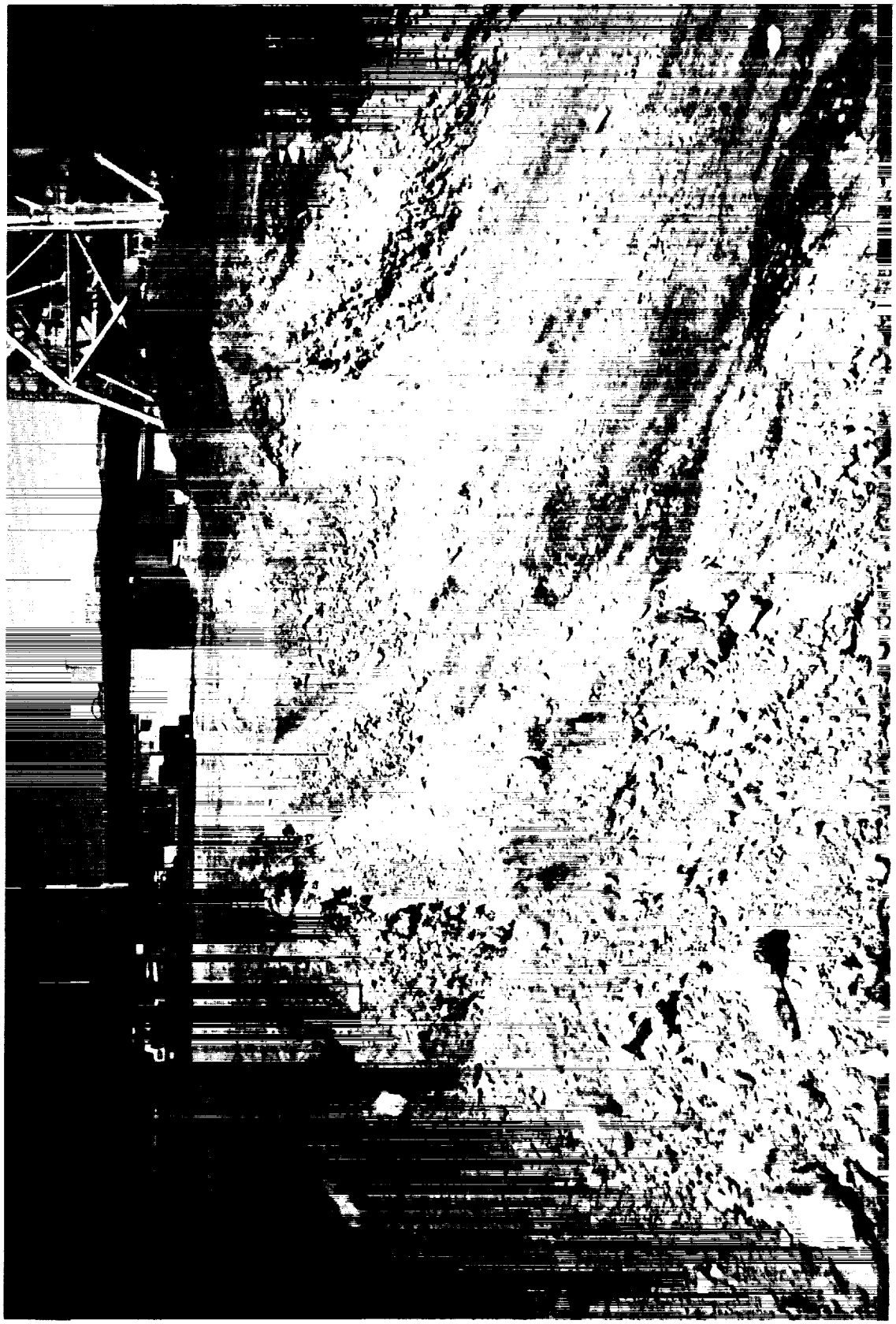


Figure 13. Apollo Site: View Looking West of A-EX-2 Excavation

Figure 14. Apollo Site: View Looking East of A-EX-2 Excavation

After these benign analytical results were reported to Mr. Ripley, Inspector for the SBC/DEHS, he gave verbal approval for the three excavation pits at the Apollo Site to be backfilled to grade with clean, native soil material made up of decomposed granite.

2. Mars Site

Figure 15 is a generalized partial plot plan of the Mars Site showing some details of the areas near Buildings G81 and G90. During the 1987 survey, four borehole samples were removed from areas near to these two buildings (Figure 16).

On May 23, 1990, two areas were excavated: a larger excavation located north of the asphalt driveway (45 x 30 ft in size with an average depth of 3 ft below grade), and a smaller excavation located about 17 ft northeast from the larger excavation (9 x 17 ft in size with an average depth of 1 ft below grade). Eight soil samples were originally taken from the bottom of the larger excavation, while only one sample was obtained from the bottom of the smaller excavation (Figure 17).

Collection of soil Sample Number 1 from the larger excavation is depicted in Figure 18, while collection of soil Sample Number 9 from the smaller excavation is shown in Figure 19.

EPA Method 418.1 for TRPH was the laboratory method used to analyze the nine soil samples taken from the Mars Site. The TRPH level of each of the nine Mars Site soil samples is shown in Figure 17. Although eight of the nine soil samples revealed no detectable levels of TRPH, Sample Number 8 taken from the southeast corner of the larger excavation showed a TRPH content of 2000 mg/kg. Because this level is far above the environmentally acceptable TRPH value of 1000 mg/kg, further excavation had to be carried out in this area.

On June 5, 1990, the southeast corner of the larger excavation was further excavated to a depth of 5 ft below grade. Three additional soil samples were obtained from the bottom of this extended excavation and all three samples showed no detectable levels of TRPH (see Figure 17). This indicated that whatever contaminated soil had been present was removed in the secondary excavation and the area now was free of subsurface contaminated soil.

After receiving these benign results from the 11 Mars Site soil samples at the larger excavation (all with no detectable TRPH), both the larger and smaller Mars Site excavations were backfilled to grade with clean native soil. The area to the north of the asphalt driveway was returned to its original condition and paved with asphalt. A clean soil cover was used to top the smaller excavation site.

The chain-of-custody records and analytical results of the TRPH levels for the Mars Site soil samples are presented in Appendix A.

3. Mojave Base Site

Figure 20 is a plot plan of the Mojave Base Site showing the location of an abandoned dump area. An overview of what the abandoned dumpsite looked like before it was cleaned up is shown in Figure 21.

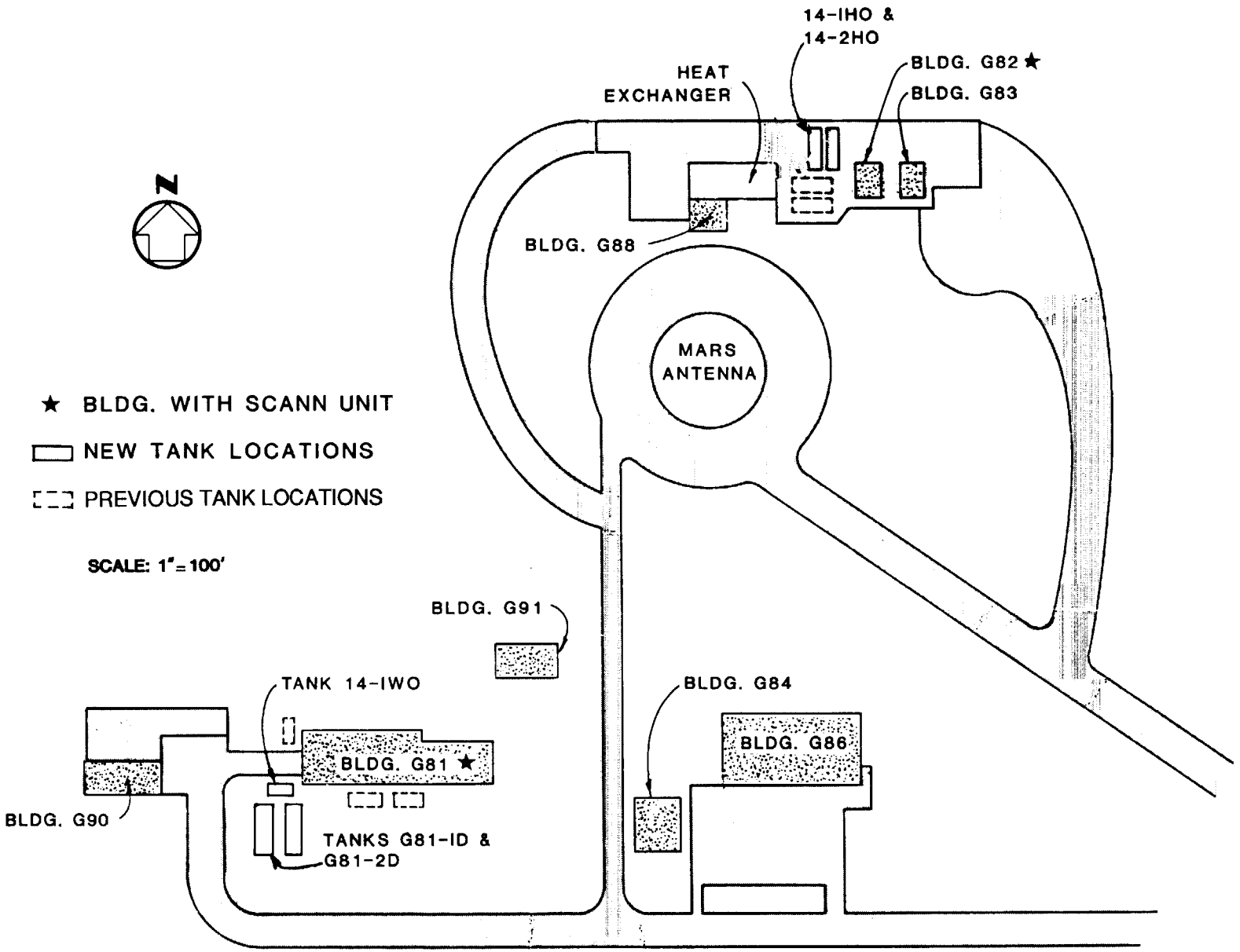


Figure 15. Mars Site: Generalized Partial Plot Plan Showing Locations of Five New USTs, SCANN Unit Buildings, and Locations of Five Old USTs that had been Removed

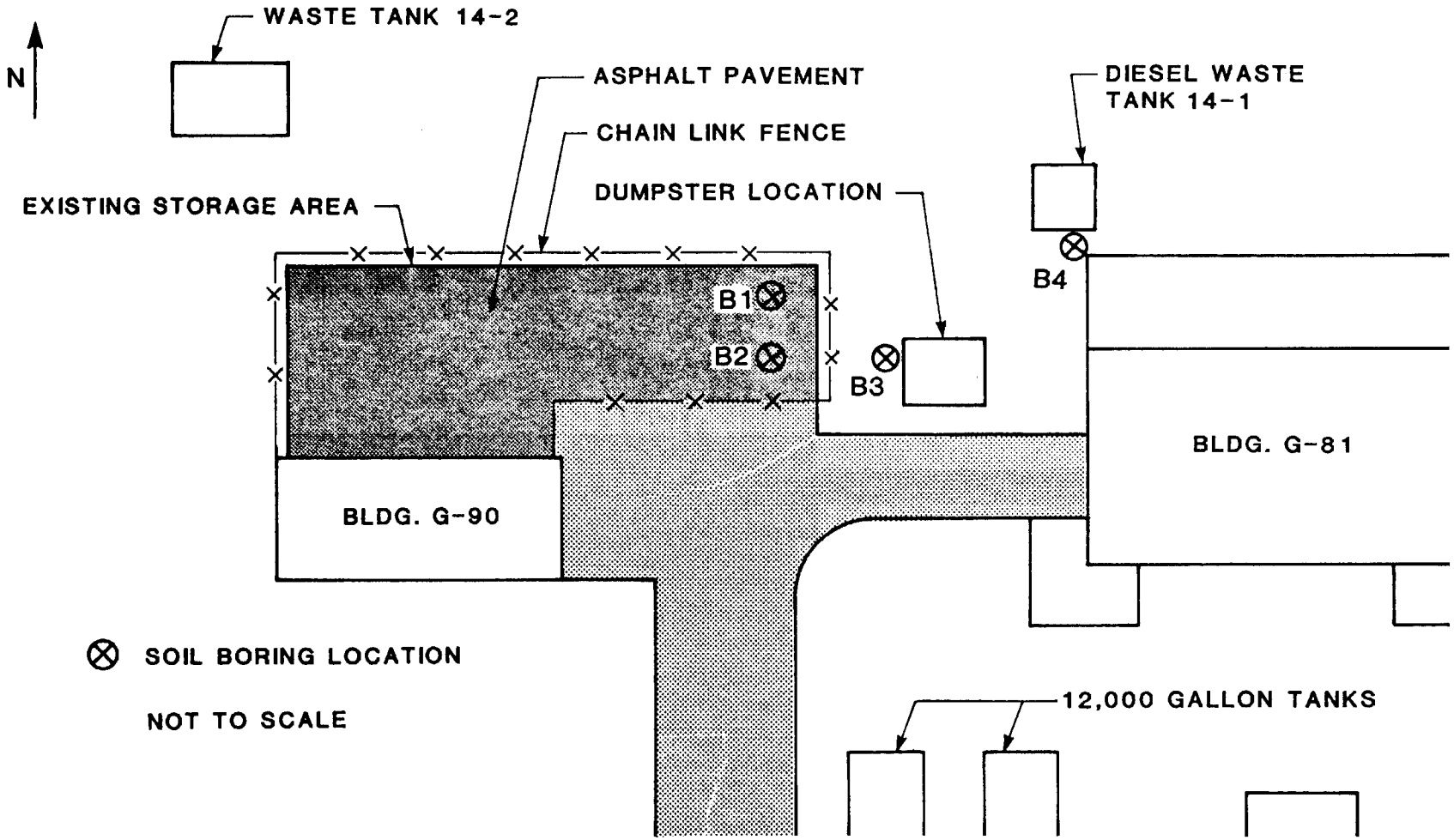


Figure 16. Mars Site: Locations of Hand-Dug Pits at the Hazardous-Materials and Waste-Storage Area near Building G-81

