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MCAS EL TORO
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MARINE CORPS AIR STATION
EL TORO
EL TORO, CALIFORNIA

INSTALLATION RESTORATION PROGRAM
FINAL WASTE MANAGEMENT PLAN

14 DECEMBER 1991

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ABBREVIATIONS

BDAT	Best Demonstrated Available Technology
BTXE	Benzene, Toluene, Xylene, and Ethylbenzene
Btu	British Thermal Units
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
DRE	Destruction and Removal Efficiency
DTSC	California Department of Toxic Substances Control
EP	Extraction Procedure
EPA	Environmental Protection Agency
FFA	Federal Facilities Agreement
GAC	Granular Activated Carbon
IRWD	Irvine Ranch Water District
JEG	Jacobs Engineering Group, Inc.
LDR	Land Disposal Restrictions
MCAS	Marine Corps Air Station
MP	Multiple Port
MS/MSD	Matrix spike/matrix spike duplicate
NACIP	Navy Assessment and Control of Installation Pollutants
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
OCSD	Orange County Sanitation District

OCWD	Orange County Water District
OU	Operable Unit
PCB	Polychlorinated biphenyls
PCE	Perchloroethylene or Tetrachloroethylene
POTW	Publicly Owned Treatment Work
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RWQCB	California Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
STLC	Soluble Threshold Limit Concentration
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TSDF	Treatment, Storage, and Disposal Facility
TTLC	Total Threshold Limit Concentration
TTU	Transportable Treatment Units
VOC	Volatile Organic Compound
WET	Wet Extraction Test
WMP	Waste Management Plan
WSA	Waste Staging Area
ZHE	Zero Headspace Extraction

1.0 INTRODUCTION

1.1 Project Background

This Waste Management Plan (WMP) has been prepared as part of the Remedial Investigation/Feasibility Study (RI/FS) for Marine Corps Air Station (MCAS) El Toro (or Station). The RI/FS is being conducted by Jacobs Engineering Group, Inc. (JEG) and its subcontractor CH2M HILL under the auspices of the Navy Comprehensive Long-Term Environmental Action, Navy (CLEAN) Program.

Previous studies conducted as part of the U.S. Navy (Navy) Assessment and Control of Installation Pollutants (NACIP) Program identified 21 potential on-Station sources of contamination resulting from past operational practices at the facility. In 1985, while the NACIP investigation was underway at MCAS El Toro, the Orange County Water District (OCWD) discovered trichloroethylene (TCE) in an agricultural well located about 3,000 feet west of the facility. Subsequent investigations led OCWD to conclude that TCE and other volatile organic compounds (VOCs) detected in groundwater had originated at MCAS El Toro.

In February 1990, the U.S. Environmental Protection Agency (EPA) placed MCAS El Toro on the National Priority List (NPL). The Marine Corps agreed to conduct an RI/FS in a Federal Facilities Agreement (FFA) signed in September 1990. The 21 sites found in the NACIP Program and the regional groundwater VOC investigation comprise the 22 sites for investigation under the RI/FS.

The 22 MCAS El Toro RI/FS sites have been grouped into three operable units (OUs). Operable Unit-1 is the regional groundwater VOC investigation. Suspected on-Station VOC source areas, including four landfills and a petroleum disposal area, are grouped into OU-2. Operable Unit-3 consists of the remaining 16 sites not addressed in OU-1 and OU-2. This document will be used as the WMP for the entire RI/FS, including activities for OU-1, OU-2, and OU-3. Table 1-1 lists the suspected waste types and contaminants for the 22 MCAS El Toro sites.

1.2 Purpose and Scope of the Waste Management Plan

The purpose of this WMP is to provide guidelines for the containment, sampling, analysis, and disposal of the waste generated during the MCAS El Toro RI/FS. The proposed work under the RI/FS will include drilling and sampling 126 groundwater monitoring wells, 10 vertical soil borings, 12 angle soil borings, and two small-diameter piezometers for a total drilling footage of approximately 30,000 linear feet. Wastes generated as part of the work will include soil cuttings, drilling mud, well development water, well purge, aquifer test water, decontamination rinsate water, personal protective equipment waste (Tyveks, gloves, spent respirator cartridges, etc.), and miscellaneous trash (cups, paper products, packaging, etc.).

Section 2.0 of this WMP identifies the approximate types and volumes of wastes that are expected to be generated during the field work and the methods that are proposed to contain and dispose of them. A brief background of applicable regulations is provided in Section 3.0 with a discussion of the methods proposed to evaluate whether or not the generated wastes are considered hazardous. Section 4.0 describes the proposed

Table 1-1
Suspected Waste Types and Contaminants at MCAS El Toro RI/FS Sites

Operable Unit	Site Number	Waste Types
OU-1	18	TCE, perchloroethylene (PCE), dichloroethylene (DCE), toluene, chlorobenzene, ethyl benzene, nitrate, total dissolved solids (TDS), and selenium
OU-2	2	General categories of construction debris, municipal wastes, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents
	3	Burnt waste, metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid wastes, and various inert solid wastes
	5	Burnt waste, municipal solid waste, unspecified fuels, oils, solvents cleaning fluids, scrap metals, and paint residues
	10	Waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and other solvents
	17	Domestic waste, cooking grease, oils and fuels from sumps, empty drums, and other unknown material
OU-3	1	FS smoke (sulfur trioxide chlorosulfonic acid), low-level radioactive material, metals, nitrated toluene, and sulfates and acidic wastes from the FS smoke disposal operations
	4	Ferrocene, hydrocarbon carrier solution, and oily discharges
	6	JP-5 fuel and waste lubricant oils
	7	JP-5 fuel and waste oil
	8	Various scrap and salvage materials and PCBs
	9	JP-5 fuel, aviation gasoline and other liquid waste such as crankcase oil
	11	PCBs
	12	Sludge from secondary wastewater treatment, heavy metals such as silver, arsenic, cadmium, copper, mercury, nickel, lead, selenium, and zinc
	13	Crankcase oils, metals, and PCBs
	14	Battery acid, paints, lead and other priority metals, waste oils, methylene chloride, and phenols
	15	Diesel fuel
	16	JP-5 fuel, leaded aviation gasoline, hydraulic fluid, crankcase oils and other waste oils, napalm, white phosphorus, and magnesium phosphate
	19	JP-5 fuel
	20	Kerosene, waste oils, and heavy metals
	21	Drums containing chemicals
	22	Fuel

Source: Brown and Caldwell, 1986.

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waste sampling and analysis procedures to be used during the RI/FS. The chemical analyses of the waste samples will be used to identify the appropriate disposal method. Alternative methods for containing and disposing of the wastes generated as part of the field work are presented in Section 5.0. Cost estimates for disposal alternatives are presented where possible. In Section 6.0 the management alternatives are evaluated against three general selection criteria: cost, practicability, and potential future liability. A summary of the selected waste management alternatives is presented. Lastly, in Section 7.0 the proposed documentation and tracking procedures used to trace the treatment or disposal path of the waste are provided.

1.3 Use of the Waste Management Plan

This WMP summarizes the selected waste containment and disposal alternatives to be used during the MCAS El Toro RI/FS. These alternatives were selected in collaboration with the EPA, the California Regional Water Quality Control Board (RWQCB), Santa Ana Region and the Cal-EPA Department of Toxic Substances Control (DTSC). Technical input from these regulatory agencies was received in review comments on the Draft WMP (JEG, 28 June 1991) and at meetings with representatives from the Navy, MCAS El Toro, and the agencies on 11 and 12 September, and 13 November 1991.

Due to the regulatory complexity of hazardous waste containment, treatment, and disposal, and the high level of uncertainty in the quantities of hazardous wastes to be generated at MCAS El Toro, it is likely that the disposal alternatives identified in the WMP may be modified during the RI field activities. Change in procedures will be proposed to the agencies at monthly technical progress meetings prior to

implementation. After agency approval, the changes will be documented as addenda to this WMP.

During field activities, a CH2M HILL waste manager will be present at MCAS El Toro to manage waste containment, track individual containers of waste, sample wastes, and oversee the treatment and disposal of wastes. This individual will have the primary responsibility for RI-derived waste management at MCAS El Toro.

2.0 WASTES TO BE GENERATED

2.1 Types of Waste

Eight types of waste will be generated as part of the MCAS El Toro CLEAN RI/FS investigation:

1. Soil Cuttings
2. Drilling Mud
3. Well Development Water
4. Well Purge Water
5. Aquifer Test Water
6. Decontamination Water
7. Disposable Personal Protective Equipment
8. Miscellaneous Nonhazardous Trash

Soil cuttings are the materials brought to the surface during drilling. These materials will be generated regardless of the drilling method used. The soil cuttings are proposed to be contained in roll-off bins. If necessary, cuttings may also be contained in drums.

Drilling mud will be generated in those wells drilled using the mud rotary method. A total of 29 wells, all for the regional groundwater VOC investigation (Site 18), are expected to be drilled using the mud rotary method. Drilling mud will have the consistency of a slurry and will be a combination of soil, bentonite, and water. The

drilling mud will be contained at the drilling rig in portable tanks and transferred to large tanks for future treatment. If necessary, drilling mud may be contained in drums.

Well development water will be generated as part of flushing and sampling the monitoring wells. Well development water contains diluted drilling mud and suspended sediments. Additional well purge and aquifer test water will also be generated during routine sampling and aquifer testing. Well purge water and aquifer test water are free of suspended solids, but may potentially contain contaminants in the groundwater. The water is expected to be contained in tanks.

Soil cuttings, drilling mud, and well waters will be held in separate tanks and bins. In addition, materials generated at each drilling location will be held in separate containers to keep materials from different drilling locations from being mixed together. This will help avoid mixing waste streams, and potentially nonhazardous and hazardous materials together to form a larger volume of contaminated material. Materials from an individual well cluster may be mixed together, (e.g., soil cuttings with soil cuttings) since these wells should have the same potential for contamination. The cluster wells occur in the regional groundwater VOC investigation (Site 18 [OU-1]).

Decontamination water will be produced as part of cleaning the drilling and well development rigs, sampling equipment, vacuum trucks, bins, and tanks. This water will be generated primarily at the on-Station decontamination pad constructed for the project. Water at these locations will be stored in large tanks; when full, these tanks will be emptied by vacuum trucks.

Potentially hazardous personal protective equipment (PPE) will be generated at the drill rigs during boring and well investigations and sampling. This equipment consists of used Tyvek suits, rubber gloves, respirator cartridges, and other disposable gear associated with potentially hazardous environmental sampling. The used gear will be contained in sealed, labeled, large trash bags at each well site, and moved at the end of each day to a roll-off bin designated specifically for this type of waste. Because this material will be potentially hazardous, no other waste will be mixed with the used personal protective equipment.

Inert and therefore unclassified household-type trash will be generated as part of the project. This will include miscellaneous paper, wrappers, cups, and plastics not directly associated with sampling. Because this material will not be tracked as potentially hazardous waste, it is not further addressed in this WMP.

2.2 Approximate Waste Volumes

Table 2-1 summarizes the proposed wells and borings to be drilled as part of the RI for OU-1, OU-2, and OU-3. Table 2-1 also shows the proposed drilling method, and estimates of the borehole or well depths, diameters, groundwater depth, resulting waste volumes, and number of waste containers estimated for the individual locations. Table 2-2 presents the estimated volumes of waste to be generated during the work.

Several assumptions were used to obtain the estimates in Tables 2-1 and 2-2, as listed below.

1. Well depths were assumed to range from 100 to 525 feet below ground surface. This is based on an approximate depth of 85 to 235 feet to groundwater. Soil borings were assumed to range from 25 to 60 feet deep.

2. Boreholes were assumed to be 12 inches in diameter throughout the project. Piezometers were assumed to be six inches in diameter.

3. The volume of soil cuttings was assumed to swell one and one-half times from the natural (In-situ) state to the excavated state. This compensates for the soil loosening during excavation and for irregularities of the borehole side walls.

4. Soil cuttings were assumed to be contained in 10-cubic-yard (yd^3) roll-off bins. The bins were assumed to be filled to no more than 50 percent capacity (5 yd^3); bins filled to over 50 percent capacity are difficult to transport. Soil cuttings from 50 percent of the individual wells or borings (150 total) are expected to be segregated during drilling as potentially hazardous or nonhazardous. This increases the estimated number of bins by 75.

5. Well clusters for the regional groundwater VOC investigation (Site 18) were assumed to be drilled as separate wells, not as multiple-port (MP) wells. If MP wells are used, soil cuttings and drilling mud volumes will probably be less than the estimates presented here.

TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	$a = \frac{1}{4}\pi d^2$ APPROX. BOREHOLE AREA ($ft.^2$)	v = ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v' + mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v' + 5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL. TANKS NEEDED (each)
1	18	Agua C & Bee @ San Diego	D	Cluster/Shallow	100	85	12	0.79	79	4	1		0	1028	1
1	18	Agua C & Bee @ San Diego	D	Cluster/Intermed.	200	85	12	0.79	157	9	2		0	4553	1
1	18	Agua C & Bee @ San Diego	M	Cluster/Intermed.	300	85	12	0.79	236	13	3	4602	1	8078	1
1	18	Agua C & Bee @ San Diego	M	Cluster/Intermed.	400	85	12	0.79	314	17	4	5777	1	11603	1
1	18	Agua C & Bee @ San Diego	M	Cluster/Deep	500	85	12	0.79	393	22	5	6952	1	15129	1
1	18	Between Agua C & Bee	D	Cluster/Shallow	220	200	12	0.79	173	10	2		0	1880	1
1	18	Between Agua C & Bee	M	Cluster/Intermed.	300	200	12	0.79	236	13	3	4602	1	4700	1
1	18	Between Agua C & Bee	M	Cluster/Intermed.	375	200	12	0.79	295	16	4	5484	1	7344	1
1	18	Between Agua C & Bee	M	Cluster/Intermed.	450	200	12	0.79	353	20	4	6365	1	9988	1
1	18	Between Agua C & Bee	M	Cluster/Deep	525	200	12	0.79	412	23	5	7246	1	12632	1
1	18	Agua Chinon & Borrego	D	Cluster/Shallow	100	85	12	0.79	79	4	1		0	1028	1
1	18	Agua Chinon & Borrego	D	Cluster/Intermed.	200	85	12	0.79	157	9	2		0	4553	1
1	18	Agua Chinon & Borrego	M	Cluster/Intermed.	300	85	12	0.79	236	13	3	4602	1	8078	1
1	18	Agua Chinon & Borrego	M	Cluster/Intermed.	400	85	12	0.79	314	17	4	5777	1	11603	1
1	18	Agua Chinon & Borrego	M	Cluster/Deep	500	85	12	0.79	393	22	5	6952	1	15129	1
1	18	Bee @ Base & San Diego	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
1	18	Between Agua & Borrego	D	Cluster/Shallow	220	85	12	0.79	173	10	2		0	5258	1
1	18	Between Agua & Borrego	M	Cluster/Intermed.	300	85	12	0.79	236	13	3	4602	1	8078	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	a = ¼πd² APPROX. BOREHOLE AREA (ft.²)	v = ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v' + mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v' + 5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
1	18	Between Agua & Borrego	M	Cluster/Intermed.	375	85	12	0.79	295	16	4	5484	1	10722	1
1	18	Between Agua & Borrego	M	Cluster/Intermed.	450	85	12	0.79	353	20	4	6365	1	13366	1
1	18	Between Agua & Borrego	M	Cluster/Deep	525	85	12	0.79	412	23	5	7246	1	16010	1
1	18	Between Bee & Agua Chinon	D	Cluster/Shallow	100	85	12	0.79	79	4	1		0	1028	1
1	18	Between Bee & Agua Chinon	D	Cluster/Intermed.	200	85	12	0.79	157	9	2		0	4553	1
1	18	Between Bee & Agua Chinon	M	Cluster/Intermed.	300	85	12	0.79	236	13	3	4602	1	8078	1
1	18	Between Bee & Agua Chinon	M	Cluster/Intermed.	400	85	12	0.79	314	17	4	5777	1	11603	1
1	18	Between Bee & Agua Chinon	M	Cluster/Deep	500	85	12	0.79	393	22	5	6952	1	15129	1
1	18	Boring 1	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 2	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 3	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 4	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 5	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 6	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 7	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Boring 8	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
1	18	Borrego at SE base	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
1	18	Marshburn near Main Gate	D	Shallow	170	155	12	0.79	134	7	2		0	1439	1
1	18	Marshburn near San Diego Creek	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	$a = \frac{1}{4}\pi d^2$ APPROX. BOREHOLE AREA ($ft.^2$)	v=ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
1	18	Marshburn @ SW base	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
1	18	Near Borrego & Gate 3	D	Shallow	220	200	12	0.79	173	10	2		0	1880	1
1	18	Near MCAS-3 on Base perimeter	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
1	18	Near PS-1 & RW-1	D	Pump Test Well	150	135	12	0.79	118	7	2		0	1322	1
1	18	Near PS-1 & RW-1	D	Pump Test Piezomet	150	135	6	0.20	29	2	1		0		0
1	18	Near PS-1 & RW-1	D	Cluster/Intermed.	200	135	12	0.79	157	9	2		0	3084	1
1	18	Near PS-1 & RW-1	M	Cluster/Intermed.	300	135	12	0.79	236	13	3	4602	1	6610	1
1	18	Near PS-1 & RW-1	M	Cluster/Intermed.	400	135	12	0.79	314	17	4	5777	1	10135	1
1	18	Near PS-4 & RW-2	D	Pump Test Well	150	135	12	0.79	118	7	2		0	1322	1
1	18	Near PS-4 & RW-2	D	Pump Test Piezomet	150	135	6	0.20	29	2	1		0		0
1	18	Near PS-4 & RW-2	D	Cluster/Intermed.	200	135	12	0.79	157	9	2		0	3084	1
1	18	Near PS-4 & RW-2	M	Cluster/Intermed.	300	135	12	0.79	236	13	3	4602	1	6610	1
1	18	Near PS-4 & RW-2	M	Cluster/Intermed.	400	135	12	0.79	314	17	4	5777	1	10135	1
1	18	Near raceway	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
1	18	Near RW-3 & RW-4	D	Cluster/Intermed.	200	185	12	0.79	157	9	2		0	1616	1
1	18	Near RW-3 & RW-4	M	Cluster/Intermed.	300	185	12	0.79	236	13	3	4602	1	5141	1
1	18	Near RW-3 & RW-4	M	Cluster/Intermed.	400	185	12	0.79	314	17	4	5777	1	8666	1
1	18	Near site 7	D	Cluster/Shallow	150	135	12	0.79	118	7	2		0	1322	1
1	18	Near site 7	D	Cluster/Intermed.	225	135	12	0.79	177	10	2		0	3966	1
1	18	Near site 7	M	Cluster/Intermed.	300	135	12	0.79	236	13	3	4602	1	6610	1
1	18	Near site 7	M	Cluster/Intermed.	400	135	12	0.79	314	17	4	5777	1	10135	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	a = ¼πd² APPROX. BOREHOLE AREA (ft.²)	v = ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
1	18	Near site 7	M	Cluster/Deep	500	135	12	0.79	393	22	5	6952	1	13660	1
1	18	North Central base	D	Shallow	220	200	12	0.79	173	10	2		0	1880	1
1	18	SE of PS-4 on Base perimeter	D	Shallow	135	120	12	0.79	106	6	2		0	1234	1
1	18	Upper Bee Canyon Wash	D	Background Well	250	235	12	0.79	196	11	3		0	1909	1
1	18	Upper Marshburn Channel	D	Background Well	250	235	12	0.79	196	11	3		0	1909	1
1	18	West area of base	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
1	18	West of Culver	D	Cluster/Shallow	100	85	12	0.79	79	4	1		0	1028	1
1	18	West of Culver	D	Cluster/Intermed.	200	85	12	0.79	157	9	2		0	4553	1
1	18	West of Culver	M	Cluster/Intermed.	300	85	12	0.79	236	13	3	4602	1	8078	1
1	18	West of Culver	M	Cluster/Intermed.	400	85	12	0.79	314	17	4	5777	1	11603	1
1	18	West of Culver	M	Cluster/Deep	500	85	12	0.79	393	22	5	6952	1	15129	1
2	2	Well 1	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	2	Well 2	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	2	Well 3	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	2	Well 4	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	2	Well 5	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	3	Well 1	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	3	Well 2	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	3	Well 3	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	3	Well 4	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	3	Well 5	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	$a = \frac{1}{4}\pi d^2$ APPROX. BOREHOLE AREA ($ft.^2$)	v = ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
2	3	Well 6	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	5	Well 1	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	5	Well 2	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	5	Well 3	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	5	Well 4	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	10/22	Boring 1	A	Shallow	25	125	12	0.79	20	1	1		0		0
2	10/22	Well 1	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
2	10/22	Well 2	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
2	10/22	Well 3	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
2	10/22	Well 4	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
2	17	Well 1	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
2	17	Well 2	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	17	Well 3	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	17	Well 4	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
2	17	Well 5	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
3	1	Well 1	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
3	1	Well 2	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
3	1	Well 3	D	Shallow	100	85	12	0.79	79	4	1		0	1028	1
3	4	Well 1	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
3	4	Well 2	D	Shallow	250	235	12	0.79	196	11	3		0	1909	1
3	6	Well 1	D	Shallow	180	165	12	0.79	141	8	2		0	1498	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	$a = \frac{1}{4}\pi d^2$ APPROX. BOREHOLE AREA ($ft.^2$)	v=ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
3	6	Well 2	D	Shallow	180	165	12	0.79	141	8	2		0	1498	1
3	6	Well 3	D	Shallow	180	165	12	0.79	141	8	2		0	1498	1
3	7	Well 1	D	Shallow	150	135	12	0.79	118	7	2		0	1322	1
3	7	Well 2	D	Shallow	150	135	12	0.79	118	7	2		0	1322	1
3	7	Well 3	D	Shallow	150	135	12	0.79	118	7	2		0	1322	1
3	7	Well 4	D	Shallow	150	135	12	0.79	118	7	2		0	1322	1
3	8	Boring 1	A	Shallow	25		12	0.79	20	1	1		0		0
3	8	Boring 2	A	Shallow	25		12	0.79	20	1	1		0		0
3	8	Boring 3	A	Shallow	25		12	0.79	20	1	1		0		0
3	8	Well 1	D	Shallow	120	105	12	0.79	94	5	2		0	1146	1
3	8	Well 2	D	Shallow	120	105	12	0.79	94	5	2		0	1146	1
3	8	Well 3	D	Shallow	120	105	12	0.79	94	5	2		0	1146	1
3	8	Well 4	D	Shallow	120	105	12	0.79	94	5	2		0	1146	1
3	9	Boring 1	A	Shallow	25		12	0.79	20	1	1		0		0
3	9	Boring 2	A	Shallow	25		12	0.79	20	1	1		0		0
3	9	Well 1	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	9	Well 2	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	9	Well 3	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	12	Well 1	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
3	12	Well 2	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
3	13	Boring 1	A	Shallow	25		12	0.79	20	1	1		0		0

