DEPARTMENT OF THE AIR FORCE
1004TH SPACE SUPPORT GROUP (AFSPACECOM)
ONIZUKA AIR FORCE BASE, PO BOX 3430
SUNNYVALE, CALIFORNIA 94088-3430

REPLY TO ATTN OF DEEV

11 Jan 88

SUBJECT Letter of Transmittal, Draft Remedial Investigation/Feasibility Study for Camp Parks Communications Annex, Pleasanton, California

TO Alameda County Department of Health Care Services
Sanitation Department
224 W. Winton
Hayward, CA. 94545

1. Martin Marietta Energy Systems, Oak Ridge, Tennessee, has prepared a draft work plan to identify and evaluate past hazardous waste disposed at Camp Parks Communications Annex.

2. Please review the attached Draft Statement of Work and provide your comments for a meeting at Onizuka AFB on 17 Feb 88 at 0900 hours.

3. Point of Contact (POC) for this project is Mr. Carl Willert at (408) 752-3561.

DANIEL E. GLINES, Maj, USAF
Base Civil Engineer

1 Atch
Draft Statement of Work

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R0471

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SAMPLE PLAN
FOR
CAMP PARKS COMMUNICATION ANNEX,
ONIZUKA AIR FORCE BASE, CALIFORNIA

DRAFT

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, TN 37922

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Prepared for:

Martin Marietta Energy Systems, Inc.
Hazardous Waste Remedial Action Program
Oak Ridge, Tennessee

December 1987

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REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAMPLE PLAN

PROJECT TITLE: Camp Parks Communications Annex
Onizuka Air Force Base

Prepared by

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37922

December 1987
Revision No. 0

DRAFT

Approved: Clifford E Vaughan
Manager, IT Civil and Environmental Engineering
Date: 12/31/87

Approved: Robert D. Ollar
General Manager, IT Knoxville Engineering
Date: 12/31/87

Approved: John H. Doyle
Quality Assurance Coordinator - QEA
Date: 12/31/87

Approved: Harry A. Pulley
Health and Safety Coordinator - IT Knoxville
Date: 1/4/88

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ACRONYMS

AER	Alternatives Evaluation Report
AFIRM	Air Force Installation Restoration Management
AFSC	U.S. Air Force Systems Command
CERCLA	Comprehensive Enviromental Response, Compensation and Liability Act
CPCA	Camp Parks Communications Annex
CPRTF	Camp Parks Radiometric Test Facility
DOD	Department of Defense
DOE	Department of Energy
Energy Systems	Martin Marietta Energy Systems, Inc.
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FSR	Feasibility Study Report
IRP	Installation Restoration Program
IT	IT Corporation
MCLs	Maximum Contaminant Levels
MEK	Methyl ethyl ketone
MIT	Massachusetts Institute of Technology
MSL	Mean Sea Level
NIPDWR	National Interim Primary Drinking Water Regulations
NOAA	National Oceanic and Atmosperic Administration
NSPWR	National Secondary Drinking Water Regulations
O&M	Operation and Maintenance
OAFB	Onizuka Air Force Base
ORNL	Oak Ridge National Laboratory
PID	Photoionization Detector
PRFTA	Parks Reserve Training Area
RI/FS	Remedial Investigation and Feasibility Study
SARA	Superfund Amendment and Reauthorization Act
TDSs	Total Dissolved Solids
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

1.1 BACKGROUND AND SCOPE

The Department of Defense (DOD) has developed the Installation Restoration Program (IRP) to identify and evaluate past hazardous material disposal sites on DOD property. Work under the IRP will control the migration of hazardous contaminants and the effects of environmental and health hazards which may have resulted from past disposal operations on DOD property. The IRP consists of four phases: Phase I, Initial Assessment/Records Search; Phase II, Confirmation; Phase III, Technology Base Development; and Phase IV, Remedial Actions. Due to the impact of the 1986 Superfund Amendment and Reauthorization Act (SARA) on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), all work for this project will follow to the extent appropriate, U. S. Environmental Protection Agency (EPA) guidance for a remedial investigation and feasibility study (RI/FS).

Martin Marietta Energy Systems, Inc. (Energy Systems) provides technical assistance in support of the IRP. IT Corporation (IT) was contracted by Energy Systems under Task Order No. X-08 issued under General Order No. 12B-97382C to produce a work plan for a site at Camp Parks Communications Annex (CPCA) of Onizuka Air Force Base (OAFB), formerly Sunnyvale Air Force Station.

An IRP Phase I Records Search was conducted by Environmental Science and Engineering, Inc. (ESE) for Sunnyvale Air Force Station, document dated July 1985. Past and current employees were interviewed, records were reviewed, regulatory agencies were contacted, and a site reconnaissance was conducted. Past waste handling and disposal practices were evaluated. Six past waste disposal or spill sites were identified. These sites were found to have no potential for contaminant migration and/or residual contamination. The dry well disposal site at CPCA [Site 6 in the ESE (1985) document] was noted to have potential for residual contamination. As a result, the U.S. Air Force Systems Command (AFSC) has requested the support of Department of Energy (DOE) in assessing the extent of contamination at this site.

1.2 PREVIOUS REPORTS

The project work and sampling plans have been prepared using the following documents concerning previous site activities as references:

- Environmental Science and Engineering, Inc. "Installation Restoration Program, Phase I: Records Search, Sunnyvale Air Force Station, California, Final Report," SD-TR-85-31, July 1985.
- Martin Marietta Energy Systems, Inc. "Statement of Work for Remedial Investigation/Feasibility Study for One Site at Camp Parks Communications Annex, Onizuka Air Force Station, California," Contract DE-AC05-840R22400, June 1987.

1.3 SITE DESCRIPTION AND HISTORY

The CPCA is a part of OAFB, formerly known as Sunnyvale Air Force Station. OAFB is located 40 miles southeast of San Francisco, California in Santa Clara County, near the southwest edge of San Francisco Bay. CPCA is located in Alameda County, 23 miles northeast of OAFB, southeast of Dublin, and north of Pleasanton, California. CPCA is situated in an area known as the Parks Reserve Forces Training Area, which is an installation of the U.S. Army's Presidio of San Francisco (Figure 1-1).

The site occupies 11.6 acres and consists of several buildings and a large communication dish antenna located in an isolated area immediately northeast of the I-680 and I-680 interchange. CPCA has been operated as a radiometric test facility since 1961, originally under the name Camp Parks Radiometric Test Facility (CPRTF). In 1961 the portion of the annex known as Area A was developed and operated by the Massachusetts Institute of Technology (MIT) until 1970. Lockheed Aircraft Corporation has been the operating contractor since 1970. In 1972 additional facilities were constructed at Area B. In 1970 AFSC assumed responsibility for the CPRTF, and in 1972 the facilities and land were officially transferred from the U.S. Army to the U.S. Air Force (Secretary of the Army, 1972). In 1975 the facility was redesignated Camp Parks Communications Annex.

1.4 ENVIRONMENTAL SETTING

The environmental setting of CPCA is summarized in this section with primary emphasis on identifying features or conditions that may promote the movement of contaminants.

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STARTING DATE: 11/18/87	DATE LAST REV.:	INITIATOR: J.STULTZ	DRAWING NO.: 409612A01
DRAWN BY: J.NEAL	DRAWN BY:	PROJ. MGR. D.CARNES	PROJECT NO.: 409612.10

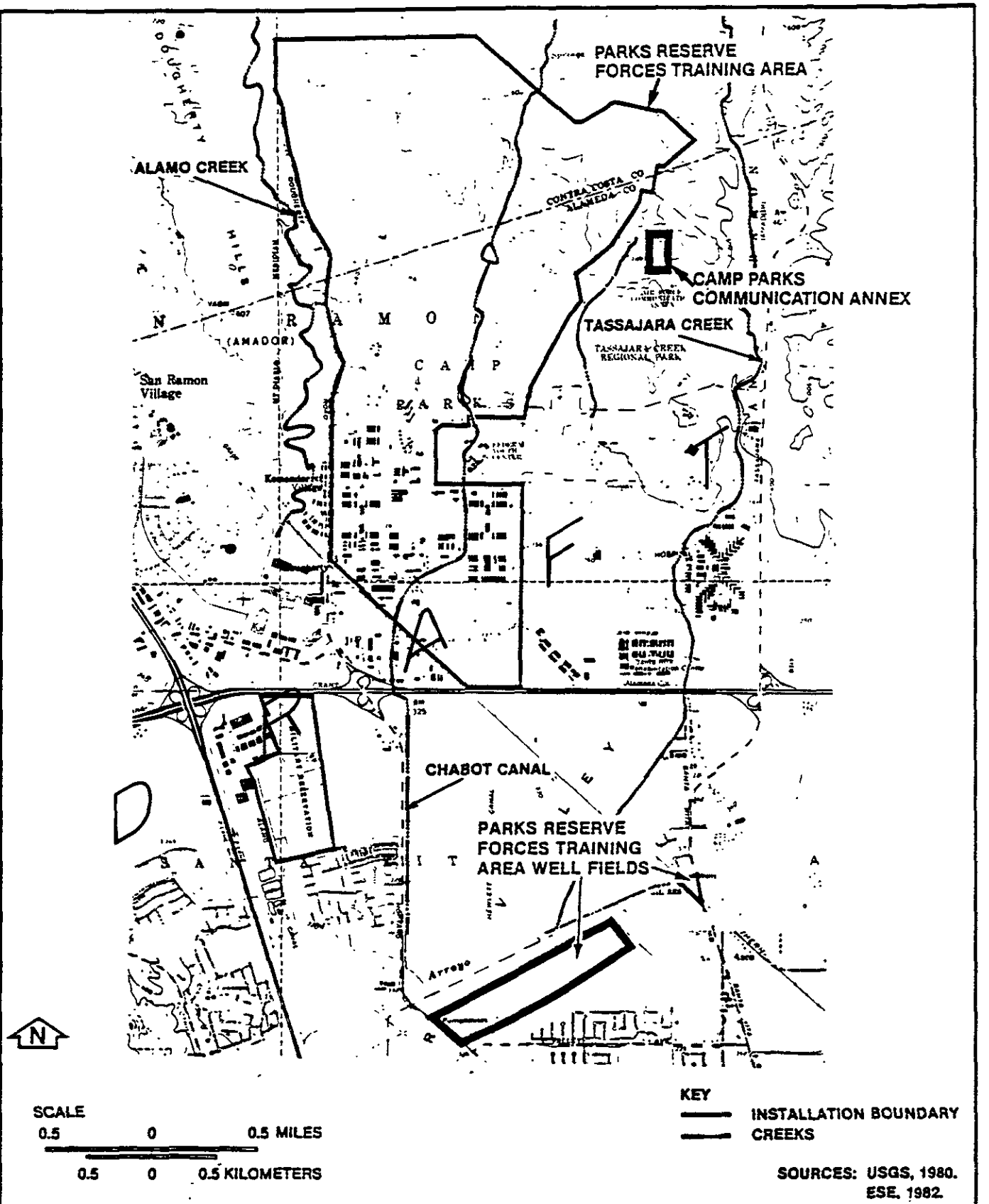

FIGURE 1-1.
AREA MAP SHOWING THE LOCATION OF PARKS RESERVE FORCES TRAINING AREA WELL FIELDS

INSTALLATION RESTORATION PROGRAM
ONIZUKA AIR FORCE BASE

1.4.1 Meteorology

Meteorological data for CPCA were obtained from the National Oceanic and Atmospheric Administration (NOAA) meteorological station at Livermore, California, which is located approximately 6 miles southeast of CPCA. The period of record for the data is 29 years (1951-1980). The climate of CPCA is mild, with average monthly temperatures ranging from a low of 45.9°F in January to a high of 71.3°F in July. The average annual temperature is 58.7°F. The area is characterized by wet winters and dry summers. Approximately 81 percent of the average 14.11 inches of annual rainfall occurs from November through March.

Net precipitation, the difference between annual precipitation and evaporation, is a minus 29.90 inches per year at CPCA, and the 1-year, 24-hour rainfall event is 2 inches (U.S. Dept. of Commerce, 1961, 1968). The low value for net precipitation indicates a low potential for significant infiltration or the formation of permanent surface water features. The 1-year, 24-hour rainfall event of 2 inches indicates a moderate potential for runoff and erosion.

1.4.2 Geography

CPCA is located on a hillcrest and is divided into two separate areas, including radar towers, small buildings, and adjacent asphalt-paved parking (Figure 1-2). Buildings 2001 and 2002 are situated at 692 feet above mean sea level (MSL), and Building 2003 is at 668 feet above MSL. Elevations decrease in all directions from the hilltop to approximately 640 feet above MSL at the boundary of CPCA. The topographic gradient from Building 2002 to the western boundary of CPCA is approximately minus 1 foot per 5 feet.

1.4.3 Soils

Soil units overlying the Tassajara Formation bedrock are classified within the Diablo series. The Diablo clay is characterized by a high shrink-swell potential and permeability ranging from 0.6 to 2.0 inches per hour. Slopes of the Diablo clay at CPCA range from 9 to 30 percent. The runoff rate is slow to medium, and the erosion potential where soil is exposed is light to moderate (U.S. Army Corps of Engineers, 1981).

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DRAWN BY: J.NEAL	DRAWN BY:	PROJ. MGR. D.CARNES	PROJECT NO.: 409612.10

SOURCES: Dept. of the Air Force, 1984b.
ESE, 1985.

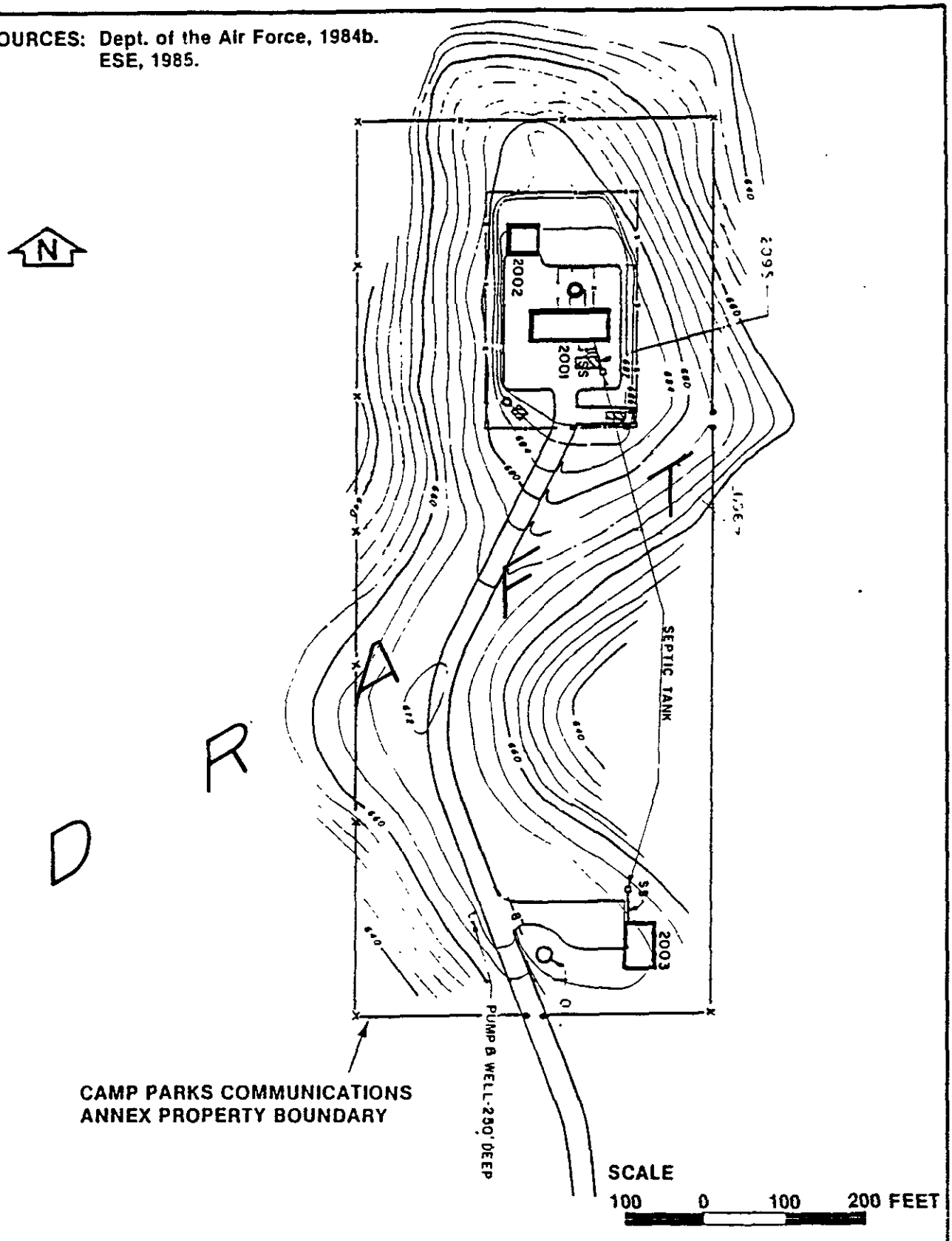

FIGURE 1-2.
GEOGRAPHY OF SITE 6, CAMP PARKS COMMUNICATIONS ANNEX

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1.4.4 Surface Water

Because of its small size and location at the top of a hill, no perennial surface water features exist on CPCA. Intermittent storm water runoff is directed through a surface drainage system of open ditches and swales. Due to the hilltop location of CPCA, storm water drainage is not a problem. The annex is located in the drainage basin of Tassajara Creek, which flows south approximately 0.5 mile east of the installation. Water quality of Tassajara Creek is characterized as slightly alkaline with high levels of sodium bicarbonate (U.S. Army Corps of Engineers, 1981).

1.4.5 Ground Water

CPCA is underlain by the Camp ground water subbasin, a portion of the Livermore Valley ground water basin. The Camp subbasin is 2,858 acres in area and includes the surface drainages of Tassajara Creek and Cottonwood Creek. The subbasin is bounded on the west by the Pleasanton Fault and on the east by steeply dipping geologic units; these geological features separate the basin hydraulically from adjacent ground water basins. Relatively low well yields in the Camp subbasin result from the presence of low permeability shale units. Recharge to the aquifer system occurs through infiltration of precipitation within the outcrop areas.

Before 1974, potable water was obtained through Parks Reserve Forces Training Area (PRFTA), which operates a well field approximately 3 miles south of CPCA. In 1974 one water well was installed within CPCA boundaries to a depth of 248 feet. The well was originally used for potable water supply purposes but is currently used only for sanitary and supply purposes. Bottled water from a water cooling unit has been used for drinking water since 1981. A geologic log and well construction details are shown in Figure 1-3.

No water quality data were available from CPCA water supply well. Analytical data for raw water from the PRFTA wells 3 miles away are summarized in Table 1-1. These data were obtained in five sampling events conducted from 1972 to 1977.