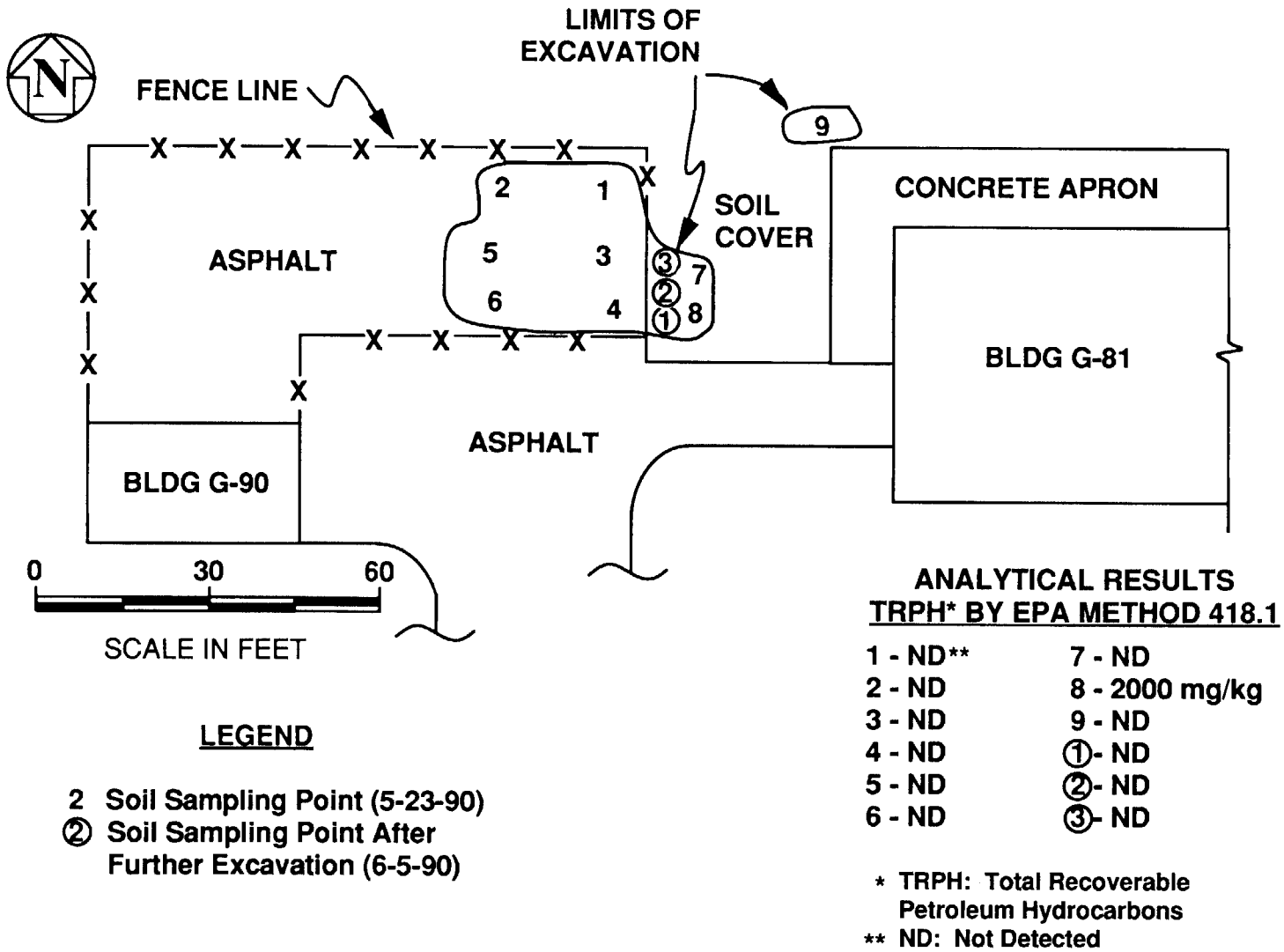


Figure 17. Mars Site: Diagram of Excavations of Petroleum-Contaminated Soil

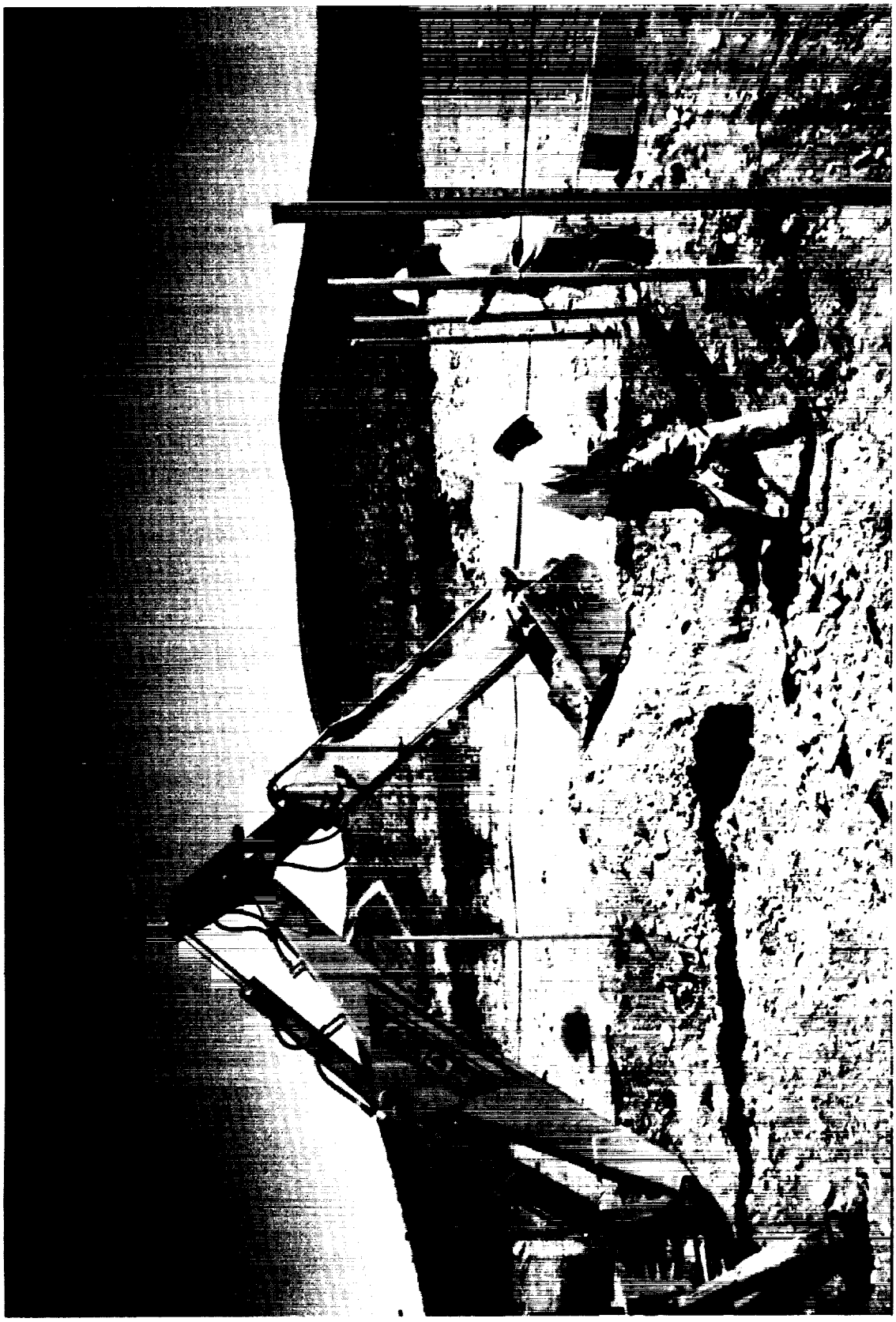


Figure 18. Mars Site: Collection of Soil Sample Number 1 from Larger Excavation Area

Figure 19. Mars Site: Collection of Soil Sample Number 9 from Smaller Excavation Area. Seventy-Meter Antenna in Background

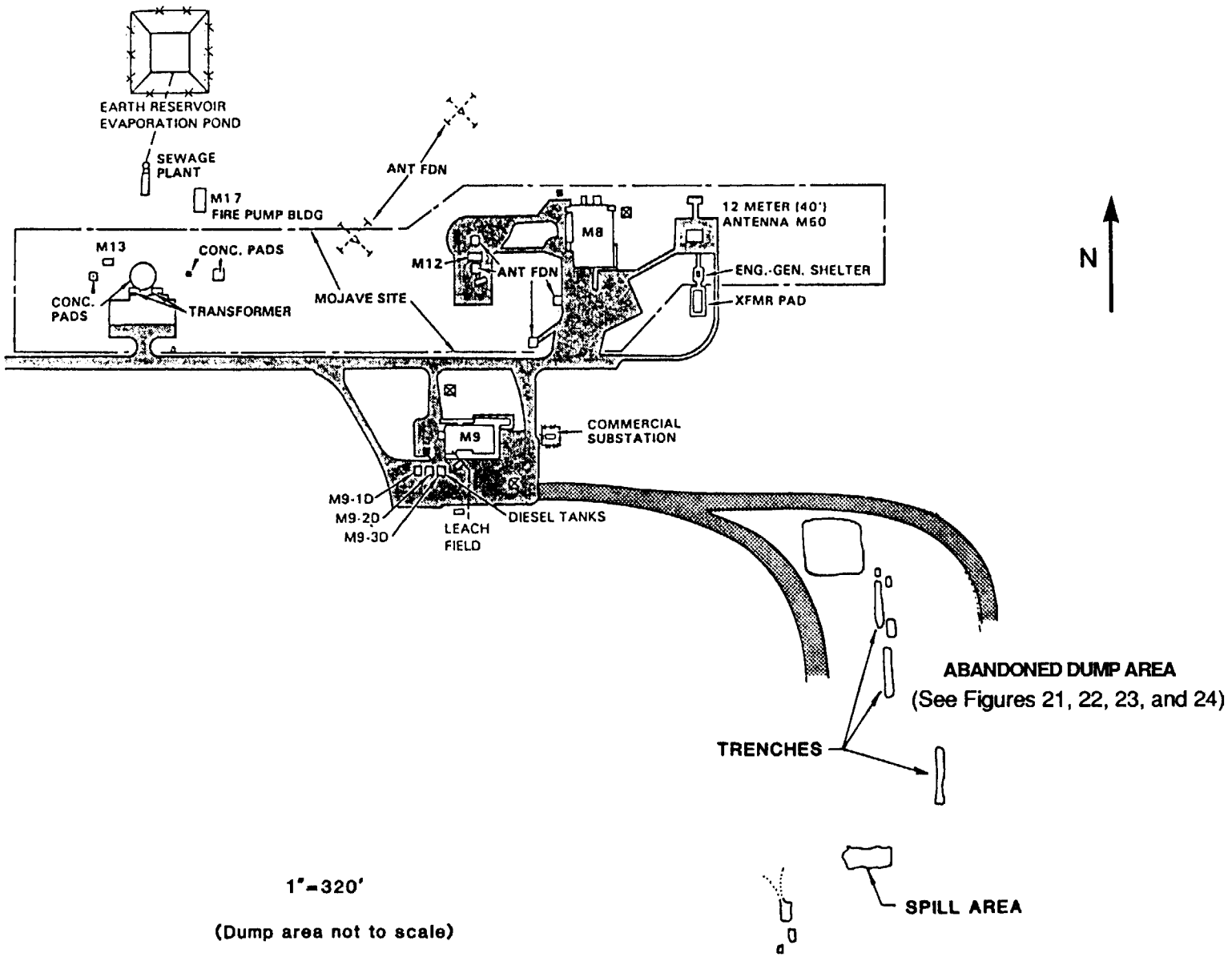


Figure 20. Mojave Base Site: Plot Plan and Location of Abandoned Dumpsite and Abandoned Sewage Plant and Sewage Evaporation Pond

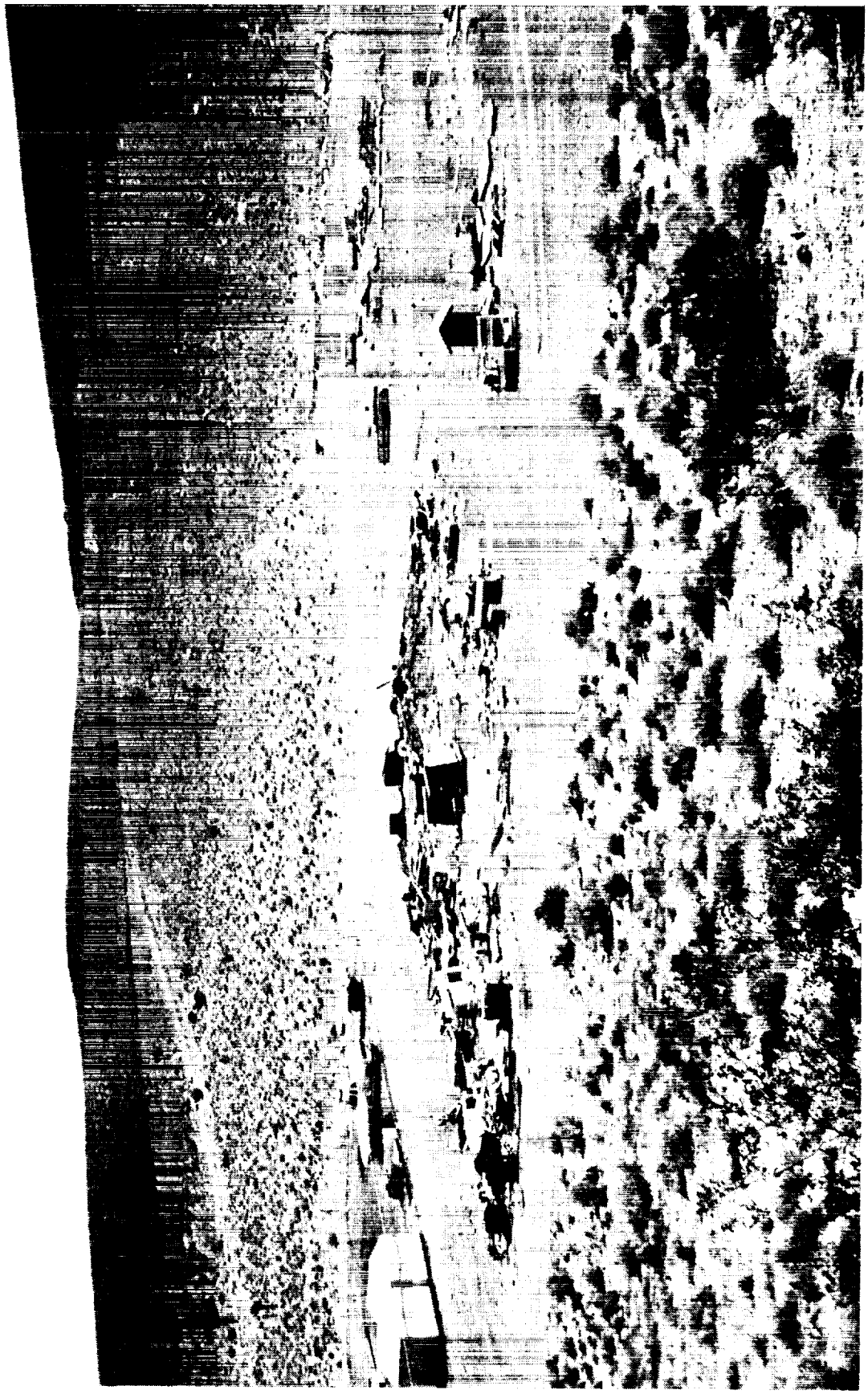


Figure 21. Mojave Base Site: Overview of Abandoned Dumpsite Before Cleanup

During the 1987 survey, seven soil samples were removed from the several open and covered trenches that made up the dumpsite (Figure 22). Photographs of a typical backhoe excavation and the testing for volatile organic materials with an HNu photoionization are depicted, respectively, in Figures 23 and 24.

On June 13, 1990, ten soil samples were obtained from the bottom of an excavation near the southeast corner of the Mojave Base Site. The excavation was 25 x 50 ft in size and had an average depth of 3 ft below grade (Figure 25).

EPA Method 7210 was the laboratory method for the detection of copper that was used to analyze the ten soil samples obtained from the Mojave Base Site. Interestingly, all ten samples contained the metal, with copper concentrations ranging from a low of 10 mg/kg (Samples 9 and 10) to a high of 140 mg/kg (Sample 6). Because all the copper levels were below 150 mg/kg, no further action was necessary according to the SBC/DEHS.

The chain-of-custody records and analytical results of the copper levels for the Mojave Base Site soil samples are presented in Appendix A.

All of the copper-contaminated soil excavated from the Mojave Base Site physically was removed from the GDSCC and trucked to the U.S. Ecology hazardous-waste landfill located in Beatty, Nevada. Manifests for this environmentally acceptable disposal of the copper-contaminated soils are presented in Appendix C.

Because the levels of copper in the Mojave Base Site soil samples were environmentally benign, the excavation at the site was backfilled to grade with clean native soil made up of decomposed granite.