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	$a = \frac{1}{4}\pi d^2$ APPROX. BOREHOLE AREA ($ft.^2$)	v=ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
3	13	Well 1	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	13	Well 2	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	13	Well 3	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	14	Boring 1	A	Shallow	25		12	0.79	20	1	1		0		0
3	14	Well 1	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	14	Well 2	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	15	Well 1	D	Shallow	140	125	12	0.79	110	6	2		0	1263	1
3	16	Boring 1	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
3	16	Boring 2	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
3	16	Well 1	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	16	Well 2	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	16	Well 3	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	16	Well 4	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	19	Boring 1	A	Shallow	25		12	0.79	20	1	1		0		0
3	19	Boring 2	A	Shallow	25		12	0.79	20	1	1		0		0
3	19	Boring 3	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
3	19	Boring 4	A	30° Angle/Shallow	60		12	0.79	47	3	1		0		0
3	19	Well 1	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	19	Well 2	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	19	Well 3	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1
3	19	Well 4	D	Shallow	200	185	12	0.79	157	9	2		0	1616	1

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

OPERABLE UNIT	SITE NO.	LOCATION	DRILLING METHOD	CLASSIFICATION	h ESTIMATED DEPTH (ft.)	hw ESTIMATED DEPTH TO WATER (ft.)	d ESTIMATED BOREHOLE DIAM. (in.)	a = ¼πd² APPROX. BOREHOLE AREA (ft.²)	v = ah APPROX. BOREHOLE VOLUME (cu. ft.)	1.5v APPROX. CUTTINGS VOLUME (cu. yd.)	EST. NO. 10 CU YD ROLL OF BINS (each)	2v'+mt DRILLING MUD VOLUME (gallons)	ST. NO 500 BBL TANKS NEEDED (each)	v'+5(h-hw) WELL DEVEL. WATER (gallons)	EST. NO. 500 BBL TANKS NEEDED (each)
3	20	Well 1	D	Shallow	220	205	12	0.79	173	10	2		0	1733	1
3	20	Well 2	D	Shallow	220	205	12	0.79	173	10	2		0	1733	1
3	20	Well 3	D	Shallow	220	205	12	0.79	173	10	2		0	1733	1
3	20	Well 4	D	Shallow	220	205	12	0.79	173	10	2		0	1733	1
3	21	Well 1	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
3	21	Well 2	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
3	21	Well 3	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
3	21	Well 4	D	Shallow	115	100	12	0.79	90	5	2		0	1116	1
Totals	150	wells and borings			29200	feet				1264	334	165193	29	460497	126
											+ 75		+15		
											= 409	(See note 4	=44	(See note 5)	

SUMMARY	CU FT.	CU YD	LBS.	TONS	GALLONS	BARRELS	
SOIL CUTTINGS	34135	1264	3539964	1770	-	-	(ASSUMES SOIL WEIGHT IS 2800 LB/CU YD.)
DRILLING MUD	22083	818	1987484	994	165193	3933	(ASSUMES MUD WEIGHT IS 90 LB/CU FT.)
DEVELOPMENT WATER	61560	2280	3841326	1921	460497	10964	(ASSUMES WATER WEIGHT IS 62.4 LB/CU FT)

(1 barrel = 42 gallons)

SEE SHEET 9 FOR NOTES AND ABBREVIATIONS

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TABLE 2-1
SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS AND TEST BORINGS
MCAS EL TORO - NAVY CLEAN (RI/FS)
WASTE MANAGEMENT PLAN

NOTES:

1. Soil Swell Factor = 1.5 (Volume Increase From Natural State To Excavated State)
2. Mud Tank Volume (mt) = 1000 Gallons (Mud Volume Added For Mud Rotary Borings Only)
3. Well Development Water Is 1 Full Well Volume Plus 5 Times Water Depth in the Well
4. Total number of bins required for soil cuttings is increased by number of wells & borings (150) times 50% in order to permit separating potentially contaminated cuttings from non-contaminated cuttings.
5. Total number of tanks required for mud rotary is increased by 50% in order to permit separating potentially contaminated mud from non-contaminated mud.

ABBREVIATIONS

h = well depth
hw = water depth
d = borehole diameter
a = borehole area (ft.^{2})
v = borehole volume (cu. ft.)
v' = borehole volume (gallons) = v x 7.48
mt = mud tank volume = 1,000 gallons
M = Mud Rotary (1000 ft. maximum depth)
A = Hollow-Stem Augers (100 ft. maximum depth)
D = Dual Tube or Air Rotary Casing Drive (250 ft. maximum depth for DT, 500 ft. maximum depth for AR)

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Table 2-2
Approximate Waste Volumes
MCAS El Toro - CLEAN RI/FS
Waste Management Plan

Waste Type	Estimated Volume[1]
Soil Cuttings[2]	1,264 yd^3 (1,770 tons)
Drilling Mud[2]	165,200 gallons (994 tons)
Well Development Water[2]	460,500 gallons
Well Purge[3] Water	261,000 gallons
Aquifer Test[4]	619,200 gallons
Decontamination Water[5]	670,300 gallons
Used Personal Protective Equipment[6]	248 yd^3

[1]See Text for assumptions used.
[2]From Table 2-1
[3]Quarterly Purge Water Volume = 145 wells x 30 gal/min x 60 min/hr x 1 hr
= 261,000 gallons
[4]Aquifer Test Water Volume = 62 wells x 30 gal/min x 60 min/hr x 4 hrs plus 2 wells x 30 gal/min x 60 min/hr x 48 hrs
= 619,200 gallons
[5]Decontamination Water Volume
Drilling Rigs = 1,000 gal/wk x 11 rigs x 18 wks = 198,000 gallons
Soil Bins = 200 gal/bin x 409 bins = 81,800 gallons
Mud Tanks = 2,000 gal/tank x 44 tanks = 88,000 gallons
Water Tanks = 1,000 gal/tank x 126 tanks = 126,000 gallons
Vacuum Trucks = 250 gal/truck x 353 truck days x 2 cleanings/day = 176,500 gallons
[6]Personal Protective Equipment = 1 (50-gal) bag/rig-day x 11 rigs x 5 days/wk x 18 wks x 0.25 yd^3/bag = 248 yd^3

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6. Wells deeper than 250 feet were assumed to be drilled with mud rotary techniques. A total of 29 wells, all for the regional groundwater VOC investigation (Site 18), are expected to be drilled using the mud rotary method. The volume of drilling mud was estimated based on two times the theoretical well volume (no swell factor), plus the mud tank volume (approximately 1,000 gallons).

7. Drilling mud was assumed to be contained in 500-barrel (21,000-gallon) frac tanks. The number of frac tanks was increased by 50 percent in order to segregate potentially hazardous mud from nonhazardous mud at half of the mud rotary wells. If drilling mud becomes contaminated, the mud may need to be changed out when the well casing is set in order to avoid carrying contaminants into a deeper aquifer.

8. Well development water was estimated based on one theoretical full well volume to flush the well (no swell factor), plus five times the well depth below the water table.

9. Well development water was assumed to be contained in 500-barrel (21,000-gallon) tanks. Water pumped from wells will be segregated by individual wells or wells in the same cluster.

10. Well purge and aquifer test water was estimated based on aquifer testing of about half of the new 126 RI wells and quarterly sampling of 145 wells (126 RI wells, plus 19 existing wells). Aquifer testing will be distributed throughout the site to ensure that all contaminated wells in any area are not eliminated. The aquifer testing was

estimated for 62 wells at 30 gallons per minute (gpm) for 4 hours, plus two wells at 30 gpm for 48 hours. Well purging during the quarterly sampling was estimated for 145 wells at 30 gpm for 1 hour of purging.

11. Decontamination water was estimated to be 1,000 gallons per drilling rig per week, with 11 rigs on-Station for 18 weeks. Decontamination water for washing out roll-off bins, drilling mud tanks, and water tanks on-Station was based on the estimated number of containers required for each waste type (provided in Table 2-1). The washout water volume was estimated to be 10 percent of the container volume for soil bins and mud tanks, and 5 percent of the volume for water tanks. Soil and mud containers were assumed to require a larger percentage of water in order to flush out solids.

    Decontamination water for washing out vacuum trucks used for on-Station hauling was also estimated. The number of cleanings was based on 2 cleanings per day for an estimated 353 truck-days. The truck-days include time for the RI well installation and development, aquifer testing, and subsequent quarterly well sampling. The wash-out volume for vacuum trucks was based on 5 percent of the truck volume (5,000 gallons), or 250 gallons per washout.

    Decontamination water for cleaning sampling equipment was assumed to be negligible in comparison to the water used for cleaning containers and equipment.

12. Personal protective equipment waste was assumed to be contained in one 50-gallon trash bag per drilling or well development rig (11 rigs) per day over a period of 18 weeks (5 days per week). Each bag of waste was estimated to occupy 0.25 yd^3.

The above quantities are estimates and may vary depending on field conditions.

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3.0 REGULATORY CONSIDERATIONS

This section presents discussions on the regulations that are applicable to the wastes expected to be generated by the MCAS El Toro RI activities. Decisions reached in consultation with the regulatory agencies on waste classification requirements are summarized in Subsection 3.1. A general waste classification strategy is discussed in Subsection 3.2. On-Station waste staging and handling issues are discussed in Subsection 3.3. Waste treatment and disposal requirements for soil cuttings, drilling mud, water, and disposable PPE are presented in Subsections 3.4 to 3.7. Federal, state, and local regulations reviewed include the following:

- Resource Conservation and Recovery Act (RCRA) [Code of Federal Regulations (CFR), Volume 40, Parts 260 to 268: 40 CFR 260 to 268]

- Federal National Pollutant Discharge Elimination System (NPDES) [40 CFR 122]

- Title 22 California Code of Regulations (CCR)

- Title 23 CCR

Agency inputs from the EPA, RWQCB, and DTSC are accounted for. Individual treatment, storage, and disposal facility (TSDF) requirements have also been reviewed.

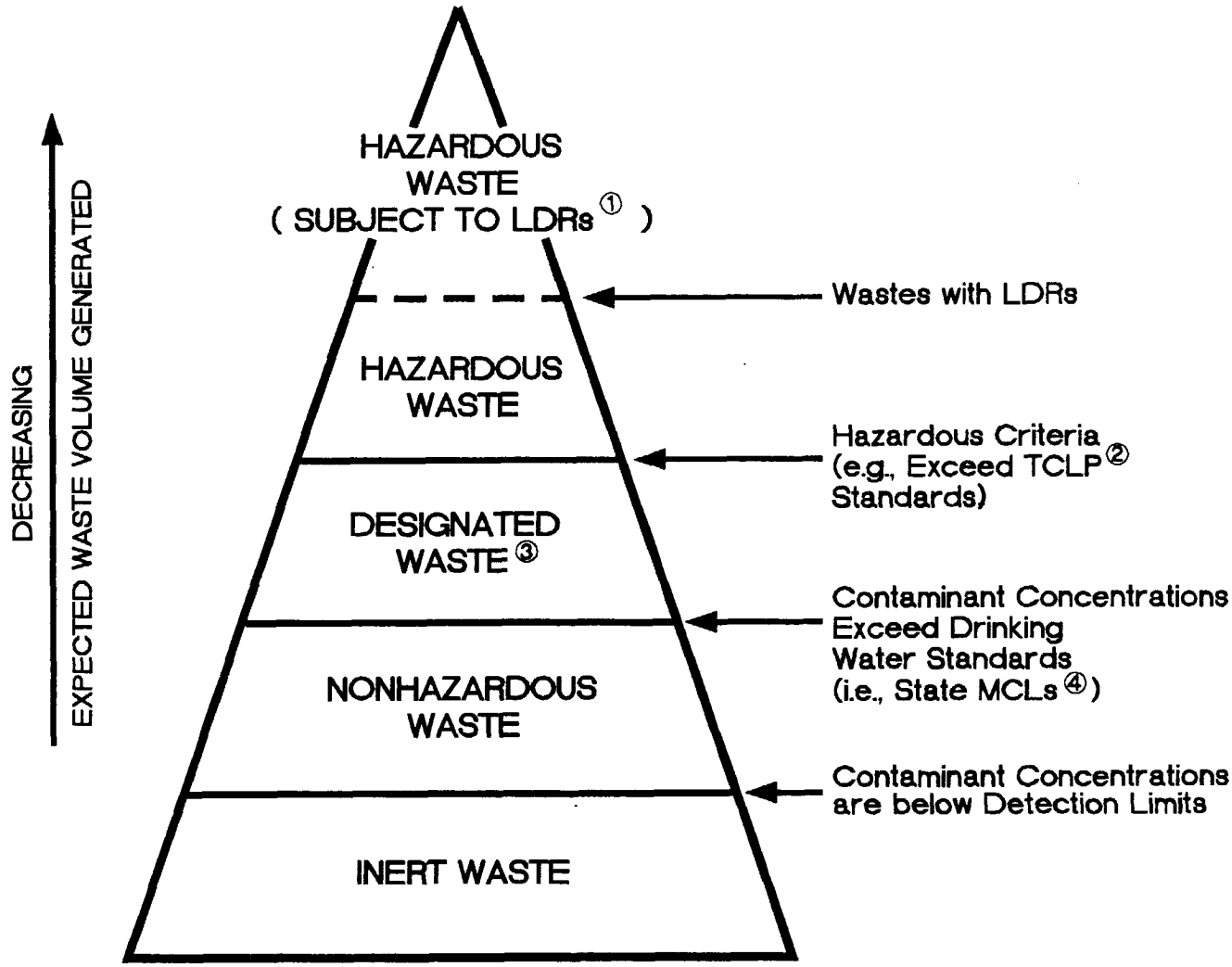
3.1 Waste Categories

The evaluation of waste management alternatives is contingent on proper waste classification according to applicable regulations. Five waste categories are defined for the RI-derived wastes. Only four waste categories are addressed in this WMP. They are:

1. Nonhazardous wastes
2. Designated wastes
3. Hazardous wastes
4. Hazardous wastes that are subject to land disposal restrictions (LDRs)

Containment and disposal of a fifth waste category, inert wastes, are not addressed in the WMP. That waste category generally includes wastes such as construction debris which are not expected to be of environmental concern. In terms of the MCAS El Toro RI/FS, wastes generated with contaminant concentrations that are below detection limits are classified as inert wastes. Special considerations for the containment and disposal of such wastes are not necessary. Figure 3-1 presents a diagram of the waste categories defined in this WMP.