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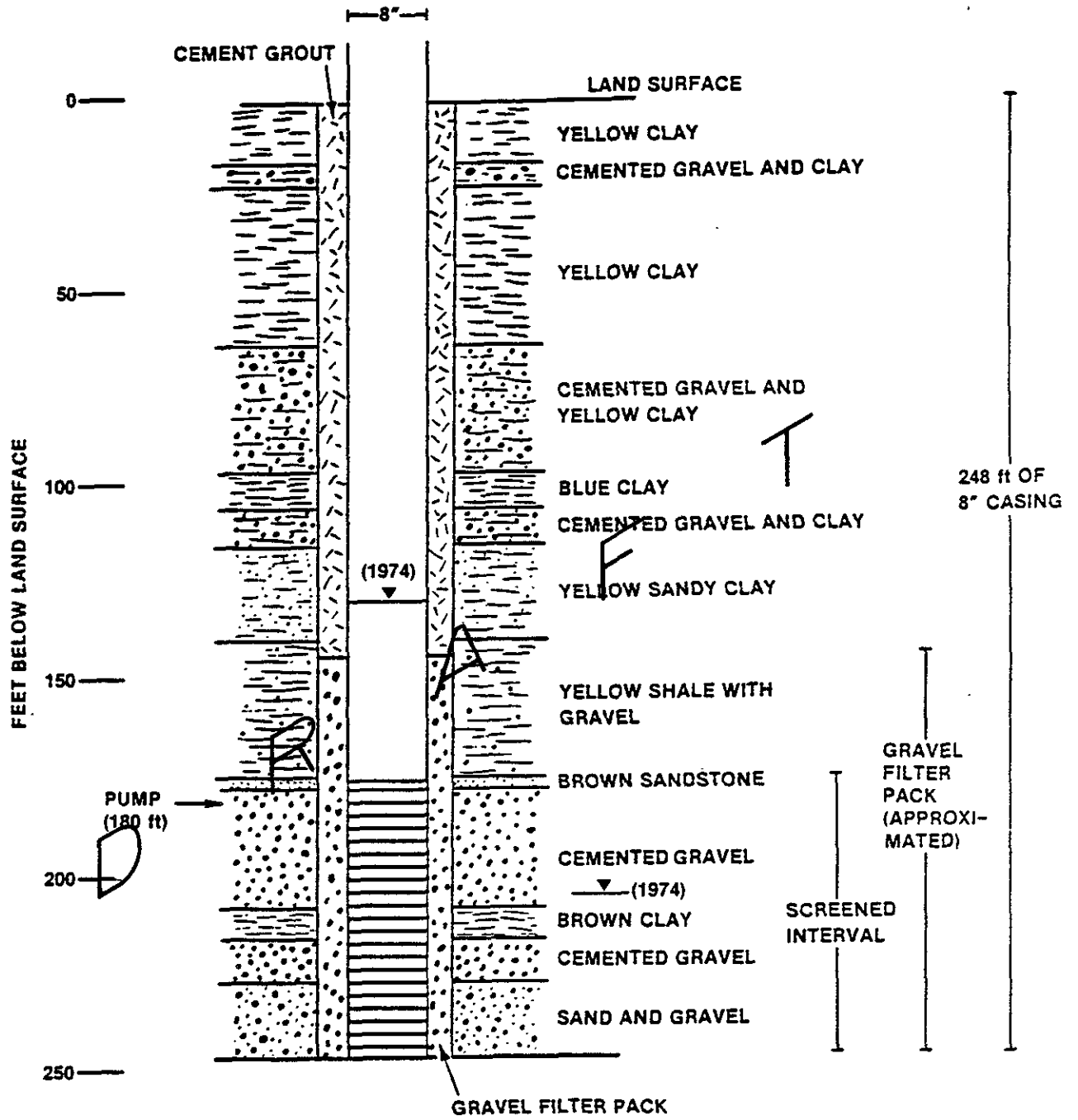

SOURCES: SAFS, 1985.
ESE, 1985.

FIGURE 1-3
GEOLOGIC LOG AND WELL CONSTRUCTION FOR CPCA WATER SUPPLY WELL

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Table 1-1. Summary of Ground Water Quality Data for PRFTA Wells*

Parameter**	Federal Drinking Water Maximum Contaminant Level	Well 3001	Well 3002	Well 3003
pH, Units	6.5-8.5[a]	7.5	7.6	7.5
Alkalinity, mg/l as Calcium Carbonate ($CaCO_3$)		344.0	342.0	334.0
Total Hardness, mg/l as $CaCO_3$		449.0	524.0	494.0
Specific Conductance, µmhos/cm		1,717.0	1,563.0	1,540.0
Total Dissolved Solids (TDSs), mg/l	500[a]	837.0	824.0	804.0
Calcium, mg/l		72.7	78.3	75.2
Magnesium, mg/l		72.8	77.5	78.3
Sodium, mg/l		113.6	75.0	63.6
Chloride, mg/l	250[a]	182.0	162.2	159.0
Sulfate, mg/l	250[a]	58.6	84.0	59.8
Nitrate, mg/l as Nitrogen	10[b]	5.8	4.1	5.0
Arsenic, mg/l	0.05[b]	<0.02	<0.02	<0.02
Barium, mg/l	1.0[b]	<0.30	0.37	0.37
Cadmium, mg/l	0.01[b]	<0.002	<0.002	<0.002
Chromium, mg/l	0.05[b]	<0.04	<0.04	<0.04
Copper, mg/l	1.0[a]	<0.12	<0.187	<0.12
Iron, mg/l	0.3[a]	<0.10	<0.10	<0.10
Lead, mg/l	0.05[b]	<0.009	<0.008	<0.009
Manganese, mg/l	0.05[a]	<0.03	<0.03	<0.03
Mercury, mg/l	0.002[b]	0.0027	0.0004	0.0044
Selenium, mg/l	0.01[b]	NA	NA	NA
Silver, mg/l	0.05[b]	<0.021	<0.021	<0.021
Zinc, mg/l	5.0[a]	<0.213	<0.223	<0.213
Fluoride, mg/l	1.4-2.4[b]	0.2	0.2	0.2
Gross Alpha, pCi/l	15.0[b]	1.2	2.3	2.3
Gross Beta, pCi/l	50.0[b]	3.2	3.9	3.0
Tritium, pCi/l	20,000	0.03	0.0406	0.0258

[a]NSDWR (EPA, 1984b).
[b]NIPDWR (EPA, 1984a).
*Note: PRFTA well field locations are shown in Figure 1-1.
**Note: pCi/l = Picocuries per liter; mg/l = milligrams per liter.
Sources: USAEHA, 1978; ESE, 1985.

As shown by the data in Table 1-1, the ground water in the area is alkaline and very hard, containing high levels of dissolved solids. These characteristics are typical of ground water in the area obtained from the sandstone, tuffaceous sandstone, and shale deposits that compose the underlying Tassajara Formation. Included in Table 1-1 are the National Interim Primary Drinking Water Regulations (NIPDWR) (EPA, 1984a) and National Secondary Drinking Water Regulations (NSDWR) (EPA, 1984b) maximum contaminant levels (MCLs) for the listed parameters. With the exception of total dissolved solids (TDSs) and mercury, the raw ground water is within the NIPDWR and NDSWR MCLs for the parameters listed in Table 1-1. TDS levels range from 804 to 837 mg/liter, which is well above the 500-mg/liter criterion. High TDS levels in water from the Tassajara Formation are principally due to calcium, magnesium, and sodium bicarbonate and do not present a health-related concern. Levels of mercury (0.0027 to 0.0044 mg/liter) were slightly above the NIPDWR MCLs (0.002 mg/liter). These mercury levels probably are from either well head pump contamination or minerals in the volcanic tuffs within the underlying geologic formations. For example, in the upland areas surrounding San Francisco Bay, cinnabar (a mercuric sulphide mineral) is mined commercially.

1.4.6 Biotic Environment

The following description of biotic communities was reported in an environmental impact statement prepared for PRFTA (U.S. Army Corps of Engineers, 1981). While no actual wildlife surveys or species counts have been performed specifically for CPCA, these species are expected to potentially occur on the annex.

The habitat of CPCA is predominantly valley grasslands with small areas of human-altered habitats consisting of buildings, pavement, and unpaved roads. The grasslands support a variety of wildlife including mammals, birds, and reptiles. A variety of large predatory birds and mammals attracted by an abundance of prey animals live at the site. No threatened or endangered species of either plants or animals have been reported in the vicinity of CPCA.

1.4.7 Potential Receptors

Potential receptors are very limited at CPCA due to the remoteness of the site and the physical location of the potentially contaminated dry well disposal pit, which is currently capped by an asphalt parking lot. As ground water is at a depth of approximately 130 feet, contamination of the aquifer is unlikely. The most likely receptor is the upper 6 to 10 feet of the soil in the immediate vicinity of the dry well.

1.4.8 Summary

The CPCA is an 11.6-acre remote installation for OAFB, consisting of several buildings and a communication tower, located immediately northeast of the I-580 and I-680 interchange. Elevations of the hilltop facility range from approximately 640 feet at the boundary to 692 feet at the crest. Storm water drains rapidly from the facility through a system of open ditches and swales to Tassajara Creek, approximately 0.5 miles to the east.

The climate at CPCA is mild. Average monthly temperatures range from 45.7°F in January to 71.3°F in July, with an average annual temperature of 58.7°F. Eighty-one percent of the 14.11-inch average annual rainfall occurs from November through March. A negative net precipitation value of 29.90 inches per year indicates a low infiltration potential. The one-year, 24-hour rainfall event of 2 inches indicates a moderate potential for runoff and erosion.

Soils at CPCA are classified in the Diablo series, with high shrink-swell potential and permeability from 0.6 to 2.0 inches/hour. With slopes of 9 to 30 percent, the runoff rate is slow to medium and exposed soil has an erosion potential of light to moderate.

CPCA is within the 2,858-acre Camp subbasin, part of the Livermore Valley ground water basin. Major surface drainages in the subbasin are Tassajara and Cottonwood Creeks. Low permeability shale bedrock results in low well yields. Infiltration of precipitation through bedrock outcrops recharges the aquifer. Ground water quality data for nearby PRFTA wells indicates high alkalinity and hardness, with high levels of dissolved solids. Despite the presence of a potable water supply well at CPCA, bottled water is used for drinking purposes.

The habitat at CPCA is valley grasslands with areas of human-altered habitat. A variety of small mammals, birds, and reptiles are present, and larger predatory birds and mammals nearby. No threatened or endangered species have been reported to exist within the CPCA.

2.0 PUBLIC RELATIONS

All questions by the medial and any public relations issues will be referred to Carl Willert (OAFB, P.O. Box 3020, Sunnyvale, CA 94088-2020).

3.0 OBJECTIVE OF SAMPLING EFFORT

The primary objectives of this sampling program are to provide sufficient site data to:

- Confirm and quantify the extent of contamination
- Verify the source of contamination, if present
- Provide data in support of a remedial action plan if the site has confirmed contamination.

4.0 RATIONALE FOR SAMPLE LOCATIONS, NUMBERS OF SAMPLES, AND ANALYSES

The sample locations will be selected on the basis of results from the geophysical (magnetometer) surveys. An estimated five soil borings will be drilled approximately 18 feet deep, with an average of four soil samples per boring to be chemically analyzed, as specified in the statement of work (Energy Systems, 1987). One of these may instead be replaced by three surface soil samples, depending on magnetometer survey results.

Projected locations of boreholes and/or soil samples are shown in Figure 4-1. These locations are as follows:

- Borehole 1 is to be within 5 feet of the dry well receiving drainage from the machine room sink.
- Borehole 2 is to be within 5 feet of the dry well receiving drainage from the air conditioner.
- Borehole 3 will be within 5 feet of the dry well receiving drainage from the transmitter room floor drain.
- The soil at the end of the machine-room floor drain pipe will be sampled by three surface soil samples if it projects outside the inner fence and ends within 12 inches of the surface or by Borehole 4 if it ends within the inner fence (under the asphalt parking lot) or deeper than 12 inches below the surface.
- Borehole 5 will provide a background reference and will be located along the entrance road at a remote location from the sites dry wells.

The sample locations are designed to sample all known drain pipes (except the septic system) from Building 2001 as well as background levels. Each borehole will be sampled at depths of 8, 11, 13, and 18 feet, for a total of four samples per borehole, as specified in the statement of work (Energy Systems, 1987). This number will effectively sample the soil column and identify any contamination migration which may have occurred from dry wells or drains. The construction details of the dry wells and proposed soil borings are shown in Figure 4-2.

As mandated in the statement of work (Energy Systems, 1987) all samples are to be analyzed for aromatic volatile organics, for priority pollutant metals, and

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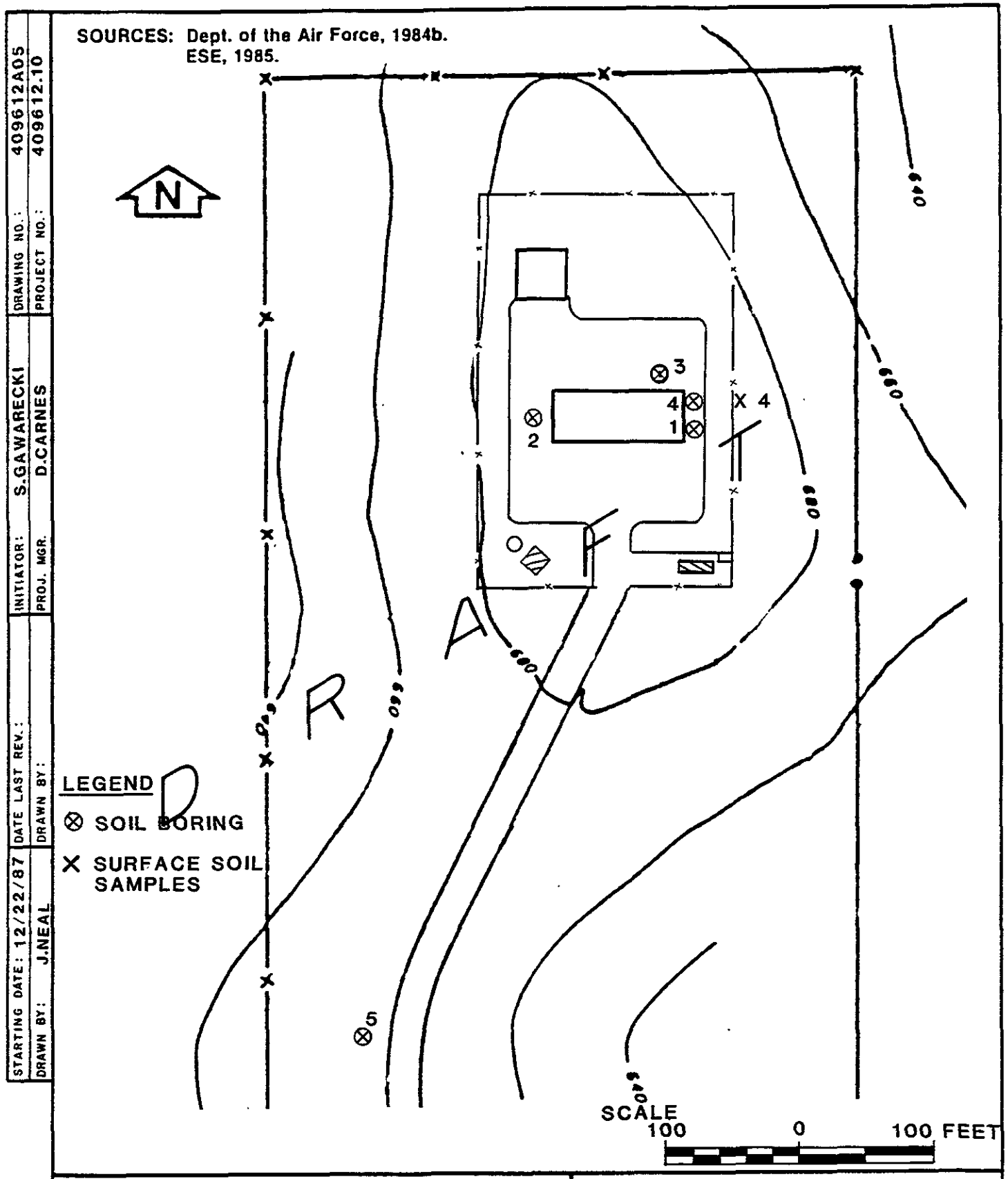

FIGURE 4-1.
SAMPLING LOCATIONS AT SITE 6, CAMP PARKS COMMUNICATIONS ANNEX

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STARTING DATE: 12/22/87	DATE LAST REV.:
DRAWN BY: J.NEAL	DRAWN BY:
INITIATOR: S.GAWARECKI	DRAWING NO.: 409612A06
PROJ. MGR. D.CARNES	PROJECT NO.: 409612.10

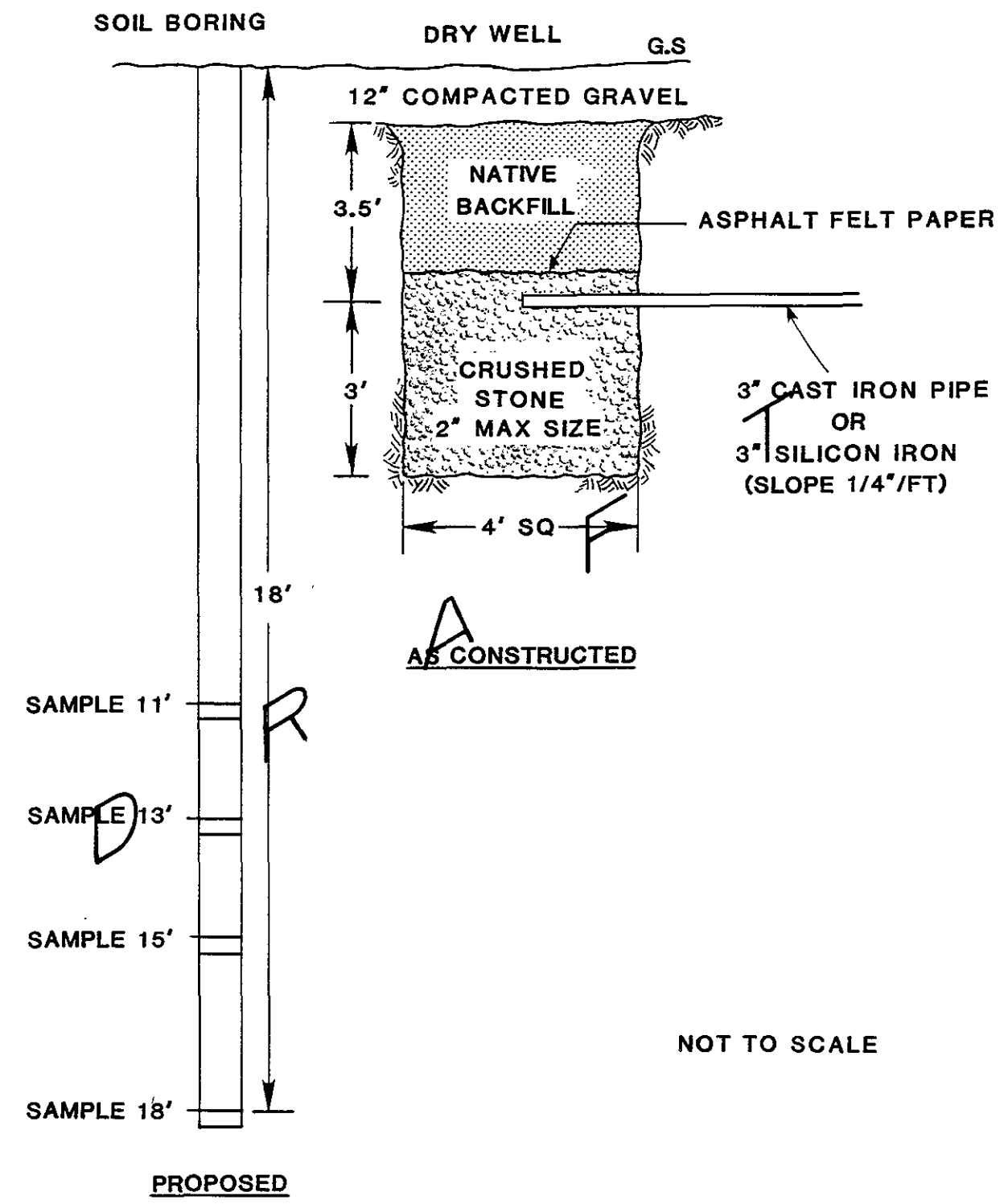

FIGURE 4-2.
CONSTRUCTION DETAILS OF DRY WELLS AND PROPOSED SOIL BORINGS

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for base/neutral extractables. The analytical methods are shown in Table 4-1. The wastes disposed of at CPCA include the chromic acid solution Bright Dip® which was poured down the sink drain in Building 2001 and paint thinner, kerosene, methyl ehtyl ketone (MEK), acetone, and alcohol which were allowed to evaporate from the parking area. The proposed analyses will detect any residues from the waste disposal operations.

All analyses will be performed by the IT laboratory in Cerritos, California. This laboratory operates under the EPA contract laboratory program (CLP).