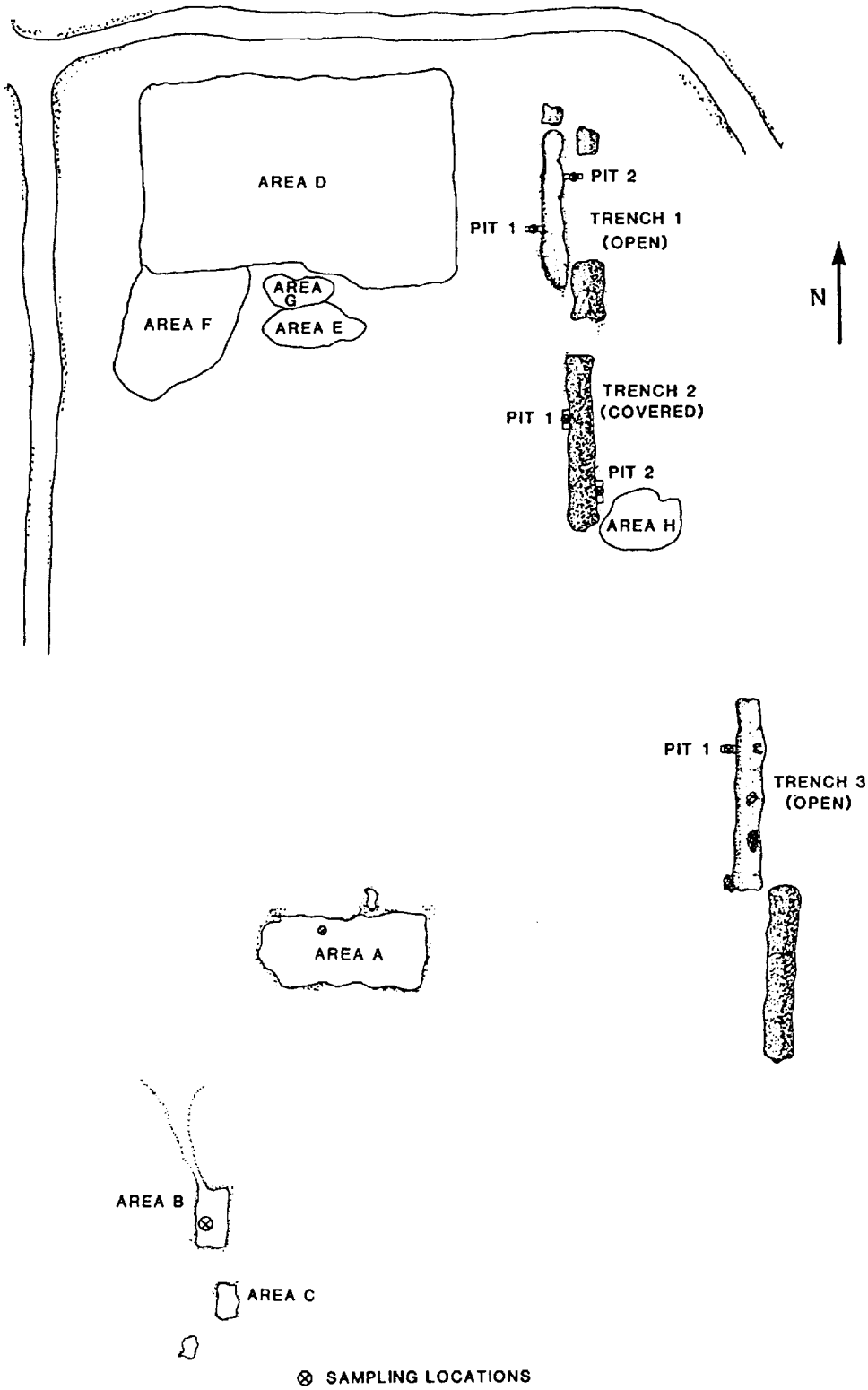


Figure 22. Mojave Base Site: Location of Open and Covered Trash-Trenches and Seven Excavated Sampling Pits at the Abandoned Dumpsite (see Figure 20 for Location of Area within Mojave Base Site)

Figure 23. Mojave Base Site: Backhoe Excavation of a Pit Adjacent to a Covered Trash-Trench at Abandoned Dumpsite

Figure 24. Mojave Base Site: HNu Photoionization Meter "Sniffing" for Volatile Organic Materials from an Excavated Pit Adjacent to an Open Trash-Trench at Abandoned Dumpsite (Note Plastic Sheet to Avoid Cross-Contamination between Trench and Pit)

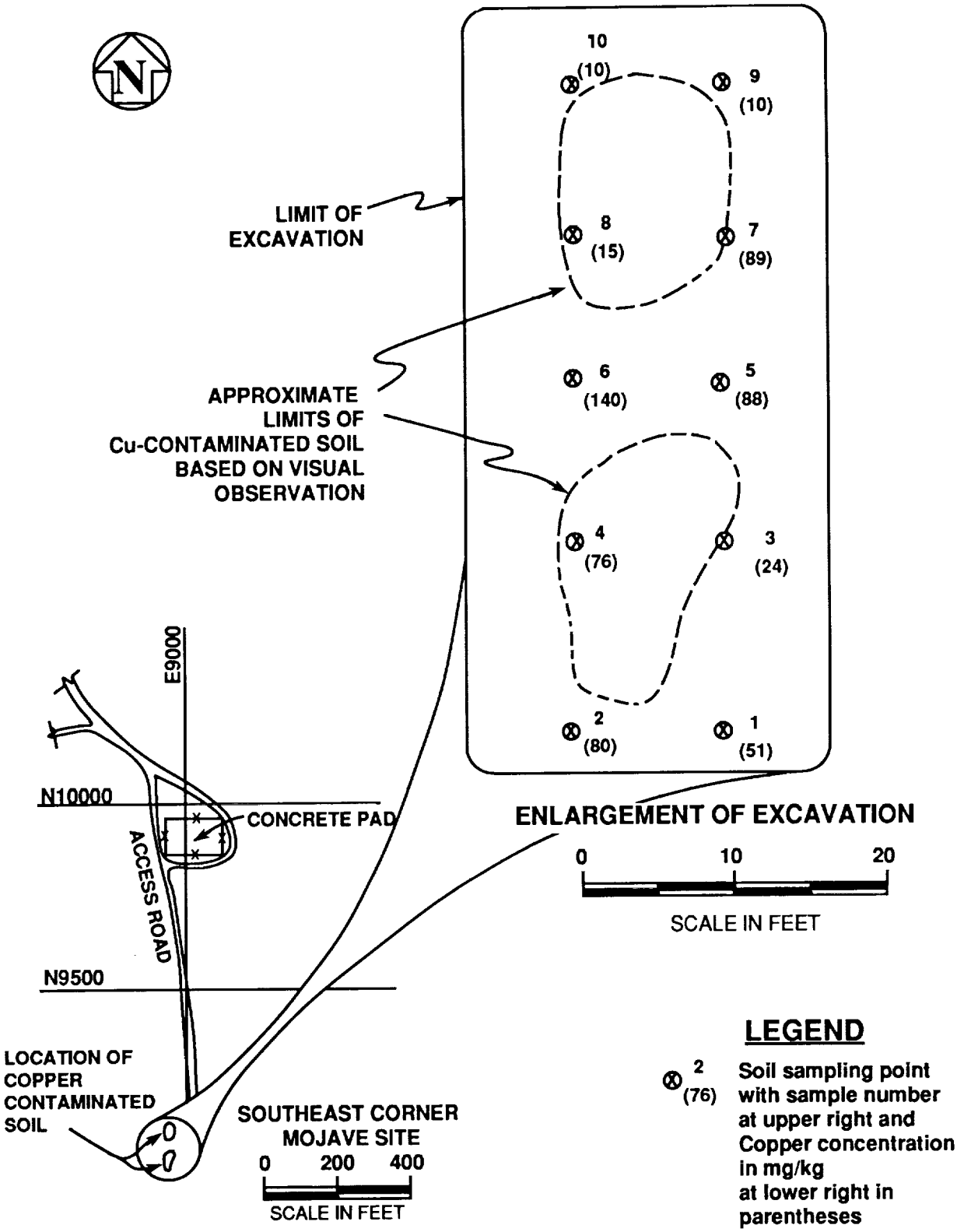


Figure 25. Mojave Base Site: Excavations of Copper-Contaminated Soil

SECTION III

THE GOLDSTONE DEEP SPACE COMMUNICATIONS COMPLEX (GDSCC)

A. LOCATION OF THE GDSCC

The GDSCC is located in southern California, in a natural, bowl-shaped depression area in the Mojave Desert, in San Bernardino County about 40 miles north of Barstow, California, and about 160 miles northeast of Pasadena, California, where JPL is located.

As indicated in Section I, the GDSCC is part of the NASA's Deep Space Network (DSN), one of the world's largest and most sensitive scientific telecommunications and radio navigation networks. The Goldstone Complex is managed, technically directed, and operated for NASA by JPL.

The 52-mi^2 Goldstone Complex lies within the western part of the Fort Irwin Military Reservation (Figure 26). A Use Permit for the land was granted to NASA by the U.S. Army. The Complex is bordered by the Fort Irwin Military Reservation on the north, east, and southeast; the China Lake Naval Weapons Center on the northwest; and the state and Federal lands managed by the U.S. Bureau of Land Management (BLM) on the south.

B. FUNCTIONS OF THE GDSCC

After the Space Act of 1958 had accelerated U.S. plans and programs for space exploration, JPL initiated construction work at Goldstone to build the first tracking station of what is now known as the DSN. Thus, for more than three decades, the primary purpose of the DSN has been and continues today to be the support for the tracking of both manned and unmanned spacecraft missions and to provide instrumentation for radio and radar astronomy in the exploration of the solar system and the universe.

Over the years, the DSN has become a world leader in the development of low-noise receivers; tracking, telemetry, and command systems; digital signal processing; and deep space radio navigation.

The basic responsibilities of the DSN are to receive telemetry signals from spacecraft, to transmit commands that control the various spacecraft operations, and to generate the radio navigation data to locate and guide the spacecraft to its destination.

Because of its advanced technical ability to perform the above services, the DSN also is able to carry out the following functions: flight radio-science, radio and radar astronomy, very long baseline interferometry (VLBI), precise measurement of minute earth movements (geodynamics), and participation in the NASA Search for Extraterrestrial Intelligence (SETI).

Goldstone also is a research and development (R&D) center both to extend the communication range and to increase the data acquisition capabilities of the DSN. It serves as a proving ground for new operational techniques. Prototypes of all new equipment are thoroughly tested at Goldstone before they are duplicated for installation at overseas stations (see Section III.C below).

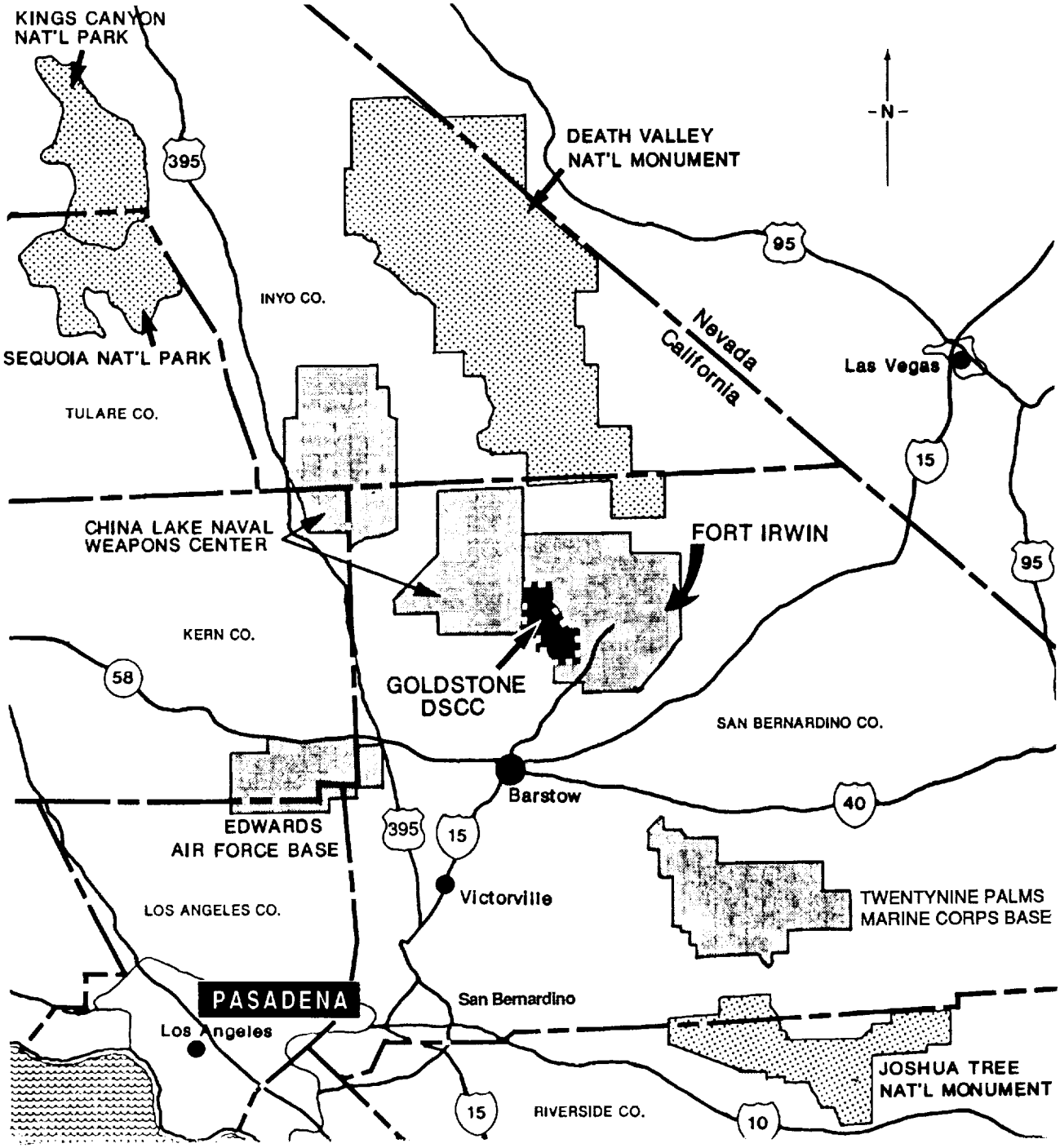


Figure 26. Geographic Relationship of the Goldstone Deep Space Communications Complex to JPL in Pasadena

C. FACILITIES AT THE GDSCC

The GDSCC is a self-sufficient, working community with its own roads, airstrip, cafeteria, electrical power, and telephone systems, and it is equipped to conduct all necessary maintenance, repairs, and domestic support services. Facilities at the GDSCC include about 100 buildings and structures that were constructed during a 30-year period from the 1950s through the 1980s. The construction of additional buildings and structures continues today as the GDSCC increases its activities and operations.

Goldstone is one of three Deep Space Communications Complexes (DSCCs) operated by NASA. The three DSCCs are located on three continents: at Goldstone in southern California's Mojave Desert; in Spain, about 60 km (37 miles) west of Madrid at Robledo de Chavela; and in Australia, near the Tidbinbilla Nature Reserve, about 40 km (25 miles) southwest of Canberra. Because these three DSCCs are approximately 120 deg apart in longitude, a spacecraft is nearly always in view of one of the DSCCs as the Earth rotates on its axis (Figure 27).

Activities at the GDSCC support six parabolic dish antennas at five sites called Deep Space Stations (DSSs): Four sites are operational for space missions, while one is devoted to R&D activities. There also are four, similar, operational DSSs in Spain and in Australia. Thus, the NASA DSN consists of a worldwide network of 12 operational DSSs.

The GDSCC also includes three antennas at the Venus Site (for R&D), while another parabolic dish antenna at the Mojave Base Site is operated by the National Oceanic and Atmospheric Administration (NOAA).

A Network Operations Control Center (NOCC), located at JPL in Pasadena, controls and monitors the DSN. A Ground Communications Facility (GCF) of the DSN operates to link together the NOCC at JPL with the three DSCCs at Goldstone, Spain, and Australia.

A 26-m (85-ft) antenna, located at the Pioneer Site, was deactivated in 1981. In 1985, the Pioneer antenna (DSS 11) was designated a National Historic Landmark by the U.S. Department of Interior, and the Pioneer Site was returned to the U.S. Army. Each of the Goldstone sites is briefly described below.