Waste soil cuttings and drilling mud will be classified as nonhazardous if the contaminant concentrations in the TCLP extracts do not exceed drinking water standards (i.e., state Maximum Contaminant Levels [MCLs]). However, wastewaters will be classified as nonhazardous if the total contaminant concentrations of the waters do not exceed Hazardous Waste Regulatory Threshold Standards (e.g., TCLP standards).



① LDRs - LAND DISPOSAL RESTRICTIONS

② TCLP - TOXICITY CHARACTERISTIC LEACHING PROCEDURE

③ THE DESIGNATED WASTE CATEGORY DOES NOT APPLY TO WASTE WATERS, BUT ONLY TO WASTE SOIL CUTTINGS AND DRILLING MUD

④ MCLs - MAXIMUM CONTAMINANT LEVELS

FIGURE 3-1
MCAS El Toro RI-Derived Waste Categories

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Waste soil cuttings and drilling mud will be classified as designated if the contaminant concentrations in the TCLP extracts exceed drinking water standards, but not hazardous waste regulatory threshold standards (e.g., TCLP standards). This waste category applies only to solid wastes and not wastewaters.

Waste soil cuttings and drilling mud will be classified as hazardous if the contaminant concentrations in the TCLP extracts exceed hazardous waste regulatory threshold standards. Wastewaters will be similarly classified if the total contaminant concentrations exceed the hazardous waste regulatory threshold standards. A portion of the hazardous wastes will be subject to LDRs. These wastes will be segregated as required to ensure and to facilitate proper treatment and/or disposal.

Disposable PPE will be assigned the appropriate classification based on the waste classification of the soil cuttings, drilling mud, and waters associated with the PPE.

3.2 Waste Classification Strategy

Waste classification is based on both federal and state requirements. The following subsections present a general strategy to waste classification.

3.2.1 Hazardous/Nonhazardous Wastes

Federal waste classification procedures are defined in 40 CFR 261. Once the waste is determined to meet the definition of a solid waste (40 CFR 261.2 and 261.4(a)) and is determined not to be an excluded waste (40 CFR 261.4(b)), it is

then compared against several lists of hazardous wastes (40 CFR 261.31 to 261.33), commonly referred to as "F-," "K-," "U-," or "P-listed Wastes." Waste determination is based on process knowledge and chemical use information. Testing may be performed to help determine whether a waste is a listed waste. If the waste does not satisfy the definitions of the wastes listed, it may still be considered a hazardous waste due to its hazardous characteristics (40 CFR 261.21 to 261.24), namely, ignitability, corrosivity (pH), reactivity, or toxicity. The toxicity characteristic, as determined using the toxicity characteristic leaching procedure (TCLP) test, includes an expanded list of organic contaminants not covered by the old extraction procedure (EP) test.

Table 3-1 lists the TCLP contaminants and their regulatory standards. The TCLP is an extraction test designed to determine the mobility of both organic and inorganic contaminants present in wastes. A special zero headspace extraction (ZHE) vessel is used when VOCs are contaminants of concern. Although the regulatory threshold standards apply strictly to contaminant concentrations in the TCLP extracts, total contaminant concentrations can be used as guidelines to determine whether high enough levels of contaminants exist in the wastes to warrant TCLP testing.

In general, the State of California regulates a larger universe of wastes and materials than federal jurisdiction. Title 22 CCR has been recodified in order to obtain RCRA authorization following the EPA requirements and process for becoming authorized. The recodification uses the text and format of 40 CFR 260 to 270 as a basis, and incorporates more stringent and broader jurisdictional

Table 3-1
TCLP, STLC, and TTLC Regulatory Standards

Sheet 1 of 3

EPA Waste Number	Contaminant[a]	Regulatory Standards		
		EPA TCLP[b] (mg/l)	Calif. STLC[c] (mg/l)	Calif. TTLC[c] (mg/kg)
	Aldrin		0.14	1.4
	Antimony [and/or Antimony compounds]		15	500
D004	Arsenic [and/or Arsenic compounds]	5.0	5.0	500
	Asbestos[d]			1.0%
D005	Barium [and/or Ba compounds excluding barite]	100.0	100	10,000[e]
	Beryllium [and/or Beryllium compounds]		0.75	75
D018	Benzene	0.5		
D006	Cadmium [and/or Cadmium compounds]	1.0	1.0	100
D019	Carbon Tetrachloride	0.5		
D020	Chlordane [chlordan]	0.03	0.25	25
D021	Chlorobenzene	100.0		
D022	Chloroform	6.0		
D007	Chromium [and/or Chromium (III) compounds]	5.0	560.0	2,500
	Chromium (VI)		5.0	500
	Cobalt [and/or Cobalt compounds]		80	8,000
	Copper [and/or Copper compounds]		25	2,500
D023	o-Cresol[f]	200.0		
D024	m-Cresol[f]	200.0		
D025	p-Cresol[f]	200.0		
D026	Cresol[f]	200.0		
D016	2,4-D	10.0		
	DDT,DDE, DDD		0.1	1.0
D027	1,4-Dichlorobenzene	7.5		
D028	1,2-Dichloroethane	0.5		
D029	1,1-Dichloroethylene	0.7		
	2,4-Dichlorophenoxyacetic acid		10	100
	Dieldrin		0.8	8.0
D030	2,4-Dinitrotoluene[f]	0.13		

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Table 3-1
TCLP, STLC, and TTLC Regulatory Standards

Sheet 2 of 3

EPA Waste Number	Contaminant[a]	Regulatory Standards		
		EPA TCLP[b] (mg/l)	Calif. STLC[c] (mg/l)	Calif. TTLC[c] (mg/kg)
D030	Dioxin (2,3,7,8-TCDD)		0.001	0.01
D012	Endrin	0.02	0.02	0.2
	Flouride salts		180	18,000
D031	Heptachlor (and its Hydroxide)	0.008	0.47	4.7
D032	Hexachlorobenzene	0.13		
D033	Hexachlor-1,3-butadiene	0.5		
D034	Hexachloroethane	3.0		
	Kepone		2.1	21
D008	Lead [and/or Lead compounds]	5.0	5.0	1,000
	Lead compounds, organic[g]			13
D013	Lindane	0.4	0.4	4.0
D009	Mercury [and/or Mercury compounds]	0.2	0.2	20
D014	Methoxychlor	10.0	10.0	100
D035	Methyl ethyl ketone	200.0		
	Mirex		2.1	21
	Molybdenum [and/or Molybdenum compounds]		350	3,500
	Nickel [and/or Ni compounds]		20	2,000
D036	Nitrobenzene	2.0		
D037	Pentachlorophenol	100.0	1.7	17
	Polychlorinated biphenyls (PCBs)		5.0	50
D038	Pyridine[h]	5.0		
D010	Selenium [and/or Selenium compounds]	1.0	1.0	100
D011	Silver [and/or Silver compounds]	5.0	5	100
D039	Tetrachloroethylene	0.7		
	Thallium and/or Thallium compounds		7.0	700
D015	Toxaphene	0.5	0.5	5
D040	Trichloroethylene	0.5	204	2,040
D041	2,4,5-Trichlorophenol	400.0		

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Table 3-1
TCLP, STLC, and TTLC Regulatory Standards

Sheet 3 of 3

EPA Waste Number	Contaminant[a]	Regulatory Standards		
		EPA TCLP[b] (mg/l)	Calif. STLC[c] (mg/l)	Calif. TTLC[c] (mg/kg)
D042	2,4,6-Trichlorophenol	2.0		
D017	2,4,5-Trichlorophenoxypropionic acid or 2,4,5-TP (Silvex)	1.0	1.0	10
	Vanadium [and/or Vanadium compounds]		24	2,400
D043	Vinyl chloride [VCM][i]	0.2		0.001%
	Zinc [and/or Zinc compounds]		250	5,000

[a]Square brackets [] indicate additional California information.
[b]40 CFR Part 261
[c]Title 22 CCR 66696 and 66699
[d]Asbestos is regulated in California under the TTLC only. The regulatory limit is 1.0 percent.
[e]Excluding barium sulfate.
[f]If o-, m- and p-cresol concentrations cannot be differentiated, the total cresol (D026)43 concentration is used
[g]Organic lead compounds are regulated in California under the TTLC only. The regulatory limit is 13 mg/kg.
[h]Quantification limit is greater than the calculated regulatory level. The quantification limit therefore becomes the regulatory level.
[i]Does not include all the decision criteria for corrosive hazardous wastes.

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amendments where applicable. The following references to subsections of Title 22 CCR uses the old version. It was felt that until readers become familiar with the new equivalent citations, the old version of Title 22 CCR better serves the purposes of this subsection. The reader is encouraged to use the cross-reference list for the relevant citations as needed. A federally-classified hazardous waste is also a California hazardous waste. However, because California regulates a larger universe of wastes, a waste can be a non-RCRA, California-only hazardous waste.

Title 22 CCR 66680(d) lists as hazardous 491 common chemicals, and 22 CCR 66680(e) lists 71 common waste names. A waste that does not match the lists of common chemicals or wastes is still subject to hazardous characteristic testing and definitional criteria as defined in 22 CCR 66696 to 66740, including toxicity criteria, persistent and bioaccumulative toxicity, ignitability, reactivity, pH, extremely hazardous criteria, and special waste list and criteria. One of the most frequently employed tests is the Waste Extraction Test (WET) procedure (Title 22 CCR 66699 and CCR 666700) used to determine persistent and bioaccumulative toxicity. Threshold standards, both Total Threshold Limit Concentration (TTLC), and Soluble Threshold Limit Concentration (STLC), are promulgated for 20 metals and inorganics and 18 organics, mostly herbicides and pesticides. Total contaminant concentrations are compared against the TTLC values, and WET test results are compared against the STLC values. As with federal requirements, total contaminant concentrations can be used as guidelines to determine whether the WET procedure is needed. Table 3-1 also lists the California toxic contaminants and their regulatory standards. The table provides a comparison between EPA TCLP, and California TTLC/STLC standards.

3.2.2 Designated Wastes

A special waste classification unique to California, designated wastes, is relevant when evaluating land disposal alternatives for solid wastes. The RWQCB has special requirements for a waste that cannot be discharged directly or indirectly to state waters, but requires disposal to land (23 CCR 2520). Different waste management strategies are required depending on the waste category. Generally, they are: Class I facilities for hazardous wastes; Class II facilities for designated wastes; and Class III facilities for nonhazardous solid wastes. However, a less hazardous waste can be disposed in a landfill with more stringent requirements. For example, a nonhazardous waste also can be disposed in either a Class II or a Class I landfill. The RWQCB has adopted the California hazardous waste classification scheme (23 CCR 2521), but has promulgated the additional category of designated wastes. In general terms, a designated waste is a nonhazardous waste that consists of contaminants that may be released to the environment at levels greater than those established for specific local water quality objectives, or that could cause degradation of state water (23 CCR 2522[a][1]).

For the MCAS El Toro RI/FS, the RWQCB has defined designated wastes as being all wastes with contaminant levels above drinking water standards and below standards prescribed for hazardous wastes. As an example, a waste would be classified as designated if it contains TCE at levels greater than drinking water standards (0.005 mg/l) and less than required to be classified as hazardous (0.5 mg/l as measured in the TCLP extract).

3.2.3 Hazardous Wastes with Land Disposal Restrictions

Federal and California LDRs are in effect for many hazardous wastes (40 CFR 268; 22 CCR 67700 to 67786). Standards are available for non-RCRA, California-only hazardous wastes. As of 8 November 1990, soil and debris generated from RI activities or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions are also subject to LDRs (40 CFR 268.32[d][2]). The regulations are promulgated to promote treatment and destruction of hazardous wastes, rather than the transfer of wastes from one setting to another. These regulations restrict the direct land disposal of different wastes by one of two sets of standards: concentration or treatment method. The concentration-based standards are considered realistic levels achievable by best demonstrated available technologies (BDATs). Results from the TCLP are compared against these standards. These standards are different from those used in the classification of wastes discussed in Subsection 3.2.1. Treatment technology-based standards are developed to require some form of treatment prior to final disposal for wastes that pose problems for uniform concentration standards development.

As an example, if a waste is determined to be an F001 waste, a spent halogenated solvent (e.g., TCE) used in degreasing, the LDRs are for F001 wastewater containing greater than 0.062 mg/l of TCE, or for F001 nonwastewater containing greater than 0.091 mg/l of TCE (40 CFR 268.41, Table CCWE). Both concentrations are measured in the waste extract as obtained using the TCLP test. For illustrative purposes only, if soil cuttings were generated while drilling an

area where spent TCE used in degreasing is known to have been disposed, then the drill cuttings may be subject to LDRs. If the concentration of TCE in the TCLP waste extract of the soil exceeds 0.091 mg/l, the soil cannot be disposed in a Class I landfill without additional treatment. The appropriate treatment would most probably be incineration to reduce the TCE level to below the threshold limit.

A second example may find that soil cuttings are generated by drilling in an area where unused, but outdated, containers of Aldicarb (EPA Waste No. P070), an insecticide, have been disposed. According to 40 CFR 268.42, Table 2, the soil is restricted from land disposal without treatment by incineration. However, there is no threshold limit for Aldicarb levels for final disposal.

The EPA is tasked to promulgate LDRs within a set time frame for all existing and newly promulgated wastes. One group of wastes that still requires LDR standards is the organic compounds of the toxicity characteristic as defined in 40 CFR 261.24. It is expected that many of the VOC-contaminated wastes generated at MCAS El Toro may not be classified as listed hazardous wastes, but rather would require testing to determine hazardous characteristics. The proposed LDR standards are not expected until the beginning of 1992, with final promulgation probably later in 1992 (EPA, 1991). Therefore, LDR considerations may not be applicable to some of the wastes generated at MCAS El Toro.

3.3 On-Station Waste Staging and Handling

As soil cuttings, drilling mud, and water are generated from the RI activities, they will be sampled and analyzed on a routine basis to determine whether they are nonhazardous designated, or hazardous (see Section 4.0 for discussion of sample collection and waste analysis). Until the wastes are properly classified, most of the wastes will be stored on-Station in a central waste staging area (WSA), as hazardous wastes. A new RCRA requirement (40 CFR 262.34[a][2]) stipulates the need for drip pads for the containers. Design, operating, waste tracking, and inspection requirements are defined in 40 CFR 265.440 to 265.445. Requirements for secondary containment used to apply only to tanks, not containers, however, it appears that the new regulations intend to make management of containers and tanks alike, to minimize spills and leaks.

The WSA will consist of a 7-inch thick, 100 feet by 460 feet concrete pad. The pad is designed to provide sufficient space for roll-off bins, tanks, and drums used during the RI. A 4-inch berm will contain spilled wastes and rain water which may accumulate within the WSA. The concrete pad is designed with the appropriate slope such that all liquids will drain to a sump that is coated with nonskid polyamide epoxy paint. Two 22,000-gallon baker tanks will be used to contain the liquids. The WSA has the capacity to contain the runoff from a 25-year, 24-hour rainfall event plus 10 percent of the total liquid volume in storage.

Once the analytical data is available, the wastes can be segregated into nonhazardous, designated, and hazardous wastes. The waste tracking protocol presented in Section 7.0 will facilitate the task of waste segregation. As most of the tanks used to

contain the wastes are portable, they meet the definition of "containers" (40 CFR 260.10 "container;" 22 CCR 66028), and not "tanks" (40 CFR 260.10 "tank;" 22 CCR 66203). While on-Station, compliance with 40 CFR 265.170 to 265.177, and 22 CCR 67240 to 67248, "Use and Management of Containers," is required. These regulatory requirements include proper care of the containers, and routine inspections. The hazardous waste containers will also require proper labeling as specified in 40 CFR 262.34 and 22 CCR 66508. Information such as the initial date of accumulation, waste composition, physical state, hazardous properties, and the generator is required. The containers are also required to have the words "Hazardous Waste" clearly marked on them (22 CCR 66508[a][3]).

The following requirements must also be complied with:

- Preparedness and Prevention (40 CFR 265.30 to 265.37; 22 CCR 67120 to 67126), which requires the availability of properly operating fire fighting equipment and arrangements with the local authorities in the event of emergencies

- Contingency Plan and Emergency Procedures (40 CFR 265.50 to 265.56; 22 CCR 67140 to 67145), which require the documentation of set procedures in case of emergencies, and the availability of such a document for use

- Personnel Training (40 CFR 265.16; 22 CCR 67105), which requires that personnel are knowledgeable of applicable hazardous waste operations

Before the start of the RI activities, the Navy will coordinate with local authorities. The existing contingency plan may be amended to cover the RI activities. All field personnel involved with the field program will be trained as per 29 CFR 1910.120.

3.4 Soil Cuttings Disposal

Nonhazardous soil cuttings may be disposed on-Station at a nonhazardous soil disposal area or at municipal (Class III) landfills. Standards for on-Station soil disposal must be approved by the RWQCB. At a minimum, only nonhazardous solid wastes, as defined in 23 CCR 2523, may be disposed to a nonhazardous soil disposal area that meets the siting and geologic setting requirements of a Class III landfill, as defined in 22 CCR 2533. The wastes are required to be greater than 50 percent solids (23 CCR 2520(d)(3)), but may contain low levels of contaminants that, when released, would not exceed applicable water quality objectives, or pose threats to state waters (23 CCR 2523[a]). The RWQCB has indicated that wastes will be classified as nonhazardous only when contaminant concentrations are below drinking water standards. The RWQCB has also indicated such wastes may be disposed as nonhazardous soil in Class III landfills or on-Station at disposal sites.