Table 4-1. Analytical Methods for Soil Boring Samples

Parameter	Method for soils
Aromatic volatile organics	SW 5030/8020 SW 5030/8015 SW 5030/8240
Base/neutral extractable	SW 5030/8270
Mercury	SW 846/7470
Arsenic	SW 846/7060
Selenium	SW 846/7740
All other priority pollutant metals	SW 3050/6010

5.0 ANALYSES TO BE PERFORMED

This section presents the sampling and analysis matrix for Site 6 at CPCA. Soil sample analyses are presented in Table 5-1.

Actual sampling locations will be determined in the field based on a magnetometer survey at each potential drilling location. The main concern is potential safety problems with drilling in areas in immediate proximity to high voltage underground utilities. Exact locations of the iron drainpipes will also be pinpointed. Following identification of borehole locations, the asphalt will be marked with fluorescent paint and soil areas will be marked with a ground stake.

Quality assurance/quality control (QA/QC) samples, estimated at one each per day, are to be duplicate samples (CP-QA-DS-01,-02); equipment rinsate blanks (CP-QA-RB-01,-02); and VOA travel blanks (CP-QA-TB-01,-02). Due to decontamination required of field equipment and the accompanying equipment rinsate blanks, field blanks are not required. Borehole 5 will yield background samples for QA/QC purposes. QA/QC samples will be treated and handled in the same manner as actual samples.

Table 5-1. Analyses To Be Performed for Soil Samples (Sample x Sample Basis)

Sample Location	Proposed Date	Concentration[a] Low	Med	High	Analysis Required: Organics[b]	Inorganics[c]	Other
_____	_____	___	___	___	V SV P All	M CN^-dist	_____
CP-BH-01-08'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-01-11'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-01-13'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-01-18'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
_____	_____	___	___	___	V SV P All	M CN^-dist	_____
CP-BH-02-08'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-02-11'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-02-13'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-02-18'	_____	X	___	___	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
_____	_____	___	___	___	V SV P All	M CN^-dist	_____
_____	_____	___	___	___	V SV P All	M CN^-dist	_____
Totals:	Low Concentration				8 ___ ___ ___	8 ___	_____
	Medium Concentration				___ ___ ___ ___	___ ___	_____
	High Concentration				___ ___ ___ ___	___ ___	_____

[a]Concentration: Low = <10 ppm; Medium = 10 ppm to 15% of any 1 constituent; and High = 15% to 100% of any 1 constituent.

[b]Organic Analysis: V = volatiles; SV = semivolatiles; P = pesticides/PCBs; All = V + SV + P.

[c]Inorganics Analysis: M = metals; CN^-dist = distillation method for cyanides.

Table 5-1. (Continued)

Sample Location	Proposed Date	Concentration[a] Low	Med	High	Analysis Required: Organics[b]	Inorganics[c]	Other
_____	_____	___	___	___	V SV P All	M CN⁻dist	_____
CP-BH-03-08'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-03-11'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-03-13'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-03-18'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
_____	_____	___	___	___	V SV P All	M CN⁻dist	_____
CP-BH-04-08'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-04-11'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-04-13'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
CP-BH-04-18'	_____	X	___	___	(V) SV P All	(M) CN⁻dist	Base/Neutral Ext
_____	_____	___	___	___	V SV P All	M CN⁻dist	_____
_____	_____	___	___	___	V SV P All	M CN⁻dist	_____
Totals:	Low Concentration				8 ___ ___ ___	8 ___	_____
	Medium Concentration				___ ___ ___ ___	___ ___	_____
	High Concentration				___ ___ ___ ___	___ ___	_____

[a]Concentration: Low = <10 ppm; Medium = 10 ppm to 15% of any 1 constituent; and High = 15% to 100% of any 1 constituent.

[b]Organic Analysis: V = volatiles; SV = semivolatiles; P = pesticides/PCBs; All = V + SV + P.

[c]Inorganics Analysis: M = metals; CN^-dist = distillation method for cyanides.

Table 5-1. (Continued)

Sample Location	Proposed Date	Concentration[a] Low	Med	High	Analysis Required: Organics[b]	Inorganics[c]	Other
_____	_____	—	—	—	V SV P All	M CN^-dist	_____
CP-BH-05-08'	_____	X	—	—	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-05-11'	_____	X	—	—	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-05-13'	_____	X	—	—	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-BH-05-18'	_____	X	—	—	(V) SV P All	(M) CN^-dist	Base/Neutral Ext
_____	_____	—	—	—	V SV P All	M CN^-dist	_____
_____	_____	—	—	—	V SV P All	M CN^-dist	_____
_____	_____	—	—	—	V SV P All	M CN^-dist	_____
Totals:	Low Concentration				4 — — —	4 —	_____
	Medium Concentration				— — — —	— —	_____
	High Concentration				— — — —	— —	_____

[a]Concentration: Low = <10 ppm; Medium = 10 ppm to 15% of any 1 constituent; and High = 15% to 100% of any 1 constituent.

[b]Organic Analysis: V = volatiles; SV = semivolatiles; P = pesticides/PCBs; All = V + SV + P.

[c]Inorganics Analysis: M = metals; CN^-dist = distillation method for cyanides.

Table 5-1. (Continued)

Sample Location	Proposed Date	Concentration[a] Low	Med	High	Analysis Required: Organics[b]	Inorganics[c]	Other
CP-QA-DS-01		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-QA-DS-02		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
					V SV P All	M CN^-dist	
CP-QA-RB-01		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-QA-RB-01		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
					V SV P All	M CN^-dist	
CP-QA-TB-01		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
CP-QA-TB-02		X			(V) SV P All	(M) CN^-dist	Base/Neutral Ext
					V SV P All	M CN^-dist	
					V SV P All	M CN^-dist	
Totals:	Low Concentration				6	6	
	Medium Concentration						
	High Concentration						

[a]Concentration: Low = <10 ppm; Medium = 10 ppm to 15% of any 1 constituent; and High = 15% to 100% of any 1 constituent.

[b]Organic Analysis: V = volatiles; SV = semivolatiles; P = pesticides/PCBs; All = V + SV + P.

[c]Inorganics Analysis: M = metals; CN^-dist = distillation method for cyanides.

6.0 METHODS AND PROCEDURES

6.1 INTRODUCTION

The soil borings will be drilled using the hollow-stem auger method. The entire length of core, minus the intervals for analysis, will be stored in core boxes in the on-site warehouse as designated by the site manager (John Meyer) for the duration of the investigation.

6.2 SUBSURFACE SOIL SAMPLING

Subsurface samples will be collected for lithologic description using a continuous 5-foot sampler. Samples will be classified with respect to type, grain size, mineralogy (when pertinent), color, and other pertinent information. Six-inch samples will be collected from the core barrel. The samples will be checked for discoloration, odor, and presence of organic vapor with an HNu detector, and data will be recorded during drilling operations. Continuous cores will be boxed, labeled in sequence, and photographed with appropriate scales for future reference.

Samples from 8-, 11-, 13-, and 18-foot depths will be packaged and shipped to the laboratory for chemical analysis. Samples will be removed from the core barrel and placed into a clean glass container and placed in a cooler. Samples selected for analyses will be shipped to the laboratory. Samples will be placed in containers as quickly as possible to minimize losses of volatile organics.

6.3 SURFACE SOIL SAMPLING

Soil samples will be collected from the upper 6 inches of surface soil at sample site 4 if the drainpipe ends within 1 foot of the surface. The samples will be collected with a stainless steel trowel. The soil will be placed in clean glass jars with Teflon-lined lids. Split samples will be obtained by collecting a second sample immediately adjacent to the first.

6.4 SAMPLE PRESERVATION

Samples will be collected in 16-ounce glass wide-mouth jars with Teflon lids and immediately put in coolers. Samples will be kept on ice at 4°C until received at the laboratory. Coolers will be shipped by a next-day delivery

service to the laboratory. Notification of shipment, including airbill number, will be phoned to the laboratory no later than 9:00 a.m. the following day.

6.5 BORINGS

6.5.1 Drilling Procedures

Drilling equipment will be cleaned and inspected for proper operation before drilling starts. Borings will be drilled using the hollow-stem auger method. Eight-inch outside diameter augers will be used. Core samples will be collected using a steel 5-foot continuous sampler. The sampler will be inserted inside the bottom auger flight and advanced with the augers. At each 5-foot interval the core barrel will be be retrieved with a drill string lowered through the hollow-stem auger. After each auger section is added another clean continuous sampler will be inserted and attached to the bottom most auger section. This procedure will allow accurate depth control, description of sediments, and selection of core samples. The borehole will be logged using standard geological nomenclature and standard geologic descriptions.

Six-inch sections at 8-, 11-, 13-, and 18-foot depths will be collected as a sample. The remaining core will be stored in a core box for the duration of the field investigation and stored at a location designated by the Site Manager. The 6-inch samples will be placed in clean glass containers with Teflon-lined lids; the containers will be supplied by the IT Cerritos laboratory. Headspace will be minimized within the sample containers. The sealed samples will be labeled and immediately placed in a cooler at 4°C. Those samples from a given boring selected for analysis will be transported as soon as possible to the laboratory.

The 5-foot continuous core and the selected sample will be screened using an HNu Model PI 101 photoionization detector (PID). In each boring samples collected at 8, 11, 13, and 18 feet will be sent for analysis. If in a given 5-foot interval extensive contamination is evident or the contamination is concentrated at a location other than the specified sample depth, the contaminated zone will be sampled and additional samples may be selected at

the discretion of the Field Geologist. The samples collected and the rationale will be recorded in the daily activities log and noted on the drilling log.

6.5.2 Borehole Abandonment

Upon completion, each borehole will be abandoned with a grout mixture of cement, bentonite, and water. The grout mixture will consist of one 95-pound bag of portland cement and 5 pounds of powdered bentonite per 6 gallons of water. The grout mixture will be placed in the hole via the tremie pipe method before the augers are pulled from the hole. The auger will be pulled from the hole as the grout is placed. The location of each abandoned boring will be measured from known permanent reference points. The location will be patched with a cold patch material and marked with a temporary labeled stake and a surveyor's pin.

6.5.3 Borehole Data

Core samples obtained from auger borings will include the following descriptive guidelines:

- Recognition and identification of soil horizon
- Recognition and identification of mappable rock units (formations) where appropriate: for example, construction of a graphic log illustrating type of sediments or rock units encountered, scaled off to depth (standard scale is 1 inch equals 10 feet)
- Reference on log:
  - Total depth of well or boring
  - Areal location of well or boring
  - Elevation at surface location of well or boring (referenced to mean sea level)
  - Identification number used for reference to well or boring
- Descriptions of sediments will include, as appropriate:
  - Color
  - Accessory minerals
  - Luster
  - Sorting, cementation, and porosity
  - Grain size
  - Lithology and composition
  - Roundness/angularity of sand grains

- Lamination (if any)
- Fracturing

- Unified Soil Classification and standard geological descriptions for evaluation of physical properties of soils and sediments.

6.6 DECONTAMINATION PROCEDURES

The drilling tools, equipment, and rig will be steam cleaned before entering the site and between individual soil borings. Additionally, drill cuttings and wash waters from suspected contaminated areas will be put into containers for eventual disposal by the subcontractor (following a review of subsurface/ground water sample data). To assure that proper disposal methods are used for these materials and to comply with California hazardous waste regulations, IT will immediately notify the Air Force of the subsurface/surface screening results that indicate significant contamination.

Minor decontamination, such as cleaning of split-spoon samplers, will be performed at each boring site. The following decontamination procedure will be used to decontaminate equipment:

- Wash with high pressure steam
- Wash and brush with an Alconox detergent solution
- Rinse with tap water and water filtered through activated carbon
- Rinse with A.C.S. grade hexane
- Rinse with deionized, distilled water
- Allow equipment to air dry
- Wrap in aluminum foil or plastic sheeting.

The split-spoon samplers will be decontaminated as above except the steam cleaning will be omitted.

All rinsates from decontamination will be collected for later discharge to the wastewater treatment plant at OAFB. Other residuals that may require disposal as a hazardous material will be transported to a central storage area for ultimate disposal by the subcontractor. The hazardous residuals may include soil and/or drilling fluid. After boring, the cuttings will be drummed and evaluated. If determined hazardous after sampling, the residuals will be disposed of at an appropriate hazardous waste landfill.

6.7 DRILLING SITE CLEANUP

Upon completion of all soil borings each drilling site will be cleaned of trash and excess soil around the boring. If the excess soil does not require containerization, it will be spread evenly around the immediate area of each site. The ground surface will be returned to its original condition as much as possible to prevent surface water drainage to the boring.

6.8 SURVEYING DATA

Soil boring locations will be identified on maps provided by the facility. The horizontal locations of the soil borings will be surveyed to an accuracy of one foot.

All surveys at the site will be performed by a licensed surveyor. The surveys will be referenced to the U.S. Geological Survey or U.S. Geodetic Survey bench marks and grid system.

6.9 UNDERGROUND UTILITIES

The Field Supervisor will determine the possibility of any utility lines, buried pipes, or miscellaneous equipment being located in the sampling area. The Site Manager and local public works department or other utility companies will determine the presence of underground utilities. If any utilities must be exposed during soil boring operations, the activity will be coordinated with a representative of the utility company and OAFS Project Personnel.

6.10 FIELD EQUIPMENT

The following measuring equipment will be necessary for the site investigation work:

- Organic vapor meter with photoionization detector
- Explosimeter
- Magnetometer.

Table 6-1 summarizes the field procedures, units of measure, and calibration procedures which will be used for each piece of equipment.

Table 6-1. Field Equipment

Equipment	Field Procedures	Units of Measure	Calibration Procedures
Photoionization Portable Gas Analyzer	Air monitoring during field operations for presence of organic vapors. Soil vapor monitoring at selected sites.	Parts per million	Calibrated by manufacturer with known gas and concentration; zero adjusted in the field daily.
Explosimeter	Air monitoring during field operations for presence of combustible gases.	Percent of lower explosive limit	Calibrated by manufacturer with known gas and concentration; daily testing in known explosive environment (gas tank) and zero adjustment in clean environment.
Magnetometer	Location of buried ferro-magnetic objects (drums) at landfills.	Gammas	Calibrated by manufacturer; checked daily in the field at site-specific base station before and after surveys.

6.11 FIELD DOCUMENTATION PROCEDURES

6.11.1 Photographs

Color photographs will be taken, with OAFB approval, of each sampling site to show the surrounding area drilling and sampling equipment and sample activities. The picture number and roll number (if more than one roll of film is used) will be logged on the Field Activity Daily Log to identify which sampling site is depicted in the photograph. Each film roll will be identified by taking a photograph of an information sign on the first frame. The job and film roll numbers will be written on each sign to identify the pictures contained on the roll, for example:

Onizuka AFB
Site Location
Roll Number 1
Frame Number 1 of 36
March 8, 1988 - (photographer's name).

Prints will be identified with the project number, date taken, and a brief description. If video recordings are made, at the beginning of each tape or new location, the above information will be recorded either verbally or written on a board and scanned by the video recorder.

6.11.2 Field Activity Daily Logs

Field data collection activities will be recorded on the Field Activity Daily Log as shown in Figure 6-1. Entries will be described at an appropriate level of detail so that the situation can be reconstructed without reliance upon memory. All log sheets will be kept in the project files in the central files at IT's Knoxville engineering office. Project files will be turned over to the appropriate Air Force office at the completion of the project contract.

Entries on the logs will contain a variety of information. At the beginning of each entry, the date, start time, weather conditions for the past 48 hours, all field personnel present, level of personal protection being used on site, and the signature of the person making the entry will be entered and other details as specified on the Field Activity Daily Log. The names of visitors to the site and the purpose of their visit will be recorded. All entries will

DAILY LOG			
	DATE		
	NO.		
	SHEET	OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME	PROJECT NO.
FIELD ACTIVITY SUBJECT:	
DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:	
VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
IT PERSONNEL ON SITE:	
	(FIELD ENGINEER) DATE

Figure 6-1

Information to be recorded in each field log are:

- Project identification
- Field activity subject
- General work activity
- Unusual events
- Visitors on site
- Subcontractor progress or problems
- Communication with the client or others
- Weather conditions
- IT personnel on site
- Sample number and time of day for each sample collected for analysis
- Listing by sample number of samples collected during the day, sorted by chain-of-custody record number (compiled at end of day)
- Record of telephone call to laboratory informing them of sample shipment
- * Accomplishment of decontamination of drilling rig and well construction materials
- * Accomplishment of required calibration checks
- * Accomplishment of well purging, with time and/or volume
- * Accomplishment of well development
- * Disposition of well development water, purging water, decontamination rinsing fluids, and drill cuttings
- * Well water levels and field measurements
- Variances from project plans and procedures (details will be recorded in the site variance log)
- Accomplishment of tailgate safety meetings
- Review of project procedures with site personnel
- Organic vapor analyzer readings for water samples
- * Accomplishment of decontamination of water sampling equipment
- Photographs taken and ID numbers.

*If the description of these methods exist in writing elsewhere, the log entry can reference them. Otherwise, the log entry needs to describe the methods. used.

Figure 6-1 (continued)

be made in water resistant ink and no erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark.

Measurements made and samples collected will be recorded. Whenever an unscheduled sample is collected or a measurement is made, a detailed description of the location or station will be recorded. Equipment used to make measurements will be identified, along with the date of last calibration. Samples will be collected following the procedures documented in this sample plan. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, and the volume and number of containers in which the sample was placed in the field. Sample numbers will be assigned in accordance with this plan. Major activities being performed or other items pertinent to the history of the investigation will also be noted.

The following information is to be recorded in each field log:

- Project identification
- Field activity subject
- General work activity
- Unusual events
- Visitors on site
- Subcontractor progress or problems
- Communication with the client or others
- Weather conditions
- IT personnel on site
- Sample number and time of day for each sample collected for analysis
- Listing by sample number of samples collected during the day, sorted by chain-of-custody record number (compiled at end of day)

- Record of telephone call to laboratory informing them of sample shipment
- * Accomplishment of decontamination of drilling rig, and sampling equipment
- * Accomplishment of required calibration checks
- * Disposition of decontamination rinsing fluids and drill cuttings
- Variances from project plans and procedures (details will be recorded in the site variance log)
- Accomplishment of tailgate safety meetings
- Review of project procedures with site personnel
- Photographs taken and their ID numbers.

6.11.3 Variance Log

Variances in the work plan, sample plan, or quality assurance plan or field activities may be initiated either in the field or the office. Any variance must be approved and recorded by the Field Supervisor. Such variances include, but are not limited to:

- A change in sampling location
- A change in the number of samples to be collected
- A change in the depth at which a sample is gathered.

All such variances will be noted in the Field Activity Daily Log and recorded on a Variance Log form as shown in Figure 6-2 and the variance will be approved by the Project Manager and Quality Assurance Coordinator. Copies of all variances will be kept in the project files.

Variances that alter the statement of work will be approved by Energy Systems after consulting with OAFB project personnel prior to proceeding with the changed condition.

*If the descriptions of these methods exist in writing elsewhere, the log entry can reference them. Otherwise, the log entry needs to describe the methods used.

Page ____ of ____

VARIANCE LOG

Office /__/ Field /__/

Project ______________________________

Project No. ____________________

Variance Date	Initiated By	Applicable Document	Description of Variance	Approved	
				PM/Date	OAO/Date

DRAFT

Figure 6-2

6.12 SAMPLE CUSTODY AND DOCUMENTATION

The sample custody and documentation procedures described in this section will be followed during sample collection at the site. Personnel involved in chain-of-custody and transfer of samples will be trained in these procedures prior to implementation of the field program at the site.

Chain-of-custody procedures are utilized to document sample possession from the time of collection to disposal, in accordance with federal guidelines. For the purpose of this plan, a sample is considered in custody if:

- It is in the sampler's or the transferee's actual possession
- It is in the sampler's or the transferee's view, after being in his/her physical possession
- It was in the sampler's or the transferee's physical possession and then he/she secured it to prevent tampering
- It is placed in a designated secure area.

6.12.1 Sample Labels

All physical samples obtained at the site will be placed in an appropriate sample container for shipment to the laboratory. Each sample container will be identified with a separate identification label. The following information will be included on the label:

- Project name and number
- Unique sample number
- Sample location
- Sampling date and time
- Signature of individual collection sample
- Preservation method employed.

The label will be filled out with waterproof ink or marker.