Total NASA/JPL facilities at the GDSCC (Figure 28) include the six DSN parabolic dish antennas, an airport, a microwave test facility, miscellaneous support buildings, and a remote support facility in Barstow, California, located about 40 miles south of the GDSCC. The GDSCC support staff consists of about 260 personnel on-site and at the Barstow facility. Table 1 summarizes the major facilities, buildings (number and square footage), and antennas (construction date and size). Three sites within the GDSCC have antennas (referred to as stations) devoted to NASA DSN operations: Echo Station, Mars Station, Uranus Station, and two antennas at the Apollo Station. Two other sites have antennas devoted to R&D: Venus, operated by the GDSCC, and Mojave, operated by NOAA.

D. ANTENNA STATIONS AT THE GDSCC

1. Echo Site (DSS 12)

The Echo Site, as the administration center and operations headquarters of the GDSCC, is the most extensively developed site on the complex. It has one 34-m (111.5-ft) antenna and 24 support buildings, with a combined area of 79,208 ft^2. Support buildings include administration and

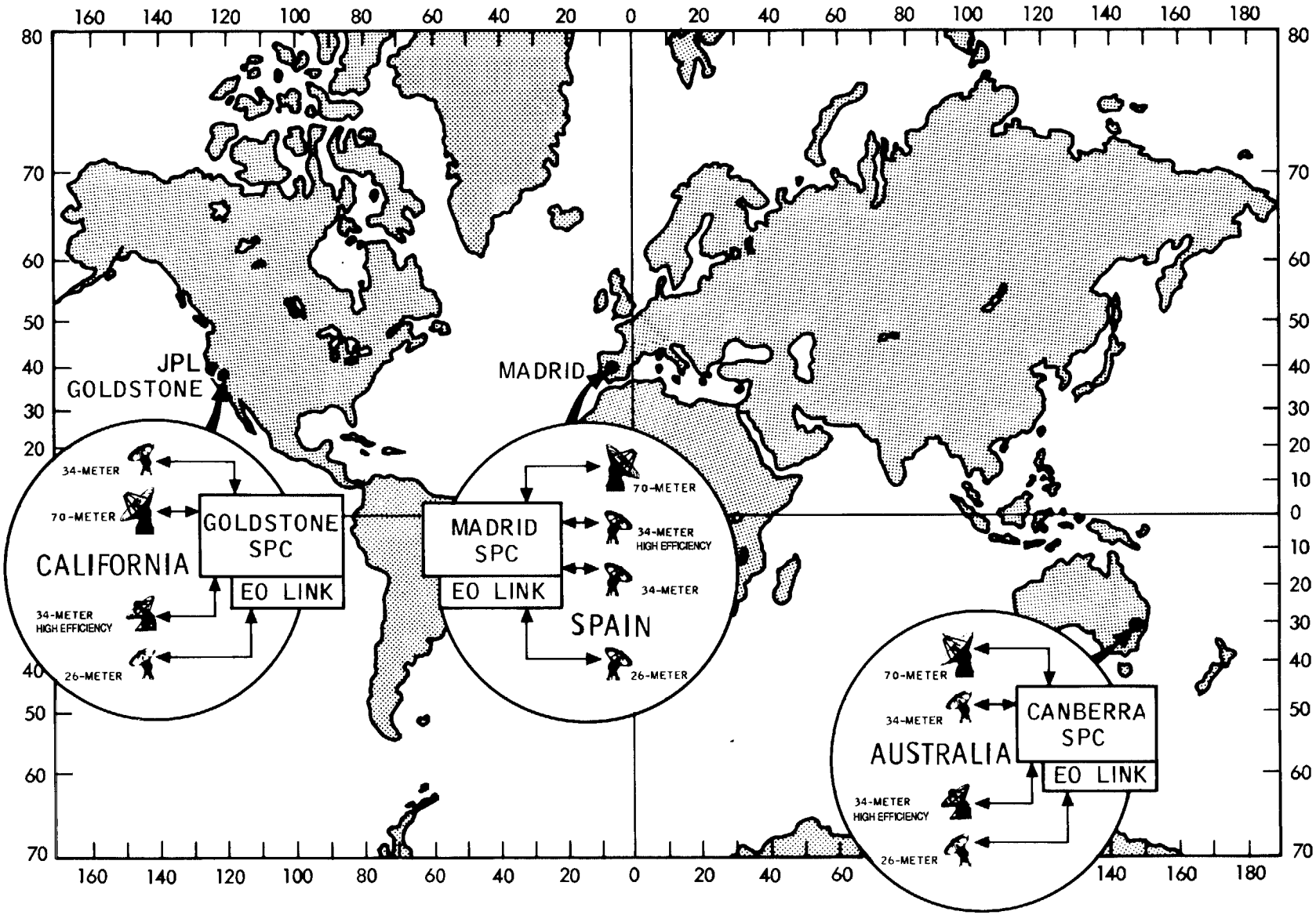


Figure 27. The Three-Continent NASA Deep Space Network as It Exists in 1992

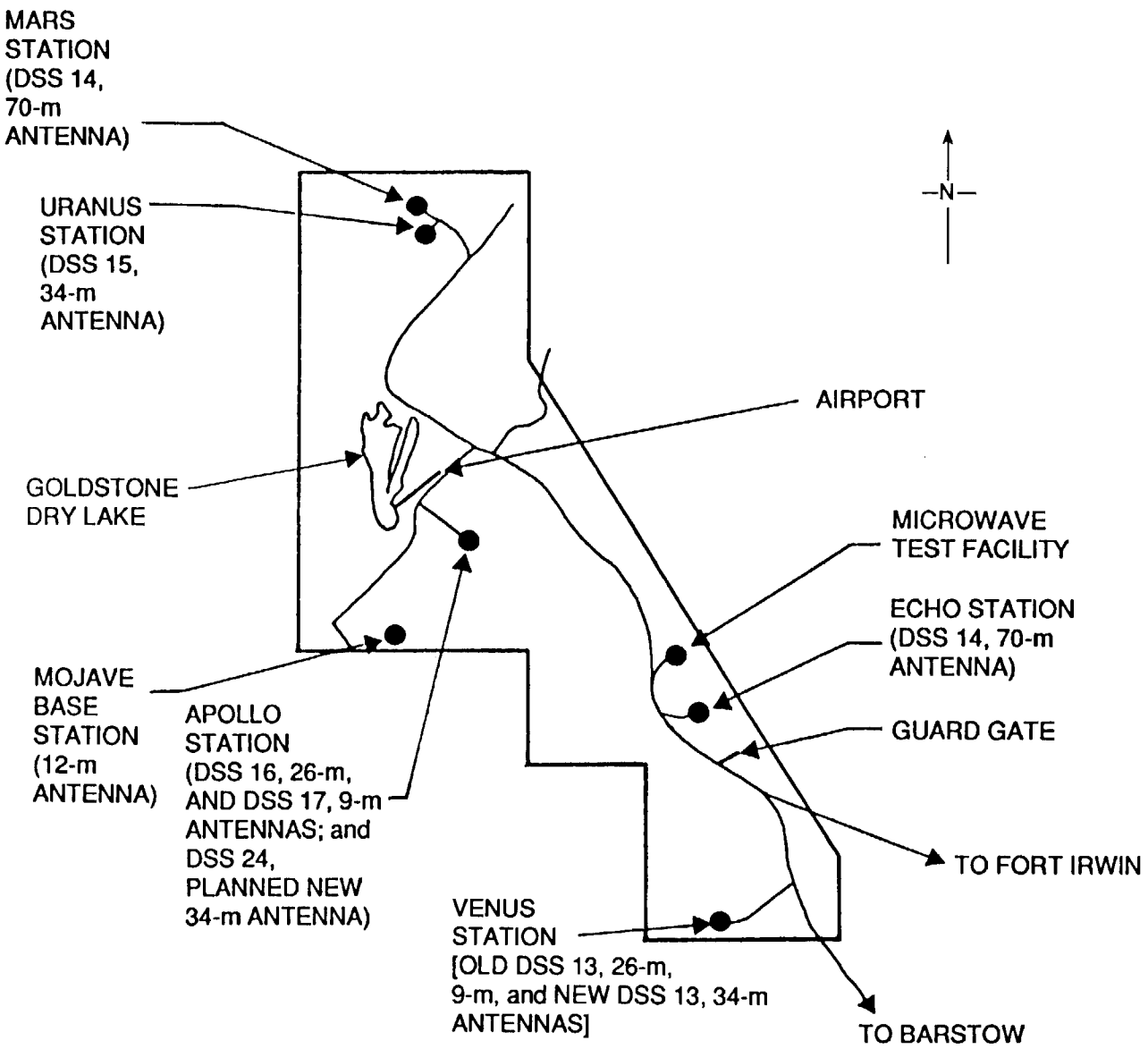


Figure 28. Schematic Map of the GDSCC Showing Locations of the Five NASA Deep Space Stations (DSSs) and the Mojave Base Station Operated by NOAA

Table 1. Major Facilities at the GDSCC

Site	Station Number	Buildings		Antennas	
		Number	(ft^2)	Date of Construction	Size (meters)
Echo Site	DSS 12	25	79,208	1961[a]	34[b]
Venus Site	DSS 13 (old)	15	12,589[c]	1962[d]	26
	DSS 13 (new)			1990	34
	Existing antenna (no number assigned)				9
Mars Site	DSS 14	14	41,754	1966	70[e]
	DSS 15			1984	34
Apollo Site	DSS 16	21	43,978	1965[f]	26
	DSS 17				9
	DSS 24[g] (planned)				34
Mojave Site		5	11,850	1964	12[h]
Airport[i]		3	4,848	1963/1970	--
Microwave Test Facility	MTF	1	2,880	1963	--
Miscellaneous	--	3	1,430	--	--
Barstow Facility[j]		1	28,343	--	--

[a]The original antenna, built in 1959, was moved to the Venus Site in 1962. A 26-m antenna, built in 1961, was extended to 34 m in 1978.

[b]This antenna is to be dismantled and removed after the planned DSS 24 antenna at the Apollo Site becomes operational in 1993.

[c]This square footage does not include the two newly constructed facilities for Hazardous Materials Storage and for Acid Wash.

[d]This antenna was constructed at the Echo Site in 1959 and moved to the Venus Site in 1962.

[e]Originally constructed as a 64-m antenna in 1966, this antenna was enlarged to 70 m in 1988.

[f]This antenna originally was constructed for the NASA Goddard Space Tracking and Data Network. JPL/GDSCC/DSN operation of the antenna began in October 1984.

[g]This planned DSS 24 antenna previously was designated as DSS 18.

[h]This antenna is operated by the National Oceanic and Atmospheric Administration (NOAA).

[i]The airport is located at the Goldstone Dry Lake.

[j]This site, a leased facility, is located in Barstow, California, about 40 miles southwest of the GDSCC.

Source: Directory of Goldstone DSCC Buildings and Supporting Facilities (Gold) Book, Document 880-165, JPL internal document, Jet Propulsion Laboratory and National Aeronautics and Space Administration, Revised Edition, October 1989.

engineering offices, cafeteria, dormitory, transportation and maintenance facilities, storage areas, and warehouses. The Echo Station originally was built in 1959 as a 26-m (85-ft) antenna. The antenna was first used in 1960 to support the Echo Project, an experiment to transmit voice communications coast-to-coast by bouncing radio signals off the reflective Mylar surface of a passive balloon-type satellite. In 1962, this original 26-m antenna was moved to the Venus Site. In anticipation of this move, a newer 26-m antenna had been built at the Echo Site in 1961. In 1978, this antenna was enlarged to 34 m (111.5 ft). The present antenna is approximately 35 m (113 ft) high and weighs about 270,000 kg (300 tons). In 1993, it is to be replaced by the new DSS 24 34-m antenna that is planned to be constructed at the Apollo Site.

2. Venus Site (DSS 13)

The Venus Site consists of three antennas: a new 34-m (111.5-ft) antenna, a 26-m (85-ft) antenna, and a 9-m (29.5-ft) antenna. The smaller antenna is no longer used. There are 15 buildings with a combined area of 12,589 ft^2. The support buildings provide space for operations control, laboratories, offices, security, workshops, warehouses, and mechanical equipment. The 26-m antenna, which was originally located at the Echo Site, was moved to the Venus Site in 1962. The antenna was used for a radar astronomy study of the planet Venus. Currently, its primary functions are R&D and performance- and reliability-testing of high-power radio-frequency transmitters and new systems and equipment prior to their introduction into the DSN.

The newly constructed DSS 13 antenna, a 34-m (111.5-ft) antenna similar in size and structure to DSS 15 (see below), began operation with research and development activities in 1991. It is to replace the older 26-m antenna. An Environmental Assessment concerning this new DSS 13 antenna is the subject of JPL Publication 87-4, Volume 6, Environmental Assessment: New 34-Meter Antenna at Venus Site, June 15, 1988.

3. Mars Site (DSS 14 and DSS 15)

The Mars Site consists of two antennas at two stations (the Mars and Uranus stations) and 14 buildings, with a combined area of 41,754 ft^2. The support buildings provide facilities for operations control, offices, training, mechanical equipment, storage, and security. In May 1989, M. B. Gilbert Associates (MBGA), Long Beach, California, submitted an Environmental Assessment to JPL concerning the construction work needed for a proposed building extension to the Operations Building (Bldg. G-86) at the Mars Site.

JPL Publication 87-4, Volume 11, Environmental Assessment: Addition to Operations Building, Mars Site, February 15, 1990, is an expanded JPL-version of the Environmental Assessment document submitted to JPL by MBGA in May 1989.

The Mars Station Antenna (DSS 14), at 70 m (230 ft) in diameter, is one of the larger antennas of its kind in the world (see front cover). In 1991, the antenna celebrated its 25th anniversary of operation. The antenna, which originally was constructed as a 64-m antenna in 1966 and enlarged to a 70-m antenna in 1988, is 7.25 times more powerful and sensitive than a 26-m antenna, extending the range of deep space communications by 2.7 times. It can maintain communications with spacecraft to the edge of the solar system. Standing more than 235 ft high, this antenna is one of the more striking features to be seen in the GDSCC geographic area. The 70-m antenna was used in August 1989 for the Voyager 2 spacecraft's encounter with the planet Neptune. The latter is located at a distance of 4.5 billion km (2.8 billion miles) from Earth.

The Uranus Station Antenna (DSS 15) is a 34-m high-efficiency (HEF), precision-shaped antenna, located approximately 1,600 ft southeast of the Mars Station Antenna. Built in 1984, this antenna at the GDSCC first was used in January 1986 to support the encounter of the Voyager 2 spacecraft with the planet Uranus. The latter is located at a distance of more than 3 billion km (1.8 billion miles) from Earth. The new, proposed 34-m, precision-shaped antennas, newly constructed at the Venus Site (see above) and planned for the Apollo Site (see below), are similar in size and structure to this Uranus Station antenna.

4. Apollo Site (DSS 16, DSS 17, and DSS 24)

The Apollo Site has a 26-m (85-ft) antenna (DSS 16), a 9-m (29.5-ft) antenna (DSS 17), and 21 buildings, with a combined total area of 43,978 ft^2. The buildings provide space for operations, equipment, storage, and warehousing. The 26-m antenna originally was constructed in 1965 by NASA's Goddard Space Tracking and Data Network to support the manned Apollo missions to the moon. Operation of this antenna under JPL management began in October 1984. Both the 26-m and the 9-m antennas now are used to support the missions of the Space Shuttle [Space Transportation System (STS)] and satellites in both low and high Earth orbits. In May 1989, M. B. Gilbert Associates, Long Beach, California, submitted an Environmental Assessment to JPL concerning the construction work needed for a planned new 34-m (111.5-ft) antenna (DSS 24) at the Apollo Site[2]. The details of this Environmental Assessment are described in JPL Publication 87-4, Volume 10, Environmental Assessment: New 34-Meter Antenna at Apollo Site, January 15, 1990.