Facility-specific waste acceptance criteria must be complied with for off-Station disposal to municipal landfills. The RWQCB sets these requirements as part of the permit conditions for the landfills. As with on-Station disposal to a nonhazardous soil disposal area, only nonhazardous solid wastes can be disposed in municipal landfills. Federal RCRA and California-only hazardous wastes, bulk liquids, or free-liquid-containing wastes cannot be disposed at the Class III landfills. Waste acceptance criteria

generally include testing for metals, asbestos, organics (such as pesticides and polychlorinated biphenyls [PCBs] listed in 22 CCR 66699), Total Petroleum Hydrocarbons (TPH), organic lead, and VOCs (such as benzene, toluene, xylenes, and ethylbenzene [BTXE]). Additional testing may be required by the landfills depending on the waste source.

Designated waste soil cuttings may be disposed in either a Class I or a Class II facility (23 CCR 2522[b]). If designated waste soil cuttings can be treated to reduce them to nonhazardous wastes, then they can be disposed as nonhazardous wastes in a Class III facility. Class I facility considerations are discussed below. Class II facilities have their own acceptance criteria including maximum limits for metals and organics. Additional testing will be required by individual Class II facilities for disposal of designated waste soil cuttings.

The designated waste soil cuttings also may be stored on-Station in bermed singly-lined cells, such as "burritos," prior to ultimate disposal. The soil cuttings can be stored inside these cells constructed of plastic liners which also covers the soil cuttings much in the fashion of burritos. Earthen berms surrounding, and therefore containing, the "burritos" complete the cell structures. The "burritos" must be situated over former landfill sites so that the requirement for a secondary liner can be waived. On-Station storage in these cells may require active or passive venting of the cells. A South Coast Air Quality Management District (SCAQMD) permit may be required should venting be necessary.

Hazardous waste soil cuttings may be disposed in Class I landfills. Facility-specific waste acceptance criteria are set as part of the permit conditions. Prior to accepting waste shipments, the waste generator is required to satisfy the permit requirements by completing waste profile information. Waste analysis by the facility, in addition to the routine analysis proposed in Section 4.0, is required as part of the permit conditions. Analytical results from the routine analysis serves only to supplement facility-specific waste profiling.

Federal RCRA standards for operating a hazardous waste landfill are defined in 40 CFR 264.300 to 264.317 for permitted hazardous waste facilities, and in 40 CFR 265.300 to 265.316 for interim status hazardous waste facilities. Similar California hazardous waste requirements are defined in 22 CCR 67400 to 67425 for both permitted and interim status facilities. Class I landfill requirements are defined in 23 CCR 2520 to 2547. The landfill classification scheme is administered by RWQCB. Hazardous waste landfills located outside California are not required to adhere to the siting and geologic criteria of Class I landfills. However, many out-of-state hazardous waste landfills do meet the substantive requirements of Class I landfills. Disposal of hazardous wastes outside of California is not confined to landfills that meet RWQCB Class I landfill requirements.

Hazardous waste soil cuttings that require additional treatment such as incineration because of their LDR status must be identified as such. Individual incinerators, whether bulk solids or aqueous injection, have certain operating requirements. In order to function properly and achieve the desired destruction and removal efficiency (DRE), waste characterization is critical. In addition to the physical characteristics of the waste, proper operation may include testing for heating value, halogen content, and sulfur

content. Not all the waste acceptance criteria for the incinerators are normally tested. Waste profiling prior to incineration is necessary in addition to the routine waste analysis.

Federal RCRA standards for operating a hazardous waste incinerator are defined in 40 CFR 264.340 to 264.351 for permitted hazardous waste facilities and in 40 CFR 265.340 to 265.353 for interim status hazardous waste facilities. California requirements are defined in 22 CCR 67450 to 67468 for both permitted and interim status facilities. Additional California requirements for incineration of certain hazardous wastes are defined in 22 CCR 66940 to 66944.

3.5 Drilling Mud Disposal

Disposal alternatives similar to those for soil cuttings are available for drilling mud. However, because of the water content requirement of land disposal, either the reduction or the elimination of free liquids in the drilling mud by solidification or dewatering is required. Nonhazardous drilling mud would generally have to achieve a water content less than 50 percent for disposal in Class III facilities, whereas free liquids must be eliminated from designated and hazardous waste drilling mud. The Paint Filter Liquids Test (EPA Method 9095) may be used to estimate the moisture content and suitability of waste drilling mud for disposal.

If solidification or dewatering were to be performed on-Station, filing appropriate treatment permits with EPA, DTSC, and RWQCB may be required. As stated in the FFA, formal permits are not required, but compliance with permit conditions is still necessary.

Portable treatment units are available for on-Station solidification or dewatering. Permits may not be required if the treatment units satisfy the conditions of permit-by-rule as transportable treatment units (TTUs) defined in 22 CCR 66392. The TTUs that meet the conditions of permit-by-rule also meet the substantive requirements of formal permitted facilities. Solidification and dewatering are listed as approved treatment processes in 22 CCR 66747(a), and drilling mud is expected to meet the list of approved influent waste streams as defined in 22 CCR 66747(b).

The removed water generated by dewatering will also require disposal. If the removed water is treated using a portable treatment system consisting of granulated carbon, the permit-by-rule requirements also apply. The treatment system will qualify as a TTU, and the removed water is expected to be an approved influent waste stream. Final disposal of the removed water is discussed below in Subsection 3.6.

3.6 Water Disposal

Water generated from well development, well purging, aquifer testing, decontamination, and on-Station dewatering can be discharged on-Station using the existing irrigation system. The irrigation system is operated under a RWQCB Cleanup and Abatement Order, and has adequate capacity for all the water expected to be generated. The RWQCB has agreed that water treated with three granulated activated carbon (GAC) beds in series can be used as irrigation water. The effluent water from the GAC treatment system must be tested to ensure compliance with discharge requirements of the Cleanup and Abatement Order. In addition, the effluent must also meet the local Basin Plan water quality objectives prescribed by the RWQCB (RWQCB, 1984). In

general, the water is required to be free of VOCs, and to meet Basin Plan objectives for inorganics such as total dissolved solids, chlorides, and sulfates.

If the wastewaters are discharged to one of the surface drainage channels, the filing of an amendment to the existing NPDES permit (40 CFR 122.21) will be required. California is empowered to administer the NPDES program. The RWQCB stipulates that the permit conditions must comply with the federal NPDES program (23 CCR 2235.2), but reserves the authority to add the RWQCB requirements (23 CCR 2235.3). Since the existing on-Station irrigation system has adequate capacity to discharge all the water generated, surface water discharge may not be necessary. However, should surface water discharge be required, an amendment to the existing NPDES permit will be applied for.

Off-Station disposal to Publicly-Owned Treatment Works (POTWs), such as the Orange County Sanitation District (OCSD) or the Irvine Ranch Water District (IRWD), is also regulated by NPDES permits as administered by the RWQCB. The two POTWs indicated that each facility's general policy is not to allow acceptance of groundwater, because the treatment facilities are not designed to treat groundwater (OCSD, 1991; IRWD, 1991). However, under extenuating circumstances (e.g., on-Station discharge is disallowed and the only alternative is disposal at a permitted hazardous waste facility, even for the treated clear water), the POTWs may allow for exceptions to their general policy. Approval is required from higher authorities, either the General Manager or Director of Engineering.

The IRWD indicated that it may be able to accept nonhazardous or treated hazardous groundwater at its water reclamation plant. The water is required to meet facility waste acceptance criteria. Acceptance of water generated during the RI requires the approval from the General Manager or Director of Engineering.

As with the treatment of removed water generated from dewatering, if a portable treatment system consisting of granulated carbon is used on-Station, the permit-by-rule requirements discussed above in Subsection 3.5 apply. The treatment system will qualify as a TTU, and the water may be an approved influent waste stream.

Water may be treated and disposed off-Station at a permitted hazardous waste TSDF. The range of treatment operations conducted at TSDFs may vary. Generally, TSDFs that accept wastewater also have recycling operations such as for waste oil and solvents. The TSDFs are permitted to treat and dispose only permitted wastes. As part of the permit conditions, waste profiling, in addition to the routine waste analysis proposed in Section 4.0, will be necessary. Prior to acceptance of the water for treatment and disposal, compliance with facility-specific waste acceptance criteria is required. As with landfills and incinerators, federal RCRA operating requirements for these TSDFs are defined in 40 CFR 264 or 265 and California hazardous waste requirements in 22 CCR.

3.7 Personal Protective Equipment Disposal

Personal protective equipment may be disposed as nonhazardous, designated, or hazardous wastes depending on waste classification. All PPE will be segregated by drilling site. Based on the analytical results of soil cuttings, drilling mud, and waters generated, PPE will be assigned the appropriate waste categories. Discussion of disposal to the appropriate landfills is presented above in Subsection 3.4.

4.0 WASTE SAMPLING AND ANALYTICAL METHODS

Many of the wastes generated from the RI activities are not expected to be listed hazardous wastes; however, testing for their hazardous characteristics is still required. This section presents the suggested sampling and analytical requirements for waste classification and disposal.

4.1 Representative Sampling

Whenever possible, the EPA representative sampling protocol found in SW-846 (EPA, 1986) will be used to collect waste samples. Sampling procedures for the wastes generated from the RI activities is discussed in the following subsections.

4.1.1 Sampling of Waste Soil Cuttings or Drilling Mud

When VOC analyses are needed to characterize soil cuttings or drilling mud, a single grab sample at mid-level depth in the roll-off bin will be collected using a trowel attached to the end of a pole. When VOC analyses are not required to characterize soil cuttings or drilling mud, then four grab samples will be collected from the top of each roll-off bin at four locations. The locations coincide with the center of four sections divided equally along the longest axis.

4.1.2 Sampling of Wastewater

Water will be sampled with a composite liquid waste sampler constructed of a glass tube. A representative depth-composite sample will be collected and properly preserved until analysis.

4.2 Analytical Methods

The following subsections present the analytical tests which will be used to test the waste generated from the RI activities. Available information on potential wastes and contaminants at each site (as summarized in Table 1-1) was reviewed to develop the analytical testing requirements at each site. Tables 4-1 and 4-2 list the required analytical tests for disposal of waste soil cuttings and drilling mud and wastewaters. Tables 4-3 and 4-4 present the test methods associated with the required analyses. A discussion of the various contaminants which will be analyzed is presented in the following subsections.

4.2.1 Testing Requirements for Soil Cuttings and Drilling Mud

All waste soil cuttings and drilling mud samples will be tested for total petroleum hydrocarbons (TPH), metals, volatile organics, and semivolatile organics. Total chromium analysis will be performed but not hexavalent chromium analysis. Typically, only the disposal of plating wastes may present the need for hexavalent chromium analysis; however, hexavalent species may reduce to lower oxidation states in soil and water. Therefore, total chromium will be tested and if the total

Table 4-1
Required Analytical Tests for Disposal of Waste Soil and Drilling Mud
MCAS El Toro, California

OU	Site No.	Waste Types	Reactivity		TPH	Total Contaminant Analysis[a]						
			Total Sulfide	Total Cyanide		Metals	Volatile Organics[b]	Semivolatile Organics	Dioxins	PCBs/ Pesticides	Herbicides	Organic Lead
1	18	TCE, PCE, DCE, toluene, chlorobenzene, ethyl benzene, nitrate, TDS, and selenium			X	X	X	X				X
2	2	General categories of construction debris, municipal wastes, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents			X	X	X	X	X	X	X	
	3	Burnt waste, metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid wastes, and various inert solid wastes			X	X	X	X	X	X	X	
	5	Burnt waste, municipal solid waste, unspecified fuels, oils, solvents cleaning fluids, scrap metals, and paint residues			X	X	X	X	X	X	X	X
	10/22	Waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and other solvents			X	X	X	X		X	X	
	17	Domestic waste, cooking grease, oils and fuels from sumps, empty drums, and other unknown material	X	X	X	X	X	X		X	X	X
3	1	FS smoke (sulfur trioxide chlorosulfonic acid), low-level radioactive materia, metals, nitrated toluene, and sulfates and acidic wastes from the FS smoke disposal operations	X		X	X	X	X	X			
	4	Ferrocene, hydrocarbon carrier solution, and oily discharges			X	X	X	X				
	6	JP-5 fuel and waste lubricant oils			X	X	X	X				
	7	JP-5 fuel and waste oil			X	X	X	X		X		
	8	Various scrap and salvage materials and PCBs			X	X	X	X		X		
	9	JP-5 fuel, aviation gasoline, and other liquid waste, such as crankcase oil			X	X	X	X				X
	11	PCBs (no waste samples)					X	X		X		
	12	Sludge from secondary wastewater treatment, heavy metals, such as silver, arsenic, cadmium, copper, mercury, nickel, lead, selenium, and zinc	X	X	X	X				X		
	13	Crankcase oils, metals, and PCBs			X	X	X	X				

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Table 4-1
Required Analytical Tests for Disposal of Waste Soil and Drilling Mud
MCAS El Toro, California

Sheet 2 of 2

OU	Site No.	Waste Types	Reactivity		TPH	Total Contaminant Analysis[a]						
			Total Sulfide	Total Cyanide		Metals	Volatile Organics[b]	Semivolatile Organics	Dioxins	PCBs/ Pesticides	Herbicides	Organic Lead
1	18	TCE, PCE, DCE, toluene, chlorobenzene, ethyl benzene, nitrate, TDS, and selenium			X	X	X	X				X
3	14	Battery acid, paints, lead and other priority metals, waste oils, methylene chloride, and phenols			X	X	X	X		X		
	15	Diesel fuel			X	X	X	X				
	16	JP-5 fuel, leaded aviation gasoline, hydraulic fluid, crankcase oils and other waste oils, napalm, white phosphorus, and magnesium phosphate			X	X	X	X	X	X		X
	19	JP-5 fuel			X	X	X	X				
	20	Kerosene, waste oils, and heavy metals			X	X	X	X				
	21	Drums containing chemicals		X	X	X	X	X		X	X	

[a]Includes compounds identified in 40 CFR 261.24, Table 1 (TCLP-toxicity characteristic list), and 22 CCR 66699 (2) (b) and (c) (California Title 22 list). If the results of total contaminant analysis exceed 20 times the TCLP standards, or 10 times the STLC standards, the TCLP will be performed. [b]Includes compounds identified in 40 CFR 268.41, Table CCWE (land-banned list for EPA Hazardous Waste Nos. F001 - F005).

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Table 4-2
Required Analytical Tests for Disposal of Wastewater
MCAS El Toro, California

Sheet 2 of 2

OU	Site No.	Waste Types	Corrosivity (pH)	TPH	Total Contaminant Analysis[a]				
					Metals	Volatile Organics[b]	Semivolatile Organics	PCBs/ Pesticides	Herbicides
3	9	JP-5 fuel, aviation gasoline, and other liquid waste, such as crankcase oil	X	X	X	X	X		
	11	PCBs (no waste samples)						X	
	12	Sludge from secondary wastewater treatment, heavy metals, such as silver, arsenic, cadmium, copper, mercury, nickel, lead, selenium, and zinc	X	X	X	X	X	X	
	13	Crankcase oils, metals, and PCBs	X	X	X	X	X	X	
	14	Battery acid, paints, lead and other priority metals, waste oils, methylene chloride, and phenols	X	X	X	X	X	X	
	15	Diesel fuel	X	X	X	X	X		
	16	JP-5 fuel, leaded aviation gasoline, hydraulic fluid, crankcase oils and other waste oils, napalm, white phosphorus, and magnesium phosphate	X	X	X	X	X	X	
	19	JP-5 fuel	X	X	X	X	X		
	20	Kerosene, waste oils, and heavy metals	X	X	X	X	X		
	21	Drums containing chemicals	X	X	X	X	X	X	X

[a]Includes compounds identified in 40 CFR 261.24, Table 1 (TCLP-toxicity characteristic list), and 22 CCR 66699 (2) (b) and (c) (California Title 22 list).
[b]Includes compounds identified in 40 CFR 268.41, Table CCWE (land-banned list for EPA Hazardous Waste Nos. F001-F005).

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Table 4-2
Required Analytical Tests for Disposal of Wastewater
MCAS El Toro, California

Sheet 1 of 2

OU	Site No.	Waste Types	Corrosivity (pH)	TPH	Total Contaminant Analysis[a]				
					Metals	Volatile Organics[b]	Semivolatile Organics	PCBs/ Pesticides	Herbicides
1	18	TCE, PCE, DCE, toluene, chlorobenzene, ethyl benzene, nitrate, TDS, and selenium	X	X	X	X	X		
2	2	General categories of construction debris, municipal wastes, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents	X	X	X	X	X	X	X
	3	Burnt waste, metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid wastes, and various inert solid wastes	X	X	X	X	X	X	X
	5	Burnt waste, municipal solid waste, unspecified fuels, oils, solvents cleaning fluids, scrap metals, and paint residues	X	X	X	X	X	X	X
	10/22	Waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and other solvents	X	X	X	X	X	X	X
	17	Domestic waste, cooking grease, oils and fuels from sumps, empty drums, and other unknown material	X	X	X	X	X	X	X
3	1	FS smoke (sulfur trioxide chlorosulfonic acid), low-level radioactive materia, metals, nitrated toluene, and sulfates and acidic wastes from the FS smoke disposal operations	X	X	X	X	X		
	4	Ferrocene, hydrocarbon carrier solution, and oily discharges	X	X	X	X	X		
	6	JP-5 fuel and waste lubricant oils	X	X	X	X	X		
	7	JP-5 fuel and waste oil	X	X	X	X	X	X	
	8	Various scrap and salvage materials and PCBs	X	X	X	X	X	X	

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Table 4-3
Waste Classification and Disposal Analyses for Waste Soil and Drilling Mud

Analysis Description	Test Method[1]
Reactivity - Total Sulfide	EPA 9030
Reactivity - Total Cyanide	EPA 9010
Total Petroleum Hydrocarbons (TPH)	EPA 418.1 (modified)
Metals	EPA 6000/7000 Series
Volatile Organics	EPA 8240
Semivolatile Organics	EPA 8270
Dioxins	EPA 8280
PCBs[2]/Pesticides	EPA 8080
Herbicides	EPA 8150
Organic Lead	CA-LUFT[3]
TCLP[4] Extraction	EPA 1311
TCLP Zero Headspace Extraction	EPA 1311

[1]Analyses will be performed using test methods specified or equivalent test methods.
[2]PCBs - Polychlorinated biphenyls.
[3]CA-LUFT - California Leaking Underground Fuel Tank (LUFT) Manual method.
[4]TCLP - Toxicity Characteristic Leaching Procedure

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Table 4-4
Waste Classification and Disposal
Analyses for Wastewater

Analysis Description	Test Method[1]
Suspended Solids	EPA 160.2
Total Dissolved Solids	EPA 160.1
Nitrates-Nitrogen	EPA 353.2/353.3
Corrosivity (pH)	EPA 150.1
Total Petroleum Hydrocarbon	EPA 418.1
Metals	EPA 6000/7000 Series
Volatile Organics	EPA 8240
Semivolatile Organics	EPA 8270
PCBs[2]/Pesticides	EPA 8080
Herbicides	EPA 8150

[1]Analyses will be performed using test methods specified or equivalent test methods.
[2]PCBs - Polychlorinated biphenyls.