Sample Numbering System

Each sample will be assigned a unique sample identification number that describes where the sample was collected. Each number will consist of a group of letters and numbers, separated by hyphens. The sample media and numbering system is as follows:

SS___ - Surface soil sample number (sequential for each sample location)

BH___ - Boring sample number (sequential for each boring with depth also noted).

This system will assign an individual number to each sample and will facilitate sample tracking and analytical data retrieval of each sample. The number will be divided into four parts:

CP-BH-01-08'
CP-SS-01

The CP designates Camp Parks; the BH signifies a borehole; the 01 signifies location 01; and the 08 signifies 8-foot sample depth. The prefix BH will be used for borehole samples; the prefix SS, for surface soil samples. If a sample location must be shifted due to field conditions, the sample number will include the letter A to designate an alteration of the sample location (i.e., CP-BH-02-11-A). The letter A will alert personnel performing data evaluation to consult the field documentation for actual sample location.

6.12.2 Chain-of-Custody Records

All samples or other physical evidence that is collected in the field will be accompanied by a Chain-of-Custody Record (Figure 6-3). The following information must be supplied in the indicated spaces in detail to complete the Chain-of-Custody Record:

- Project name/number
- Laboratory destination
- Sample team members
- The sampling station number, location, and description, date and time collected, sample type, container type, condition upon receipt
- Any special instructions and/or sample hazards
- All samplers must sign in the designated blocks, also indicating their company, date, and time

INTERNATIONAL TECHNOLOGY CORPORATION

CHAIN-OF-CUSTODY RECORD

R/A Control No. _____

C/C Control No. 002289

PROJECT NAME/NUMBER _____ LAB DESTINATION _____

SAMPLE TEAM MEMBERS _____ CARRIER/WAYBILL NO. _____

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.

Special Instructions: _____

Possible Sample Hazards: _____

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: _____

   Received By: _____

2. Relinquished By: _____

   Received By: _____

3. Relinquished By: _____

   Received by: _____

4. Relinquished By: _____

   Received By: _____

WHITE - To accompany samples
YELLOW - Field copy

Figure 6-3

- Request for analysis number
- Air bill number.

A Chain-of-Custody Record will accompany the sample during shipment to the laboratory. If samples are split and sent to different laboratories, a copy of the Chain-of-Custody Record will be sent with each sample.

The "remarks" column will be used to record specific considerations associated with sample acquisition such as: sample type, container type, sample preservation methods, etc. When transferring samples, the individuals relinquishing and receiving will sign, date, and note the time on the record.

A copy of this record will follow the samples to the laboratory. The laboratory maintains one file copy, and the completed original will be returned to the Project Manager as a part of the final analytical report. This record will be used to document sample custody transfer from the sampler to the laboratory.

Shipments will be sent by air express courier and a bill of lading will be used. Bills of lading will be retained as part of the permanent documentation.

The following methodology will be followed for all samples subject to chemical analysis:

- Each individual is responsible for the care and custody of samples they collect until the samples are properly transferred to the Field Geologist.
- The Field Geologist is personally responsible for the care and custody of the samples collected until they are properly transferred to another person or facility.
- Sample labels will be completed for each sample using waterproof, indelible ink.
- All samples collected must be documented in the Field Activity Daily Log.
- A Chain-of-Custody Record will be completed by the sampler for all samples or physical evidence collected.

- Each time responsibility for custody of a sample changes, the new custodian will sign, date, and note the time that the change occurred.

- During the course and at the end of the field work, the Field Geologist will determine whether these procedures have been followed, and/or if the collection of additional samples is required.

- Each time responsibility for custody of a sample changes, the new custodian will sign, date, and note the time that the change has occurred.

- Samples will be properly packaged for shipment to the IT laboratory for analysis.

- All samples will be accompanied by the Chain-of-Custody Record. The original will be placed in a plastic bag with the Request for Analysis inside the secured shipping container if samples are shipped. One copy of the record will be retained by the Field Geologist. The original record will be transmitted to the Project Manager after samples are accepted by the laboratory. This copy will become a part of the project file.

- If sent by mail, the package will be registered with return receipt requested. If sent by common carrier, a government bill of lading (GBL) or air bill will be used. Receipts from post offices, copies of GBLs, and air bills will be retained as part of the documentation of the chain of custody. The air bill number, GBL number, or registered mail serial number will be recorded in the remarks section at the bottom of the Chain-of-Custody Record.

- Upon sample destruction or disposal, the custodian responsible for the disposal will complete the Chain-of-Custody Record, file a copy, and send a copy to the Project Manager or to his/her designated representative for record keeping.

- The Chain-of-Custody Record is a serialized document. Once this record is completed, it becomes an accountable document and a copy must be maintained in the project file.

6.12.3 Sample Handling, Packaging, and Shipment

All samples will be placed in precleaned glass or plastic bottles for shipment to the laboratory. The precleaned bottles will be obtained from the IT Cerritos laboratory.

A Chain-of-Custody Record and Request for Analysis form describing the

contents of the cooler will be placed in a sealed plastic bag and taped to the upper lid of the cooler. The shipping coolers will be taped shut with security labels taped over opposite ends of the lid.

A Request for Analysis form will be completed and sent to the laboratory with the samples. This form will contain analytical testing requirements for all samples and blanks. An example of this form is shown in Figure 6-4.

All materials for packing and preserving the samples will be supplied by the Cerritos laboratory. The following procedure will be followed for packing the samples:

- Secure and tape the drain plug on the cooler with fiber tape. Line the cooler with a large heavy duty plastic bag.
- Make sure all sample container caps are tight (will not leak) and secure the cap with tape to ensure that the cap will not vibrate loose during transport.
- Place all sample containers in separate and appropriately sized polyethylene bags and seal bags with tape.
- Place 2 to 4 inches of packing material (styrofoam, vermiculite) in the bottom of the cooler and then place the sample containers in the cooler with sufficient space to allow for the addition of more packing between the sample containers.
- Put "blue ice" packs (or ice that has been placed in heavy duty polyethylene bags and properly sealed) on top of or between the samples. Fill all remaining space between the samples with packing. Securely fasten the top of the larger heavy duty plastic liner bag with tape.
- The shipping containers will be marked "THIS END UP," and arrow labels which indicate the proper upward position will be affixed to the container. A label containing the name and address of the shipper will be placed on the outside of the container. Labels used in the shipment of hazardous materials (such as Cargo Only Aircraft, Flammable Solids, etc.) are not permitted to be on the outside of the container used to transport environmental samples and will not be used.

Samples will be shipped at the end of each day to the Cerritos laboratory via overnight air delivery.

37876

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REQUEST FOR ANALYSIS

R/A Control No.
C/C Control No. _____

PROJECT NAME _____
PROJECT NUMBER _____
PROJECT MANAGER _____
BILL TO _____

PURCHASE ORDER NO. _____

DATE SAMPLES SHIPPED _____
LAB DESTINATION _____
LABORATORY CONTACT _____
SEND LAB REPORT TO _____

DATE REPORT REQUIRED _____
PROJECT CONTACT _____
PROJECT CONTACT PHONE NO. _____

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager)

Normal _____ Rush _____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other _____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis Lab will charge for packing, shipping, and disposal)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples

Figure 6-4

6.13 QUALITY ASSURANCE SAMPLES

QA/QC samples will be submitted to the laboratory with the soil samples. The QA/QC samples will consist of blind duplicates. These duplicate samples will be given a false sample number similar to the true sample identity. The true sample numbers will be recorded in field records, but will not appear on the sample container labels or the Chain-of-Custody Records. The purpose of the duplicate samples is to provide a check on laboratory analytical precision. Duplicate samples will be collected at areas where contamination is suspected based on odor, discoloration or the presence of organic vapors.

Blank samples, prepared using deionized organic free water, will be analyzed to check for container contamination. In addition, equipment rinsate blanks will be used to test the effectiveness of decontamination procedures. During each decontamination, a rinsate sample of the final rinse with deionized organic free water will be collected. Each water or rinse blank will require a 1-liter glass organics bottle. Caps and cap liners will be compatible with the designated analytical requirements. The IT laboratory will supply all bottles, caps, and preservatives. All rinsate samples gathered during the day will be shipped with the soil samples.

As an additional quality assurance measure, split samples will be provided to parties expressing an interest in receiving them. Split samples of soils collected using split-spoon samplers may not be available, because of insufficient sample volume. Soil samples will not be split when collected for analysis of volatile organic compounds (VOCs).

7.0 HEALTH AND SAFETY PLAN

7.1 INTRODUCTION

The purpose of this health and safety (HS) plan is to describe the health hazard controls and procedures to minimize the accident and injury risks associated with field work conducted during the site investigation at the CPCA.

The provisions specified here are intended to conform to all applicable state and federal environmental and occupational health and safety regulations, Air Force safety and health guidelines, and IT policies and procedures. These control measures will apply to field personnel who participate in the site investigation field work at the CPCA. IT will continuously monitor the site conditions to ensure that the field work does not endanger surrounding on-site and off-site personnel.

In order to account for changing site conditions, the parameters of this plan may change; however, no changes will be made without prior approval of the IT Health and Safety Coordinator and designated client representative. All health and safety requirements in this plan are site specific and are based on the hazards present and the work tasks required.

7.2 HAZARD ASSESSMENT

7.2.1 Potential Hazardous Activities

The potential hazardous activities that site personnel may encounter during this project include drilling boreholes. The risk levels associated with the potential hazardous activity is assumed to be high until eliminated or controlled.

7.2.2 Chemical Hazards

Based on historical records of materials disposed of or handled at the site, the following chemical contaminants may potentially be encountered during the study:

- Paint thinner
- Kerosene
- Methyl ethyl ketone
- Acetone
- Alcohol
- Chronic acid.

Major potential chemical hazards may include:

- Fire and explosion hazards from combustible gases or vapors
- Personnel exposure by inhalation, ingestion, and/or skin absorption of toxic gases, vapors, or dusts
- Personnel injury by contact with corrosive or irritating chemical contaminants.

Fire or explosion conditions are not expected to be encountered during site investigation activities for the following reasons:

- Anticipated low concentrations of volatile organic vapors that would be present in the soil and water
- Work activities to be conducted in an outdoor environment allowing for dilution of combustible gases and vapors
- Air monitoring that will be conducted with a combustible gas/oxygen meter during drilling activities to assess flammable vapors.

Field personnel are not expected to encounter significant exposures to the chemical contaminants present at the site for the following reasons:

- Anticipated low concentrations of contaminants that would be present and would become airborne during drilling and sampling
- Personal protective equipment that field personnel will use (as necessary) during drilling and sampling activities to minimize potential for inhalation and skin absorption of contaminants
- Decontamination/hygiene measures to be used to prevent skin contact and/or ingestion of the contaminants
- Work will be performed in an outdoor environment, so air contaminants will be diluted.

7.2.3 Safety Hazards

The major potential safety hazards associated with this project are:

- Mechanical injury hazard during drilling and well installation operations
- Physical hazards caused by environmental conditions at the site
- Heat stress caused by ambient temperatures and impermeable protective garments personnel wear
- Noise exposure from drilling equipment.

7.3 ASSIGNMENT OF RESPONSIBILITIES

Assignment of responsibilities for development, coordination and implementation of the HS plan is necessary for proper administration of the plan.

7.3.1 Health and Safety Coordinator

The Health and Safety Coordinator (HSC) is responsible for the development of the HS plan. These areas of responsibility include hazard assessment, medical programs, training requirements, air monitoring, personal protective equipment, site control, decontamination protocol, contingency plans and record keeping.

7.3.2 Field Supervisor

The Field Supervisor is responsible for field implementation of the HS Plan. This includes communicating the specific requirements to all site personnel and consulting with the HSC regarding safety and health requirements.

7.3.3 Site Personnel

All site personnel are responsible for understanding and complying with all site safety and health requirements. Documentation of this will be made on the Tailgate Safety Meeting form.

7.4 MEDICAL PROGRAM

Establishment of a medical screening, health surveillance and emergency medical assistance program is essential for worker protection.

7.4.1 Medical Screening and Health Surveillance

7.4.1.1 IT Personnel

All IT personnel assigned to this project will have completed a pre-employment and/or periodic update (annual) physical examination. Medical examinations are performed by preapproved industrial medical groups whose physicians are aware of the nature of the work field personnel are engaged in. This examination meets all OSHA medical examination requirements and consists of the following:

- Medical and Occupational History Forms
- Physical Examination
- Complete and differential blood count
- Urinalysis (dipstick and microscopic)
- SMA-20 (or equivalent)
- Audiometric examination
- Chest X-ray (14 x 17 posterior/anterior view)
- Pulmonary Function Test (FVC and FEV 1.0)
- EKG (for employees over 45 or when there is an indication of problems)
- Vision acuity and color
- Drug and alcohol screen (for personnel employed after March 1985)

7.4.1.2 Subcontractor Personnel

Subcontractor personnel utilized on this project will have completed physical examinations within the past year as described above.

7.4.1.3 Medical Record Evaluation

All medical records will be submitted to IT's medical consultant, Dr. Nakai, for evaluation. The evaluation will include a judgment (as per results of pulmonary function test) of the employee's ability to use negative or positive pressure respiratory protective equipment. Employees found to have medical conditions which could directly or indirectly be aggravated by exposure to the chemical substances within the work environment or by physical demands of the job will be counseled by the health and safety office about their condition, and their on site activity may be restricted by the Field Supervisor.

7.4.2 Emergency Medical Assistance

Prior to work start up, an emergency medical assistance network will be established. The OAFB Point of Contact (POC) will be notified of IT's

presence at the base. The POC will apprise base security of the procedures that will be followed and ensure that emergency transportation has access to the work area. The local fire department rescue squad, ambulance service, hospital emergency room, and other pertinent emergency services will be identified. Telephone numbers and locations of these services will be maintained in an easily accessible location at the site (specific information is included in section 7.10).

Key site personnel will be qualified to render first-aid and/or cardiopulmonary resuscitation (CPR). A first-aid kit will be available at the site for use by qualified personnel.

Any injury or illness not limited to a first-aid case will be immediately reported to the Field Supervisor. This notification will allow for coordination of internal health and safety resources to assist the treating physician in rendering appropriate care as necessary.

7.4.3 Injury and Illness Treatment

Any employee or subcontractor who is suspected of having an overexposure to chemical contaminants or needs to have nonemergency medical treatment for an on site injury or illness will be sent to an approved contracted medical clinic.

In the event of injuries or illnesses, the Field Supervisor will be required to complete a Supervisor's Employee Injury Report form (Figure 7-1).

Personnel who develop or sustain a lost-time illness will be examined (or reexamined) by an approved physician. The medical clinic's physician will be required to certify in writing that an individual is fit to return to work prior to the individuals reassignment to the project.

7.4.4 Medical Records

IT's corporate Health and Safety Department will maintain records on all IT employees and subcontractors. IT maintains all medical surveillance records for a period of 30 years and makes these records available as required by state and/or federal (OSHA, EPA) regulations.

SUPERVISOR'S EMPLOYEE INJURY REPORT

This is an official document to be initiated by the employee's supervisor. Please answer all questions completely. This report must be forwarded to the employee s Regional Health and Safety office within 24 hours of the injury.

Injured's Name _____ Sex ____ S.S. No _____ Birthdate _____

Home Address _____ City _____ State _____ Zip _____ Phone _____

Job title _____ Employee s P.C. _____ Hire date _____ Hourly wage _____

SUPERVISOR

Date of incident _____ Time _____ Time reported _____ To whom? _____

Client name _____ Client address _____ Time shift began _____

Exact location of incident _____ Did employee leave work? ☐ No ☐ Yes When _____

Has employee returned to work? ☐ No ☐ Yes When _____ Did employee miss a regularly scheduled shift? ☐ No ☐ Yes

Doctor/Hospital name _____ Address _____

Witness name(s) _____ Statements attached? ☐ No ☐ Yes

Nature of injury _____ Exact body part _____

Medical attention: ☐ None ☐ First aid on site ☐ Doctor s office ☐ Hospital ER ☐ Hospitalized

Job assignment at time of incident _____ Job: _____ Phase: _____ Task: _____ Subtask: _____

Describe incident _____

What unsafe physical condition or unsafe act caused the incident? _____

What corrective action has been taken to prevent recurrence? _____

Supervisor/Foreman _____ (Print) _____ Signature _____ Date

MANAGER

MANAGER

Comments on incident and corrective action _____

Manager s name _____ (Print) _____ Signature _____ Date

HEALTH AND SAFETY

HEALTH AND SAFETY

Concur with action taken? ☐ No ☐ Yes Remarks _____

OSHA Classification:

☐ Incident only ☐ First aid ☐ No lost workdays ☐ Lost workdays ☐ Restricted activity ☐ Fatality

Days away from work _____ Days restricted work _____ Total days charged _____

☐ State jurisdiction ☐ Federal L&H ☐ Date ER submitted _____ Which claims office _____

Coding: A. Injury type or illness _____ B. Injured body parts _____ C. Activity at time of accident _____ D. Injury cause code _____

E. Agent code _____ F. Safety rule violated code _____ G. Accident prevention code _____

Name _____ (Print) _____ Signature _____ Date

ITC FORM 9300.1-1 (07/86)
Refer to ITC PRO 9300.1 for reporting procedures

White: Corporate Health and Safety Yellow: Regional Health and Safety Pink: Profit/Cost Center

80A-6-65

Figure 7-1

7.5 TRAINING PROGRAM

Health and safety training is required for all personnel who will be assigned to work on this site investigation and who may be expected to perform potentially hazardous activities. Training includes preproject training and site-specific training.

7.5.1 Preproject Training

Site personnel will have completed formal health and safety training as required by OSHA interim final rule 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," published December 19, 1986, issued under the authority of the Superfund Amendment and Reauthorization Act of 1986.

7.5.2 Site-Specific Training

Site personnel will complete site specific training which will address potential hazards at the site and control measures to be implemented. The safety meeting information will be recorded on a Tailgate Safety Meeting form (Figure 7-2) and maintained in the project files. This training will include:

- Site HS plan - Site personnel will be instructed verbally on the contents of the HS plan.
- Hazard Awareness - Employees will be made aware (during the tailgate safety meeting) of the chemicals used or suspected to have been used on site. Information will also include potential routes of exposure, acute and/or chronic effects, protective clothing to be worn, precautionary measures to be taken, and specific task assignments. This information will be communicated during tailgate safety meetings, which will be conducted by the Field Supervisor on a daily basis or whenever new employees or subcontractors arrive at the job site.
- Material Safety Data Sheets (MSDS) - Completed MSDS for the chemicals on site, prepared in accordance with OSHA procedures, will be made available to all employees.

7.6 AIR MONITORING

Area air monitoring will be conducted with a direct reading instruments for explosive limits, oxygen, and volatile organic compounds (VOCs) at each work area. Monitoring for explosive limits and oxygen deficiency is to be conducted using MSA 260/261 combustible gas/oxygen meter. Monitoring for VOCs

TAILGATE SAFETY MEETING

Division/Subsidiary _____ Facility _____

Date _____ Time _____ Job Number _____

Customer _____ Address: _____

Specific Location _____

Type of Work _____

Chemicals Used _____

SAFETY TOPICS PRESENTED

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Emergency Procedures _____

Hospital Clinic _____ Phone ( ) _____ Paramedic Phone ( ) _____

Hospital Address _____

Special Equipment _____

Other _____

ATTENDEES

NAME PRINTED	SIGNATURE

Meeting conducted by:

NAME PRINTED _____ SIGNATURE _____

Supervisor _____ Manager _____

36-8-85

Figure 7-2

is to be conducted using a HNu PI-101 photoionization detector. Monitoring for combustible atmosphere and oxygen will be conducted in all general work areas during drilling. VOCs will be monitored in the breathing zone of the workers.

Action levels for area air monitoring are:

VOC	>5 parts per million (ppm) (based on benzene calibration)
Oxygen	<20 percent
Flammable atmospheres	>10 percent of the lower explosion limit (based on propane calibration)

If action levels are equaled or exceeded, work will stop immediately and personnel will move upwind in the Exclusion Zone and let the area vent for a minimum of 5 minutes. At the end of the 5-minute waiting period, air quality measurements will be taken. If concentrations have not reduced to below action levels, the level of protection and work procedures will be reevaluated. Air purifying respirators are required if VOC levels above 5 ppm are measured in the workers breathing zone.