5. Mojave Base Site (NOAA Antenna)

The Mojave Base Site has one antenna and five buildings, with a combined area of 11,850 ft^2. At one time, these buildings provided support facilities for operations, equipment, and maintenance. Except for the NOAA operations buildings, however, these building now are not in use.

The Mojave Base Site has a 12-m (40-ft) antenna operated by NOAA. The antenna is involved in several programs, including monitoring of shifts in the Earth's tectonic plates, monitoring weather changes, and retrieving information from very low-orbiting Earth satellites.

E. SUPPORT FACILITIES AT THE GDSCC

1. Goldstone Dry Lake Airport

The airport consists of an approximately 6,000- by 100-ft paved runway. There are two buildings at the airport site neither of which is presently in use. An open hanger is used to provide shelter for a single aircraft. For its personnel, NASA operates three scheduled shuttle flights per week to the GDSCC that originate from the Burbank-Glendale-Pasadena Airport. In addition, the Goldstone airport is used infrequently by administrative Army flights. Both NASA and the U.S. Army use propeller-driven aircraft.

---

[2] This planned DSS 24 antenna previously was designated as DSS 18.

2. Microwave Test Facility and Fire-Training Area

The Microwave Test Facility (MTF) and Fire-Training Area consist of a single building of 2,880 ft^2 along with areas identified for fire fighting. The MTF is used for research and development testing of antenna microwave equipment. Fire training includes procedures for the quenching of fires.

3. Miscellaneous Buildings in the GDSCC Area

Three buildings and structures at the GDSCC that fall into this category include the main gate house, pump house, and radio spectrum monitor. The total area of these three buildings/structures is 1,430 ft^2.

4. Off-Site Facility at Barstow, California

In addition to the above-mentioned on-site facilities, the GDSCC leases an office and warehouse support facility in the nearby city of Barstow. The facility is a single-story, 28,343-ft^2 structure located at 850 Main Street.

F. NONSTRUCTURAL SUPPORT FACILITIES AT THE GDSCC

1. Transportation Network

The major roadways in the area are shown in Figure 29. The only surface public transportation route to the GDSCC is by the Fort Irwin Road that leads to Fort Irwin. The NASA Road cutoff from Fort Irwin Road leads into the GDSCC. The NASA Road merges with Goldstone Road, which is the only north-south paved access road within the complex. Both of the NASA and Goldstone Roads are paved two-lane roads and are maintained by the Fort Irwin Post Engineer. Two-lane paved access roads also lead to each of the sites and major facilities.

2. Utilities and Services

The Southern California Edison Company provides electricity for the Goldstone Complex. The GDSCC provides its own backup diesel-engine generators to ensure operations during emergencies and continuity of electrical service for prescheduled periods of time. Gasoline, diesel oil, and hydraulic oil are stored in double-walled underground storage tanks fitted with sensors between the walls to detect leaks. Water is supplied by Fort Irwin from groundwater basin wells. Sanitary sewage is discharged through septic tank systems to leaching fields. The Echo and Mars Sites discharge wastewater to evaporation ponds (see JPL Publication 87-4, Environmental Projects: Volume 8, Modifications of Wastewater Evaporation Ponds, October 15, 1989).

G. SOLID-WASTE MANAGEMENT FACILITIES AT THE GDSCC

At the Echo Site, the GDSCC operates its own 10-acre, Class III solid-waste landfill. This facility accepts only nonhazardous, solid wastes.

Most of a small quantity of hazardous waste, generated at the GDSCC each year, is sent to off-site commercial facilities for reclamation and eventual reuse. The remainder is transported to off-site commercial treatment of disposal facilities within 90 days of generation. The GDSCC now has four, new, properly managed storage facilities for hazardous materials and wastes: one is located at the Echo Site, one at the Venus Site, and two at the Mars Site. The GDSCC does not operate any facilities that require a hazardous waste permit.

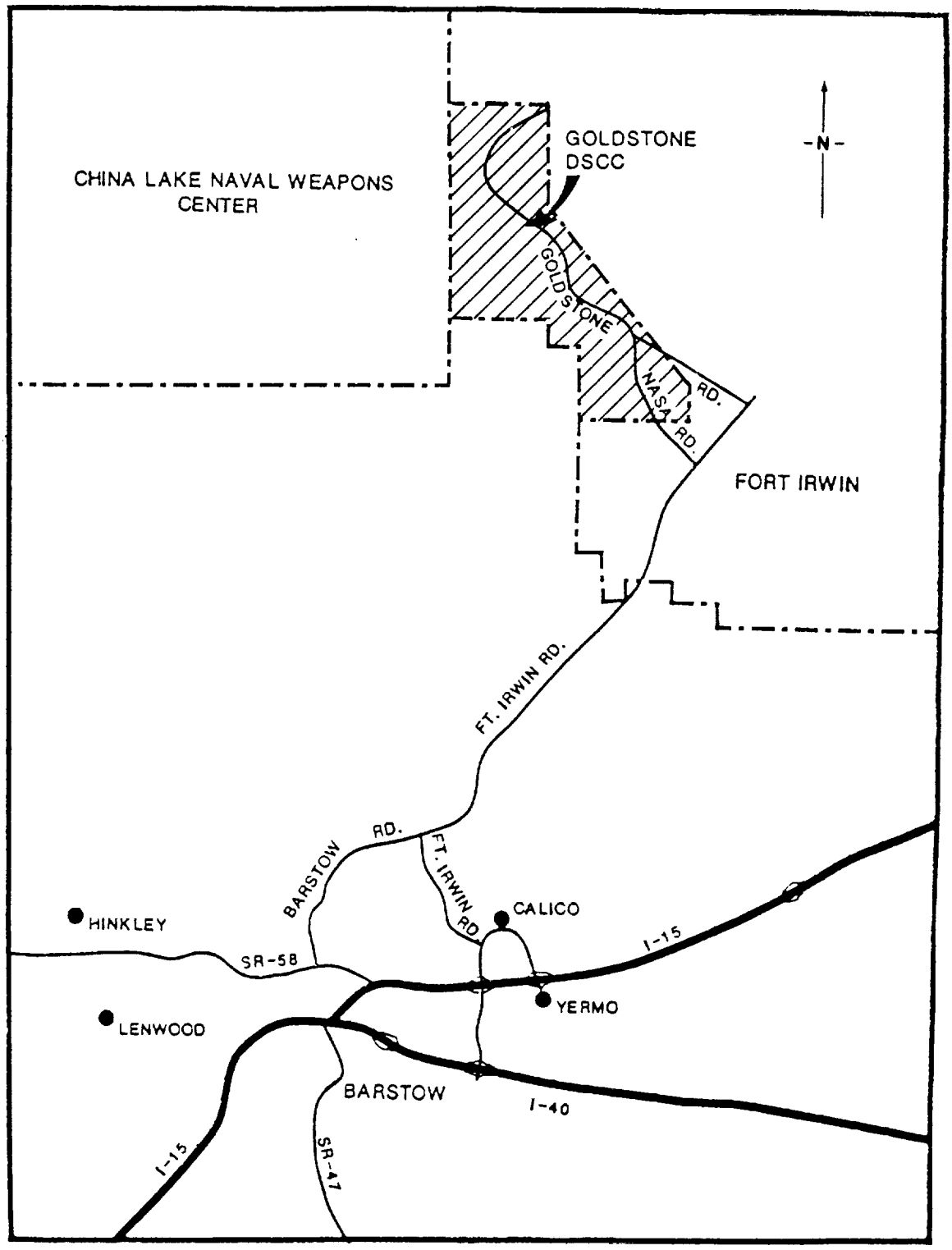


Figure 29. Major Roads Leading to and at the GDSCC

Details concerning the construction of these two new storage facilities for hazardous materials and wastes at the Echo and Venus Sites are described in JPL Publication 87-4, Environmental Projects: Volume 9, Construction of Hazardous Materials Storage Facilities, November 14, 1989. Two more storage facilities for hazardous materials and wastes, one at the Mars Site and the other at the Apollo Site, were completed in 1990. In accordance with its environmental management program, the GDSCC conducts all of its waste-management operations in strict compliance with environmental regulations, in a manner consistent with protection of human health and the environment.

H. WASTEWATER MANAGEMENT FACILITIES AT THE GDSCC

Four functioning sewage evaporation ponds, one pair at the Echo Site and another pair at the Mars Site, are designed to receive effluent from an upstream septic tank system. Extensive work was completed in the spring of 1989 to repair and reshape the previously eroded embankments of the wastewater evaporation ponds. Details of this construction work are recorded in JPL Publication 87-4, Environmental Projects: Volume 8, Modifications of Wastewater Evaporation Ponds, October 15, 1989.

I. UNDERGROUND STORAGE TANKS (USTs) AT THE GDSCC

As a large-scale facility located in a remote, isolated desert region, the GDSCC operations to support the various DSS antennas require numerous on-site storage facilities for gasoline, diesel oil, hydraulic oil, and waste oil. The most environmentally safe and economical way to store large quantities of these liquids is in double-walled, steel shells with outer fiberglass coating for corrosion protection, and a monitoring system in the annular space between the inner and outer shells to detect any leaks in either shell.

The installation of 13 new USTs with the above-described, environmentally safe properties (7 at the Echo Site, 5 at the Mars Site, and 1 at the Mojave Base Site) is discussed in detail in JPL Publication 87-4, Environmental Projects: Volume 13, Underground Storage Tanks: Removal and Replacement, February 15, 1991.

J. OPERATIONAL RELATIONSHIPS BETWEEN THE GDSCC AND FORT IRWIN

Because the GDSCC is located within the Fort Irwin property, the two installations potentially can affect each other's roles and missions. Fort Irwin is a U.S. Army installation serving at the U.S. Army National Training Center (NTC). The remote desert environment allows military task forces to practice large-scale training maneuvers that could affect natural, historic, and cultural resources at the GDSCC. This especially is true when the maneuvers involve the movement of heavy equipment (tanks, large trucks) within the GDSCC. Most maneuvers occur at the eastern border of the GDSCC, and every effort is made by both the GDSCC and Fort Irwin personnel to avoid the use of sensitive areas for such maneuvers.

K. NATURAL ENVIRONMENTAL ASPECTS OF THE GDSCC

1. Geology

The GDSCC is located in the North Central section of the Mojave Desert Province. Typically, the Mojave Desert Province consists of broad, flat plains separated by low mountains (1,000 to 2,000 ft of topographic relief). The GDSCC is situated within one of these low mountain areas.

The GDSCC is located in a naturally occurring bowl-shaped depression area bounded on three side by geological faults. The Garlock Fault lies to the north, while the Blackwater and Calico Faults lie, respectively, to the west and south. The GDSCC is bounded on the east by the Tiefort Mountains. Each antenna site at the GDSCC is located on natural alluvial material, ranging in thickness from 15 ft at the Venus Site to more than 70 ft at the Echo Site. The alluvium is derived from the surrounding hills.

2. Hydrology

Groundwater in the Goldstone area is generally confined and is found at depths ranging from 170 ft near the Minitrack Site to approximately 1,000 ft below the Echo Site. Chemical analyses of the groundwater have yielded total dissolved solids (TDS) values in excess of 1,000 ppm, indicating that the groundwater is brackish. The Goldstone Complex currently obtains potable water form a group of wells located at Fort Irwin, approximately 10 miles to the southeast.

3. Climatic Conditions

The GDSCC lies within the U.S. Naval Weather Service's Southwest Desert, Climatic Area A. Mean annual temperatures for the area range from 50°F to 80°F. Temperatures can climb as high as 114°F during the summer months, and drop as low as 11°F during the winter months. Mean annual precipitation for the area is approximately 2.5 in.; most precipitation falls between November and February.

SECTION IV

CERTIFICATION

I hereby certify that all work performed by Engineering-Science, Inc., Pasadena, California, and the Jenkin Construction Company, Long Beach, California, in their work pertaining to the excavation, removal, and disposal of hydrocarbon-contaminated soils from the Apollo and Mars Sites, and the excavation, removal, and disposal of copper-contaminated soils at the Mojave Base Site in the Goldstone Deep Space Communications Complex of the Ft. Irwin Military Preservation, San Bernardino County, California, as described in this report, was performed in compliance with Federal, State, and local regulations, and in accordance with good engineering practice.

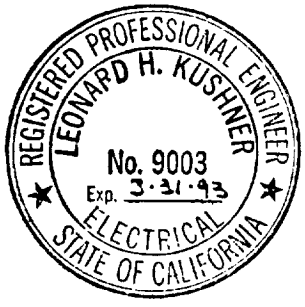
Leonard H. Kushner
Registered Professional Engineer

Signature Lou Kushner

Date Signed: March 15, 1992

Registration No.	E9003, Electrical	State: California
	SF186, Safety	California
	EA 0078 Environmental Assessor	California

Stamp/Seal



APPENDIX A

CHAIN OF CUSTODY RECORDS AND RESULTS OF ANALYSES FOR HYDROCARBONS AND METALS IN GDSCC SOIL SAMPLES

Jacobi Const. Co 900503-754-76.

GOLDSTONE DEEP SPACE COMMUNICATIONS COMPLEX
CHAIN OF CUSTODY

850 East Main Street, Barstow, California 92311 619-386-8330

Project No.	Project Name	Date
		5-8-90

Samplers: (Signature) Carol J. Craiglow Carol Craiglow
PAUL A. FARMANIAN Paul Farmanian

Station No.	Date	Time	Station Location	Sample Types: EPA 48 hr.	Number of Containers	Analysis Requested
Apollo	5-8-90	1240	JPL-A-EX1-1	X	1	
		1250	JPL-A-EX1-2	X	1	
		1300	JPL-A-EX1-3	X	1	
		1305	JPL-A-EX1-6	X	1	
		1310	JPL-A-EX1-4	X	1	
		1315	JPL-A-EX1-5	X	1	
		1330	JPL-A-EX2-1	X	1	
		1325	JPL-A-EX2-2	X	1	
		1335	JPL-A-EX2-3	X	1	

Special Requirements: ※ 4-HOUR TURNAROUND

Estimated Cost

Total Number of Containers: 9

Split Sample Storage Location

Relinquished by: (sig)	Date/Time	Received by (sig)	Date/Time	Relinquished by (Sig)	Date/Time	Received by (sig)	Date/Time
Carol J Craiglow	5-8-90 2:28 pm	H. Alberson	5-8-90 2:31	H. Alberson	5-8-90 3:35	D J Kan	5-8-90 2:57
Relinquished by: (sig)	Date/Time	Received by (sig)	Date/Time	Relinquished by (sig)	Date/Time	Received by (sig)	Date/Time
		L J Chrystal	05/08 16:57				

Method of Shipment:	Shipped by:: (signature)	Courier (signature)	Received for Lab by (sig)	Date/Time
Hand Delivered			L J Chrystal Address ESB Labs	05/08 16:57

A-2

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-754
Invoice No.	60328

Sample Marked:	Submitted	Sampled
JPL-A-EX1-1	Jim K.	CJC/PAF
Apollo	05/08/90	05/08/90
soil	16:58	12:40

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	30 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-755
Invoice No.	60328

Sample Marked:	Submitted	Sampled
JPL-A-EX1-2	Jim K.	CJC/PAF
Apollo	05/08/90	05/08/90
soil	16:58	12:50

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	20 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900508-756
Invoice No. 60328

Sample Marked:
JPL-A-EX1-3
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:00

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	10 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-757
Invoice No.	60328

Sample Marked:
JPL-A-EX1-4
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:10

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	10 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mach

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-758
Invoice No.	60328

Sample Marked:
JPL-A-EX1-5
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:15

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	20 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mackey

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-759
Invoice No.	60328

Sample Marked:
JPL-A-EX1-6
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:05

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	20 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-760
Invoice No.	60328

Sample Marked:
JPL-A-EX2-1
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:30

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	10 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-761
Invoice No.	60328

Sample Marked:
JPL-A-EX2-2
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:25

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	40 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.
Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/15/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900508-762
Invoice No.	60328

Sample Marked:
JPL-A-EX2-3
Apollo
soil

Submitted	Sampled
Jim K.	CJC/PAF
05/08/90	05/08/90
16:58	13:35

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	20 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/09/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

Edward S. Babcock & Sons, Inc
3215 Chicago Avenue
Riverside, CA 92507

(714) 684-1881

CHAIN OF CUSTODY RECORD

Jenkin Construction Co.