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chromium levels exceed the threshold level for hexavalent chromium, the regulatory agencies will be notified to obtain further instructions.

Polychlorinated biphenyls and dioxins will be tested at sites where suspected waste disposal practices dictate the need. Reactivity, specifically total sulfide and total cyanide, will be tested at sites where wastes from unknown sources are disposed, or suspected waste disposal practices dictate the need. Organic lead will be tested only at sites where gasoline and/or leaded fuel are suspected to have been spilled or disposed. Pesticides and herbicides analyses will be performed only at sites where wastes of unknown sources are disposed. Pesticides and herbicides are not expected to be present at all sites. Fluoride compounds are not expected at MCAS El Toro, and will not be tested.

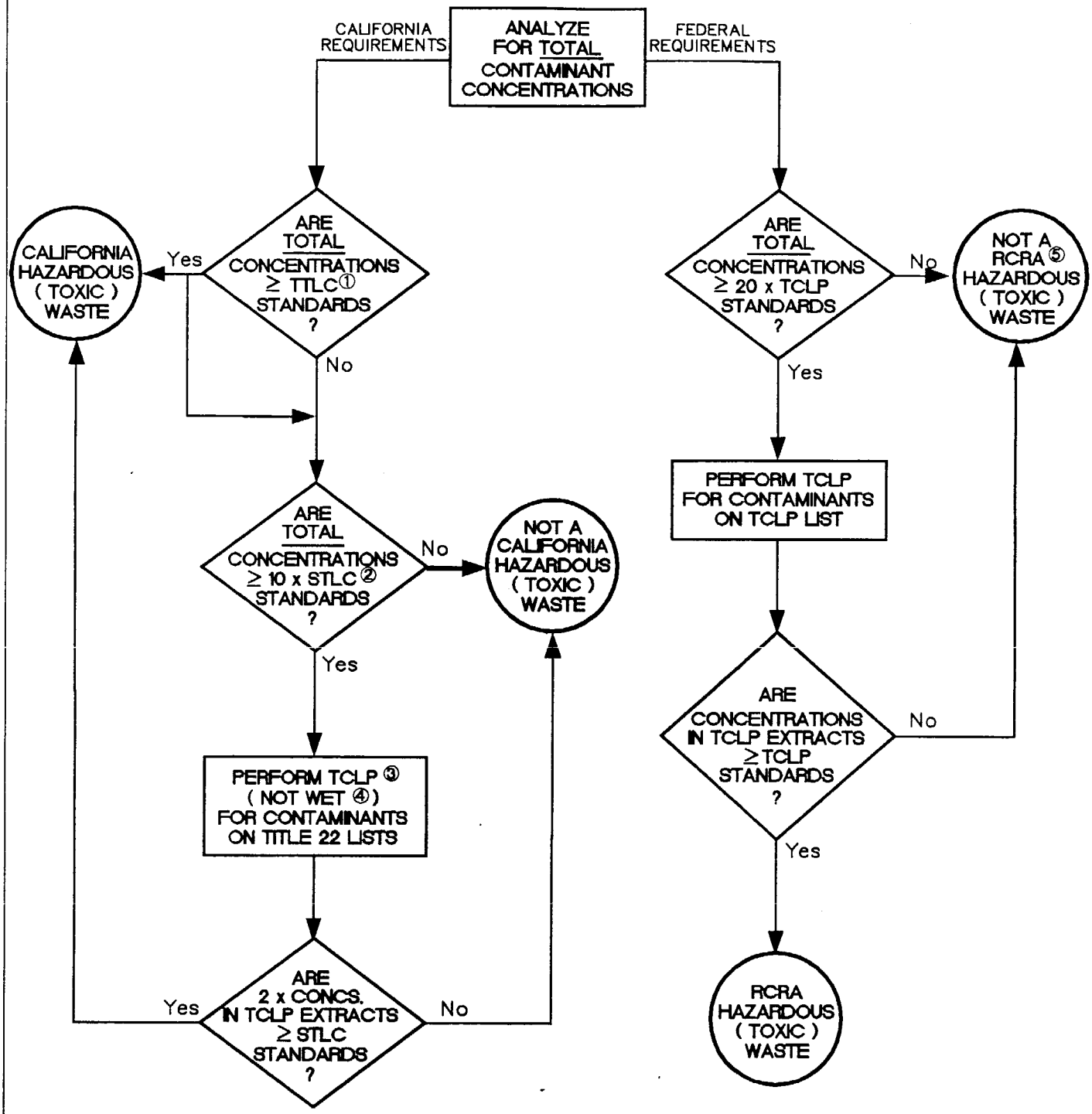
For a waste to be considered hazardous by federal regulations, the contaminant concentrations in the TCLP extract must exceed the TCLP standards. However, the total contaminant concentrations may be compared against the TCLP standards to determine if TCLP testing is required. Since TCLP uses a 20:1 dilution for the extraction, TCLP testing will be required to determine whether a waste sample exceeds the TCLP standards only if the total contaminant concentrations are greater than 20 times the TCLP standards.

To meet the California regulations, waste samples must first be analyzed for their total contaminant concentrations and compared against the TTLC standards. If any contaminant concentrations in the waste exceed the TTLC standards, the waste is considered hazardous. If the contaminant concentrations do not exceed

TTLC standards but are more than ten (10) times the STLC standards, the waste is required to undergo the WET procedure. The results of the WET should then be compared to the STLC standards. For the wastes generated from the RI activities in this study, TCLP is proposed instead of the WET.

It is proposed that soil and drilling mud waste samples be tested first for total contaminant concentrations using analytical methods that include the TCLP list of hazardous contaminants and California's Title 22 list of hazardous substances. If the analytical results exceed 20 times the TCLP standards, or 10 times the STLC standards, the TCLP (and not the WET) will be performed. The TCLP extract will be analyzed for the contaminants which appear on either the TCLP, and/or the Title 22 lists. For contaminants listed under Title 22, the results of the TCLP test will be converted by multiplying by two (2) for comparison against STLC standards, since the TCLP uses a 20:1 dilution for the extraction, whereas the WET uses a 10:1 dilution. A flow diagram depicting the use of total contaminant concentrations and TCLP testing in waste classification is shown in Figure 4-1. The rationale for the proposals are discussed below.

The comparison of the contaminant concentrations in the TCLP extract against the STLC standards instead of the comparison of the WET extract against the STLC standards is valid because it leads to a more conservative assignment of a waste's hazardous character for the following reasons:



① TTLC - TOTAL THRESHOLD LIMIT CONCENTRATION

② STLC - SOLUBLE THRESHOLD LIMIT CONCENTRATION

③ TCLP - TOXICITY CHARACTERISTIC LEACHING PROCEDURE

④ WET - WASTE EXTRACTION TEST

⑤ RCRA - RESOURCE CONSERVATION AND RECOVERY ACT

FIGURE 4-1
FLOW DIAGRAM OF USE OF TOTAL CONTAMINANT CONCENTRATIONS AND TCLP TESTING IN WASTE CLASSIFICATION

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- The TCLP is a more controlled extraction procedure than the WET

- The laboratory quality assurance/quality control protocols that have been developed for the TCLP are more comprehensive than those developed for WET

- A ZHE vessel for volatile organics is used for the TCLP and not for the WET

- The TCLP test, which uses two buffered acetate solutions, is generally more aggressive than the WET, which uses citric acid as the extraction solution.

Therefore, only the TCLP extraction procedures will be used to characterize the waste soil cuttings and drilling mud.

4.2.2 Testing Requirements for Wastewater

All wastewater samples will be tested for pH, TPH, metals, volatile organics, and semivolatile organics. Hexavalent chromium analysis will not be performed because only total chromium levels have regulatory significance in wastewater. Organic lead analysis also will not be performed because the contaminant does not have regulatory significance in wastewater. Additionally, the wastewater is not expected to be contaminated with sulfide, cyanide or dioxins at concentrations requiring testing. Pesticides and herbicides analyses will be performed only at sites where wastes of unknown sources are disposed.

4.3 Quality Assurance/Quality Control

Field and laboratory quality assurance/quality control (QA/QC) procedures are important aspects of the analytical program. For the field portion, duplicate samples of each waste matrix (i.e., soil, mud, water) will be submitted at a frequency of 10 percent. Also, one trip blank for each matrix will be sent for VOC analysis each day that samples are collected. Laboratory QA/QC will entail following the procedures prescribed for each analytical method, Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 5 percent, except for organic lead which require 20 percent MS/MSD samples.

4.4 Sample Custody

The sample custody procedures for the waste samples are described in the MCAS El Toro Sampling and Analysis Plan (SAP) (28 February, 1991), Appendix A, Chapter 5.

5.0 WASTE MANAGEMENT ALTERNATIVES

5.1 Introduction

This section presents the waste management alternatives for each of the wastes introduced in Section 2.0, Wastes to be Generated. Waste classification is based on applicable EPA, DTSC, and RWQCB regulations discussed in Section 3.0, Regulatory Considerations. The four waste categories, as described in Subsection 3.1, are:

1. Nonhazardous wastes

2. Designated wastes

3. Hazardous wastes

4. Hazardous wastes with contaminant levels exceeding federal or California LDR threshold limits

The following discussion is not intended to be a comprehensive analysis of all possible treatment and disposal options. Only alternatives considered reasonable based on the current understanding of applicable regulations, regulatory agency input, site contamination information, and preliminary cost estimates are discussed. Order-of-magnitude cost estimates for treatment and disposal alternatives are expected to be accurate from minus (-) 30 percent to plus (+) 50 percent. One note of importance

involves hazardous wastes that exceed the LDRs and require treatment prior to final disposal. The list of suspected waste types and contaminants at MCAS El Toro (see Table 1-1) are varied. However, the predominant waste types are various petroleum products, such as fuels and oils. From previous investigations, the primary contaminants in groundwater are identified as VOCs, such as TCE and perchloro-ethylene (PCE). Although the required or recommended BDATs are numerous and dependent on the waste, it is reasonable to concentrate on incineration because petroleum products and VOCs appear to be most prevalent. For the purposes of this plan and due to the preliminary nature of available site contamination information, only incineration will be considered for hazardous wastes subject to LDRs and requiring additional treatment before land disposal. Therefore, if additional treatment is necessary, soil cuttings may be treated by bulk solids incineration, and hazardous drilling mud may be treated by aqueous injection incineration.

Table 5-1 provides a summary of the alternatives discussed in the subsections below. In Section 6.0, waste management alternatives are evaluated against three general criteria: cost, practicability, and potential future liability.

The discussions below present the waste management alternatives according to hazard category and waste type. The vendors and agencies contacted to obtain the cost information are identified. Common to many of the treatment and disposal alternatives are the transportation costs. Several vendors were contacted for vacuum truck and roll-off bin truck rental costs. Average rental costs are assumed based on quotes from the following vendors:

Table 5-1
Summary of Waste Management Alternatives for
MCAS El Toro RI/FS

Sheet 1 of 2

Waste Category	Management Alternatives
Soil Cuttings	
Nonhazardous Soil Cuttings	o On-Station disposal in a nonhazardous soil disposal area.
	o Off-Station disposal at a municipal (Class III) landfill.
Designated Soil Cuttings	o On-Station storage at designated bermed area in singly-lined cells or "Burritos" for later disposal.
	o The Navy has excluded the alternative of: Off-Station disposal at a designated (Class II) landfill
Hazardous Soil Cuttings	o Off-Station disposal at a hazardous (Class I) landfill.
Hazardous Soil Cuttings Subject to Land Disposal Restrictions	o Off-Station disposal at a hazardous bulk solids incinerator[a].
Drilling Mud	
Nonhazardous Drilling Mud	o On-Station disposal in a nonhazardous soil disposal area. A minimum water content is not required.
	o Off-Station disposal at a solidification/recycling facility.
Designated Drilling Mud	o On-Station solidification or dewatering if required. o On-Station storage at designated bermed area in singly-lined cells or "Burritos" for later disposal. o Treatment of water generated from dewatering with activated carbon and disposal of the water as specified for water with low solids.
Hazardous Drilling Mud	o On-Station solidification or dewatering if required. o On-Station storage at designated bermed area in singly-lined cells or "Burritos" for later disposal. o Treatment of water generated from dewatering with activated carbon and disposal of the water as specified for water with low solids.

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Table 5-1
Summary of Waste Management Alternatives for
MCAS El Toro RI/FS

Sheet 2 of 2

Waste Category	Management Alternatives
Hazardous Drilling Mud (continued)	o Off-Station disposal at a hazardous (Class I) landfill with solidification.
Hazardous drilling mud subject to land disposal restrictions	o Off-Station disposal at a hazardous aqueous injection incinerator.
Wastewaterb	
Water With Low Solids ("Clear" Water)	o On-Station treatment and discharge to the existing irrigation system. o On-Station treatment and discharge to surface water via drainage channels (NPDES). o On-Station treatment and discharge to reinjection well. o On-Station treatment and discharge to publicly-owned treatment works (POTWs). o On-Station treatment and discharge to Irvine Ranch Water District (IRWD) Water Reclamation Plant.
	o Off-Station disposal at a treatment, storage, disposal facility (TSDF)
Water With High Solids ("Turbid" Water)	o Off-Station disposal at a TSDF
Personal Protective Equipment (PPE)	o Off-Station disposal at appropriate landfills[c].

[a]If required, other alternatives besides incineration will be considered for hazardous wastes subject to land disposal restrictions (LDRS) as analytical data becomes available.
[b]May include well development water, well purge water, aquifer test water, and decontamination water.
[c]Depending on the assigned waste categories of PPE, they may be disposed at Class I or Class III landfills.

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- Falcon Disposal Service, Garden Grove, California
- Environmental Dynamics, Inc., Paramount, California
- Laidlaw Environmental Services, Wilmington, California
- MP Environmental Services, Inc., Bakersfield, California
- Pacific Environmental Management Corporation, Wilmington, California

In cases where per-load transportation costs are not available, the following assumptions are used:

- The average speed of the trucks is 40 miles per hour (mph) if travel is exclusively in the Orange County -- Los Angeles area, and 45 mph if travel reaches locations outside the Orange County -- Los Angeles area.

- Off-Station transportation time costs are for round trips and include a total of 2 hours for loading and unloading the wastes and for paperwork, such as manifesting.

- Costs for off-Station transport requiring over 8 hours are calculated using standard 12-hour days, which includes overtime premiums.

Other pertinent assumptions are:

- Vacuum truck load capacity is 90 percent of the 5,000-gallon capacity, or 4,500 gallons.

- Roll-off bin capacity is 50 percent of the 10 yd^3 capacity, or 5 yd^3. The trucks have a truck-and-trailer configuration capable of carrying two 10 yd^3 bins, or total capacity of 10 yd^3.

- The soil cuttings density is 1.4 tons per yd^3, and the drilling mud density is 1.2 tons per yd^3.

5.2 Nonhazardous Soil Cuttings

Two management options for nonhazardous soil cuttings are:

1. On-Station disposal in a nonhazardous soil disposal area
2. Off-Station disposal at a municipal (Class III) landfill

5.2.1 On-Station Nonhazardous Soil Disposal Area

An on-Station disposal area may be used to dispose of both nonhazardous soil cuttings and nonhazardous drilling mud. The RWQCB has indicated that nonhazardous wastes which meet drinking water standards can be disposed of in this area.

Table 5-2 presents the approximate costs for the construction and operation of an on-Station soil disposal area. The on-Station central WSA will be in the proximity of the disposal area such that the time to transfer the soil cuttings and drilling mud between the two areas will be minimal. The location of the central WSA will

Table 5-2
Nonhazardous Soil Cuttings
Disposal at On-Station Disposal Area

Cost Item	Pascal & Ludwig Ontario, California
Transportation:	
Trucking Rate[1] ($/hour)	86
Hauling Time (hour)	1
On-Station Transportation[2] ($/ton)	6
Excavation and Construction ($/day)	800
Construction Time (days)	3
Tilling Cost ($/day)	500
Estimated Tilling Time (days)	22
Total Disposal Area Cost ($/area)	13,400
Total Disposal Area Cost ($/ton)[3]	23
Total On-Station Disposal Cost ($/ton)	29

[1]Based on 12-hour day.
[2]Transportation cost is based on 10 cubic yards per load and soil cuttings density of 1.4 tons per cubic yard.
[3]Assumed a conservative quantity of only 590 tons of soil cuttings disposed. The quantity of soil cuttings disposed at the disposal area is expected to be greater.

Source:

Ludwig, A., Pascal & Ludwig Engineers, Ontario, California. June 1991.

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be north of the intersection of North Marine Way and the Gate 2 entrance road. The disposal area is approximately 1 mile southeast of the central WSA. The hauling time required includes loading and unloading the soils. The transportation costs are based on the soil cutting density and the trucking load capacity as discussed in Subsection 5.1.

The disposal area is expected to be 2 acres in area and 1 foot deep. Construction of the disposal area is estimated to require 3 days for scarifying and constructing a small berm around the area. The berm is intended to confine the soil cuttings and dewatered drilling mud within the soil disposal area. Soil and mud are expected to be placed and the area tilled once per week for 5 months. The costs are estimated for a front-end loader capable of operating with a tiller wheel attached to the back of the loader.

In order to make cost comparisons against off-Station disposal at a municipal landfill, a conservative quantity of 590 tons of soil cuttings is assumed to be disposed at the soil disposal area. This quantity of soil cuttings is equivalent to one-third the total expected soil cuttings generated. A greater quantity of soil cuttings, as well as dewatered nonhazardous drilling mud, is expected to be disposed of in this area.