If the measured concentrations continue to exceed the action levels, the level of protection necessary for personnel will be reevaluated. In extreme cases, a particular operation may be delayed and restarted under new health and safety guidelines or may be abandoned totally.

7.7 SITE CONTROL

Regulated areas will be established to control the indiscriminate dispersion of contamination around the work area and to minimize personnel exposures and equipment contamination. Access to these regulated areas will be restricted to those designated employees who are qualified to perform hazardous materials work and who are properly attired in the required personal protective equipment.

Three distinct control zones will be used to regulate the job site. They are defined as follows:

- Exclusion Zone: This zone includes the actual areas of contamination. This zone has the highest contaminant inhalation exposure potential and/or presents a high probability of skin contact with contaminants.

- Contamination Reduction Zone: This zone has the next highest contaminant inhalation hazard but does not have a high probability of skin contact with contaminants. The Contamination Reduction Zone will be initially identified as the area surrounding the Exclusion Zone.

- Support Zone: This zone includes the area outside of the Contamination Reduction Zone. Adverse exposure to contaminants in this area is unlikely. The Support Zone will initially be identified as areas beyond the contamination reduction zone.

The placement of these control zones will be determined by the Field Supervisor prior to the start of work. These zones will be established by placing barricades with tape or other well identified markings around each zone.

All personnel initially entering the Exclusion Zone will be required to wear Level D protection as defined in Section 7.8 of this plan. Equipment and personnel leaving this area will be decontaminated within the Contamination Reduction Zone enroute to the Support Zone. The procedures to be used in this decontamination process are discussed in Section 7.9.

Since the Support Zone is considered to be a non-contaminated area, personnel working within this area will not be required to wear personal protective equipment other than normal work apparel.

7.8 EMPLOYEE PROTECTIVE EQUIPMENT

During soil sampling and drilling activities, field personnel are not expected to accrue significant exposures to the contaminants present at the site. If exposures occur, the exposures would likely result from direct contact with the contaminated soil and through the inhalation of volatile organic air contaminants and contaminated dust.

Personnel working in the Camp Parks Communication Annex Exclusion zone will be required to wear Level D protection. This protection will include:

- Hardhat
- Disposable Tyvek coveralls without hoods (optional)
- Nitrile gloves
- Rubber steel-toed boots
- Safety glasses with side shields
- Goggles (impact/splash) for work in wet or dusty conditions.

A higher level of protective equipment may be required depending on hazard assessment during performance of field activities. As a contingency to level D protection, level C protection will include:

- Full-face air-purifying respirator with organic vapor/acid gas cartridges and dust/mist prefilters
- Disposable coated Tyvek suit
- Chemical-resistant gloves
- Steel-toed boots
- Chemical-resistant boot covers
- Safety glasses
- Hardhat.

7.9 DECONTAMINATION

7.9.1 Personnel Decontamination

All personnel working within the Exclusion Zone will be required to pass through a decontamination station to remove and/or wash off their protective equipment and clothing before they are permitted to enter the non-contaminated support areas of the job site. A decontamination corridor will be set up within the Contamination Reduction Zone. The corridor will consist of plastic lined containers of tap water and buckets of soap and water solutions placed in a linear manner within the Contamination Reduction Zone. The decontamination process will require that all personnel exiting the Exclusion Zone step into the decontamination corridor and complete the following decontamination steps:

- Remove and discard disposable tyvek coveralls.

- Wash, rinse, and remove protective gloves.
- Remove hardhat.
- Remove respirator and store in plastic bag. If the respirator is not visibly contaminated, it will not require cleaning prior to being used again during the workshift. If the respirator is visibly contaminated, it will be washed and rinsed in a respirator cleaning solution prior to being used again during the workshift.

7.9.2 Equipment Decontamination

All drilling, sampling and analytical tools used within the Exclusion Zone will be thoroughly cleaned before they are taken into the noncontaminated work area. The equipment decontamination procedures are described in the Work Plan. It is expected that only the drill stem components may become contaminated. Therefore, only the active portion of the drilling rig will be decontaminated. If other portions of the drilling equipment are suspected of contacting contaminated material, their exteriors will be scraped and/or brushed, then washed with water until surfaces are visually free of soil buildup before being driven from the site.

7.9.3 Disposal of Decontamination Waste

Solid and liquid wastes collected within the decontamination corridor will be packaged in Department of Transportation (DOT) specification 55-gallon drums. The drums will be inventoried and labeled by field personnel to indicate borehole origin. After analytical results determine if the soil or water is contaminated, the drums will be disposed of in an appropriate manner. One DOT drum will be set aside to collect all disposable personnel protective equipment.

7.10 CONTINGENCY PLAN

In the event of a catastrophy (fire, explosion, chemical release) or severe (life threatening) medical emergency, an emergency action plan will be implemented by the field personnel. This plan will enable the appropriate response actions to be taken by field personnel involved in an emergency, will establish the means of alerting these individuals of the emergency situation, and will indicate the responsibilities of all key personnel in charge of the action plan.

7.10.1 Assignment of Responsibilities for Contingency Plan

The Field Supervisor will be the primary contact individual and coordinator of all emergency activities. He will be responsible for:

- Informing all site personnel of the contents of the action plan
- Evaluating the severity of the emergency
- Implementing appropriate response actions
- Notifying all site personnel, the HSC and concerned authorities of the emergency situation
- Summoning appropriate emergency services (fire department, ambulance, etc.)

The HSC will provide the Field Supervisor with pertinent health hazard information needed to effectively evaluate the emergency incident and will recommend appropriate response actions.

It is the obligation of the field personnel to inform the Field Supervisor of all potential emergency situations and to abide by the response actions issued by the Field Supervisor.

7.10.2 Emergency Actions

In the event of a catastrophic incident work will cease and all field personnel will be evacuated from the site. The evacuation will proceed in a direction directly opposite of the critical effected area with all personnel assembling in a predesignated location outside of the Support Zone. Decontamination procedures will be followed as practicable. A head count will be taken of the assembled employees. Any injured individuals will be administered first aid. The Field Supervisor will notify the following OAFB departments as appropriate:

• Emergency number	911
• Fire Department	Nonemergency (415) 828-2057 Fire emergency only (415) 828-3815
• Santa Rita Police	(415) 828-7400
• Security	(408) 752-3200
• Medical Ambulance	(415) 447-7000
• Base Environmental Engineer	Carl Willert - (408) 752-3561.

In the event of a medical emergency, all injured individuals will be given emergency first aid by the site emergency medical designee. Severely injured personnel will be transported to:

Valley Memorial Hospital
1111 East Stanley Blvd.
Livermore, California
(415)447-7000

This medical facility will be notified of the planned work and the potential medical emergencies likely to result from a job site accident. All employees will be made aware of the emergency procedures, with copies located for easy employee access. Also, maps showing the route to the hospital will be posted throughout the work site.

7.10.3 Emergency Communications

Manually operated airhorns will be used as signal devices to alert all site personnel of the emergency. Designated airhorn signals will consist of the following:

- Intermittent single blast: fire or chemical release emergency
- Intermittent double blast: medical emergency
- Continuous blast: evacuate site.

The contents of this action plan will be reviewed with the field personnel on a daily basis during the tailgate safety meetings.

7.11 GENERAL REQUIREMENTS

Field personnel will follow these general safety requirements:

- No food, drink or smoking articles will be allowed in work areas (exclusion zone and contamination reduction zone).
- Personnel will be required to wash their face and hands before eating, drinking or smoking.
- A fire extinguisher will be located in the work area.
- If noise exposure levels exceed 85 dB, hearing protective devices (ear plugs) will be issued to all affected field personnel.

7.12 RECORD KEEPING

7.12.1 Medical Records

IT's corporate Health and Safety Department maintains medical records for IT employees and subcontractors. IT maintains all medical surveillance records for a period of 30 years and makes these records available as required by state and/or federal regulations.

IT uses the Preemployment Examination Form and Update/End-of-Project-Termination Examination Form for physical examinations for IT employees and subcontractors. IT uses the Supervisor's Employee Injury Report form (Figure 7-1) for documenting employee injuries and illnesses on site.

7.12.2 Training Records

Verification of all health and safety training provided to employees will become part of a permanent record. Items that are recorded include attendance, agenda, and respirator fit test results.

7.12.3 Air Monitoring Records

Air monitoring will be recorded on the Field Activity Daily Log form. Calibration of the air monitoring instruments will be in accordance with the requirements of the quality assurance plan (under separate cover).

8.0 REFERENCES

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DRAFT

QUALITY ASSURANCE PLAN

FOR

CAMP PARKS COMMUNICATION ANNEX
ONIZUKA AIR FORCE BASE, CALIFORNIA

Prepared by

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Submitted by

Hazardous Waste Remedial Action Program
Oak Ridge, Tennessee

Operated by

Martin Marietta Energy Systems, Inc.

Prepared for

U.S. Department of Energy
Under Contract No. DE-AC05-84OR21400

December 1987

DRAFT

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Quality Assurance Plan

PROJECT TITLE: Camp Parks Communications Annex
Onizuka Air Force Base

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December 1987
Revision No. 0

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Date: 12/31/87

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Date: 12/31/87

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DRAFT

CONTENTS

CONTENTS (Continued)

TABLES

FIGURES

ACRONYMS

AER	Alternatives Evaluation Report
AFIRM	Air Force Installation Restoration Management
AFSC	U.S. Air Force Systems Command
CERCLA	Comprehensive Enviromental Response, Compensation and Liability Act
CPCA	Camp Parks Communications Annex
CPRTF	Camp Parks Radiometric Test Facility
DOD	Department of Defense
DOE	Department of Energy
Energy Systems	Martin Marietta Energy Systems, Inc.
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FSR	Feasibility Study Report
IRP	Installation Restoration Program
IT	IT Corporation
MCLs	Maximum Contaminant Levels
MEK	Methyl ethyl ketone
MIT	Massachusetts Institute of Technology
MSL	Mean Sea Level
NIPDWR	National Interim Primary Drinking Water Regulations
NOAA	National Oceanic and Atmosperic Administration
NSPWR	National Secondary Drinking Water Regulations
O&M	Operation and Maintenance
OAFB	Onizuka Air Force Base
ORNL	Oak Ridge National Laboratory
PRFTA	Parks Reserve Training Area
RI/FS	Remedial Investigation and Feasibility Study
SARA	Superfund Amendment and Reauthorization Act
TDSs	Total Dissolved Solids

1.0 INTRODUCTION

The purpose of this quality assurance (QA) plan is to document the methods that will be used to ensure that the work performed at the hazardous waste disposal site and the subsequent analytical work will accomplish the required objectives in the statement of work document. IT will conduct these activities under the management direction of Martin Marietta Energy Systems, Inc. (Energy Systems). This plan is responsive to the requirements of the U.S. Air Force, under the responsibility of Air Force Systems Command/Space Division for the Installation Restoration Program (IRP) related activities at the Camp Parks Communication Annex (CPCA), Onizuka Air Force Base (OAFB).

The scope of this QA plan encompasses all environmentally related measurement activities identified in the remedial investigation/feasibility study (RI/FS) of the site identified as having substantial potential to cause environmental contamination. The implementation of this QA plan will provide the control necessary to ensure the precision, accuracy, and completeness of the data generated during the remedial investigation.

The IT Engineering Services' quality assurance program addresses all aspects of a site investigation project which affect the quality of the end product. The IT Analytical Services Cerritos laboratory-specific quality assurance manual identifies the policies and procedures which define acceptable practices applicable to environmentally related analytical laboratory activities. The IT Engineering Services' quality assurance manual, supplemented with this QA plan and the IT laboratory quality assurance manual, provides the controls necessary to satisfy the statement of work.

2.0 PROJECT ORGANIZATION

Figure 2-1 of this plan shows the project organization and individual assignments. Project, field, and laboratory personnel are directly subject to the requirements of this QA plan.

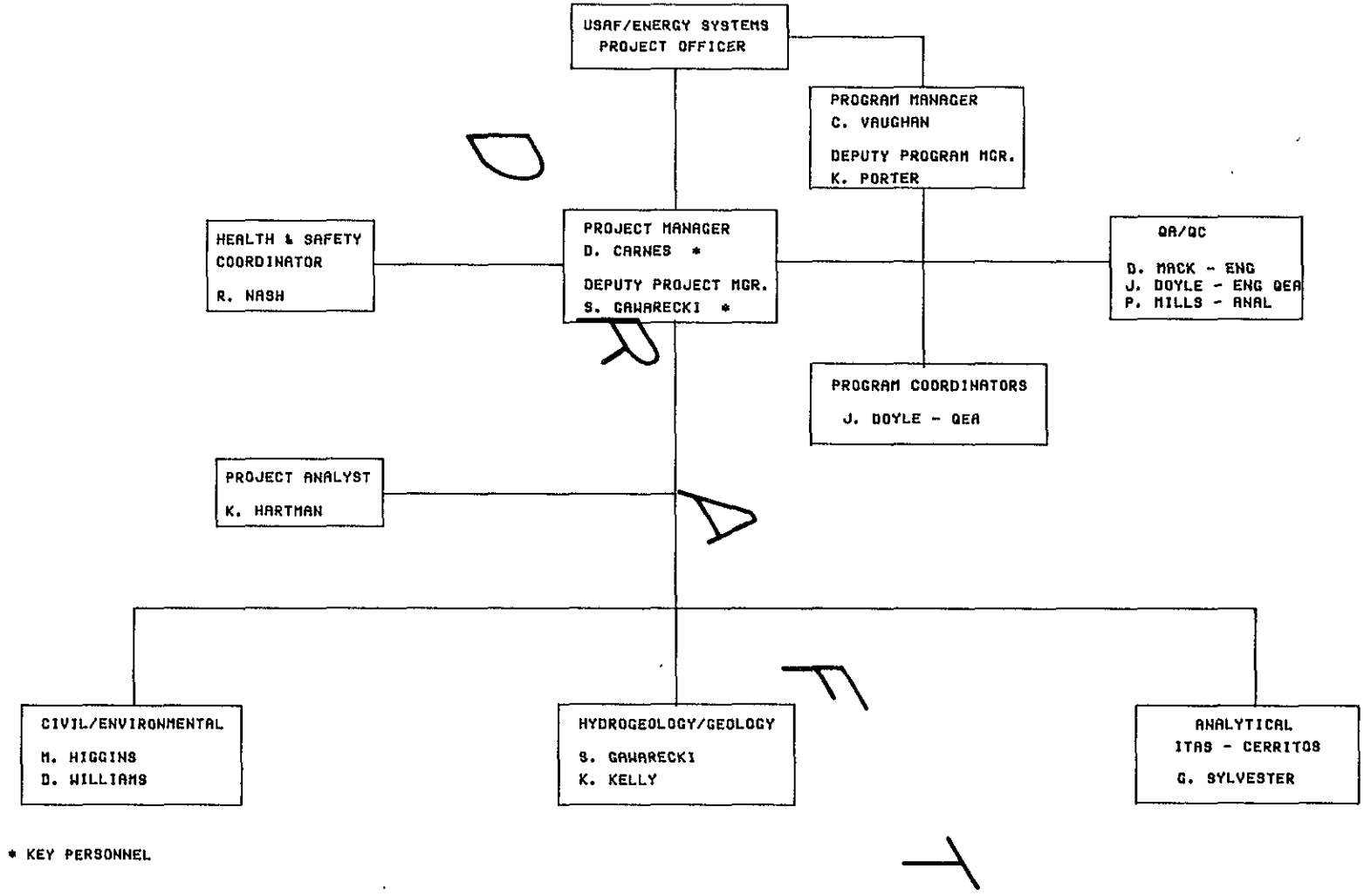
2.1 AUTHORITY AND RESPONSIBILITY

The responsibilities of key technical positions for this project are described in the following sections.

2.1.1 Project Manager

The Project Manager will be the prime point of contact for this work and will have primary responsibility for technical, financial, and scheduling matters. The Project Manager's duties include:

- Communicating proposed variances in the work plan, QA plan, or sample plan to the Quality Assurance Coordinator
- Assigning duties to the project staff and orienting the staff to the needs and requirements of the project
- Providing any necessary training for the project staff in project requirements
- Supervising the performance of project team members
- Providing budget and schedule control
- Monitoring subcontractor work and approving of subcontract invoices
- Establishing a project records system
- Reviewing project deliverables for technical accuracy and completeness before their release
- Assuring compliance with specific requirements of the QA plan
- Regularly communicating project status, progress and any nonconformances or other problems to the Quality Assurance Coordinator.



PROJECT ORGANIZATION FOR ONIZUKA AIR FORCE BASE RI/FS WORK

FIGURE 2-1

2.1.2 Deputy Project Manager

The Deputy Project Manager's responsibilities include:

- Providing sufficient resources to the project team so that it can respond fully to the requirements of the investigation
- Providing direction and guidance to the Project Manager as appropriate
- Reviewing the quality of the data gathered during the course of the project and reviewing the final project report
- Other responsibilities as directed by the Project Manager.

2.1.3 Quality Assurance Coordinator

Responsibilities of the Quality Assurance Coordinator include:

- Being the official contact for quality assurance matters for the project
- Actively identifying and responding to quality assurance/quality control (QA/QC) needs, resolving problems, and answering requests for guidance or assistance
- Reviewing, evaluating, and approving quality related changes to the work plan, QA plan, and sample plan
- Actively tracking the progress of quality tasks and consulting with the Project Manager and Program Manager
- Preparing and submitting QA/QC reports to management
- Ensuring that appropriate corrective actions are taken for all nonconformances
- Verifying that appropriate methods are specified for obtaining data of known quality and integrity
- Scheduling and performing an appropriate quality assurance verification activity for each site to ensure compliance with requirements and procedures
- Other responsibilities as requested by the Project Manager.

2.1.4 Health and Safety Coordinator

The Health and Safety Coordinator will be responsible for seeing that site personnel adhere to the site safety requirements. Additional responsibilities are included in the sample plan (Section 7.0). In the absence of the Health and Safety Coordinator, the Field Supervisor will assume the role of the Health and Safety Coordinator.

2.1.5 Field Supervisor

The Field Supervisor will be responsible for:

- Providing orientation and training to field personnel (including subcontractors) on the requirements of the work plan, sample plan, and QA plan prior to start of work each day
- Providing direction and supervision to the drilling subcontractor during the drilling of soil borings and installation of monitoring wells
- Maintaining a Field Activity Daily Log
- Maintaining a Visual Classification of Soils Log for each borehole
- Ensuring that the drilling subcontractor and sampling personnel adhere to the work plan, the QA plan, and sample plan
- Ensuring use of calibrated measurement and test equipment, and that proper labeling, handling, storage, shipping, and Chain-of-Custody procedures are used at the time of sampling
- Establishing and maintaining a field records system
- Coordinating activities with the Project Manager
- Other responsibilities as directed by the Project Manager.

2.2 SUBCONTRACTOR ACTIVITIES

The selection of qualified subcontractors will be in accordance with the IT's procurement and quality assurance procedures. Subcontractors are selected, in part, on the basis of previous work experience with IT, surveys, audits, or current records of the subcontractor. IT routinely performs field quality checks, inspections and tests, reviews subcontractor prepared documentation and performs audits. Before starting work, IT will perform a quality check to determine if the subcontractor has fulfilled the procurement requirements necessary to begin work activities.

2.3 QUALIFICATIONS AND TRAINING OF PERSONNEL

Personnel assigned to the project, including field personnel and subcontractors, will be qualified to perform the tasks to which they are assigned. Besides education and experience, specific training could be required to qualify individuals to perform certain activities. Training will be documented on the appropriate form and placed in the project file as a

record. Project personnel will receive an orientation to the work plan, sample plan, and QA plan as appropriate to their responsibilities before participation in project activities. The orientation will be documented.

3.0 SAMPLING PROCEDURES

The sample plan was prepared to document the scope and methodology of exploration and sampling activities for Site 6 at the CPCA.

The sample plan describes sampling locations; the numbers and types of samples to be collected; sampling equipment, procedures, sample containers; decontamination procedures; shipping and packaging methods; and sampling personnel.