Lab #s: 900523-214-231 Invoice No. 160716

Project No.

Project Name / Location: JPL - Goldstone APOLLO SITE

Samplers: (signature) Howard T Hargrove

Determination Requested: 418.1

Description	Sampled Date	Sampled Time	Number of Containers	Condition of Sample: Sealed	Chilled	Preserved	Remarks
JPL-AP-EX2 - 1	23May24	12:50	1		✓		
2		12:55	1		✓		
3		12:59	1		✓		
4		13:08	1		✓		
5		13:13	1		✓		
6		13:15	1		✓		
7		13:20	1		✓		
8		13:23	1		✓		
9	"	13:26	1		✓		

Try for 24 hr list

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By
Howard T Hargrove	23May24 16:30				
Relinquished By:	Date/Time:	Received By:	Received For Lab By:	Date / Time	
				5/23/90	1630

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-214
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-1

Submitted	Sampled
HTH 05/23/90 16:30	HTH 5/23/90 12:50

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-215
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-E\2-2

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	12:55

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mach

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-216
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-3

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	12:59

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mach

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-217
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-4

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	13:08

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-218
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-5

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	13:13

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-219
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-6

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	13:15

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-220
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-7

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	13:20

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-221
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-8

Submitted	Sampled
HTH 05/23/90 16:30	HTH 5/23/90 13:23

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-222
Invoice No.	60716

Sample Marked:
JPL Goldstone, Apollo
Site soil AP-EX2-9

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	13:26

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	700 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Edward S. Babcock & Sons, Inc
3215 Chicago Avenue
Riverside, CA 92507

(714) 684-1881

CHAIN OF CUSTODY RECORD

Jenkin Construction Co.

Lab #s: _____ Invoice No. _____

Project No. | Project Name / Location: JPL GOLDSTONE MARS SITE

Samplers: (signature) Howard T Hargrove

Description	Sampled Date	Sampled Time	Determination Requested	Number of Containers	Condition of Sample: Sealed	Chilled	Preserved	Remarks
JPL-MA-6X1-1	23May90	09:51	4 18.1	1		✓		
-2		10:05		1		✓		
-3		10:20		1		✓		
-4		10:30		1		✓		Try for 24 Hr RUSH
-5		10:40		1		✓		
-6		10:50		1		✓		
-7		11:00		1		✓		
-8		11:05		1		✓		
-9		11:20		1		✓		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time	Received By:
Howard T Hargrove	23May90 16:30				
Relinquished By:	Date/Time	Received By:	Received For Lab By:	Date / Time	
				5/23/90 1630	

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-223
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-1

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	9:51

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-224
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-2

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	10:05

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mackey

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-225
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-3

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	10:20

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-226
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-4

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	10:30

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.
Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-227
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-5

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	10:40

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-228
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-6

Submitted	Sampled
HTH 05/23/90 16:30	HTH 5/23/90 10:50

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900523-229
Invoice No. 60716

Sample Marked:
JPL Goldstone, Mars Site
Soil MA-EX1-7

Submitted	Sampled
HTH 05/23/90 16:30	HTH 5/23/90 11:00

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.
Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-230
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-8

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	11:05

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	2000 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502
05/30/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900523-231
Invoice No.	60716

Sample Marked:
JPL Goldstone, Mars Site
soil MA-EX1-9

Submitted	Sampled
HTH	HTH
05/23/90	5/23/90
16:30	11:20

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 05/24/90

Notes: ND = None Detected at Practical Quantitation Limit

cc:

Edward S. Babcock & Sons, Inc.

Edward S. Babcock & Sons, Inc
3215 Chicago Avenue
Riverside, CA 92507

(714) 684-1881

CHAIN OF CUSTODY RECORD

Lab #s: _____ Invoice No. _____

Project No.	Project Name / Location	Samplers: (signature)
	Jenkin Construction Co. Goldstone · JPL	Howard T Haygrove

Description	Sampled Date	Sampled Time	Determination Requested	Number of Containers	Condition of Sample: Sealed	Chilled	Preserved	Remarks
JPL-MA-EX3-1	5June90	10:30	4181		✓	✓		
-2	5June90	10:40	4181		✓	✓		
-3	5June90	10:50	4181		✓	✓		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time	Received By:
Howard T Haygrove	5June90 14 | 10				
Relinquished By:	**Date/Time**	**Received By:**	**Received For Lab By:**	**Date / Time**	
			[illegible]	6-5-90	1415

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/12/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900605-242
Invoice No.	61012

Sample Marked:
Goldstone-JPL
MA-EX3-1
Soil

Submitted	Sampled
HTH	HTH
06/05/90	06/05/90
14:15	10:30

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	10 mg/kg		
Practical Quantitation Limit	10 mg/kg		

Date analysis completed: 06/12/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/12/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900605-243
Invoice No.	61012

Sample Marked:
Goldstone-JPL
MA-EX3-2
Soil

Submitted	Sampled
HTH	HTH
06/05/90	06/05/90
14:15	10:40

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

ND = None Detected at PQL.

Date analysis completed: 06/12/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mack

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/12/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No.	900605-244
Invoice No.	61012

Sample Marked:
Goldstone-JPL
MA-EX3-3
Soil

Submitted	Sampled
HTH	HTH
06/05/90	06/05/90
14:15	10:50

Chain of Custody on file: Y

Parameter Name	Results	Parameter Name	Results
EPA 418.1 - soil extension			
Total Petroleum Hydrocarbons	ND mg/kg		
Practical Quantitation Limit	10 mg/kg		

ND = None Detected at PQL.

Date analysis completed: 06/12/90

Notes:

cc:

Edward S. Babcock & Sons, Inc.

Allison Mach

Edward S. Babcock & Sons, Inc
3215 Chicago Avenue
Riverside, CA 92507

(714) 684-1881

CHAIN OF CUSTODY RECORD

Jenkin Construction Co 714 426-9351

Lab #s: 10613-930, 930 Invoice No. 61265

Project No.

Project Name / Location: JPL Goldstone MOJAVE SITE

Samplers: (signature) Howard T Hargrove

Determination Requested

Description	Sampled Date	Sampled Time	Number of Containers	Condition of Sample: Sealed	Chilled	Preserved	Remarks
JPL-MOJ-EX4-1	13Jun90	10:30	1	✓	✓		
-2		10:32	1	✓	✓		
-3		10:35	1	✓	✓		
-4		10:37	1	✓	✓		
-5		10:40	1	✓	✓		
-6		10:42	1	✓	✓		
-7		10:45	1	✓	✓		
-8		10:47	1	✓	✓		
-9		10:50	1	✓	✓		
-10		10:53	1	✓	✓		

TLG #

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time	Received By:
Howard T Hargrove	13Jun90 1615				
Relinquished By:	Date/Time	Received By:	Received For Lab By:	Date / Time	
				6/13/90 1615	

*BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-930
Invoice No. 61265
Customer No. je2156

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:30

Sample Marked: JPL Goldstone Mojave #JPL-MOJ-EX4-1

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.0

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	51	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-931
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-2

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:32

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.6

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	80	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

cc:

Edward S. Babcock & Sons, Inc.

·BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-932
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-3

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:35

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.1

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	24	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-933
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-4

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:37

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.3

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	76	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

'BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-934
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-5

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:40

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 99.0

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	88	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-935
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-6

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:42

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.7

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	140	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-936
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-7

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:45

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.1

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	89	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-937
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-8

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:47

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.2

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	15	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-938
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-9

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:50

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.0

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	10	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

cc:

Edward S. Babcock & Sons, Inc.

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906
EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

06/19/90

To: Jenkin Construction Co.
P. O. Box 1427
Long Beach, CA 90801
Attn: L. L. Thomas

Lab No. 900613-939
Invoice No. 61265
Customer No. je2156

Sample Marked: JPL Goldstone Mojave
#JPL-MOJ-EX4-10

	Submitted	Sampled
By	HTH	HTH
Date	06/13/90	06/13/90
Time	16:15	10:53

Chain of Custody on File: Y

Sample Matrix	Sample Preparation	Digestion Method
Water	XX Total	EPA 3005
XX Soil	CAM WET	EPA 3010
Sludge	EP Toxicity	EPA 3020
Oil	TCLP	EPA 3040
Non-aqueous liquid		XX EPA 3050

Percent Solids (%) 98.1

Parameter Name	EPA Method	Result mg/kg As Received	PQL
Antimony (Sb)	7040/7041	NA	
Arsenic (As)	7060	NA	
Barium (Ba)	7080	NA	
Beryllium (Be)	7090/7091	NA	
Cadmium (Cd)	7130/7131	NA	
Chromium (Cr)	7190/7191	NA	
Chromium +6 (hex)	7196	NA	
Cobalt (Co)	7200/7201	NA	
Copper (Cu)	7210	10	10
Lead (Pb)	7420/7421	NA	
Mercury (Hg)	7470/7471	NA	
Molybdenum (Mo)	7480/7481	NA	
Nickel (Ni)	7520	NA	
Selenium (Se)	7740	NA	
Silver (Ag)	7760	NA	
Thallium (Tl)	7840/7841	NA	
Vanadium (V)	7910/7911	NA	
Zinc (Zn)	7950	NA	

Date analysis completed: 06/14/90
ND = Not Detected at Practical Quantitation Limit (PQL).
NA = Not Analyzed or Not Applicable.
Notes:

Edward S. Babcock & Sons, Inc.

cc:

APPENDIX B

CORRESPONDENCE WITH
SAN BERNARDINO COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH
CONCERNING REMOVAL OF CONTAMINATED SOIL FROM THE GDSCC

Allied-Signal Aerospace Company

Bendix Field Engineering Corporation
[illegible] East Main Street
Barstow, CA 92311

Allied Signal

12 March 1991

Mr. Ronald Ripley
San Bernardino County
Department of Environmental Health
385 North Arrowhead Avenue
San Bernardino, California

Dear Mr. Ripley:

The purpose of this letter is to document the final disposition of oil and/or diesel contaminated soil at Goldstone Deep Space Communications Complex (GDSCC).

All soils excavated from the Apollo, Mars, Mojave and Echo Sites contaminated with oil and/or diesel fuel has been recycled into an 1800 foot paved road leading to the entrance of the GDSCC landfill. The road was completed Friday, March 8, 1991.

Your concurrence that this recycling project using the contaminated soil in constructing this road was performed properly, as defined by the rules and regulations of San Bernardino County, would be appreciated.

Please sign, date and return this letter to the undersigned. If you have any questions, please do not hesitate to call me at (619) 255-8388

Sincerely,

David C. Roberts

Ronald A. Ripley (As per my correspondence dated 10-31-90)
Concurrence, Mr. Ronald Ripley
San Bernardino County Department of Environmental Health

cc: E. Abrahamy
L. Kushner

ENVIRONMENTAL HEALTH SERVICES

385 North Arrowhead Avenue • San Bernardino, CA 92415-0160 • (714) 387-4646
320 East "D" Street • Ontario, CA 91764 • (714) 391-7570
15505 Civic Drive • Victorville, CA 92392 • (619) 243-8141
17830 Arrow Highway • Fontana, CA 92335 • (714) 829-6244
57407 Twentynine Palms Highway • Yucca Valley, CA 92284
San Bernardino County Vector Control Program
2355 East Fifth Street • San Bernardino, Ca 92415 • (714) 383-3200
Environmental Enforcement and Housing
172 West Third Street • San Bernardino, CA 92415-0315 • (714) 387-5612/5615
Air Pollution Control District
15428 Civic Drive, Suite 200, Victorville, CA 92392 • (619) 243-8200

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
PUBLIC WORKS AGENCY

PAUL F. RYAN, R.E.H.S.
Director

Also serving the cities of:

Adelanto	Loma Linda
Apple Valley	Montclair
Barstow	Needles
Big Bear Lake	Ontario
Chino	Rancho Cucamonga
Colton	Redlands
Fontana	Rialto
Grand Terrace	San Bernardino
Hesperia	Twentynine Palms
Highland	Upland

Victorville

OCTOBER 31, 1990

BENDIX FIELD ENGINEERING CORPORATION
850 EAST MAIN STREET
BARSTOW, CA 92311

ATTENTION: MR. HAROLD ALDERSON

SUBJECT: CORRESPONDENCE DATED OCTOBER 15, 1990 REGARDING CLEANUP ACTIVITIES AT THE GOLDSTONE DEEP SPACE COMMUNICATIONS COMPLEX, FORT IRWIN, CA.

The Department concurs with the subject correspondence regarding excavation and removal of contaminated soil at the Apollo, Mars and Mojave sites with the exception that the Department gave Ms. Craiglow of Engineering Science full authority in deeming an excavation complete. The Department established minimum requirements that Ms. Craiglow was to supervise and document their compliance. The Department will require the receipt of this documentation before it may conclude investigations regarding this matter.

Additionally, prior to terminating these investigations, the Department will require notification of the completion of the recycling project. This is necessary because the Department not only must assure the removal of the contamination, but it must also document the contaminated soil's final disposition.

Please submit the required documentation and notification upon completion of the recycling project, so that the Department may issue complete concurrence with regard to the clean up activities at these sites. If you have any questions, please call me at (714) 387-4631.

Ronald A. Ripley

RONALD A. RIPLEY, R.E.H.S.
ENVIRONMENTAL HEALTH SPECIALIST III
EMERGENCY RESPONSE/ENFORCEMENT

RAR/blm

Allied-Signal Aerospace Company

Bendix Field Engineering Corporation
850 East Main Street
Barstow CA 92311

Allied Signal

15 October 1990

Mr. Ronald Ripley
San Bernardino County
Department of Environmental Health
385 North Arrowhead Avenue
San Bernardino, California 92415

Dear Mr. Ripley:

The purpose of this letter is to document your approval of the excavation and removal of contaminated soil conducted at the Goldstone Deep Space Communications Complex (GDSCC). Subsurface borings identified hydrocarbon contaminated soil at the Apollo and Mars site and copper-contaminated soil at the Mojave site at GDSCC. Contaminated soil was excavated from these three sites in May and June 1990 by Jenkin Construction Company. All excavations and soil sampling was conducted under the supervision of Carol J. Craiglow, Registered Geologist for the State of California. Ms. Craiglow is employed by Engineering-Science.

The initial soil sampling and excavation was conducted at the Apollo site on May 8, 1990. You were present on that day and provided on-site guidance for acceptable and proper sampling and excavation procedures to Ms. Craiglow. It was agreed that Ms. Craiglow supervised all remaining sampling and excavations, your on-site supervision would not be required. No excavation was deemed complete until all soil sample analysis were below the action level (1000 mg/kg for hydrocarbons and 150 mg/kg for copper). Ms. Craiglow had full authority in deeming an excavation complete. All records of the soil analysis and excavation are on file at the offices of Jet Propulsion Laboratory and Engineering Science.

Your concurrence that all sampling, excavations and removal of contaminated soil conducted at GDSCC as described above was performed properly as defined by the rules and regulations of San Bernardino County would be appreciated. Please sign, date and return this letter to the undersigned. If you have any questions, please do not hesitate to call me (619-255-8330) or Paul Farmanian (818-440-6148), Engineering Science Project Manager.