5.2.2 Off-Station Disposal at a Municipal (Class III) Landfill

There are four Orange County municipal (Class III) landfills: Bee Canyon, Prima Deshecha, Santiago, and Olinda. Bee Canyon Landfill is the closest at

approximately 5 miles northeast of MCAS El Toro. Outside of Orange County, the closest landfill is BKK Landfill in West Covina, approximately 40 miles away. Waste acceptance criteria for the landfills include analyses for metals and organics listed in 22 CCR 66699, organic lead, TPH, and VOCs such as BTXE and certain chlorinated compounds. Other specific analyses may be required by the landfills depending on the waste. The limits for contaminants not listed in 22 CCR 66699 are set by the RWQCB as part of the permit conditions.

Table 5-3 presents the approximate costs for disposing of nonhazardous soil cuttings to the Class III landfills identified. The time required to transport the soil cuttings is based on an average speed of 40 mph, and 2 hours for loading, unloading, and paperwork. The trucking load capacity and soil density are assumed to be the same as stated above in Subsection 5.1. The costs shown in Table 5-3 do not include separate waste acceptance analyses to be performed by the individual landfills; the routine waste analysis discussed in Section 4.0 may be sufficient.

5.3 Designated Waste Soil Cuttings

The management option considered for designated waste soil cuttings is on-Station storage in bermed singly-lined cells or "burritos." Since the Navy has decided that Class II landfills are not to be used for disposal of designated wastes from MCAS El Toro due to potential liability, the management option is not considered further. As discussed in Subsection 3.4, the "burritos" consist of single layers of plastic liners used to store and to cover the soil cuttings. These cells are generally contained within

Table 5-3
Nonhazardous Soil Cuttings
Disposal to Class III Landfill

Cost Item	Bee Canyon Landfill Irvine, California	Other Orange County Landfills[1]	BKK Landfill West Covina, California
Transportation:			
Trucking Rate[2] ($/hour)	86	86	86
Hauling Time (hour)	2	3	4
Total Transportation[3] ($/ton)	12	18	25
Landfill Fee ($/ton)	18	18	25
Total Landfill Cost ($/ton)	30	36	54

[1]Olinda Landfill - Brea, California; Santiago Canyon Landfill - Orange, California; Prima Deshecha Landfill - San Juan Capistrano, California.
[2]Based on 12-hour day.
[3]Transportation costs are based on 10 cubic yards per load and soil cuttings density of 1.4 tons per cubic yard.

Source:

Jackson, E. Orange County Sanitation District, Integrated Waste Management. May and June 1991.
Levis, M. BKK Corporation, West Covina, California. May and June 1991.

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earthen berms. The RWQCB has agreed that a second liner is not necessary if the cells are situated over existing landfills on-Station. If necessary, venting systems can be incorporated into the design of the cells. The designated soil cuttings generated during the RI will be stored on-Station until final remedial actions are taken. Ultimate disposal of the RI-derived designated soil cuttings will be accomplished together with the designated wastes generated from site remediation. Treatment to reduce the designated wastes to nonhazardous wastes can be effected during the final remediation phase.

Table 5-4 presents the approximate costs for storing designated soil cuttings on-Station. Site work is estimated for an area one acre in size and 2 feet deep. The liner material consists of 40-mil-thick Hypalon. The estimates assume construction of several "burritos" located within one larger area of 1 acre. For the purpose of cost comparisons, 590 tons of designated soil cuttings are assumed stored in the "burritos." This quantity of soil cuttings is equivalent to one-third the total expected soil cuttings generated. A greater quantity of soil cuttings, as well as dewatered nonhazardous drilling mud, to be stored in the "burritos." The transportation rates are as discussed in Subsection 5.1. The soil cutting density and trucking load capacity are also as presented in Subsection 5.1.

5.4 Hazardous Waste Soil Cuttings

The management option considered for hazardous waste soil cuttings is off-Station disposal at a hazardous (Class I) landfill. Hazardous waste soil cuttings will be transported to a hazardous (Class I) landfill for disposal. Table 5-5 presents the

approximate costs of transporting and disposing of the soil cuttings at three Class I landfills: Chemical Waste Management's Kettleman Hills facility in Kettleman City, California; Laidlaw Environmental's Imperial Valley facility in Westmoreland, California; and U.S. Ecology's facility in Beatty, Nevada. The trucking rate is based on a per load basis. The soil cuttings density and trucking load capacity are assumed to be the same as discussed above in Subsection 5.1. Disposal at the two California facilities requires a relatively high state tax. The waste profile fees are waste acceptance analyses conducted by the landfills as part of their permit conditions. Analytical data from the routine analyses described in Section 4.0 serve as support data for the facilities. One profile is generally required per waste stream and, under most circumstances, would be less than the number of loads of waste. Roll-off bin decontamination is necessary after each trip.

5.5 Hazardous Waste Soil Cuttings Subject to Land Disposal Restrictions

The management option considered in this plan for hazardous waste soil cuttings subject to LDRs is off-Station disposal at a hazardous bulk solids incinerator. If the contaminants in the hazardous waste soil cuttings exceed LDR threshold levels, thus precluding direct disposal at permitted landfills, the waste would require treatment by solids incineration. Three incinerators are identified: Chemical Waste Management's facility in Sauget, Illinois; Chemical Waste Management's facility in Port Arthur, Texas; and Westinghouse/Aptus facility in Coffeyville, Kansas. Incinerators that treat bulk solids generally have set limits on heating values of the waste. For example, Chemical Waste Management's Illinois incinerator has a requirement of less than 1,000 British Thermal Units (Btu), whereas its Texas facility has a requirement of less than 3,000 Btu. The Btu

Table 5-4
Designated Waste Soil Cuttings
On-Station Storage in Bermed Singly-Lined Cells or "Burritos"

Cost Item	Cost
Transportation:	
Trucking Rate[1] ($/hour)	86
Hauling Time (hour)	2
Total Transportation Cost[2] ($/ton)	12
Storage Area:	
Sitework for storage area[3] ($/area)	48,400
Liner cost[4] ($)	10,000
Total Storage Area Cost[5] ($/ton)	276
Total On-Station Storage ($/ton)	288

[1]Based on 12-hour day.
[2]Transportation costs are based on 10 cubic yards per load and soil cuttings density of 1.4 tons per cubic yard.
[3]Sitework for an area one acre in size and 2 feet deep. Assumed cost of $15 per cubic yard.
[4]Liner consists of 10,000 feet^2 of 40-mil Hypalon.
[5]Assumed a conservative quantity of only 590 tons of soil cuttings stored. The quantity of soil cuttings stored in the area is expected to be greater.

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Table 5-5
Hazardous Waste Soil Cuttings
Disposal to Class I Landfill

Cost Item	Chemical Waste Management Kettleman Hills, California	Laidlaw Environmental Imperial Valley, California	U.S. Ecology Beatty, Nevada
Transportation:			
Trucking Rate ($/load)	1,000	1,000	1,500
Total Transportation[1] ($/ton)	71	71	107
Landfill Fee ($/ton)	113	100	110
Other Fees and Taxes ($/ton)	116	117	62
Total Landfill Cost ($/ton)	300	288	279
Additional Cost[2]:			
Waste Profile Fee ($/waste)	400	350	150

[1]Transportation costs are based on 10 cubic yards per load and soil cuttings density of 1.4 tons per cubic yard.
[2]An additional cost is bin decontamination fee ($/bin).

Source:

Bige, J. Chemical Waste Management. Anaheim, California. June 1991.
Beale, J. Laidlaw Environmental. Martinez, California. June 1991.
Calvo, G. U.S. Ecology. Irvine, California. May 1991.

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values of the soil cuttings generated at MCAS El Toro are expected to meet the incinerator requirements.

Table 5-6 presents the costs associated with transporting and disposing of soil at the three incinerators. The trucking rate for Westinghouse is based on a per load basis, while those for Chemical Waste Management are based on transportation assumptions stated above in Subsection 5.1. The soil cuttings density and trucking load capacity are also assumed to be the same as discussed above in Subsection 5.1. Once again, one waste profile is generally required per waste stream and, under most circumstances, would be less than the number of loads of waste. Roll-off bin decontamination is also necessary after each trip.

5.6 Nonhazardous Drilling Mud

Two management options for nonhazardous drilling mud are:

1. On-Station disposal in a nonhazardous soil disposal area (Subsection 5.2.1).
2. Off-Station disposal at a solidification/recycling facility

5.6.1 On-Station Disposal in a Nonhazardous Soil Disposal Area

Nonhazardous drilling mud may be disposed of in the on-Station nonhazardous soil disposal area as discussed in Subsection 5.2.1. Since nonhazardous wastes have to meet drinking water standards, the RWQCB has indicated that on-Station

have to meet drinking water standards, the RWQCB has indicated that on-Station disposal will not have to meet the minimum requirements of solid-to-liquid ratio.

However, if dewatering becomes necessary, the cost of on-Station solidification or dewatering is presented in Table 5-7. The unit rental cost includes mobilization/ demobilization and one operator working a 12-hour day. Additional costs vary depending on the frequency of equipment decontamination, amount of chemicals used, origination point of the treatment unit, and ancillary equipment and materials needed such as a generator, pumps, and piping.

5.6.2 Off-Station Disposal at a Solidification/Recycling Facility

Nonhazardous drilling mud may also be disposed of off-Station at a solidification/ recycling facility, namely, VenVirotek (a wholly-owned subsidiary of Chemfix Technologies, Inc.), in Ventura, California. Using the "CHEMFIX" process, oil industry wastes, drilling mud, tank bottom sediments, and sewage sludge have been successfully treated and recycled as inert soil substitute material with the trade name "NATURFIL." The CHEMFIX process is a chemical fixation/stabilization technology that works by adding a combination of different chemical agents to immobilize contaminants and eliminate free liquids. The technology works best on mud with at least 5 percent solids. The mud may also contain low levels of petroleum products and other organics. Waste acceptance analyses include metals and organics listed in 22 CCR 66699, TPH, oil and grease, pH, and ignitability. The final product is a soil-like substance with differing degrees of

Table 5-6
Hazardous Waste Soil Cuttings Subject to Land Disoposal Restrictions
Disposal to Bulk Solids Incinerator

Cost Item	Chemical Waste Management Sauget, Illinois	Chemical Waste Management Port Arthur, Texas	Westinghouse/ Aptus Coffeyville, Kansas
Transportation:			
Trucking Rate ($/load)	86[1]	86[1]	NA[2]
Hauling Time (hour)	85	75	NA[2]
Total Transportation[3] ($/ton)	528	461	296
Incineration Fee ($/ton)	1,200	1,100	1,600
Total Incineration Cost ($/ton)	1,728	1,561	1,896
Additional Cost[4]:			
Waste Profile Fee ($/waste)	900	900	450

[1]Based on 12-hour day.
[2]NA - Not applicable.
[3]Transportation costs are based on 10 cubic yards per load and soil cuttings density of 1.4 tons per cubic yard.
[4]An additional cost is bin decontamination fee ($/bin).

Source:

Bige, J. Chemical Waste Management. Anaheim, California. June 1991.
Calvo, G. U.S. Ecology. Irvine, California. May 1991.

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Table 5-7
Nonhazardous Drilling Mud
On-Station Solidification or Dewatering

Cost Item	Baroid Drilling Fluids, Inc. Bakersfield, California[1]	Laidlaw Environmental Martinez, California[2]
Solidification/Dewatering Unit Rental Cost[3] ($/day)	700	700
Additional Costs[4]:		
Equipment Decontamination ($/day)	800	--[5]

[1]Treatment unit is for solidification with dewatering chemicals.
[2]Treatment unit is for dewatering by phase separation.
[3]Includes mobilization/demobilization, and one operator for 12-hour day.
[4]Additional costs include dewatering chemicals, unit transportation and ancillary equipment.
[5]Vendor information was not obtained.

Source:

Beale, J., Laidlaw Environmental, Martinez, California. June 1991.
Dudley, T., Baroid Drilling Fluids, Inc., Bakersfield, California. May 1991.

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friability depending on the initial water content of the waste treated. The artificial soil is then disposed as daily cover for municipal landfills operated by the Ventura Regional Sanitation District.

The costs for disposal of nonhazardous drilling mud to a solidification/recycling facility are presented in Table 5-8. The transportation costs are based on transporting the mud in 4,500-gallon loads in vacuum trucks. The vacuum trucks would require washing out between loads.

5.7 Designated Waste Drilling Mud

The management option considered for designated waste drilling mud is on-Station solidification or dewatering (if required), storage on-Station in bermed singly-lined cells ("burritos"), and if necessary, disposal of removed water as specified for water with low solids (Subsection 5.10).

On-Station solidification and dewatering procedures are described in Subsection 5.6. Once the designated waste is dewatered and passes the Paint Filter Liquids Test, it will be transported to "burritos" for storage. Ultimate disposal of the designated wastes generated during the RI will be accomplished together with the designated wastes generated during site remediation. The water removed by the dewatering process will be disposed as specified in Subsection 5.10.

The costs of on-Station solidification or dewatering of designated waste drilling mud will be similar to the costs presented below for solidification or dewatering of hazardous

waste drilling mud (Subsection 5.8, Table 5-9). Although the concentration of contaminants will be lower than hazardous waste drilling mud, health and safety precautions are needed. Additional costs may include the cost of PPE and the dewatering equipment operator's health and safety monitoring.

5.8 Hazardous Waste Drilling Mud

Two management options for hazardous waste drilling mud are:

1. On-Station solidification or dewatering if required; disposal of treated drilling mud at a hazardous (Class I) landfill (Subsection 5.4), and, if necessary, disposal of removed water as specified for water with low solids (Subsection 5.10)

2. Off-Station disposal at a hazardous (Class I) landfill with solidification

5.8.1 On-Station Solidification or Dewatering

Hazardous waste drilling mud cannot be disposed of at a Class I landfill without eliminating free liquids as determined using the Paint Filter Liquids Test. This may be accomplished by solidification or dewatering on-Station prior to transporting the treatment product to a Class I landfill for disposal. The treatment product would be transported and disposed of as solid hazardous waste. Additional solidification to further remove free liquids at the landfill may be necessary. If dewatering is accomplished by phase separation, the removed water would require either disposal to an off-Station TSDF or GAC treatment and discharge to

Table 5-8
Nonhazardous Drilling Mud
Disposal to Solidification/Recycling Facility

Cost Item	VenVirotek (Chemfix Technologies, Inc.) Ventura, California
Transportation:	
Trucking Rate[1] ($/hour)	67
Hauling Time (hour)	7
Total Transportation[2] ($/gal)	0.10
Solidification Fee ($/gal)	0.19
Total Solidification Cost: ($/gal)	0.29
($/ton)[3]	48
Additional Cost: Vacuum Truck Washout Fee	NA

[1]Based on regular 8-hour day because of proximity between MCAS El Toro and VenVirotek.
[2]Transportation cost is based on 4,500 gallons per load.
[3]Based on drilling mud density of 90 lbs per cubic feet or 1.2 tons per cubic yard.
NA - Not available, cost will depend on rates from waste trucking company.

Source:

Kistler, L. Chemfix Technologies, Inc. Ventura, California. May and June 1991.

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Table 5-9
Hazardous Waste Drilling Mud
On-Station Solidification or Dewatering

Cost Item	Baroid Drilling Fluids, Inc. Bakersfield, California[1]	Laidlaw Environmental Martinez, California[2]
Solidification/Dewatering Unit Rental Cost[3] ($/day)	700	700
Additional Cost[4]: Equipment Decontamination ($/day)	800	--[5]

[1]Treatment unit is for solidification with dewatering chemicals.
[2]Treatment unit is for dewatering by phase separation.
[3]Includes mobilization/demobilization, and one operator for 12-hour day.
[4]Additional costs include dewatering chemicals, unit transportation, ancillary equipment, personal protective equipment, and monitoring equipment.
[5]Vendor information was not obtained.

Source:

Beale, J. Laidlaw Environmental. Martinez, California. June 1991.
Dudley, T. Baroid Drilling Fluids, Inc. Bakersfield, California. May 1991.

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the on-Station irrigation system (see Section 5.10). On-Station disposal of the removed water may require VOC treatment plus solids removal.

The costs of on-Station solidification or dewatering of hazardous waste drilling mud are presented in Table 5-9. The costs are similar to those presented for nonhazardous drilling mud (see Table 5-7). However, equipment decontamination costs would probably increase, which would approximately double the daily rental cost of a treatment unit. The frequency of such decontamination would depend on the quantity of mud treated, the concentration of contaminants, and possibly the number of different waste streams. Additional cost considerations include PPE for the operator and health and safety monitoring.

5.8.2 Off-Station Disposal at a Hazardous (Class I) Landfill

Hazardous waste drilling mud may be transported and disposed off-Station at a Class I landfill once the waste is solidified. Chemical Waste Management's Kettleman Hills facility in Kettleman City, California, can accept drilling mud and treat the waste at the facility using inert sorbent materials prior to disposal.

Table 5-10 presents the costs for this management alternative. The drilling mud would be considered a liquid and transported by vacuum truck. The cost of solidification/landfilling is charged according to the original volume transported to the facility. No additional disposal fee is assessed. The transportation cost is based on 4,500-gallon loads. Conversion from total cost in dollars per gallon to dollars per ton is based on a drilling mud density of 90 pounds per cubic foot or

1.2 tons per cubic yard. The waste profile fee is higher for wastes that require solidification prior to landfill disposal. Again, the profile fee is charged on a per-waste stream basis and would not necessarily correspond to the number of loads of waste.

5.9 Hazardous Waste Drilling Mud Subject to Land Disposal Restrictions

The management option considered in this plan for hazardous waste drilling mud subject to LDRs is off-Station disposal at a hazardous aqueous injection incinerator. On-Station dewatering of hazardous waste drilling mud that exceeds LDR threshold levels prior to off-Station treatment and disposal has been eliminated as an option because of the high cost. Aside from dewatering costs, the dewatered sludge would still require incineration as a solid hazardous waste. The removed water would also require additional treatment and/or disposal. Operating costs for the dewatering unit are expected to be high because of the LDR considerations.