3.1 PREVENTION OF CROSS CONTAMINATION

To prevent sample contamination and cross contamination, the drill rig, sampling tools, and sampling equipment will be decontaminated before entering the site, between drilling the boreholes, before sampling, and before removal from the base. Each decontamination activity will be recorded on the Field Activity Daily Log. Detailed procedures for decontamination of drilling and sampling equipment and disposal of decontamination by-products are provided in the sample plan.

3.2 SAMPLE IDENTIFICATION

Samples will be containerized in sample containers that have been cleaned, treated with preservative if required, and prelabeled by the IT laboratory. The labels on containers provided by the laboratory will state the type preservative, if any, and the sample type for which the container is intended. As samples are collected and sealed in containers, sample containers will be marked. Sampling personnel will adhere to the identification procedure as described in the sample plan. After collection, identification, and preservation, the sample will be maintained under the chain-of-custody procedure described in the sample plan.

3.3 SAMPLE TURNAROUND TIME

Sample analyses will be scheduled based on the approved project schedule.

3.4 FIELD DOCUMENTATION

An integral part of the QA plan for the field activities will be maintaining a Field Activity Daily Log. Information identified on the log is obtained from

site exploration and sampling activities and will be documented by the Field Supervisor.

All information pertinent to field activities will be recorded in the Field Activity Daily Log. Entries in the log will be made using water-resistant ink and corrections will be made using a single-line strike-out. Entries will include as a minimum:

- The names and affiliations of field personnel
- A general description of the day's field activities
- Documentation of weather conditions during the previous 48 hours
- Field equipment calibration data
- Field measurements such as temperature, pH, conductance, and readings from personnel safety instruments.

Appropriate field generated data forms will be prepared based on the sample plan. Data to be recorded will include such information as the monitored location (e.g., boring, well, depth, sampling station, elevation, drill cutting discoloration and odor, and field coordinates) and applicable sample analysis to be conducted. Equipment that may be used in the field is listed on the Field Measurement and Test Equipment List (Table 3-1).

Procedures cannot be prepared which properly address all specific conditions encountered during a field program. Variances from approved operating procedures in the work plan, QA plan, or sample plan will be documented on a Variance Log. The Field Supervisor will initiate and chronologically maintain the Variance Log. The Variance Log requires the approval of the Project Manager and the Quality Assurance Coordinator before work proceeds. Any variance from the health and safety plan, in Section 7.0 of the sample plan, must be signed off by the Health and Safety Coordinator. Approval by the Project Manager can be initiated on a verbal basis via telephone with follow-up sign-off. In no case will an IT subcontractor initiate a variance. If a variance is proposed by the client, it will be so recorded. Copies of the Variance Log will be kept on site until the field work is complete and then will be sent to the project files.

Table 3-1. Field Measurement and Test Equipment List

Instrument To Be Calibrated	Standard Reference	Calibration Technique	Acceptance Specifications
HNu photoionization detector (PID)	Gas standard kit	Refer to IT equipment calibration instruction, C1-2	Meter indicates standard ppm concentrations and zero setting
Explosimeter, MSA Combustible Gas and Oxygen Alarm, Model 621	261 Calibration kit	Refer to IT calibration instruction, C1-3	LEL meters reads 47-55 percent Oxygen meter reads 20-8 percent

3.5 FIELD DATA MANAGEMENT

The intended use of field data is to assess the nature of the site and the extent of potential problems resulting from past activities at the site and to identify, evaluate, and recommend appropriate actions.

Numerical analyses, instrument readings and recordings, measurements and tests will be documented and subjected to internal review. Field records will be legible and sufficiently complete to permit reconstruction of data gathering activities by a qualified individual other than the originator when data are reduced. The method of reduction of data will be identified and recorded. Field generated data sheets are collected and reviewed for accuracy and completeness by the Field Supervisor. The data sheets are assembled by the Field Supervisor into packages that represent each borehole, monitoring well, etc. These data sheet record packages are sent to the IT project management office in Knoxville, Tennessee, for review, examination, analysis of data, and for the technical staff to use in preparing the required reports. Reporting of field data will be included in the internal remedial investigation report, which will be approved by the Project Manager, the Quality Assurance Coordinator, and the Deputy Project Manager.

4.0 SAMPLE CUSTODY

Evidence of sample collection, shipment, laboratory receipt, and laboratory custody until disposal will be documented on a Chain-of-Custody Record. A sample is considered in custody if it is:

- In a person's actual possession
- In view, after being in physical possession
- Locked, so that no one can tamper with it, after having been in physical custody
- In a secured area restricted to authorized personnel

The Chain-of-Custody Record is to be used by IT personnel in collecting and shipping samples. The IT laboratory will not accept samples collected by IT personnel for analysis without a correctly prepared Chain-of-Custody Record and a Request for Analysis form.

4.1 FIELD CUSTODY PROCEDURES

Field custody procedural activity includes:

- Before sampling begins, the Field Supervisor will instruct site personnel in the Chain-of-Custody procedures, as necessary.
- The quantity and types of samples and sample locations have been determined and are outlined in the sample plan.
- The Field Supervisor determines whether proper custody procedures and report forms were used during the field work and documents results in Field Activity Daily Log.
- The Field Supervisor has overall responsibility for the care and custody of the samples collected until they are transferred or properly dispatched to the laboratory. Each individual that collects a sample is responsible for sample custody until transferred to someone else via the Chain-of-Custody Record.
- Shipment information is recorded for shipment of samples at the end of the shift, day, or collection period on the Field Activity Daily Log.

4.2 SAMPLE LABELING

Sample labels must contain sufficient information to uniquely identify the sample in the absence of other documentation. Labels will include as minimum:

- Project name and number
- Unique sample number
- Sample location
- Sampling date and time
- Signature of individual collecting the sample
- Preservation method employed.

The sample label will be directly affixed to the sample container and will be completed using indelible ink.

4.3 TRANSFER OF CUSTODY AND SHIPMENT

Transfer of custody and shipping procedures include:

- A Chain-of-Custody Record will be initiated in the field for each sample. A copy of this record will accompany each sample.
- In the event that the laboratory sample custodian judges sample custody to be invalid (e.g., samples arrive damaged), a Nonconformance Report form will be initiated. The Project Manager and Quality Assurance Coordinator will be notified. The Project Manager will make a decision as to the fate of the sample(s) in question. The sample(s) will either be processed "as is" with custody failure noted along with the analytical data, or rejected with sampling rescheduled if necessary. The Project Manager and Quality Assurance Coordinator will sign-off the Nonconformance Report, noting the reason for disposition.
- Each time responsibility for custody of the sample changes, the new custodian will sign the record and note the date.
- The custody of individual sample containers will be documented by recording each container's identification on an appropriate Chain-of-Custody Record.
- The analyses to be performed for each sample will be recorded on a Request for Analysis form.
- Upon sample destruction or disposal, the custodian responsible for the disposal will complete the Chain-of-Custody Record, file a copy, and send a copy to the Project Manager or to his designated representative for record keeping.

4.4 LABORATORY RECEIPT AND ENTRY OF SAMPLES

Upon receipt at the laboratory, the sample is removed from the shipping container and the sample identification is compared to the information contained on the sample bottles to that on sample packing lists, or included Chain-of-Custody Records. If discrepancies exist, appropriate notes (signed and dated) are made on the Chain-of-Custody Record and the shipping and receiving supervisor is notified.

The following items are checked upon receipt of samples with the Chain-of-Custody Record or the accompanying forms:

- The seals and tapes on the cooler are unbroken and uncut.
- The sample containers in the cooler are intact.
- The identification on the sample bottles corresponds to the entries on accompanying forms.
- The number of sample containers received (i.e., bottles) is equal to the number of samples listed on the chain-of-custody or accompanying forms. Samples are identified by giving each "Job" a unique number.

Identification numbers are stamped on stickers and securely wrapped about each sample.

4.5 PRE-ANALYSIS STORAGE

Personnel from the appropriate IT laboratory group receive and log in the samples. These personnel have the responsibility of picking up samples, specific to their group, from shipping and receiving. The samples are then placed into temporary storage until analysis.

Samples are stored as prescribed in the IT laboratory quality assurance manual. Methods of storage are intended generally to:

- Retard biological action
- Retard hydrolysis of chemical compounds and complexes
- Reduce volatility of constituents
- Reduce absorption effects.

Preservation methods are generally limited to pH control, chemical addition, refrigeration, and freezing.

4.6 POST-ANALYSIS STORAGE

Anticipation of re-analysis prescribes proper environmental control. If re-analysis is not anticipated, environmental conditions are not observed, and the samples are stored at room temperature.

5.0 ANALYTICAL PROCEDURES

5.1 SUMMARY OF STANDARD LABORATORY OPERATING PROCEDURES

Actions by the laboratory that are routinely followed when analyzing samples include:

- Holding times and the amount of sample available are reviewed and the analyses prioritized.
- Analyses are performed within holding times according to accepted procedures.
- A calibration curve consisting of at least three standards and a reagent blank are prepared as specified in the methodology.
- Preparation and analysis of at least one procedural blank are completed for each group of samples analyzed.
- At least one spiked sample is analyzed for every 20 samples processed to monitor the percent recovery and accuracy of the analytical procedure.
- One sample duplicate is analyzed for every 20 samples processed.

The analytical procedures for the analyses required by the sample plan are referenced in the IT laboratory manual for the U.S. Environmental Protection Agency (EPA) contract laboratory program (CLP). IT's analytical laboratory routinely follows the CLP protocols for sampling, preservation, extraction, QA/QC, and analysis.

5.2 ORGANIC COMPOUNDS

The analyses for the required organic analyses will be performed by the IT laboratory. The instrumentation to be used by the laboratory is gas chromatography/mass spectrometry (GC/MS). The Cerritos laboratory is approved under the EPA CLP for organic analyses.

5.3 METALS

The analyses for hazardous substance list metals will be performed by an IT laboratory. Analyses will be performed by inductively coupled plasma spectroscopy (ICP) or atomic absorption spectroscopy (AA). The Cerritos laboratory is approved under the CLP for inorganic analyses.

6.0 QUALITY CONTROL PROCEDURES

6.1 FIELD QUALITY CONTROL PROCEDURES

To check the quality of data from field sampling efforts, blank (water) and duplicate soil samples will be submitted to IT's analytical laboratory. Field quality control samples are specified in the sample plan. Blank samples will be analyzed to check for container contamination. Duplicate samples will be analyzed to check for sampling and analytical error causing data scatter. The confidence limits and percent level of uncertainty will be calculated and reported in the remedial investigation report. Typically, one duplicate will be prepared for every 10 samples collected and one blank will be prepared for every 10 samples (including duplicates) submitted for analysis.

Water used for the analysis of trace metals will be purified by reverse osmosis/deionization to not less than 1 MΩcm. Water for organic determinations will be deionized and then further purified with activated carbon.

Standard IT sampling equipment and procedures will be used for blank and duplicate sampling as described in the sample plan. Blank (water) and duplicate samples will be treated as separate samples for identification, logging, and shipping.

6.2 LABORATORY QUALITY CONTROL PROCEDURES

6.2.1 Volatile Organics

Samples for volatile organics analysis will be analyzed according to current EPA CLP procedures. An initial calibration curve will be prepared using a mixture of standards at five different concentrations and a mixture of three internal standards. Each GC/MS tune will be verified every 12 hours to ensure that its performance on bromofluorobenzene or DFTPP meets the applicable EPA criteria. The continuous calibration is also verified prior to sample analysis by re-analysis of the mid-range standard.

All standards, method blanks, and samples will be spiked before analysis with surrogate standards as specified in CLP procedures. Surrogate standards are defined as nonpriority pollutant compounds used to monitor the percent recovery efficiencies of the analytical procedures on a sample-by-sample basis. Samples exhibiting surrogate standard responses outside the established control limits will be re-analyzed. If the problem is not resolved by re-analysis, the Project Manager will be notified that resampling is required.

At least one method blank every 12 hours will be purged and analyzed for volatile organic compounds. Volatile organics analysis requires a method blank consisting of 5 milliliters of organic free water spiked with the appropriate surrogate standards. Results of the method blank analysis will be maintained with the corresponding sample analyses.

Matrix spike and matrix spike duplicate analyses will be performed on one of every 20 samples per matrix type analyzed. A separate aliquot of the sample will be spiked with the appropriate HSL compounds before extracting the sample. The percent recoveries for the respective compounds will then be calculated. Should the percent recovery values fall outside the appropriate QC limits, the other QC parameters will be evaluated to determine whether an error in spiking occurred or whether the entire set of samples required reprepara tion and analysis.

The relative percent error for each parameter will then be calculated from these matrix spike and matrix spike duplicate analyses. If the average relative percent error falls outside the appropriate QC limits, the other QC parameters would be evaluated to determine whether the duplicate sample should be re-extracted and analyzed or whether the entire set of samples should be reprepared and analyzed.

6.2.2 Metals and Miscellaneous

As for the organics, at least one method blank, consisting of reagent water and reagents used in the method, will be analyzed for every day of sampling.

Duplicate and matrix spike analyses will also be conducted at the same frequency as for the organics, though not necessarily on the same samples, due to potential sample volume limitations.

Evaluation of the QC data and any corrective action necessary will be the same as for the organics.

6.2.3 General Chemical Laboratory Controls

In addition to instrument calibration and the analysis of quality control samples, the following controls will be implemented:

- Reagents and solvents will be of certified composition. Reagent storage environment and duration will meet EPA guidelines.
- Laboratory equipment such as balances will be regularly calibrated.
- Volumetric measurements will be made with certified glassware.
- Data reduction computations will be independently checked.
- Qualified personnel will be used for laboratory analyses.
- Holding times and sample storage provisions will conform to EPA guidelines.

The IT laboratory QA/QC Coordinator is responsible for preparing quality control standards. He will send quality control samples into the laboratory for analysis. Statistical analyses will then be performed utilizing the results of QC sample analyses.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

7.1 DATA REDUCTION AND VALIDATION

Data reduction, validation, and reporting will be performed as follows and as described in the IT laboratory quality assurance manual. Analytical data are generated by the GC/MS computer software, the GC computer, the ICAP computer, and associated laboratory instrumentation. Outputs include identifications of compounds, concentrations, retention times, and comparisons to standards. Outputs are in graphic form (chromatograms), bar graph (spectra), and printed tabular form in the standard formats specified for each analysis. If incomplete or incorrect outputs are received, corrective actions are taken according to procedures established for each type of analysis, consistent with manufacturer recommendations.

In the data review process, the data are compared to information such as the sample history, sample preparation, and QC sample data to evaluate the validity of the results. Corrective action is minimized through the development and implementation of routine internal system controls. Analysts are provided with specific criteria that must be met for each procedure, operation, or measurement system.

Data validation includes dated and signed entries by analysts and group leaders on the worksheets and logbooks used for samples, the use of sample tracking and numbering systems to track the progress of samples through the laboratory, and the use of quality control criteria to reject or accept specific data.

Steps and checks used to validate precision and accuracy of the measured parameters and to support the representativeness, comparability, and completeness include:

- Description of the calibration performed
- Description of routine instrument checks (noise levels, drift, linearity, etc.)
- Documentation of the traceability of instrument standards, samples, and data

- Documentation of analytical methodology and QC methodology
- Description of the controls taken to determine and minimize interference contaminants in analytical methods (use of reference blanks and check standards for method accuracy and precision)
- Description of routine maintenance performed
- Documentation of sample preservation and transport when shipped elsewhere.

7.2 DATA REPORTS

The format and content of a data report is dependent upon project needs, such as client or contract requirements and government agency reporting formats. The IT quality assurance program does not specify a report format; however, the following items are applicable to data presentation:

- The final data presentation shall be checked in accordance with data verification requirements and approved by the Laboratory Manager
- Data are presented in a tabular format whenever possible
- Data will be formatted as a Certificate of Analysis
- Each page of data is identified with the project number and name; date of issue; and, if appropriate, client name
- Data presentation includes:
  - Sample identification number used by the IT laboratory and/or the sample identification provided to the laboratory, if different than identification used in the laboratory
  - Chemical parameters analyzed, reported values, and units of measurement
  - Detection limit of the analytical procedure if the reported value is less than the detection limit
  - Data for a chemical parameter are reported with consistent significant figures for samples
  - Results of quality control sample analysis if appropriate
  - Achieved accuracy, precision, and completeness of data if appropriate
  - Footnotes referenced to specific data if required to explain reported values.

8.0 CALIBRATION PROCEDURE AND FREQUENCY

8.1 GENERAL CALIBRATION PROCEDURES

Laboratory and field measuring and testing equipment will be identified and calibrated in accordance with the requirements of IT's engineering services quality assurance manual and IT laboratory quality assurance manual and the use of approved calibration instructions. Measuring equipment, test equipment and reference standards will be calibrated at prescribed intervals and/or before use. Calibration frequency will be based on the analytical methods employed, the type of equipment, inherent stability, manufacturer's recommendations, values given in national standards, intended use, and experience. Laboratory instrument calibration frequency will be performed as dictated by each analytical method. A summary of calibration requirements for field equipment is provided in Table 3-1. Table 8-1 identifies the laboratory analytical equipment that will require calibration when used.

In some cases, particularly for field equipment, scheduled periodic calibration will not be performed because the equipment is not continuously in use. Such equipment will be calibrated on an "as needed" basis prior to use, and then at the required frequencies for as long as its use continues.

Calibrated equipment will be uniquely identified by using the manufacturer's serial number. A label with the identification number and the date when the next calibration is due will be attached to the equipment. If this identification is not possible, records traceable to the equipment will be readily available for reference.

8.2 CALIBRATION FAILURES

Scheduled periodic calibration of testing equipment will not relieve field or laboratory personnel of the responsibility of employing properly functioning equipment. If an individual suspects an equipment malfunction, he should remove the device from service, tag it so it is not inadvertently used, and notify the Laboratory QA/QC Coordinator or Field Supervisor, as appropriate, so that recalibration can be performed or substitute equipment can be obtained.

Table 8-1. Laboratory Analytical Equipment Calibration List

Instrument to be Calibrated	Standard Reference	Calibration Technique	Acceptable Performance Specifications
Atomic absorption spectrophotometry	Three levels plus one blank, bracketing the sample concentrations; certified standards from chemical supply house are used	Direct reading using serial dilution of commercial standard	Per current CLP
Gas chromatography (GC)	Three levels plus one blank; at least one level of reference standard at theoretical concentration of sample	(±) 95 percent of the original curve	Per current CLP
Gas chromatography/ mass spectrometry (GC/MS)	All in-house solutions (DFTPP), (SPCC), and (CCC)	Reference standards, retention time, and additive percent recovery for surrogates	Per current CLP time, and additive percent recovery for surrogates
Inductively coupled plasma spectrophotometer	Certified standards from chemical supply house	Serial dilutions of commercial	Per current CLP standards; direct readouts

Equipment that cannot be calibrated or becomes inoperable during use will be removed from service and either segregated to prevent inadvertent use or tagged to indicate it is out of calibration. Such equipment will be repaired and recalibrated or replaced as appropriate. Any such action should be reported in the Field Activities Daily Log or appropriate laboratory log.

8.3 CALIBRATION RECORDS

Records will be prepared and maintained for each piece of calibrated measuring and test equipment and each reference standard to indicate that established calibration procedures have been followed. Records for equipment used will be kept in the project files.

Much of the measuring and test equipment used for field geophysical surveys is calibrated or checked as part of the operational use. For this equipment, records of the calibrations or checks will be kept either in the files of projects for which the work was performed or as part of the responsible organization's calibration record system.

9.0 NONCONFORMANCES AND CORRECTIVE ACTION

Nonconforming equipment, items, activities, conditions and unusual incidents that could affect compliance with project requirements will be identified, controlled, and reported in a timely manner. A nonconformance is defined as a malfunction, failure, deficiency, or deviation which renders the quality of an item unacceptable or indeterminate. The originator (any IT employee) of a Nonconformance Report (NCR) will describe the finding on the form provided for this purpose and notify the Project Manager and Quality Assurance Coordinator. Each nonconformance will be reviewed and a disposition given for the item, activity, or condition. The disposition of a nonconformance will be documented and approved by the IT organization responsible for the issuance of the nonconformance. The Quality Assurance Coordinator will concur with the disposition of the nonconformance.