Sincerely,

H. Alderson

Harold Alderson

Concurrence, Mr. Ronald Ripley
San Bernardino County Department of
Environmental Health

cc: E. Abrahamy
L. Kushner

APPENDIX C

HAZARDOUS-WASTE MANIFESTS FOR REMOVAL OF COPPER-CONTAMINATED SOIL FROM THE GDSCC

REPLY TO:
P. O. BOX 1427
LONG BEACH,
CALIFORNIA 90801
STATE LIC. #245128

JENKIN CONSTRUCTION CO., 2650 LIME AVENUE, LONG BEACH, CALIFORNIA (213) 426-9351

August 16, 1990

Engineering-Science, Inc.
P. O. Box 7107
Pasadena, California 91109

Attention: Mr. P. A. Farmanian

Subject: Goldstone Environmental Projects
Phase II

Gentlemen:

Enclosed are copies of the documents generated by the Copper-contaminated soil disposal as you requested. Harold Alderson, the environmental officer at Goldstone has a copy of this material.

Please call if we can be of further assistance in this matter.

Very truly yours,

JENKIN CONSTRUCTION CO.

L. L. Thomas
Project Manager

LLT:mn

Invoice

61348

US Ecology, Inc.
9200 Shelbyville Road, Suite 300
P.O. Box 7246
Louisville, Kentucky 40257-0246
502-426-7160

76 939 5

RHO-CHEM
P.O. Box 6021
Inglewood, CA 90301

90061403363, 3336, 3337, 3364, 3387, 3388

ATTN: MARIE SCHLAGER

USEcology
an American Ecology company

Please remit to closest location:
Dept. 94168, Louisville, KY 40294
Dept. 05647, San Francisco, CA 94139

☒ Environmental
☐ Nuclear

☒ Beatty, Nevada (702-553-2203)
☐ Richland, Washington (509-377-2411)
☐ Pleasanton, California (415-463-9260)
☐ Robstown, Texas (512-387-3518)
☐ Louisville, Kentucky (502-426-7160)

Date	Invoice Number	Customer purchase order	Terms
7-06-90	61348	NASA/JPL	Net 30 Days

RECEIVED FROM YOUR FACILITY 6-13-90

MANIFEST NO. 90272977		
24.30 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,673.00
24.30 tons @ $20.00/ton for taxes		$ 486.00
		$3,159.00
MANIFEST NO. 90272976		
23.46 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,580.60
23.46 tons @ $20.00/ton for taxes		$ 469.20
		$3,049.80

RECEIVED FROM YOUR FACILITY 6-14-90

MANIFEST NO. 90272980		
22.14 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,435.40
22.14 tons @ $20.00/ton for taxes		$ 442.80
		$2,878.20
MANIFEST NO. 90272979		
23.12 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,543.20
23.12 tons @ $20.00/ton for taxes		$ 462.40
		$3,005.60

RECEIVED FROM YOUR FACILITY 6-15-90

MANIFEST NO. 90272964		
23.07 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,537.70
23.07 tons @ $20.00/ton for taxes		$ 461.40
		$2,999.10
MANIFEST NO. 90138909		
18.88 tons of Chemical waste @ $110.00/ton	432.0 cu. ft.	$2,076.80
18.88 tons @ $20.00/ton for taxes		$ 377.60
		$2,454.40
		$17,546.10

LB. CU. FT.

Total Amount Due $17,546.10

Please pay from invoice. We do not mail statements.

To insure proper credit of your account, please return pink

A service charge of 1½% per month (but not to exceed the lawful applicable rate) will be added to all accounts not paid within the specified terms. Collection costs, including

PACIFIC

PACIFIC INDUSTRIAL SERVICE CORPORATION

TRANSPORTATION ORDER

SERVICE ORDER NO. № 9341

☐ 925 W. Esther St., Long Beach, CA 90813 213/590-8626 Fax: 213/435-9203
☐ 1501 Loveridge Rd., Pittsburg, CA 94565 415/427-6106 Fax: 415/427-2289
☐ P.O. Box 3, Kaysville, Utah 84037 801/544-1263

Customer Name: C Jenkies CON	Requested by:
Billing Address: PO Box 1427 Long Beach	Customer Phone
City / State / Zip	Job Time / Date: 6-13-90
Job Location	Pacific Job#: 7452
Service Requested: Job Schedule 2 Loads Had To go To Long Beach yard for more manifest and analysis Drove Back To Barstow	Driver: Larry R
	Vehicle#: 30
	Cust. Contact
	Customer P.O.#

PERSONNEL REPORT

DATE:	DEPART TERMINAL	JOB ARRIVAL	JOB DEPARTURE	ARRIVE-DEPART TSDF-FACILITY	ARRIVE TERMINAL	NET HOURS
6-14-90	AM: 4:20 PM.	(AM) 5:30 PM:	AM: 11:30 PM:	IN: OUT:	AM: PM: 8:00	16
DATE: PM:	AM: PM:	AM: PM:	AM: PM:	IN: OUT:	AM: PM:	

DRIVERS COMMENTS: ____________

PVT. ______ WASTE Haz Soil ______ DISPOSAL ______ TRAILER ______
BIN# ______ MANIFEST# ______ RECEIPT# ______ CONDITION ______

REGULAR ______ HRS @ ______ PER HR. ______	______ (______) @ ______ PER ______
OTHER ______ HRS @ ______ PER HR. ______	______ SCALE CHARGE ______
MILAGE ______ MLS @ ______ PER ML. ______	______ DISPOSAL CHARGE ______
DEMURRAGE ______ HRS @ ______ PER HR. ______	______ WASHOUT CHARGE ______
SUBSISTENCE ______ DAYS @ ______ PER DAY ______	______ STORAGE CHARGE ______
CUSTOMER FLAT RATE ______	______ %SURCHARGE ______
SUB TOTAL	SUBTOTAL

CUSTOMER SIGNITURE ______________ TOTAL CHARGES ______________

[redacted]

DUANE'S

Equipment Rental

769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: [illegible] 1101

CUSTOMER/ SHIPPER: Pacific

ADDRESS:

DATE: 6-13 1990

DEBTOR: Duanes

TRUCK#: 1

TRAILER#: 3

CAL-T#:

RATE @ ____ ☐ HOURLY ☐ TONNAGE

OVERLYING CARRIER: Duanes Eq. Rental

UNDERLYING CARRIER: Same

MATERIAL POINT OF ORIGIN: Fort Irwin - Barstow

POINT OF DESTINATION: US Ecology - Beatty Nev.

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
90272976		745-2	2138	9:00	11:00			2.0	

TOTAL TIME: 3.0
DEDUCTIBLE TIME: 1.0
NET TIME: 2.0
TOTAL TONS:
ACCESSORIAL OTHER CHARGES:
SUB TOTAL:
TOTAL CHARGES:

TYPE OF DUMP TRUCK EQUIPMENT TRAILER(S)

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

TRUCK	TRACTOR
☐ 2 AXLE	☐ 2 AXLE
☐ 3 AXLE	☒ 3 AXLE

☐ NONE
☐ BOTTOM DUMP DBL.
☐ TRANSFER
☒ END DUMP SEMI
☐ _____

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER: Tim Dola

RECEIVED BY:

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

Form Approved OMB No. 2050—0039 (Expires 9-30-91)

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

Department of Health Servic
Toxic Substances Control Divis
Sacramento, Califor

90272976

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. CA7800012391 — Manifest Document No. 000002

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

3. Generator's Name and Mailing Address
NASA/JPL (GOLDSTONE TRACKING FACILITY)
4800 OAK GROVE DRIVE
PASADENA, CALIFORNIA 91108 619-386-8330

A. State Manifest Document Number 90272976

B. State Generator's ID

5. Transporter 1 Company Name — 6. US EPA ID Number — C. State Transporter's ID — D. Transporter's Phone

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
U.S. ECOLOGY INC.
HIGHWAY 95
BEATTY, NEV. NVTR000000000 — 10. US EPA ID Number — G. State Facility's ID — H. Facility's Phone 702 553 2203

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. HAZARDOUS WASTE SOLID n.o.s. ORM-E NA 9189 CONTAMINATED SOIL AND DEBRIS	001	DF	116	Y	State EPA/Other D007, 8 & 11
b.					State EPA/Other
c.					State EPA/Other
d.					State EPA/Other

J. Additional Descriptions for Materials Listed Above
PROFILE # 17-000-1077

K. Handling Codes for Wastes Listed Above
a. 03 — b. — c. — d.

15. Special Handling Instructions and Additional Information
GLOVES AND GOGGLES

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 — Signature — Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

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

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

DHS 8022 A (1/88)
EPA 8700—22
(Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

[redacted]

DUANE'S

Equipment Rental

769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: NC 1151

CUSTOMER/SHIPPER Pacific Industrial

ADDRESS

DATE 6-13 1990

DEBTOR Duane's

TRUCK# 2

TRAILER# 4

CAL-T#

RATE @ ☐ HOURLY ☐ TONNAGE

OVERLYING CARRIER Duane's Equip Rental

UNDERLYING CARRIER Duane's Equip Rental

MATERIAL POINT OF ORIGIN Nasa J.P.L. Goldstone Tracking

POINT OF DESTINATION Cal St. Ecology Battery Mesa

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
90272977		7452	2138	8:00	11:00				

TOTAL TIME 3
DEDUCTIBLE TIME 1
NET TIME 2

TOTAL TONS
ACCESSORIAL OTHER CHARGES
SUB TOTAL
TOTAL CHARGES

TYPE OF DUMP TRUCK EQUIPMENT TRAILER(S)

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

TRUCK: ☐ 2 AXLE ☒ 3 AXLE
TRACTOR: ☐ 2 AXLE ☐ 3 AXLE

☐ NONE
☐ BOTTOM DUMP DBL.
☐ TRANSFER
☑ END DUMP SEMI
☐ _____

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER Duane | RECEIVED BY: Tom

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

State of California — Health and Human Agency
Form Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. (Form designed for use on elite (12-pitch typewriter).

Toxic Substances Control Division
Sacramento, California

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: CA7800028911 — Manifest Document No.: 00001

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

3. Generator's Name and Mailing Address
NASA/JPL (COLLISTONE TRACKING FACILITY)
4800 OAK GROVE DRIVE
PASADENA, CALIFORNIA 91108 619-386-8330

A. State Manifest Document Number: 90272977

B. State Generator's ID:

5. Transporter 1 Company Name: DAVES ENVIRONMENTAL — 6. US EPA ID Number: NVR000111211

C. State Transporter's ID: 11-163

D. Transporter's Phone: 13-221-4114

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
U.S. ECOLOGY INC.
HIGHWAY 95
BEATTY, NEV. — 10. US EPA ID Number: NVT330010000

G. State Facility's ID

H. Facility's Phone: 702-553-2203

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. HAZARDOUS WASTE SOLID n.o.s. ORM-E NA 9189 CONTAMINATED SOIL AND DEBRIS	001	DT	16	Y	State 611 / EPA/Other D007,8 & 11
b.					State / EPA/Other
c.					State / EPA/Other
d.					State / EPA/Other

J. Additional Descriptions for Materials Listed Above
PROFILE # 17-000-1077

K. Handling Codes for Wastes Listed Above
a. 03 b. c. d.

15. Special Handling Instructions and Additional Information
GLOVES AND GOGGLES

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 | Signature | Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DAVE KLEIN — Signature | Month Day Year: 11 6 91

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

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year: 11 6 91

DHS 8022 A (1/88)
EPA 8700—22
(Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

PACIFIC

PACIFIC INDUSTRIAL SERVICE CORPORATION

TRANSPORTATION ORDER

SERVICE ORDER NO.

☐ 925 W. Esther St., Long Beach, CA 90813 213/590-8626 Fax: 213/435-9203
☐ 1501 Loveridge Rd., Pittsburg, CA 94565 415/427-6106 Fax: 415/427-2289
☐ P.O. Box 3, Kaysville, Utah 84037 801/544-1263

No. 8264

Customer Name: Jenkins Con				Requested by:	
Billing Address				Customer Phone	
City: PO Box 1427 Long Beach	State: CA.	Zip	Job Time	Date: 6/4-96	
Job Location				Pacific Job #: 7452	
Service Requested: Loaded 2 Loads of Soil				Driver: LARRY R	
Transport To Dump Site				Vehicle #: 30	
				Cust. Contact	
				Customer P.O.#	

PERSONNEL REPORT

DATE:	DEPART TERMINAL	JOB ARRIVAL	JOB DEPARTURE	ARRIVE-DEPART TSDF-FACILITY	ARRIVE TERMINAL	NET HOURS
	AM: 600	AM: 700	AM:	IN:	AM:	12
	PM:	PM:	PM:	OUT:	PM: 1200	

DATE:	DEPART TERMINAL	JOB ARRIVAL	JOB DEPARTURE	ARRIVE-DEPART TSDF FACILITY	ARRIVE TERMINAL	NET HOURS
	AM:	AM:	AM:	IN:	AM:	
PM:	PM:	PM:	PM:	OUT:	PM:	

DRIVERS COMMENTS: _____

PVT. _____ WASTE HAZ Soil DISPOSAL US Ecology TRAILER _____

BIN# _____ MANIFEST# _____ RECEIPT# _____ CONDITION _____

REGULAR _____ HRS @ _____ PER HR.		_____ ( ) @ _____ PER	
OTHER _____ HRS @ _____ PER HR.		_____	SCALE CHARGE
MILAGE _____ MLS @ _____ PER ML.		_____	DISPOSAL CHARGE
DEMURRAGE _____ HRS @ _____ PER HR.		_____	WASHOUT CHARGE
SUBSISTENCE _____ DAYS @ _____ PER DAY		_____	STORAGE CHARGE
CUSTOMER FLAT RATE		_____	%SURCHARGE
SUB TOTAL			SUBTOTAL

CUSTOMER SIGNITURE _____ TOTAL CHARGES _____

[redacted]

DUANE'S

Equipment Rental

769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: NS 1132

CUSTOMER/ SHIPPER Pacific

ADDRESS

DATE 6-14 1990

DEBTOR Duanes

TRUCK# 1

TRAILER# 3

CAL-T#

OVERLYING CARRIER Duanes Eq. Rental

UNDERLYING CARRIER Same

RATE @ ☐ HOURLY ☐ TONNAGE

MATERIAL POINT OF ORIGIN Fort Irwin

POINT OF DESTINATION US Ecology - Nev

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
		7452	2138	8:00	9:00				

TOTAL TIME	TOTAL TONS
DEDUCTIBLE TIME	ACCESSORIAL OTHER CHARGES
	SUB TOTAL
NET TIME	TOTAL CHARGES

TYPE OF DUMP TRUCK EQUIPMENT TRAILER(S)

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

TRUCK	TRACTOR	TRAILER(S)
☐ 2 AXLE	☐ 2 AXLE	☐ NONE
☐ 3 AXLE	☒ 3 AXLE	☐ BOTTOM DUMP DBL.
		☐ TRANSFER
		☒ END DUMP SEMI
		☐ _____

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER

RECEIVED BY:

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

Form Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. *(Form designed for use on elite (12-pitch typewriter).*

Department of Health Services
Toxic Substances Control Division
Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. CA 7 1 8 1 0 0 0 1 2 1 3 1 9 1 2 | Manifest Document No. 0 1 0 1 0 1 4

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

3. Generator's Name and Mailing Address
NASA/JPL (DEEP SPACE COMMUNICATION)
4800 OAK GROVE DRIVE
PASADENA, CAL.) 91108 619-386-8330

A. State Manifest Document Number 90272980

B. State Generator's ID

5. Transporter 1 Company Name | 6. US EPA ID Number | C. State Transporter's ID | D. Transporter's Phone

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
U.S. ECOLOGY INC.
HIGHWAY 95
BEATTY, NEV.