If the contaminants in the hazardous drilling mud exceed LDR threshold levels, thus precluding direct disposal of the dewatered sludge at permitted landfills, the waste would require treatment by aqueous incineration. Chemical Waste Management's TWI facility in Sauget, Illinois, can accept drilling mud for aqueous incineration. Incinerators that treat liquids generally have set limits on heating values of the waste. The Btu values of the drilling mud generated at MCAS El Toro are expected to meet the incinerator requirements.

Table 5-10
Hazardous Waste Drilling Mud
Disposal to Class I Landfill With Solidification

Cost Item	Chemical Waste Management Kettleman Hills, California
Transportation:	
Trucking Rate ($/hour)	72
Hauling Time (hour)	12
Total Transportation Cost[1] ($/gal)	0.19
Solidification/Landfill Fee ($/gal)	1.95
Total Solidification/Landfill Cost ($/gal):	2.14
Total Solidification/Landfill Cost[2] ($/ton)	357
Additional Cost[3]:	
Waste Profile Fee ($/waste)	800

[1]Transportation cost is based on 4,500 gallons per load.
[2]Based on drilling mud density of 90 lbs per cubic feet or 1.2 tons per cubic yard.
[3]An additional cost is truck decontamination fee ($/load).

Source:

Bige, J. Chemical Waste Management. Anaheim, California. June 1991.

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Table 5-11 presents the costs associated with transporting and disposing drilling mud at the Chemical Waste Management incinerator. The trucking rate is based on transportation assumptions stated in Subsection 5.1. The trucking load capacity is assumed to be 4,500 gallons per vacuum truck load. Once again, one waste profile is generally required per waste stream and, under most circumstances, would be less than the number of loads of waste. Vacuum truck washout or decontamination is also necessary after each trip.

5.10 Nonhazardous Water With Low Solids

Six management options for nonhazardous water with low solids (nonhazardous "clear" water) are:

1. On-Station treatment and discharge to the existing irrigation system
2. On-Station treatment and discharge to surface water via drainage channels
3. On-Station treatment and discharge to reinjection well
4. On-Station treatment and discharge to POTWs
5. On-Station treatment and discharge to IRWD water reclamation plant
6. Off-Station disposal to a TSDF

Common to the first five options is the use of a temporary on-Station GAC treatment system to treat clear wastewater generated from RI activities. The main objective of the treatment system will be to treat nonhazardous and hazardous water to remove VOCs. The system is expected to consist of three GAC beds in series to remove primarily VOCs. A triple-bed GAC system would help prevent the contaminant concentrations in

the effluent from exceeding discharge requirements. Pretreatment units such as sand filtration and clarification may be necessary to remove solids, oil, and grease, which tend to foul activated carbon. Such treatment may also be necessary to meet the various discharge requirements under each discharge scenario. The treated water would than be relatively free of solids. Calgon Carbon Corporation provides skid-mounted GAC units that are transportable. Additional treatment units, such as for sand filtration and clarification, can be added to the system. OH Materials provides a transportable treatment system that is already mounted in a semitrailer. As with the Calgon Carbon unit, additional treatment units can be added to the system provided by OH Materials.

Two 500-barrel, or 21,000-gallon, Baker tanks may be piped in front of the GAC unit, one for use as an equalization tank, and the second as the feed tank. A third Baker tank may be piped after the treatment units as a holding tank where the treated water can be collected and analyzed prior to being discharged. The quality of the treated water will then be analyzed for compliance with discharge requirements. Another alternative is to install a 2-inch diameter pipeline from the WSA to the irrigation water tank. With this option, the GAC treatment system can be located on the WSA.

Table 5-12 presents the costs for on-Station treatment using three GAC beds in series. The system contains 6,000 pounds of activated carbon, and the rental duration is expected to be 7 months. Vacuum trucks would be used to transport the water to the first Baker tank from either the drilling locations or the central WSA. The time required

Table 5-11
Hazardous Waste Drilling Mud Subject to Land Disposal Restrictions
Disposal to Aqueous Injection Incinerator

Cost Item	Chemical Waste Management Sauget, Illinois
Transportation:	
Trucking Rate[1] ($/hour)	72
Hauling Time (hour)	86
Total Transportation Cost[2] ($/gal)	1.38
Incineration Fee ($/gal)	3.60[3]
Total Incineration Cost ($/gal)	4.98
Total Incineration Cost ($/ton)	838
Additional Cost[4]:	
Waste Profile Fee ($/waste)	900

[1]Based on 12-hour day.
[2]Transportation cost is based on 4,500 gallons per load.
[3]If less than 2,000 gallons, the incineration fee is $3.90/gallon.
[4]An additional cost not included is the truck decontamination fee ($/load).

Source:

Bige, J. Chemical Waste Management. Anaheim, California. June 1991.

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Table 5-12
Nonhazardous and Hazardous Wastewater With Low Solids
On-Station Treatment by Granulated Activated Carbon System

Cost Item	Calgon Carbon Corporation San Mateo, CA	OH Materials Walnut Creek, CA
Carbon Treatment System:		
Setup and Freight ($/Unit)	5,000[1]	33,750[2]
Unit Rental ($/month)	550[3]	2,000[4]
Rental Time (months)	7	5
Total Carbon Treatment System Cost[5] ($)	18,300	47,750
Total Carbon Treatment System Cost[6] ($/gal)	0.02	0.05
Transportation:		
Trucking Rate[7] ($/hour)	72	72
Hauling Time per tank truck (hour)	2	2
Total On-Station Transportation[8] ($/gal)	0.03	0.03
Total On-Station Treatment ($/gal)	0.05	0.08
Additional Cost[9]:		
Carbon Regeneration ($/time)	500	None
500-Barrel Baker Tank ($/mo)	720	720

[1]Calgon Carbon offers a single-bed skid-mounted carbon unit with 2,000 pounds of granulated activated carbon (GAC). The costs include mobilization/demobilization.
[2]OH Materials offers three trailer mounted carbon units contained in a trailer with a total of 6,000 pounds of GAC. The costs include mobilization/demobilization, as well as carbon regeneration.
[3]The unit rental is charged starting the second month, and does not include operator costs.
[4]The unit rental quote was $12,000 and it included costs for 1.5 operators full-time. The rental cost alone is estimated to be $2,000/month.
[5]Costs are for a triple-bed or triple-unit GAC treatment system, without operator support.
[6]Assume a conservative volume of only 1 million gallons treated. The volume of water treated is expected to be greater.
[7]Based on 12-hour days.
[8]On-Station transportation costs are based on 4,500 gallons per load.
[9]Additional costs include, water analysis ($/sample), pretreatment, and solids removal.

Source:

Barnhill, D. OH Materials. Walnut Creek, California. June 1991.
Wood, S. Calgon Carbon Corporation. San Mateo, California. June 1991.

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for loading and unloading is assumed to be 2 hours. The vacuum truck load capacity is assumed to be 4,500 gallons per load. Additional cost items include Baker tank rental, treated water analyses, and other required pretreatment.

5.10.1 On-Station Treatment and Discharge to the Existing Irrigation System

The RWQCB has agreed that treated water can be discharged to the existing irrigation system which is operated under a Cleanup and Abatement Order for treatment of groundwater elsewhere on the Station. The RWQCB indicated the discharge requirements will require the water to be free of VOCs, and to meet Basin Plan objectives for inorganics such as total dissolved solids, chlorides, and sulfates.

The system has adequate capacity for all the water expected to be generated during the RI. The same water tank used to hold the current irrigation water can be used to store the additional water generated. The cost involved with this option is already presented in Table 5-12. The cost to transport the water to the irrigation water tank represents those for transport by vacuum truck. Costs may be less if a 2-inch diameter pipeline is used instead.

5.10.2 On-Station Treatment and Discharge to Surface Water Via Drainage Channels

Nonhazardous clear water may be discharged to surface water via drainage channels as authorized under NPDES. The drainage channels are used to convey

storm water runoff. A separate storm sewer system does not exist. The water will require treatment by the GAC treatment system prior to discharge. Agua Chinon Wash is close to the WSA. If the GAC treatment system is located near the WSA, this option incurs no transportation costs as indicated in Table 5-12. However, the RWQCB has indicated the discharge option should be considered only if other options have been exhausted (e.g., the capacity of the existing irrigation system is inadequate to handle the volume of water expected to be generated).

Discharge to surface water presents special problems. The NPDES permit authorizes MCAS El Toro to discharge stormwater runoff at four discharge points. Provisions are in place to monitor for VOCs but discharge levels are not specified. All nonstorm-induced discharge at two of the discharge points requires the Station to notify the RWQCB. Dry weather discharges are restricted without prior authorization by the RWQCB. Oil/water separators and weirs are used to divert low or dry weather flows in the drainage channels of the sanitary sewer, namely the POTW operated by the IRWD. Overflows during dry weather conditions are considered unauthorized discharges. If nonhazardous clear water were discharged to the drainage channels, the treated water may carry along residual contaminants such as nitrates and petroleum hydrocarbons present in the drainage channels as it flows towards the discharge points. A portion of the water discharged to the drainage channels would be routed to the sanitary sewer. Depending on the volume of water discharged, overflows of the weir may occur. Any discharge of the treated clear water will require filing amendments to the current discharge requirements.

5.10.3 On-Station Treatment and Discharge to Reinjection Well

Treated nonhazardous clear water could be discharged by reinjection to the upper aquifer. The RWQCB has indicated that groundwater free of VOCs and meeting Basin Plan objectives for inorganics may be discharged by reinjection. However, the potential impact to the hydrogeologic regime caused by reinjection of potentially 1 million gallons of water is unknown. Use of discharge by reinjection is not recommended until the site hydrogeology has been sufficiently characterized. Cost estimates, for cost items such as the installation of reinjection well(s) and piezometers, were therefore not obtained.

5.10.4 On-Station Treatment and Discharge to POTWs

The OCSD and the IRWD were contacted to determine if treated nonhazardous and hazardous clear water may be discharged to the two POTWs. Both agencies indicated that their general policy is not to allow acceptance of groundwater because the treatment facilities are not designed to treat groundwater (OCSD, 1991; IRWD, 1991). However, under extenuating circumstances (e.g., on-Station discharge is disallowed and the only alternative is disposal at a TSDF, even for treated nonhazardous clear water), the POTWs may allow for exceptions to their general policy. Approval is required from either the General Manager or Director of Engineering.

Since the volume of water expected to be generated can be handled by the existing irrigation system, cost estimates for this option were not prepared. However, the discharge option will be pursued as needed.

5.10.5 On-Station Treatment and Discharge to the Irvine Ranch Water District Water Reclamation Plant

Treated nonhazardous and hazardous clear water an be discharged to the IRWD water reclamation plant. The water is required to meet facility waste acceptance criteria. Although acceptance of water generated during the RI requires approval from the General Manager or Director of Engineering, there is no general policy against receiving such treated water.

As with the option to discharge to POTWs, since the volume of water expected to be generated can be handled by the existing irrigation system, cost estimates for this option were not prepared. However, the discharge option will be pursued as needed.

5.10.6 Off-Station Disposal to a TSDF

Nonhazardous clear water may also be disposed off-Station at permitted TSDFs. Three permitted TSDFs are identified within a 50-mile radius of MCAS El Toro: Petroleum Recycling Corporation (PRC), in Signal Hill, California; Chemtech Systems, Inc., in Vernon, California; and Gibson Oil and Refining Company, Inc.,

in Wilmington, California. The three facilities are capable of accepting most of the water expected to be generated at MCAS El Toro.

Table 5-13 presents the costs for transport and disposal of the water off-Station to the three TSDFs. Assumptions for the time required to transport the water and the vacuum truck load capacity are the same as those discussed above in Sub-section 5.1. Additional cost items include a waste profile fee and a surcharge for high solids content, which is charged for solids content generally greater than 1 percent. The waste profile fee is on a per-waste-stream basis. Due to the need to dispose of solid residues if a filtration unit is operated to remove solids, it is anticipated that the majority of water which is not clear will be sent off-Station to a TSDF.

5.11 Hazardous Wastewater With Low Solids

Six management options for hazardous water with low solids (hazardous "clear" water) are:

1. On-Station treatment and discharge to the existing irrigation system
2. On-Station treatment and discharge to surface water via drainage channels
3. On-Station treatment and discharge to reinjection well
4. On-Station treatment and discharge to POTWs
5. On-Station treatment and discharge to IRWD water reclamation plant
6. Off-Station disposal to a TSDF

They are the same options as those specified for nonhazardous clear water.

The major difference between treating hazardous and nonhazardous clear water lies in the levels of contaminants present in the water. Additional GAC contact time or treatment units may be required for the hazardous water. The treatment system described in Subsection 5.10 is designed to remove VOCs. Additional treatment units would be added (if required) to provide smooth operation of the GAC system and compliance with solids, and oil and grease levels specified in the various discharge scenarios. Water can also be transported off-Station and disposed of at a permitted TSDF. The costs for the same two management alternatives as nonhazardous clear water are presented in Tables 5-12 and 5-13.

5.12 Nonhazardous Water With High Solids

The primary management option for nonhazardous water with high solids ("turbid" water) is off-Station disposal at a TSDF. The high solids content of nonhazardous turbid water may pose the greatest barrier to on-Station treatment and disposal. As discussed above in Subsections 5.10 and 5.11, the on-Station treatment system is designed primarily for VOC removal. The logistical problems and added costs for removing settled solids do not justify treating water containing large amounts of solids. The best option may be to segregate water with high solids content for transport and disposal off-Station to a TSDF. TSDFs are capable of handling water with high solids content at a surcharge (see Table 5-13).

Table 5-13
Nonhazardous, Designated and Hazardous Wastewater With High Solids
Disposal to Treatment, Storage, and Disposal Facility

Cost Item	Petroleum Recycling Corporation Signal Hill, CA	Chemtech Systems, Inc. Vernon, CA	Gibson Oil and Refining Co., Inc. Wilmington, CA
Transportation:			
Trucking Rate[1] ($/hour)	72	72	72
Hauling Time (hour)	4	5	4
Total Transportation[2] ($/gal)	0.06	0.08	0.06
Treatment Cost ($/gal)	0.45	0.45	0.55
Total Treatment Cost ($/gal)	0.51	0.53	0.61
Additional Costs:			
Waste Profile Fee ($/waste)	150	150	None
High Solids Content ($/gal)[3]	0.0275	0.035	0.0275

[1]Based on 12-hour days.
[2]Transportation costs are based 4,500 gallons per load.
[3]High solids content surcharge is for solid content greater than 1 percent.

Source:

Biedermann, R. Chemtech Systems, Inc. Vernon, California. June 1991.
Hill, J. Petroleum Recycling Corporation. Signal Hill, California. June 1991.
Palmer, P. Gibson Oil & Refining Company, Inc. Bakersfield, California. June 1991.

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5.13 Hazardous Wastewater With High Solids

The primary management option for hazardous wastewater with high solids is off-Station disposal to a TSDF, the same as that for nonhazardous water with high solids (see Subsection 5.12).

Again, the high solids content of the hazardous waste turbid water may pose a barrier to on-Station treatment and disposal. Water that cannot be treated on-Station may be transported off-Station and disposed of at a permitted TSDF. TSDFs are capable of handling water with high solids content at a surcharge (see Table 5-13).

5.14 Disposable Personal Protective Equipment

The management option for disposable PPE is off-Station disposal at appropriate landfills. The spent PPE will be contained in trash bags at each site. Depending on the analytical results of the soil cuttings, drilling mud and water generated at each site, the PPE can be assigned as nonhazardous, designated, or hazardous wastes. Since the PPE will be segregated, they can be disposed of at Class I or Class III landfills. Class II landfills are excluded as instructed by the Navy. The cost of disposal at a Class I landfill is presented in Table 5-14. Additional costs may include waste profile and bin decontamination fees.

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Table 5-14
Disposable Personal Protective Equipment
Disposal to Class I Landfill

Cost Item	Chemical Waste Management Kettleman Hills, CA
Transportation:	
Trucking Rate ($/load)	1,000
Total Transportation Cost[1] ($/cubic yard)	50
Landfill Fee ($/cubic yard)	135
Other Fees and Taxes ($/cubic yard)	--[2]
Total Landfill Cost ($/cubic yard)	2,185
Additional Cost[3]:	--[2]

[1]Transportation costs are based on the full load capacity of 20 cubic yards per load.
[2]Vendor information was not obtained.
[3]Additional costs include waste profile fee ($/waste), and bin decontamination fee ($/load).

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6.0 EVALUATION OF WASTE MANAGEMENT ALTERNATIVES

In this section, the waste management alternatives introduced in Section 5.0 for the MCAS El Toro RI activities are evaluated against three general selection criteria: cost, practicability, and potential future liability. Recommendations are also offered based on the preliminary analysis for wastes with more than one management option. A summary of the recommended waste management alternatives is presented in Table 6-1. The selected waste disposal alternatives for each waste category are based upon estimated waste volumes and disposal costs. This document is not intended to present a comprehensive analysis of all possible treatment and disposal options. Due to uncertainties in these quantities, alternate disposal methods may be used during the MCAS El Toro RI after receiving concurrence from the regulatory agencies.

6.1 Nonhazardous Soil Cuttings

The management alternatives for nonhazardous soil cuttings are:

1. On-Station disposal in a nonhazardous soil disposal area
2. Off-Station disposal at a municipal (Class III) landfill

For the following discussion, refer to Subsection 5.2 and Tables 5-2 and 5-3.

6.1.1 Cost

The cost analysis depends on the quantity of nonhazardous soil cuttings generated. The first alternative has a fixed cost item in the construction and operation of the disposal area. By comparing on-Station disposal to disposal at the closest municipal landfill, Bee Canyon Landfill, the break-even point can be calculated by solving the equation:

$$6.T + 13{,}400 = 30T$$

where T is the quantity of soil cuttings generated, in tons. The value of T is 558 tons, or 399 yd^3. The more cost effective alternative appears be the first alternative because more than 399 yd^3 of nonhazardous soil cuttings are estimated to be generated.

6.1.2 Practicability

Both management alternatives can be easily implemented. Operation of the on-Station disposal area will require meeting minimum requirements set by the RWQCB (see discussion in Subsection 3.4). If disposal is to an Orange County landfill, a county waste disposal specialist would have to be physically present during waste sampling. Coordination will be required between the Station and the county.