The Laboratory QA/QC Coordinator is responsible for assessing quality control sample information. If data fall outside accepted limits, the Laboratory QA/QC Coordinator will immediately notify the Operations Manager and the responsible Group Leader. If the situation is not corrected and an out-of-control condition occurs or is expected to occur, the Laboratory QA/QC Coordinator will notify the Technical Director and the Laboratory Manager. The Operations Manager and Group Leaders are responsible for identifying the source of the nonconformance and initiating corrective action. Completion of corrective action should be evidenced by data returning to prescribed acceptable limits.

The modification, repair, rework, or replacement of nonconforming equipment, items, or activities will require the reverification of acceptability. In certain instances, as determined by the Project Manager, Program Manager, or Quality Assurance Coordinator, these actions may require that corrective action be completed and verified before site work continues.

The equipment, item, or activity that has the deficiency may be temporarily stopped while the nonconformance is being investigated. If in the opinion of the Project Manager and the Quality Assurance Coordinator the nonconformance does not significantly affect the technical quality or use of the work, the

work may continue pending resolution of the nonconformance. The basis for such decisions will be documented on the Nonconformance Report and submitted to the Quality Assurance Coordinator for review and approval. The documentation will indicate that the decision was made prior to continuing with the work. The records of nonconformance and their dispositions will be kept in the project central files.

In addition, the Project Manager will notify Energy Systems of significant nonconformances which could impact the schedule or results of the work, and will indicate the corrective action taken or planned.

10.0 QUALITY ASSURANCE AUDIT PRACTICE

An audit, or audits, will be scheduled and directed by the Quality Assurance Coordinator to verify compliance with the IT quality assurance program and the final QA/QC plan requirements. An audit will consist, as appropriate, of an evaluation of project and work plan requirements, implementation and the effectiveness of the implementation, and a review of project documentation.

10.1 AUDIT PLANNING AND CONDUCT

Audits will cover field activities as well as other project activities and will be conducted in accordance with the IT engineering services quality assurance manual by one or more of the following personnel:

- Don Mack, Quality Assurance Coordinator (Knoxville office)
- Jack Doyle, Quality Assurance Coordinator, Quality Engineering Associates.

Records of field operations will be reviewed to verify that field-related activities were performed in accordance with appropriate project procedures. Items reviewed will include, but not be limited to, calibration records of field equipment; Field Activity Daily Logs; photographs; and data, logs, and field drawings resulting from the field operations.

Audits will also examine, as appropriate, the documentation and verification of field and laboratory data and results; laboratory, documentation, and verification of analyses; preparation and verification of drawings, logs; content, consistency, and conclusions of the final report; compliance with IT and project requirements; and maintenance and filing of project records.

10.2 AUDIT REPORTING

Audit results will be reported to the appropriate IT management. Requests for any necessary corrective actions will be made in the audit report as described in Section 9.0 of this plan.

DRAFT

REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN

for

CAMP PARKS COMMUNICATIONS
ANNEX, ONIZUKA AIR FORCE BASE, CALIFORNIA

Prepared by

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Submitted by

Hazardous Waste Remedial Action Program
Oak Ridge, Tennessee

Operated by

Martin Marietta Energy Systems, Inc.

Prepared for

U.S. Department of Energy
Under Contract No. DE-AC05-84OR21400

December 1987

DRAFT

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
WORK PLAN

PROJECT TITLE: Camp Parks Communications Annex
Onizuka Air Force Base

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December 1987
Revision No. 0

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Date: 12/31/87

Approved: John H. Doyle
Quality Assurance Coordinator - QEA

Date: 12/31/87

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TABLES

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ACRONYMS

AER	Alternatives Evaluation Report
AFIRM	Air Force Installation Restoration Management
AFSC	U.S. Air Force Systems Command
CERCLA	Comprehensive Enviromental Response, Compensation and Liability Act
CPCA	Camp Parks Communications Annex
CPRTF	Camp Parks Radiometric Test Facility
DOD	Department of Defense
DOE	Department of Energy
Energy Systems	Martin Marietta Energy Systems, Inc.
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FSR	Feasibility Study Report
IRP	Installation Restoration Program
IT	IT Corporation
MCLs	Maximum Contaminant Levels
MEK	Methyl ethyl ketone
MIT	Massachusetts Institute of Technology
MSL	Mean Sea Level
NIPDWR	National Interim Primary Drinking Water Regulations
NOAA	National Oceanic and Atmosperic Administration
NSPWR	National Secondary Drinking Water Regulations
O&M	Operation and Maintenance
OAFB	Onizuka Air Force Base
ORNL	Oak Ridge National Laboratory
PRFTA	Parks Reserve Training Area
RI/FS	Remedial Investigation and Feasibility Study
SARA	Superfund Amendment and Reauthorization Act
TDSs	Total Dissolved Solids

1.0 INTRODUCTION

1.1 BACKGROUND AND SCOPE

The U.S. Department of Defense (DOD) has developed the Installation Restoration Program (IRP) to identify and evaluate past hazardous material disposal sites on DOD property. Work under the IRP will control the migration of hazardous contaminants and the effects of environmental and health hazards which may have resulted from past disposal operations on DOD property. The IRP consists of four phases: Phase I, Initial Assessment/Records Search; Phase II, Confirmation; Phase III, Technology Base Development; and Phase IV, Remedial Actions. Due to the impact of the 1986 Superfund Amendment and Reauthorization Act (SARA) on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), all work for this project shall follow to the extent appropriate, U. S. Environmental Protection Agency (EPA) guidance for a remedial investigation and feasibility study (RI/FS).

Martin Marietta Energy Systems, Inc. (Energy Systems) provides technical assistance in support of the IRP. IT Corporation (IT) was contracted by Energy Systems under Task Order No. X-08 issued under General Order No. 12B-97382C to produce a work plan for a site at Camp Parks Communications Annex (CPCA) of Onizuka Air Force Base (OAFB), formerly Sunnyvale Air Force Station.

An IRP Phase I Records Search was conducted by Environmental Science and Engineering, Inc. (ESE) for Sunnyvale Air Force Station; the document was dated July 1985. Past and current employees were interviewed, records were reviewed, regulatory agencies were contacted, and a site reconnaissance was conducted. Past waste handling and disposal practices were evaluated. Six past waste disposal or spill sites were identified. These sites were found to have no potential for contaminant migration and/or residual contamination. The dry well disposal site at CPCA [Site 6 in the ESE (1985) document] was noted to have potential for residual contamination. As a result, the U.S. Air Force Systems Command (AFSC) has requested the support of U.S. Department of Energy (DOE) in assessing the extent of contamination at this site.

The objective of this project work plan is to provide an overview of the planned RI/FS (items 1 through 3 below) and to identify the specific work tasks planned to characterize the site (items 1 and 2 below).

1. Confirmation and quantification of the extent of contamination
2. Verification of the source of contamination
3. Preparation of a remedial investigation report.

An authorization to proceed for the project was issued September 23, 1987.

1.2 PREVIOUS REPORTS

This project work plan has been prepared using the following documents that concern previous site activities as references:

Environmental Science and Engineering, Inc., "Installation Restoration Program, Phase I: Records Search, Sunnyvale Air Force Station, California, Final Report," SD-TR-85-31, July 1985.

Martin Marietta Energy Systems, Inc., "Statement of Work for Remedial Investigation/Feasibility Study for One Site at Camp Parks Communications Annex, Onizuka Air Force Station, California," Contract DE-AC05-84OR22400, June 1987.

1.3 WORK PLAN ORGANIZATION

The remaining part of Section 1.0 describes the site's history, the environmental setting at the site, and the areas being investigated. Section 2.0 briefly summarizes the remedial action plan work activities. The specific tasks planned to more completely characterize the extent of contamination and probable contamination sources at the sites are discussed in Section 3.0. The sample plan (under separate cover) provides details concerning the field investigation, sampling, and analysis procedures to be followed during the site investigation. The quality assurance plan (under separate cover) provides documentation requirements of the methods that will be used to ensure that the work performed at the site and the subsequent analytical work will accomplish the objective stated in the sample plan.

1.4 SITE DESCRIPTION AND HISTORY

The CPCA is a part of OAFB, which was formerly known as Sunnyvale Air Force Station. OAFB is located 40 miles southeast of San Francisco, California, in Santa Clara County, near the southwest edge of San Francisco Bay. CPCA is located in Alameda County, 23 miles northeast of OAFB, southeast of Dublin, and north of Pleasanton, California. CPCA is situated in an area known as the Parks Reserve Forces Training Area, which is an installation of the U.S. Army's Presidio of San Francisco.

The site occupies 11.6 acres and consists of several buildings and a large communication dish antenna; it is located in an isolated area immediately northeast of the I-580 and I-680 interchange. CPCA has been operated as a radiometric test facility since 1961, originally under the name Camp Parks Radiometric Test Facility (CPRTF). In 1961 the portion of the annex known as Area A was developed and operated by the Massachusetts Institute of Technology (MIT) until 1970. Lockheed Aircraft Croporation has been the operating contractor since 1970. In 1972 additional facilities on Area B were constructed. In 1970 AFSC assumed responsibility for the CPRTF, and in 1972 the facilities and land were officially transferred from the U.S. Army to the U.S. Air Force (Secretary of the Army, 1972). In 1975 the facility was redesignated Camp Parks Communications Annex.

1.5 ENVIRONMENTAL SETTING

The environmental setting of CPCA is summarized in this section with primary emphasis on identifying features or conditions that may promote the movement of contaminants.

1.5.1 Meteorology

Meteorological data for CPCA were obtained from the National Oceanic and Atmospheric Administration (NOAA) meteorological station at Livermore, California, which is located approximately 6 miles southeast of CPCA. The period of record for the data is 29 years (1951-1980). The climate of CPCA is mild, with average monthly temperatures ranging from a low of 45.9°F in January to a high of 71.3°F in July. The average annual temperature is

58.7°F. The area is characterized by wet winters and dry summers. Approximately 81 percent of the average 14.11 inches of annual rainfall occurs from November through March.

Net precipitation, the difference between annual precipitation and evaporation, is minus 29.90 inches per year at CPCA, and the 1-year, 24-hour rainfall event is 2 inches (U.S. Dept. of Commerce, 1961, 1968). The low value for net precipitation indicates a low potential for significant infiltration or the formation of permanent surface water features. The 1-year, 24-hour rainfall event of 2 inches indicates a moderate potential for runoff and erosion.

1.5.2 Geography

CPCA is located on a hillcrest and is divided into two separate areas, including radar towers, small buildings, and adjacent asphalt-paved parking. Buildings 2001 and 2002 are situated at 692 feet above mean sea level (MSL), and Building 2003 is at 668 feet above MSL. Elevations decrease in all directions from the hilltop to approximately 640 feet above MSL at the boundary of CPCA. The topographic gradient from Building 2002 to the western boundary of CPCA is approximately minus 1 foot per 5 feet.

1.5.3 Soils

Soil units overlying the Tassajara Formation bedrock are classified within the Diablo series. The Diablo clay is characterized by a high shrink-swell potential and permeability ranging from 0.6 to 2.0 inches per hour. Slopes of the Diablo clay at CPCA range from 9 to 30 percent. The runoff rate is slow to medium, and the erosion potential where soil is exposed is light to moderate (U.S. Army Corps of Engineers, 1981).

1.5.4 Surface Water

Because of its small size and location at the top of a hill, no perennial surface water features exist on CPCA. Intermittent storm water runoff is directed through a surface drainage system of open ditches and swales. Due to the hilltop location of CPCA, storm water drainage is not a problem. The annex is located in the drainage basin of Tassajara Creek, which flows south approximately 0.5 mile east of the installation. Water quality of Tassajara

Creek is characterized as slightly alkaline with high levels of sodium bicarbonate (U.S. Army Corps of Engineers, 1981).

1.5.5 Ground Water

CPCA is underlain by the Camp ground water subbasin, a portion of the Livermore Valley ground water basin. The Camp subbasin is 2,858 acres in area and includes the surface drainages of Tassajara Creek and Cottonwood Creek. The subbasin is bounded on the west by the Pleasanton Fault and on the east by steeply dipping geologic units; these geological features separate the basin hydraulically from adjacent ground water basins. Relatively low well yields in the Camp subbasin result from the presence of low permeability shale units. Recharge to the aquifer system occurs through infiltration of precipitation within the outcrop areas.

Before 1974, potable water was obtained through Parks Reserve Forces Training Area (PRFTA), which operates a well field approximately 3 miles south of CPCA (Figure 1-1). In 1974 one water well was installed within CPCA boundaries to a depth of 248 feet. The well was originally used for potable water supply purposes but is currently used only for sanitary and supply purposes. Bottled water from a water cooling unit has been used for drinking water since 1981. A geologic log and well construction details are shown in Figure 1-2.

No water quality data were available from CPCA water supply well. Analytical data for raw water from the PRFTA wells 3 miles away are summarized in Table 1-1. These data were obtained in five sampling events conducted from 1972 to 1977.

As shown by the data in Table 1-1, the ground water in the area is alkaline and very hard, containing high levels of dissolved solids. These characteristics are typical of ground water in the area obtained from the sandstone, tuffaceous sandstone, and shale deposits that compose the underlying Tassajara Formation. Included in Table 1-1 are the National Interim Primary Drinking Water Regulations (NIPDWR) (EPA, 1984a) and National Secondary Drinking Water Regulations (NSDWR) (EPA, 1984b) maximum contaminant levels (MCLs) for the listed parameters. With the exception of total dissolved solids (TDSs) and mercury, the raw ground water is within the NIPDWR

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STARTING DATE: 11/18/87	DATE LAST REV.:	INITIATOR: J.STULTZ	DRAWING NO.: 409612A01
DRAWN BY: J.NEAL	DRAWN BY:	PROJ. MGR. D.CARNES	PROJECT NO.: 409612.10

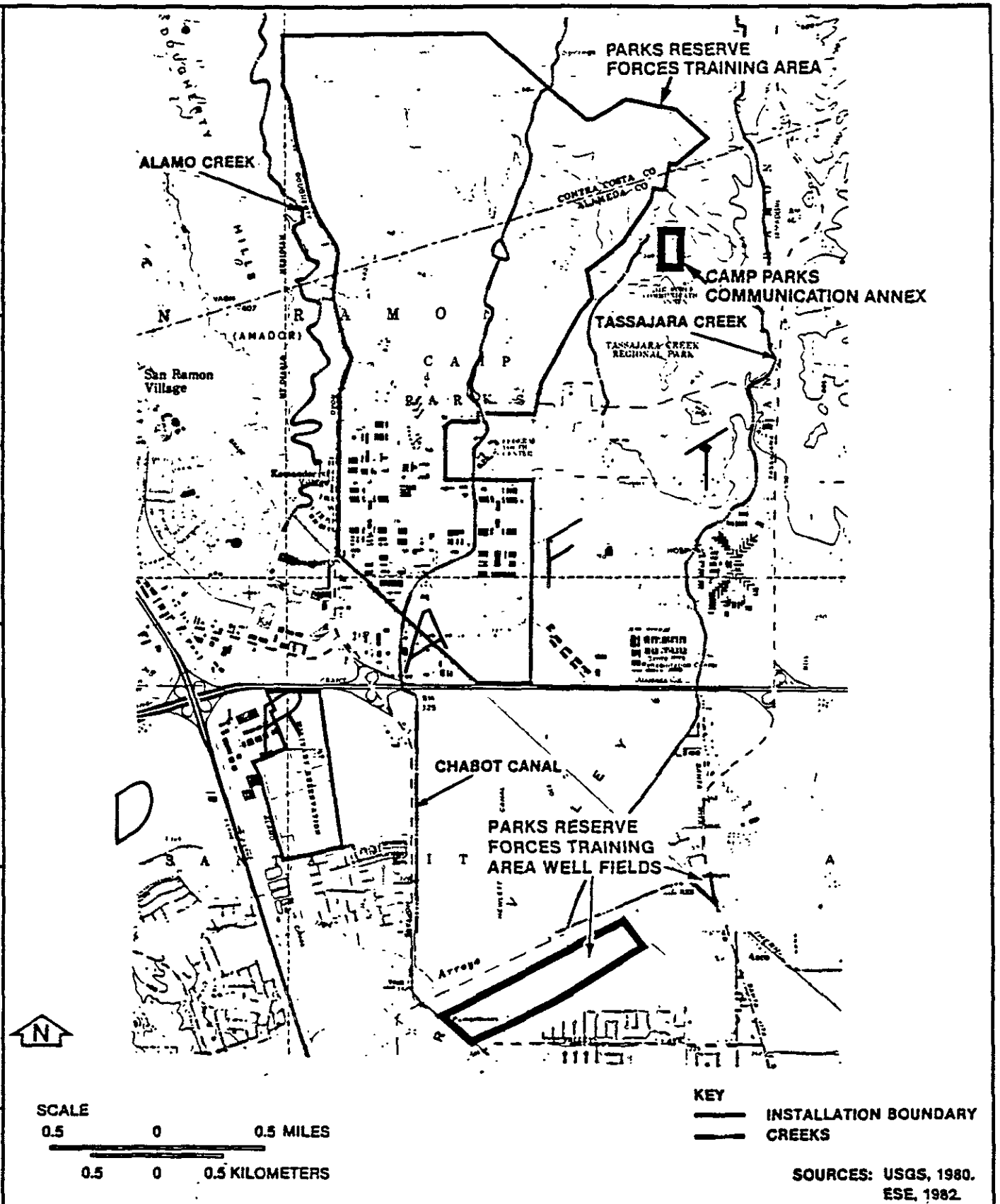

FIGURE 1-1.
AREA MAP SHOWING THE LOCATION OF PARKS RESERVE FORCES TRAINING AREA WELL FIELDS

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DRAFT

STARTING DATE: 12/22/87	DATE LAST REV.:	INITIATOR: S.GAWARECKI	DRAWING NO.: 409612A04
DRAWN BY: J.NEAL	DRAWN BY:	PROJ. MGR. D.CARNES	PROJECT NO.: 409612.10

SOURCES: Dept. of the Air Force, 1984b.
ESE, 1985.