10. US EPA ID Number NVT 3 3 0 0 1 1 0 0 0

G. State Facility's ID

H. Facility's Phone 702-553-2203

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a. HAZARDOUS WASTE SOLID n.o.s. ORM-E NA 9189 CONTAMINATED SOIL AND DEBRIS	0 0 1	2 T	1 6	Y	State 611 / EPA/Other D007, 8, 11
b.					State / EPA/Other
c.					State / EPA/Other
d.					State / EPA/Other

J. Additional Descriptions for Materials Listed Above
PROFILE # 17-000-1077

K. Handling Codes for Wastes Listed Above
a. 03 b. c. d.

15. Special Handling Instructions and Additional Information
GLOVES AND GOGGLES

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 | Signature | Month Day Year

TRANSPORTER
17. Transporter 1 Acknowledgement of Receipt of Materials — Printed/Typed Name | Signature | Month Day Year
18. Transporter 2 Acknowledgement of Receipt of Materials — Printed/Typed Name | Signature | Month Day Year

FACILITY
19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

DHS 8022 A (1/88)
EPA 8700—22
(Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

[redacted]

DUANE'S
Equipment Rental
769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: № 1,52

CUSTOMER/SHIPPER: Pacific Industrial

ADDRESS:

DATE: 6-14 19 90

DEBTOR: Duane's

TRUCK#: 5

TRAILER#: 4

CAL-T#:

OVERLYING CARRIER: Duane's Equip Rental

UNDERLYING CARRIER: Duane's Equip Rental.

RATE @ ____ ☐ HOURLY ☐ TONNAGE

MATERIAL POINT OF ORIGIN: Nasa JPL Holdston Trucking It. Lewis

POINT OF DESTINATION: U.S. Ecology, Beatty Nev

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
		7452	2138	8:00	9:30				

TOTAL TIME	TOTAL TONS
	ACCESSORIAL OTHER CHARGES
DEDUCTIBLE TIME	SUB TOTAL
NET TIME	TOTAL CHARGES

TYPE OF DUMP TRUCK EQUIPMENT

TRUCK: ☐ 2 AXLE ☐ 3 AXLE

TRACTOR: ☐ 2 AXLE ☒ 3 AXLE

TRAILER(S): ☐ NONE ☐ BOTTOM DUMP DBL. ☐ TRANSFER ☒ END DUMP SEMI ☐ ____

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER: Duane

RECEIVED BY: [signature]

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

State of California—Health and Welfare Agency
Form Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. (Form designed for use on elite (12-pitch typewriter).

Department of Health Services
Toxic Substances Control Division
Sacramento, California

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: CA7800020341 — Manifest Document No.: 0003
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
NASA/JPL (DEEP SPACE COMMUNICATION)
4800 OAK GROVE DRIVE
PASADENA, CAL., 91108
4. Generator's Phone: 619-386-8330

A. State Manifest Document Number: 90272979
B. State Generator's ID:

5. Transporter 1 Company Name: [illegible handwriting]
6. US EPA ID Number: [illegible handwriting]
C. State Transporter's ID: [illegible]
D. Transporter's Phone: [illegible]

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
U.S. ECOLOGY INC.
HIGHWAY 95
BEATTY, NEV.
10. US EPA ID Number: NVT330010000
G. State Facility's ID:
H. Facility's Phone: 702-553-2203

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. HAZARDOUS WASTE SOLID n.o.s. ORM-E NA 9189 CONTAMINATED SOIL AND DEBRIS	001	DT	16	Y	State 611; EPA/Other D007, 8, 11
b.					State; EPA/Other
c.					State; EPA/Other
d.					State; EPA/Other

J. Additional Descriptions for Materials Listed Above
PROFILE # 17-000-1077

K. Handling Codes for Wastes Listed Above
a. 03 b. c. d.

15. Special Handling Instructions and Additional Information
GLOVES AND GOGGLES

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: [illegible] Signature: [illegible] Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible handwriting] Signature: [illegible signature] Month Day Year: [illegible]

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

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible handwriting] Signature: [illegible signature] Month Day Year: [illegible]

DHS 8022 A (1/88)
EPA 8700—22
(Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

PACIFIC INDUSTRIAL SERVICE CORPORATION

TRANSPORTATION ORDER

SERVICE ORDER NO.

☐ 925 W. Esther St., Long Beach, CA 90813 213/590-8626 Fax: 213/435-9203
☐ 1501 Loveridge Rd., Pittsburg, CA 94565 415/427-6106 Fax: 415/427-2289
☐ P.O. Box 3, Kaysville, Utah 84037 801/544-1263

No 9349

Customer Name: Jenkins Con.				Requested by:	
Billing Address: PO Box 1427 Long Beach				Customer Phone	
City	State	Zip		Job Time	Date: 6/5-90
Job Location					Pacific Job#: 7452
Service Requested: Loaded Soil 7 Load's Transported To Dune Site.					Driver: TAYLOR
					Vehicle #: 30
					Cust. Contact
					Customer P.O.#

PERSONNEL REPORT

DATE:	DEPART TERMINAL	JOB ARRIVAL	JOB DEPARTURE	ARRIVE-DEPART TSDF-FACILITY	ARRIVE TERMINAL	NET HOURS
6-15-90	AM. 600 Barstow	AM: 730	AM: 1000	IN:	AM: Long Beach	8
	PM.	PM:	PM:	OUT:	PM: 200	
DATE:	DEPART TERMINAL	JOB ARRIVAL	JOB DEPARTURE	ARRIVE-DEPART TSDF FACILITY	ARRIVE TERMINAL	NET HOURS
	AM:	AM:	AM:	IN:	AM:	
PM:	PM:	PM:	PM:	OUT:	PM:	

DRIVERS COMMENTS: _____

PVT. _____ WASTE _____ DISPOSAL U.S. Ecology TRAILER _____

BIN# _____ MANIFEST# _____ RECEIPT# _____ CONDITION _____

REGULAR _____ HRS @ _____ PER HR. _____		_____ (_____) @ _____ PER _____	
OTHER _____ HRS @ _____ PER HR. _____		_____	SCALE CHARGE _____
MILAGE _____ MLS @ _____ PER ML. _____		_____	DISPOSAL CHARGE _____
DEMURRAGE _____ HRS @ _____ PER HR. _____		_____	WASHOUT CHARGE _____
SUBSISTENCE _____ DAYS @ _____ PER DAY _____		_____	STORAGE CHARGE _____
CUSTOMER FLAT RATE _____		_____	%SURCHARGE _____
SUB TOTAL		SUBTOTAL	

CUSTOMER SIGNITURE _____ TOTAL CHARGES _____

[redacted]

DUANE'S

Equipment Rental

769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: NO 1103

CUSTOMER/ SHIPPER Pacific

ADDRESS

DATE 6-15- 1990

DEBTOR Duane's

TRUCK# #1

TRAILER# #3

CAL-T#

RATE @ ☐ HOURLY ☐ TONNAGE

OVERLYING CARRIER: Duanes Eq. Rental

UNDERLYING CARRIER: Same

MATERIAL POINT OF ORIGIN: Fort Irwin - Barstow

POINT OF DESTINATION: US Ecology - Nev

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
90272964		7452	2138						

TOTAL TIME	TOTAL TONS
DEDUCTIBLE TIME	ACCESSORIAL OTHER CHARGES
	SUB TOTAL
NET TIME	TOTAL CHARGES

TYPE OF DUMP TRUCK EQUIPMENT TRAILER(S)

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

TRUCK	TRACTOR
☐ 2 AXLE	☐ 2 AXLE
☐ 3 AXLE	☒ 3 AXLE

☐ NONE
☐ BOTTOM DUMP DBL.
☐ TRANSFER
☒ END DUMP SEMI
☐ _____

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER	RECEIVED BY:

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

California — Health and Welfare Agency
Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. (Form designed for use on elite (12-pitch typewriter).

Department of Health Services
Toxic Substances Control Division
Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: CA7800020014 — Manifest Document No.: 00004
2. Page 1 of
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
NASA/JPL (Deep Space Communications)
4800 Oak Grove Drive
Pasadena, Ca 91109

4. Generator's Phone: 619/386-8230

A. State Manifest Document Number: 90272964
B. State Generator's ID

5. Transporter 1 Company Name — 6. US EPA ID Number
C. State Transporter's ID
D. Transporter's Phone

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
U. S. Ecology Inc.
Highway 95
Beaty, Nev.

10. US EPA ID Number: NVT330010000
G. State Facility's ID
H. Facility's Phone: 702/553-2203

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous waste solid n.o.s. ORM-E NA 9189 contaminated soil and debris	001	DT	115	Y	State 611; EPA/Other 2007, 8, 11
b.					State; EPA/Other
c.					State; EPA/Other
d.					State; EPA/Other

J. Additional Descriptions for Materials Listed Above
Profile # 17-009-1077

K. Handling Codes for Wastes Listed Above
a. b. c. d.

15. Special Handling Instructions and Additional Information

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: David Roberts — Signature — Month Day Year: 06 15 90

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

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

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

DHS 8022 A (1/88)
EPA 8700—22
(Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

Within California, call 1-800-852-7550

[redacted]

DUANE'S

Equipment Rental

769 East Kemp Place
Covina, CA 91722
Phone: (818) 331-4742

BILL NO: NO 1053

CUSTOMER/ SHIPPER Pacific Industrial

ADDRESS

DATE 6-15 1990

DEBTOR Duane's

TRUCK# 5

TRAILER# 4

CAL-T#

OVERLYING CARRIER Duane's Equip Rental

UNDERLYING CARRIER Duane's Equip Rental

RATE @ ☐ HOURLY ☐ TONNAGE

MATERIAL POINT OF ORIGIN Nasa J. Pl. Mt Irwin

POINT OF DESTINATION U.S. Ecology, Beatty Nev.

MANIFEST NO.	WEIGHT	JOB NO.	P.O. NO.	LOADING ARRIVE	LOADING DEPART	UNLOADING ARRIVE	UNLOADING DEPART	STAND BY TIME	BREAKDOWN REASON FOR DELAY
		7452	2138	8:00					

TOTAL TIME	TOTAL TONS
DEDUCTIBLE TIME	ACCESSORIAL OTHER CHARGES
	SUB TOTAL
NET TIME	TOTAL CHARGES

TYPE OF DUMP TRUCK EQUIPMENT TRAILER(S)

EPA# CAD981983158
HAULER# 2286
CAL T 151-145

TRUCK	TRACTOR	
☐ 2 AXLE	☐ 2 AXLE	☐ NONE
☐ 3 AXLE	☑ 3 AXLE	☐ BOTTOM DUMP DBL.
		☐ TRANSFER
		☑ END DUMP SEMI
		☐

I AGREE TO COURT COSTS, ATTORNEY'S FEES AND ALL COSTS THAT ARISE FROM ANY PROCEEDINGS FOR THE COLLECTION OF AMOUNTS DUE TO THE ABOVE CARRIER FOR WORK DONE FOR THE ABOVE SHIPPERS WILL BE PAID BY THE ABOVE SHIPPERS. NOTE: P.U.C. requires payment for these charges not later than 15th of following month. - These charges include (1) fees to pay for regulation of transportation companies by the California Public Utilities Commission and (2) taxes paid to California cities instead of excise or business license taxes they could otherwise impose.

DRIVER Duane

RECEIVED BY:

TERMS: All accounts due and payable 15th of month following purchase. Past due after 30 days. A service charge of 1 1/2% PER MONTH which is an ANNUAL PERCENTAGE RATE OF 18% - will be charged on the unpaid balance of past due accounts.

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

Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. CA1710012031 — Manifest Document No.

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

3. Generator's Name and Mailing Address
NASA/JPL (Deep Space Communication)
4800 Oak Grove Drive Pasadena, Ca 91109

4. Generator's Phone ( ) 619/336-8330

A. State Manifest Document Number 90138909

B. State Generator's ID

5. Transporter 1 Company Name DAVE [illegible] ENTAL — 6. US EPA ID Number [illegible]

C. State Transporter's ID 11015

D. Transporter's Phone 312-331-[illegible]

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
U. S. Ecology Inc.
Highway 95
Beatty, Nev. — 10. US EPA ID Number NVT330010000

G. State Facility's ID

H. Facility's Phone 702-553-2203

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
Hazardous waste solid n.o.s. ORM-E NA 9139 contaminated soil and debris	001	DT	15	Y	State 611 / EPA/Other 9007, 3.11
b.					State / EPA/Other
c.					State / EPA/Other
d.					State / EPA/Other

J. Additional Descriptions for Materials Listed Above
Profile #17-000-1077

K. Handling Codes for Wastes Listed Above
a. b. c. d.

15. Special Handling Instructions and Additional Information
GLOVES AND GOGGLES

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	Signature	Month	Day	Year
David Roberts		06	16	88

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
DAVE [illegible]	[illegible]	06	16	88

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

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

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]	06	16	88

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

HS 8022 A (1/88)
PA 8700—22
Rev. 9-88) Previous editions are obsolete.

Do Not Write Below This Line

GREEN: HAULER RETAINS

U.S.Ecology-Beatty, Nevada-(702)553-2204 #4696

6-13-90
3:56PM
ID 90272976

78720 lb GR
31800 lb TA
46920 lb NT

AUTHORIZED SIGNATURE

U.S.Ecology-Beatty, Nevada-(702)553-2204 #4698

6-13-90
4:05PM
ID 90272977

80960 lb GR
32360 lb TA
48600 lb NT

AUTHORIZED SIGNATURE

U.S. Ecology-Beatty, Nevada-(702)553-2204 #4721

6-14-90
2:19PM
ID 90272979

78780 lb GR
32540 lb TA
46240 lb NT

U.S. Ecology-Beatty, Nevada-(702)553-2204 #4723

6-14-90
2:25PM
ID 90272980

75300 lb GR
31020 lb TA
44280 lb NT

U.S.Ecology-Beatty, Nevada-(702)553-2204 #4750

6-15-90
3:43PM
ID 901388909

70280 lb GR
32520 lb TA
37760 lb NT

U.S.Ecology-Beatty, Nevada-(702)553-2204 #4751

6-15-90
3:51PM
ID 90272964

77620 lb GR
31480 lb TA
46140 lb NT

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 87-4, Vol. 14	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle ENVIRONMENTAL PROJECTS: Volume 14 Removal of Contaminated Soil and Debris		5. Report Date March 5, 1992 6. Performing Organization Code
7. Author(s) Len Kushner		8. Performing Organization Report No.
9. Performing Organization Name and Address JET PROPULSION LABORATORY California Institute of Technology 4800 Oak Grove Drive Pasadena, California 91109		10. Work Unit No. 11. Contract or Grant No. NAS7-918 13. Type of Report and Period Covered JPL Publication
12. Sponsoring Agency Name and Address NATIONAL AERONAUTICS AND SPACE ADMINISTRATION Washington, D.C. 20546		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Numerous diverse activities at the Goldstone Deep Space Communications Complex (GDSCC) are carried out in support of six parabolic dish antennas. Some of these activities can result in possible spills or leakages of hazardous materials and wastes stored both above ground in steel drums and below ground in underground storage tanks (USTs). These possible leaks or spills, along with the past practice of burial of solid debris and waste in trenches and pits, could cause local subsurface contam-ination of the soil.

In 1987, the Jet Propulsion Laboratory (JPL), retained Engineering-Science, Inc. (E-S), Pasadena, California, to identify the specific local areas within the GDSCC with subsurface soil contamination. The E-S study determined that some of the soils at the Apollo Site and the Mars Site were contaminated with hydro-carbons, while soil at a nonhazardous waste dumpsite at the Mojave Base Site was contaminated with copper.

This volume is a JPL-expanded version of the PE 209 E-S report, and also reports that all subsurface contaminated soils at the GDSCC now have been excavated, removed, and disposed of in an environ-mentally acceptable way, and the excavations have been backfilled and covered in accordance with accepted Federal, State, and local environmental rules and regulations.

17. Key Words (Selected by Author(s))	18. Distribution Statement
121.Ground Support Systems/Facilities(Space) 188.Civil Engineering; 216.Environment Pollution; 260.Methods & Equipment (General). Soil pollution, Goldstone DSCC, Contaminated soil disposal, Hydrocarbon & Metal Analysis	Unclassified, unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	130	