Table 6-1
Recommended Waste Management Alternatives for MCAS El Toro RI/FS

Waste Category	Proposed Management Method(s)
Soil Cuttings:	
Nonhazardous Soil Cuttings	On-Station at Nonhazardous Soil Disposal Area
Designated Soil Cuttings	Store On-Station at Designated Bermed Area in Singly-Lined Cells or "Burritos" for Future Treatment
Hazardous Soil Cuttings	Off-Station Disposal at Class I Landfill
Hazardous Soil Cuttings Subject to Land Disposal Restrictions	Off-Station Disposal at Hazardous Bulk Solids Incinerator[a]
Drilling Mud:	
Nonhazardous Drilling Mud	On-Station at Nonhazardous Soil Disposal Area
Designated Drilling Mud	o On-Station dewatering to reduce moisture, if required o On-Station Storage at designated bermed area in singly-lined cells or "Burritos" for later disposal o Treatment of water generated from dewatering with GAC, if necessary, and discharge as Irrigation Water
Hazardous Drilling Mud	If a Large Quantity of Water is Generated: o On-Station Dewatering to Reduce Moisture, if required o Off-Station Disposal of Solids to Class I Landfill o Treatment of water generated from dewatering with GAC, if necessary, and discharge as irrigation water If a Small Quantity of Waste is Produced: o Off-Station Disposal at Class I Landfill with Solidification
Hazardous Drilling Mud Subject to Land Disposal Restrictions	Off-Station disposal at hazardous bulk solids or aqueous injection incinerator depending on a moisture content
Wastewater	
Nonhazardous Wastewater With Low Solids ("Clear Water")	o On-Station treatment and discharge to the existing irrigation system o Discharge to IRWD Water Reclamation Plant
Nonhazardous Wastewater With High Solids	o Off-Station disposal at a TSDF
Hazardous Wastewater With Low Solids ("Clear" Water)	o GAC Treatment and On-Station Discharge to Existing Irrigation System o Off-Station Discharge to a TSDF
Hazardous Wastewater With High Solids ("Turbid" Water)	Off-Station Disposal at TSDF
Personal Protective Equipment (PPE)	Off-Station Disposal at Class I Landfill

Notes:
[a]Other alternatives besides incineration will be considered for hazardous wastes subject to land disposal restrictions (LDRS) as analytical data becomes available.

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6.1.3 Potential Future Liability

On-Station disposal in a nonhazardous soil disposal area may substantially minimize the potential future liability of the Navy. The potential for noncompliance with permit requirements exists even for Class III landfills.

6.1.4 Recommended Alternative

Disposal in the on-Station designated area appears to be the preferred alternative because of its low cost and low risk for potential future liability.

6.2 Designated Waste Soil Cuttings

The management alternative presented for designated waste soil cuttings is on-Station storage in bermed singly-lined cells or "burritos" for future disposal. The Navy has excluded the option of off-Station disposal at a designated (Class II) landfill. For the following discussion, see Subsection 5.3 and Table 5-4.

6.2.1 Cost

The cost analysis was not performed because only one management alternative is considered.

6.2.2 Practicability

Storing the designated waste soil cuttings on-Station will require periodic maintenance checks. The storage period may be extended depending on the final remediation measures. Run-off control will be necessary. It is anticipated the berms would provide such control. Also, should venting be necessary, a SCAQMD permit may be required.

6.2.3 Potential Future Liability

Because the designated soil cuttings will be stored on-Station, the liability is minimized. The final disposal of the designated wastes should ensure compliance with permit requirements to minimize liability at that stage.

6.3 Hazardous Waste Soil Cuttings

The management alternative presented for hazardous waste soil cuttings is off-Station disposal at a hazardous (Class I) landfill. For the following discussion, refer to Subsection 5.4 and Table 5-5.

6.3.1 Cost

A cost analysis was not performed because only one management alternative is considered.

6.3.2 Practicability

This management alternative is expected to be easily implemented.

6.3.3 Potential Future Liability

The potential for noncompliance with permit requirements exists. The compliance records of the three landfills should be reviewed prior to disposal.

6.4 Hazardous Waste Soil Cuttings Subject to Land Disposal Restrictions

The management alternative presented for hazardous waste soil cuttings subject to LDRs is off-Station disposal at a hazardous bulk solids incinerator. For the following discussion, refer to Subsection 5.5 and Table 5-6.

6.4.1 Cost

A cost analysis was not performed since only one management alternative is considered.

6.4.2 Practicability

This management alternative is expected to be easily implemented.

6.4.3 Potential Future Liability

The potential for noncompliance with permit requirements exists. The compliance records of the three incinerators should be reviewed prior to disposal.

6.5 Nonhazardous Drilling Mud

The management alternatives for nonhazardous drilling mud are:

1. On-Station disposal in a nonhazardous soil disposal area
2. Off-Station disposal at a solidification/recycling facility

For the following discussion, refer to Section 5.6 and Table 5-8.

6.5.1 Cost

The cost analysis depends on the quantity of nonhazardous drilling mud generated. The first alternative has a fixed cost item in the construction and operation of the disposal area. By comparing on-Station disposal to disposal at VenVirotek, the break-even point can be calculated by solving the equation:

$$6T + 13{,}400 = 48T$$

where T is the quantity of drilling mud generated, in tons. The value of T is 319 tons, or 266 yd^3 or 53,700 gallons. The more cost effective alternative

appears to be the first alternative because more than 53,700 gallons of nonhazardous drilling mud are expected to be generated. Note that a smaller quantity of drilling mud is required to make the first option more cost-effective when vacuum truck washout fee is included in the costs for off-Station disposal at VenVirotek.

6.5.2 Practicability

Both management alternatives can be easily implemented. Operation of the on-Station disposal area will require meeting minimum requirements set by the RWQCB (see discussion in Subsection 3.4). The RWQCB has indicated a minimum water content is not required for the drilling mud because the contaminant concentrations will be below drinking water standards. Disposal of the drilling mud at VenVirotek will require meeting waste acceptance criteria including metals and organics listed in 22 CCR, TPH, oil and grease, pH, and ignitability. The nonhazardous drilling mud is expected to meet these waste acceptance criteria.

6.5.3 Potential Future Liability

On-Station disposal in a nonhazardous soil disposal area may minimize the potential future liability of the MCAS El Toro. The potential for noncompliance with permit requirements exists at off-Station facilities. Disposal of drilling mud off-Station may be subject to risks due to noncompliance.

6.5.4 Recommended Alternative

Disposal of nonhazardous drilling mud in the on-Station soil disposal area appears to be the preferred alternative because of its cost-effectiveness and the low risk of potential future liability.

6.6 Designated Waste Drilling Mud

The management alternative presented for designated waste drilling mud is on-Station solidification or dewatering (if required); on-Station storage in bermed singly-lined cells ("burritos") for future disposal; and disposal of removed water as specified for water with low solids (Subsection 5.10).

6.6.1 Cost

The cost analysis was not performed because only one management alternative is considered.

6.6.2 Practicability

Storing the designated waste drilling mud on-Station will require periodic maintenance checks. The storage period may be extended depending on the final remediation measures. Runoff control will be necessary. It is anticipated the berm would provided much control. Also, should venting be necessary, a SCAQMD permit may be required.

6.6.3 Potential Future Liability

Because the solidified/dewatered drilling mud will be stored on-Station, the liability is minimized. The final disposal of the designated wastes should ensure compliance with permit requirements to minimize liability at that stage.

The water removed from designated waste drilling mud will be treated with three GAC units as specified for clear water (Subsection 5.10) and consumed on-Station in the existing irrigation system. Although the potential for noncompliance with permits exists, the risk is minimized by on-Station disposal.

6.7 Hazardous Waste Drilling Mud

The management alternatives for hazardous waste drilling mud are:

1. On-Station solidification or dewatering (if required); disposal of treated drilling mud at a hazardous (Class I) landfill (Subsection 5.4); and, disposal of removed water as specified for water with low solids (Subsection 5.10)

2. Off-Station disposal at a hazardous (Class I) landfill with solidification

For the following discussion, refer to Subsection 5.8 and Tables 5-9 and 5-10.

6.7.1 Cost

The cost is dependent on the quantity of hazardous waste drilling mud generated. If the solidification/dewatering unit is assumed to be rented for 10 days, and the total cost of operating the unit is assumed to be $30,000 (including dewatering chemical, ancillary equipment, PPE and monitoring equipment), the break-even point can be calculated using the following equation:

$$30{,}000 = 357T,$$

where T is the quantity of hazardous drilling mud, in tons. The value of T is then 84 tons, or 70 yd^3 or 14,000 gallons. The cost of treating the removed water is not included, because it is negligible compared to the other cost items. The cost of vacuum truck decontamination for off-Station disposal is not included. It would increase the costs for off-Station disposal, and decrease the break-even quantity of hazardous drilling mud.

In general, if a small quantity of waste is produced, off-Station disposal may be economical. However, if the quantity of waste produced is greater than approximately 70 yd^3 or 14,000 gallons, on-Station solidification/dewatering and disposal of dewatered solids in Class I facilities may be more economical. The removed water can be disposed on-Station through the existing irrigation system after GAC treatment as described in Subsection 5.10.

6.7.2 Practicability

The on-Station management alternative is operationally more difficult than off-Station disposal. Dewatering would be performed using a portable system. Aside from the treatment unit and an operator, additional requirements may include PPE, health and safety monitoring, chemicals, and other materials. If the portable unit does not qualify as a TTU by virtue of permit-by-rule, a permit would have to be filed (see Subsection 3.5 for a discussion of permitting). The dewatered sludge and removed water would require disposal.

6.7.3 Potential Future Liability

On-Station disposal to the irrigation system may substantially minimize the potential future liability of the Navy. The potential for noncompliance with permit requirements exists at off-Station facilities. Disposal of drilling mud may be subject to risks due to noncompliance.

6.7.4 Recommended Alternative

Disposal after on-Station solidification or dewatering will be the preferred alternative because of its cost-effectiveness and reduction of the risk of potential future liability. However, if the quantity of hazardous waste drilling mud generated is small, then disposal to Class I landfill with off-Station solidification may be more cost-effective.

6.8 Hazardous Waste Drilling Mud Subject to Land Disposal Restrictions

The management alternative presented for hazardous waste drilling mud subject to LDRs is off-Station disposal at a hazardous aqueous injection incinerator. For the following discussion, refer to Subsection 5.9 and Table 5-11.

6.8.1 Cost

A cost analysis was not performed since only one management alternative is considered.

6.8.2 Practicability

The management alternative may be easily implemented.

6.8.3 Potential Future Liability

The potential for noncompliance with permit requirements exists.The compliance records of the incinerator should be reviewed prior to disposal.

6.9 Nonhazardous Water With Low Solids

Six management options for nonhazardous clear water, were discussed in Subsection 5.10. However, cost information was prepared only for the following two of the management alternatives:

1. On-Station treatment and discharge to the existing irrigation system
2. Off-Station disposal at a TSDF

For the following discussion, refer to Section 5.10 and Tables 5-12 and 5-13.

6.9.1 Cost

A large volume of clear water (up to 1 million gallons) is expected to be generated from activities such as the initial round of quarterly monitoring sampling and aquifer testing of the wells. At a minimum total cost of $0.51 per gallon for treatment at a TSDF, the first alternative, on-Station treatment and disposal, is more cost-effective. If the cost for operating the treatment system, including analytical costs, is assumed to be $230,000, only a total of 460,000 gallons of water would have to be treated on-Station in order for the first alternative to be more cost-effective.

6.9.2 Practicability

The first alternative would be more difficult to implement than the second alternative. Treatment units, Baker tanks, an operator, other equipment and materials would be required. Samples would require analysis. If the treatment system does not qualify as a TTU by virtue of permit-by-rule, a permit would have to be filed (see Subsection 3.5 for a discussion of permitting). The quality of treated water would have to meet discharge requirements.

6.9.3 Potential Future Liability

On-Station treatment and disposal may substantially minimize the potential future liability of MCAS El Toro. The potential for noncompliance with permit requirements exists at permitted TSDFs.

6.9.4 Recommended Alternative

On-Station treatment and disposal is the preferred alternative because of its cost-effectiveness and low risk of potential future liability, despite more complicated operational requirements. However, if the capacity of the existing irrigation system is inadequate, off-Station discharge to the IRWD's water reclamation plant is a viable option.

6.10 Hazardous Wastewater With Low Solids

The management alternatives for hazardous waste clear water are:

1. On-Station treatment and discharge to the existing irrigation system
2. Off-Station disposal at a TSDF

For the following discussion, refer to Subsection 5.11 and Tables 5-12 and 5-13.

6.10.1 Cost

The cost analysis for hazardous waste clear water is essentially the same as that for nonhazardous water. However, depending on the non-VOC contaminant levels, the total cost may increase if additional treatment units are added to remove or destroy the contaminants. The treatment system would basically be designed to remove VOCs.

6.10.2 Practicability

See Subsection 6.9.2.

6.10.3 Potential Future Liability

See Subsection 6.9.3.

6.10.4 Recommended Alternative

On-Station treatment and disposal is the preferred alternative because of its cost-effectiveness and low risk of potential future liability, despite more complicated operational requirements. If necessary, off-Station discharge to the IRWD water reclamation plant is also a viable option.

6.11 Nonhazardous Water With High Solids

The management alternative presented for nonhazardous turbid water is off-Station disposal at a TSDF. For the following discussion, refer to Subsection 5.12 and Table 5-13.

6.11.1 Cost

A cost analysis was not performed since only one management alternative is considered.

6.11.2 Practicability

The management alternative may be easily implemented.

6.11.3 Potential Future Liability

The potential for noncompliance with permit requirements exists. The compliance records of the TSDFs should be reviewed prior to disposal.

6.12 Hazardous Wastewater With High Solids

The management alternative presented for high solids hazardous wastewater is off-Station disposal at a TSDF. For the following discussion, refer to Subsection 5.13 and Table 5-13.

6.12.1 Cost

A cost analysis was not performed since only one management alternative is considered.

6.12.2 Practicability

The management alternative may be easily implemented.

6.12.3 Potential Future Liability

The potential for noncompliance with permit requirements exists. The compliance records of the TSDFs should be reviewed prior to disposal.

6.13 Disposable Personal Protective Equipment

The management alternative for disposable PPE is off-Station disposal at appropriate landfills. For the following discussion, refer to Subsection 5.14 and Table 5-14.

6.13.1 Cost

A cost analysis was not performed since only one general management alternative is considered. Cost savings are possible by segregating nonhazardous from hazardous disposable PPE. Depending on the waste category assigned to individual bags of PPE, disposal can be to a Class I or a Class III landfill.

6.13.2 Practicability

The management alternative may be easily implemented. As part of waste minimization, it may be possible to segregate hazardous from nonhazardous disposable PPE. However, the need for waste tracking would be critical in order to demonstrate clear segregation.

6.13.3 Potential Future Liability

The potential for noncompliance with permit requirements exists. The compliance records of the landfills should be reviewed prior to disposal.

7.0 WASTE DOCUMENTATION AND TRACKING PROCEDURES

This section describes the procedures by which all wastes will be tracked so that proper disposal can be arranged within the requirements of the regulations. The tracking process will document when the waste is generated, the status of the waste, and the ultimate waste disposal location.

7.1 Sample Tracking

The MCAS El Toro SAP (28 February 1991) describes a sample tracking and analysis tracking procedure. Waste samples will be tracked following the same procedure found in Chapter 6 of the SAP. Separate notebooks will be kept for waste sample tracking and site investigation sample tracking.

7.2 Waste Tracking

In order to track wastes from the well or borehole through accumulation, pickup, treatment, and final disposal locations, a matrix form was created. Figure 7-1 will be used to track the status of wastes generated during the entire field program.

Figure 7-1 will also serve the following purposes:

- Provide a time line for monitoring on-Station waste accumulation times
- Track receipt of laboratory analyses for waste characterization

- Track waste arrival at off-Station TSDFs
- Track receipt of waste profile results from TSDFs

Chemical analyses of waste samples will be entered into a data base for storage, retrieval, and comparison to regulatory standards.

FIGURE 7-1
WASTE TRACKING FORM

BY _____ DATE _____ PROJECT NO. _____ NOTES _____

SITE _____

ACTIVITY _____

WELL OR BORING DESIGNATION	APPROX DEPTHS	WASTE TYPE & APPROX. VOLUME	GENERATION		STORAGE LOCATION	WATER TREATMENT		WASTE PICKUP			DATE RECEIVED		WASTE MANIFEST		
			DATE	TIME		DATE	TIME	DATE	TIME	DISPOSAL LOCATION	HAZ. WASTE ANALYSES	PROFILE ANALYSES	MANIFEST NUMBER	SIGNED BY	DATE REC'D FROM TSDF

LABORATORY _____ PHONE _____

CHAIN OF CUSTODY NUMBER _____

DATE SHIPPED/CARRIER _____

AIRBILL NUMBER _____

WASTE TYPES

M=DRILLING MUD

S=SOIL CUTTINGS

W=WATER

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Appendix A

SAFETY CONSIDERATIONS FOR SAMPLING STORED DRILLING WASTE

Safety Considerations for Sampling Stored Drilling Waste

Site Safety and Health Plan

MCAS El Toro, California

This appendix presents the considerations to be used by on-Station personnel when sampling the waste storage containers at MCAS El Toro. The level of personal protective equipment used should match the level used at the drilling site where the waste was generated. For example, if Level C protection is used at the drill site, then Level C should be used for waste sampling.

It is envisioned that samples will be collected by placing a ladder next to the tanks or roll-off containers. This scenario requires two people to collect the sample. One would steady the ladder and ready the sample container while the other person would collect the sample from the tank or roll-off while balancing on the ladder. Since volatiles are likely to be present in the waste, the storage containers must be vented prior to sampling. Before sampling begins, a combustible gas indicator will be used to measure the concentration of explosive gases. The instrument will be retained for periodic measurements during sampling.

When sampling a roll-off bin with soil cuttings, a trowel attached to the end of a pole may be needed to collect the sample. One risk in sampling from a ladder is a fall that may cause back injury or other injuries. Also, precautions must be taken to avoid heat stress.

Specific safety standards applicable to the use of ladders are found in Part 1926, Subpart L, Ladders and Scaffolding, Occupational Safety and Health Administration Construction Industry Standards. The basic requirements to be followed when using ladders are:

- Ladders with broken parts or evidence of corrosion should not be used.

- Ladders should not be placed in driveways unless they are protected by barricades.