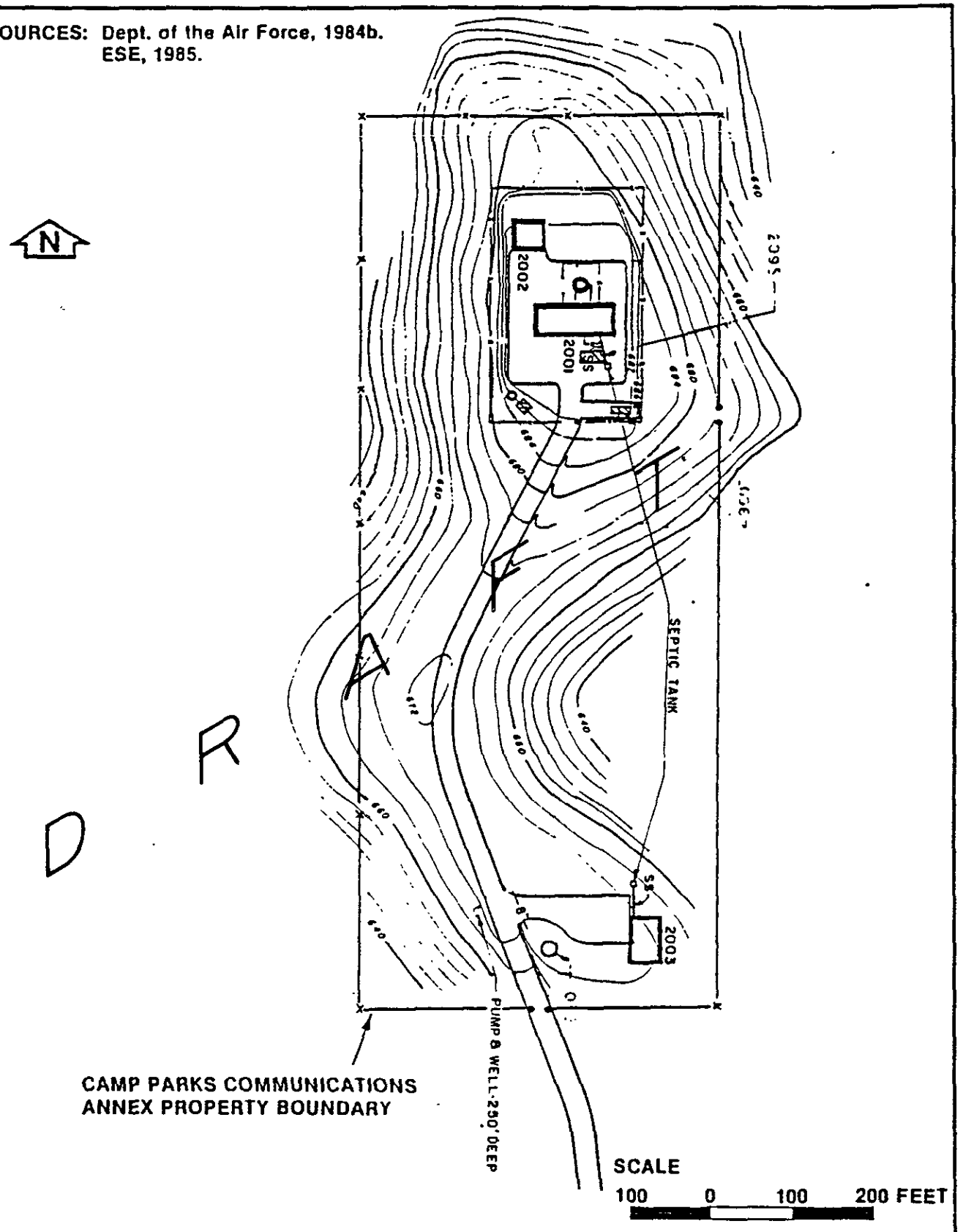

FIGURE 1-2.
GEOGRAPHY OF SITE 6, CAMP PARKS COMMUNICATIONS ANNEX

INSTALLATION RESTORATION PROGRAM
ONIZUKA AIR FORCE BASE

Table 1-1. Summary of Ground Water Quality Data for PRFTA Wells*

Parameter**	Federal Drinking Water Maximum Contaminant Level	Well 3001	Well 3002	Well 3003
pH, Units	6.5-8.5[a]	7.5	7.6	7.5
Alkalinity, mg/l as Calcium Carbonate ($CaCO_3$)		344.0	342.0	334.0
Total Hardness, mg/l as $CaCO_3$		449.0	524.0	494.0
Specific Conductance, µmhos/cm		1,717.0	1,563.0	1,540.0
Total Dissolved Solids (TDSs), mg/l	500[a]	837.0	824.0	804.0
Calcium, mg/l		72.7	78.3	75.2
Magnesium, mg/l		72.8	77.5	78.3
Sodium, mg/l		113.6	75.0	63.6
Chloride, mg/l	250[a]	182.0	162.2	159.0
Sulfate, mg/l	250[a]	58.6	84.0	59.8
Nitrate, mg/l as Nitrogen	10[b]	5.8	4.1	5.0
Arsenic, mg/l	0.05[b]	<0.02	<0.02	<0.02
Barium, mg/l	1.0[b]	<0.30	0.37	0.37
Cadmium, mg/l	0.01[b]	<0.002	<0.002	<0.002
Chromium, mg/l	0.05[b]	<0.04	<0.04	<0.04
Copper, mg/l	1.0[a]	<0.12	<0.187	<0.12
Iron, mg/l	0.3[a]	<0.10	<0.10	<0.10
Lead, mg/l	0.05[b]	<0.009	<0.008	<0.009
Manganese, mg/l	0.05[a]	<0.03	<0.03	<0.03
Mercury, mg/l	0.002[b]	0.0027	0.0004	0.0044
Selenium, mg/l	0.01[b]	NA	NA	NA
Silver, mg/l	0.05[b]	<0.021	<0.021	<0.021
Zinc, mg/l	5.0[a]	<0.213	<0.223	<0.213
Fluoride, mg/l	1.4-2.4[b]	0.2	0.2	0.2
Gross Alpha, pCi/l	15.0[b]	1.2	2.3	2.3
Gross Beta, pCi/l	50.0[b]	3.2	3.9	3.0
Tritium, pCi/l	20,000	0.03	0.0406	0.0258

[a]NSDWR (EPA, 1984b).
[b]NIPDWR (EPA, 1984a).
*Note: PRFTA well field locations are shown in Figure 1-1.
**Note: pCi/l = Picocuries per liter; mg/l = milligrams per liter.
Sources: USAEHA, 1978; ESE, 1985.

and NDSWR MCLs for the parameters listed in Table 1-1. TDS levels range from 804 to 837 mg/liter, which is well above the 500-mg/liter criterion. High TDS levels in water from the Tassajara Formation are principally due to calcium, magnesium, and sodium bicarbonate and do not present a health-related concern. Levels of mercury (0.0027 to 0.0044 mg/liter) were slightly above the NIPDWR MCLs (0.002 mg/liter). These mercury levels probably are from either well head pump contamination or minerals in the volcanic tuffs within the underlying geologic formations. For example, in the upland areas surrounding San Francisco Bay, cinnabar (a mercuric sulphide mineral) is mined commercially.

1.5.6 Biotic Environment

The following description of biotic communities was reported in an environmental impact statement prepared for PRFTA (U.S. Army Corps of Engineers, 1981). While no actual wildlife surveys or species counts have been performed specifically for CPCA, these species are expected to potentially occur on the annex.

The habitat of CPCA is predominantly valley grasslands with small areas of human-altered habitats consisting of buildings, pavement, and unpaved roads. The grasslands support a variety of wildlife including mammals, birds, and reptiles. A variety of large predatory birds and mammals attracted by an abundance of prey animals live at the site. No threatened or endangered species of either plants or animals have been reported in the vicinity of CPCA.

1.5.7 Potential Receptors

Potential receptors are very limited at CPCA due to the remoteness of the site and the physical location of the potentially contaminated dry well disposal pit, which is currently capped by an asphalt parking lot. As ground water is at a depth of approximately 130 feet, contamination of the aquifer is unlikely. The most likely receptor is the upper 6 to 10 feet of the soil in the immediate vicinity of the dry well.

1.5.8 Summary

The CPCA is an 11.6-acre remote installation for OAFB, consisting of several buildings and a communication tower, located immediately northeast of the I-580 and I-680 interchange. Elevations of the hilltop facility range from approximately 640 feet at the boundary to 692 feet at the crest. Storm water drains rapidly from the facility through a system of open ditches and swales to Tassajara Creek, approximately 0.5 miles to the east.

The climate at CPCA is mild. Average monthly temperatures range from 45.7°F in January to 71.3°F in July, with an average annual temperature of 58.7°F. Eighty-one percent of the 14.11-inch average annual rainfall occurs from November through March. A negative net precipitation value of 29.90 inches per year indicates a low infiltration potential. The one-year, 24-hour rainfall event of 2 inches indicates a moderate potential for runoff and erosion.

Soils at CPCA are classified in the Diablo series, with high shrink-swell potential and permeability from 0.6 to 2.0 inches/hour. With slopes of 9 to 30 percent, the runoff rate is slow to medium and exposed soil has an erosion potential of light to moderate.

CPCA is within the 2,858-acre Camp subbasin, part of the Livermore Valley ground water basin. Major surface drainages in the subbasin are Tassajara and Cottonwood Creeks. Low permeability shale bedrock results in low well yields. Infiltration of precipitation through bedrock outcrops recharges the aquifer. Ground water quality data for nearby PRFTA wells indicates high alkalinity and hardness, with high levels of dissolved solids. Despite the presence of a potable water supply well at CPCA, bottled water is used for drinking purposes.

The habitat at CPCA is valley grasslands with areas of human-altered habitat. A variety of small mammals, birds, and reptiles are present, and larger predatory birds and mammals nearby. No threatened or endangered species have been reported to exist within the CPCA.

2.0 PROJECT WORK PROGRAM

This section presents the IRP Phase IV-A project tasks that will be performed at the CPCA site as described in Section 1.0. The work program includes the required tasks, starting with the project work plan through preparation of the remedial action plan (RAP) if control measures are required. Task 1, the initial coordination meeting, has been completed.

2.1 TASK 2 - PREPARE PROJECT WORK PLAN

This project work plan has been prepared to include descriptions of each project task and the schedule for implementing the work program. The project work plan will include a detailed plan for further characterizing the site to determine the extent and probable sources of contamination.

2.2 TASK 3 - REMEDIAL INVESTIGATION

The scope of work for site investigation/quantification and implementation of Task 3 is described in Section 3.0 of this document. Sample plan (separate cover) details the procedures for implementing the remedial investigation.

2.3 TASK 4 - REMEDIAL INVESTIGATION REPORT AND WORK PLAN

During Task 4, a site investigation report will be prepared after the completion of Task 3. This report will summarize site investigation evaluations, findings, and conclusions from Task 3. The report will identify those areas requiring remedial action, those that require no further investigation, or those that require additional data.

If additional data collection is required, a work plan - stage II will be prepared concurrently with the remedial investigation report.

2.4 TASK 5 - PREPARATION OF THE FEASIBILITY STUDY

2.4.1 Screen Control Measures

The first part of Task 5 will involve identification of the potential remedial approaches that may be considered for the dry well site. This activity will include listing feasible technologies, including management methods, that

might be appropriate. The technologies identified will be assessed using a qualitative screening analysis that considers factors such as the following:

- Technical Feasibility
  - Contaminant characteristics
  - Site characteristics
  - Effectiveness
  - Reliability
  - Time frame for remediation
- Environmental and Public Health Effects
  - Risks to receptors
  - Exposure routes
  - Exposure time frame
  - Aquatic and plant life
  - Resource commitments
- Cost Effectiveness
  - Initial capital
  - Ongoing expenditures
- Other
  - Safety
  - Public acceptance

The screening evaluation will eliminate those options which clearly do not have potential application at CPCA. However, control methods will not be eliminated solely due to noncompliance with regulatory standards or because they are unproven in similar application. Innovative or unique technologies that are relevant to the site problems will be brought to the attention of Energy Systems and U.S. Air Force officials. If additional field or technology performance information (including additional site investigation and treatability studies) requirements are identified in this or the next task, Energy Systems and U.S. Air Force personnel will be notified. They will assist in evaluating the additional data needs and will decide if additional studies are warranted.

2.4.2 Develop Detailed Alternatives

Technologies which have passed the initial screening will be combined to form candidate alternatives for remediation of the identified site problems. These alternatives will undergo a preliminary screening, considering public health, environmental impact, and cost factors. This analysis will be designed to eliminate those alternatives that do not provide adequate protection of public

health, welfare, and the environment or those that are much more costly but do not provide significantly greater protection. This preliminary evaluation will be subjective and cost assessments will be order-of-magnitude.

In developing remedial alternatives at CPCA, at least one control option will be included in each of the following categories:

- An alternative that provides for treatment or disposal at an off-site facility approved by state and federal regulatory agencies
- An alternative that attains applicable and relevant state and federal public health or environmental standards
- An alternative that exceeds applicable and relevant public health or environmental standards
- An alternative that does not attain applicable or relevant public health or environmental standards, but reduces the likelihood of present or future threats
- A no action alternative.

If the preliminary screening under this task removes all alternatives in any one of the above categories from consideration, at least one alternative from the category will be carried forward for more detailed evaluation. The most feasible alternatives will be described in sufficient detail to enable evaluation. The descriptions of each remedial alternative will at least include:

- Technologies incorporated
- Key design assumptions that will affect performance, implementability, environmental impact, or cost
- Measures needed to ensure worker safety during implementation
- Required land use controls, right-of-way acquisition, personnel training and supervision, permanent relocations, and coordination with local, state, and federal agencies.

Capital and operation and maintenance (O&M) cost estimates will be made for each feasible alternative. Present worth analyses and sensitivity analyses

will also be conducted to assist in decision making. The "Air Force Installation Restoration Program Management Guidance," July 1985 will be used as a reference for costing information.

2.4.3 Evaluate Detailed Alternatives

The most feasible remedial alternatives developed in Task 4 will be refined in sufficient depth to enable comparison and identification of the positive and negative features of each scheme. Each alternative will be evaluated according to five criteria:

- Technical feasibility
- Institutional/regulatory requirements
- Public health effects
- Environmental assessment
- Cost effectiveness.

The technical feasibility comparisons will include items such as performance, reliability, implementability, and safety consideration. Institutional and regulatory analyses will cover such issues as compliance with relevant agency requirements and consistency with community relations programs. Analysis of the public health effects of each remedial action alternative will include an assessment of the long-term health impacts expected and the risks associated with each option. An environmental assessment will be prepared to document the anticipated environmental impacts from each remedial action alternative and the appropriate mitigating measures. The cost-effectiveness evaluation will include estimates of capital expenditures and operation and maintenance costs, present-worth analyses, and cost-sensitivity analysis.

2.4.4 Alternatives Evaluation Report

A narrative matrix that presents the major conclusion from these evaluations will be prepared to enable comparison of the detailed alternative plans in terms of each of the evaluation criteria. This comparative matrix will be presented in the alternatives evaluation report (AER) briefings.

2.4.5 Alternatives Evaluation Report Briefings

The subcontractor will attend a 1-day meeting at OAFB to present the AER. The

objective of this meeting is to reach a consensus on which alternative the direction of the FS should focus.

2.4.6 Describe Selected Alternative

After the AER meeting, the remedial action plan(s) selected by the U.S. Air Force for the site at CPCA will be developed in more detail (conceptual design level). This will include such items as the following:

Engineering Description:

- Conceptual design criteria and rationale
- Operational description of process units or other facilities
- Description of O&M requirements
- Types of equipment required, including approximate capacity, size, and construction materials
- List of additional engineering data required to proceed with design
- Preliminary project schedule
- Conceptual plan view drawings of the sites showing general locations for project actions and facilities.

Cost Analysis

- Capital cost estimates
- O&M cost estimates and duration of operating expenses.

Regulatory Compliance

- Construction and environmental permit requirements
- Description of technical requirements for environmental mitigation measures
- Right-of-way requirements
- Operating permit requirements.

The description will be comprehensive and sufficiently detailed to be used as a baseline document for design of the selected remedial alternative for each site.

2.4.7 Prepare Environmental Assessment

The environmental assessment will document all environmental analyses conducted in support of the feasibility study report (FSR) preparation. The environmental assessment will include summary descriptions of detailed alternatives considered in the FS, environmental impact analysis of each alternative, either references for all data cited or the actual data used in support of the analyses, and descriptions of mitigating measures appropriate for use with each detailed alternative.

2.4.8 Prepare and Review Internal Feasibility Study Report

Within 6 weeks of the AER briefing, IT will submit 15 copies of the internal FSR.

Within 2 weeks of delivery of the internal FSR, IT will attend a 1-day internal FSR review meeting.

2.4.9 Prepare and Review Draft Feasibility Study Report

Within 2 weeks of the conclusion of the internal FSR review meeting, IT will submit 15 copies of a draft FSR, which addresses comments received at the internal FSR review meeting.

Within 6 weeks of delivery of the draft FSR, IT will attend a 2-day draft FSR review meeting to present the draft FSR and to receive comments from the U.S. Air Force, Energy Systems, and regulatory agencies.

2.4.10 Prepare and Review AFIRM Feasibility Study Report

Within 2 weeks of the conclusion of the draft FSR review meeting, IT will submit 15 copies of an Air Force Installation Restoration Management (AFIRM) FSR. Four weeks after the delivery of the AFIRM FSR, IT will attend a 1-day AFIRM FSR review meeting to present the FSR and to receive comments from the AFIRM committee.

2.4.11 Prepare Final Feasibility Study Report

Within 2 weeks of the completion of the AFIRM FSR review meeting, IT will prepare the final FSR to include documentation of any modifications to the AFIRM FSR, technical considerations, the responses of the U.S. Air Force to

regulatory agency comments, and either a record of decision or a decision document.

3.0 SITE INVESTIGATION PLAN

The field investigation plans for the CPCA dry well site are described in this section.

3.1 HISTORY OF SITE 6

The CPCA has been in existence since 1960. Industrial operations over the past 17 years have been limited mainly to maintenance of electronic equipment and components (summarized in Table 3-1).

Waste materials generated as a result of this maintenance are paint thinner (<1 gallon per year), kerosene (<5 gallons per year), methyl ethyl ketone (MEK) (<1 gallon per year), acetone (<1 gallon per year), alcohol (1 gallon per year), rags and empty chemical containers (variable quantity), Bright Dip® (chromic acid) (<1 gallon per year), and solid waste (2 cubic yards per week). Since operations in 1960, the waste paint thinner, kerosene, MEK, acetone, and alcohol have been disposed of by allowing the wastes to evaporate from the parking area. From 1960 to 1972, the waste Bright Dip® was discharged via a sink drain to a dry well adjacent to Building 2001. Since 1960, all solid waste (including rags and empty containers) has been hauled to an off-base sanitary landfill.

3.2 INVESTIGATION PLANS FOR SITE 6

All questions by the media and any public relations issues will be referred to Carl Willert (OAFB, P.O. Box 3020, Sunnyvale, CA 94088-3020).

The field investigation for Site 6 will involve surface geophysical methods, soil boring and sampling, and surface soil sampling (sample plan).

The surface geophysical methods will be magnetometer surveys. Magnetometer survey will be used to identify buried ferromagnetic metal and to locate utility lines and drain pipes.

Following the magnetometer surveys, an estimated five soil borings will be drilled approximately 18 feet deep in locations selected using the results of the surveys. The data from the magnetometer surveys can be used to locate the

Table 3-1. CPCA Industrial Operations--Waste Generation

Shop Name	Location (Bldg No.)	Waste Material	Waste Quantity (gal/yr)*	Waste Management Practices (1950 / 1960 / 1970 / 1980)
Equipment maintenance	2001	Paint thinner	<1	Evaporated from parking area
		Kerosene	≤5	Evaporated from parking area
		Methyl ethyl ketone	<1	Evaporated from parking area
		Acetone	<1	Evaporated from parking area
		Alcohol	1	Evaporated from parking area
		Rags and empty containers	Variable	Hauled to off-base sanitary landfill
		Bright Dip® (chromic acid)	<1	Sink dispsal to dry well
		Solid waste (refuse)	2 yd^3/wk	Hauled to off-base sanitary landfill

*Unit of measurement is gallons per year (gal/yr) unless indicated otherwise.

Key:

_____Confirmed timeframe and disposal data from shop personnel.

---------Estimated timeframe and disposal data from shop personnel.

-------->Arrow incidates current practice at the time of the site visit.

Source: ESE, 1985.

drilling rig at places that will avoid buried utility lines, which can be a safety hazard and can interfere with the augering. The actual depth of any contaminated area will be determined from the borings, and soil samples will be obtained and analyzed for the parameters listed in the sample plan. Three surface soil samples will be collected at the end point (determined by magnetometer surveys) of the machine room floor drain, if this drain ends close to the surface. Sampling locations are shown in the sample plan. Only one location will be sampled. Borehole 4 will be drilled at the end of the pipe, if it is inside the main fence as earlier drawings suggest or if it ends over 1 foot below land surface; if the pipe extends outside the main fence and ends close to the surface as later drawings suggest, surface soil samples will be collected. An average of four soil samples per boring will be chemically analyzed.

3.3 SITE INVESTIGATION SCHEDULE FOR SITE 6

An important factor in the site investigation program is to begin after the wet season. Assuming the work is authorized to start March 8, 1988, the key milestones in the site investigation study are:

Milestones	Date
• Begin project mobilization	February 23, 1988
• Initiate magnetometer surveys	March 8, 1988
• Start drilling at site	March 9, 1988
• Complete drilling	March 10, 1988
• Complete sampling and analysis	April 11, 1988
• Submit internal remedial investigation report	May 11, 1988
• Attend internal remedial investigation report review meeting	May 25, 1988
• Submit draft investigation report	June 8, 1988
• Attend draft remedial investigation report review meeting	July 20, 1988
• Submit final remedial report	August 3, 1988

4.0 REFERENCES

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