M60050.002520
MCAS EL TORO
SSIC #5090.3

Well Destruction Report

AW-4

Marine Corps Air Station

El Toro, California

SWDIV Contract No. N68711-93-D-1459, Delivery Order No. 0070
OHM Project No. 18609
Document Control No. SW5116
Revision 0
April 9, 1998

OHM Remediation Services Corp.

2031 Main Street
Irvine, California 92714-6509

OHM Remediation
Services Corp.
A Subsidiary of OHM Corporation

April 9, 1998

Mr. Dave Jesperson, Code 57CS1.DJ
Naval Facilities Engineering Command
Southwest Division
1220 Pacific Highway
San Diego, CA 92132-5187

Attention: Ms. Lynn Hornecker, 56MC.LMH

Subject: Contract N68711-93-1459, Delivery Order 70
Remediation of Various UST's, AOC's, and RFA Sites
Well Destruction Report for Well AW-4, MCAS El Toro, California

Dear Ms. Hornecker:

Attached are two copies of the Well Destruction Report for Well AW-4. OHM will also forward copies to the MCAS El Toro Environmental Department per the cover transmittal. As indicated in the transmittal form, copies will also be sent to Bechtel. It is our understanding that the report will be presented as an appendix in a Bechtel report concerning Site 24, which will then be submitted into the Administration Record as part of the CERCLA requirements.

If you have any questions or need additional copies of the report please call or e-mail me.

Sincerely,

#5501

Jay Neuhaus, R. G.
Project Manager

cc: J. Rogers, COTR
B. Lindsey, 56MC.BL
W. Lee, MCAS El Toro
OHM PMO File (1C)
Pat Brooks, Bechtel
Project File

2031 Main Street ■ Irvine, California 92614-6509 ■ 714-263-1146 ■ FAX: 714-263-1147

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

OHM TRANSMITTAL/DELIVERABLE RECEIPT

CONTRACT N68711-93-D-1459 **DOCUMENT CONTROL NO: SW5116**

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Dave Jespersen, Code 57CS1.DJ
Building 131
1220 Pacific Highway
San Diego, California 92132-5101

Date: 14-Apr-98

D.O.: 70

Location: MCAS EL TORO

FROM: James Franklin FOR
Stewart Bornhoft, Program Manager

Edwin G. Bond, Contracts Manager

DESCRIPTION OF ENCLOSURE: **Well Destruction Report AW-4, Dated April 9, 1998.**

TYPE: Contract Deliverable ( ) ($) D. O. Deliverable (X) (Tech) Request for Change ( ) Other ( )

VERSION: FINAL **REVISION** 0

ADMIN RECORD: Yes ( ) No (X) Category ( ) Confidential ( )

SCHEDULED DELIVERY DATE: 09-Apr-98 **ACTUAL DELIVERY DATE:** 14-Apr-98

NUMBER OF COPIES SUBMITTED TO THE NAVY: 1/O, 4C, 4/E
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B. Lindsey, 56MC.BL (1C/1E)	Chron (1C)	P. Brooks, BNI (1C/1E)
L. Hornecker, 56MC.LH (1C/2E)	J. Neuhaus, Irv (1C/1E)	
G. Steinway, 56MC.GS (1C)	J. Kosztowney, Irv (1C/1E)	

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Introduction

This report covers the well destruction activities performed at Marine Corps Air Station (MCAS) El Toro. OHM Remediation Services (OHM) was directed by the Navy under the Navy Southwest Division Facilities Engineering Command (SWDIV) Contract No. N6871-93-D-1459, Delivery Order (DO) 070 to destroy one well, AW-4, located at the MCAS El Toro.

Site Location

MCAS El Toro is located approximately 45 miles southeast of Los Angeles in Orange County, California, one mile north of the intersection of Interstate 5 (the Santa Ana Freeway) and Interstate 405 (the San Diego Freeway). Refer to Figure 1-1 for the Site Location Map. The well was located in the southwest portion of the MCAS El Toro near the intersection of L Street and North 14 Street. Refer to Figures 1-2 and 1-3 for maps showing the location of AW-4 and ancillary features.

Background Information

Records were not found regarding the well construction details. Based on the limited information available, the well was probably drilled in the early 1940s as a water supply well. The well was no longer used (i.e. abandoned) probably by 1947. In November, 1995, an attempt was made by a previous contractor to check the well condition, and the bottom of the well was measured at approximately 493 feet below ground surface (bgs). A video logging of the well showed evidence of extreme fouling, and the well casing was heavily encrusted. The slots appeared to be vertical, hand cut by torch, and the location of the top of the screen could not be determined. The following Table 1-1 presents the pertinent well information.

Table 1-1
Summary of AW-4 Well Construction

Well Feature	Dimensions	Comment
Surface completion	Flush to ground. Completion in asphalt surface	
Filter Pack	Unknown	Discussion with the driller indicated that the well was drilled by cable tool method and probably filter pack was not used
Blank Casing	12" dia. Steel	
Well Screen	12" dia. Steel. Vertical slots appear to be hand cut by torch	As shown in video completed on 3/20/98, the top of screen start at approximately at 210' bgs and appear to continue all the way to the bottom
Well bottom	Approx. 494'	452' on 3/13/98 (after wire brushing)
Depth to water	102' bgs	At time of destruction
Survey Coordinates	Northing = 2189849.530 Easting = 6107957.020 Ground Surface Elevation = 266.820	NAD 83 Controls

Well Destruction Activities

The well destruction activities were performed between 9 March, 1998 and 1 April, 1998. On 5 March, 1998, prior to the start of well destruction activities, a Well Destruction Permit No. 98-03-22 was obtained from Orange County Health Care Agency (OCHCA). A copy of the Well Destruction Permit is presented as Appendix A. In addition OCHCA was notified of the project schedule so that their personnel could witness the well destruction activities.

On 9 March, 1998, Beylick Drilling Inc., OHM's subcontractor for the well destruction, mobilized a well rehabilitation rig to the site. On 10 March, 1998, prior to starting well rehabilitation, the bottom of the well was measured at 494' bgs. The inside of the well casing was cleaned by scrubbing it with a wire brush. The scrubbing was followed by bailing of scale out of the well. On 13 March 1998, the wire brush could not go past 452' bgs. A bailer was sent down the well which encountered a hard resistance at 452 feet bgs. Formation material (sand and gravel) was brought up in the bailer. The impediment at 452 feet bgs suggested a failure in the well casing at 452 feet bgs, which allowed the formation material into the well.

The water in the bailer was very black and opaque, and emitted a strong sulfurous odor. At this point, the well cleaning operation was stopped and water in the well was allowed to settle for video logging.

On 20 March, 1998, a video camera was lowered into the well. The video indicated that the well casing was free of scales but it was extremely corroded. This corrosion probably caused the well casing to collapse at 452' bgs during the wire brushing operation. The video also showed the top of screen started at 210' bgs and continued as far as the video visibility permitted. The well casing was not visible below 393' bgs, due to highly turbid water below this depth. As a result, video logging was stopped at 393' bgs. Due to the high turbidity of the water in the well, it was decided to not collect a water sample for chemical analysis. A copy of the chemical analysis of the ground water from well AW-4, collected during the Phase II Remedial Investigation of Installation Restoration Program (IRP) Site 24, is included in Appendix B.

On 23 March, 1998, a 10'x 10' area around the well was geophysical surveyed for underground utilities.

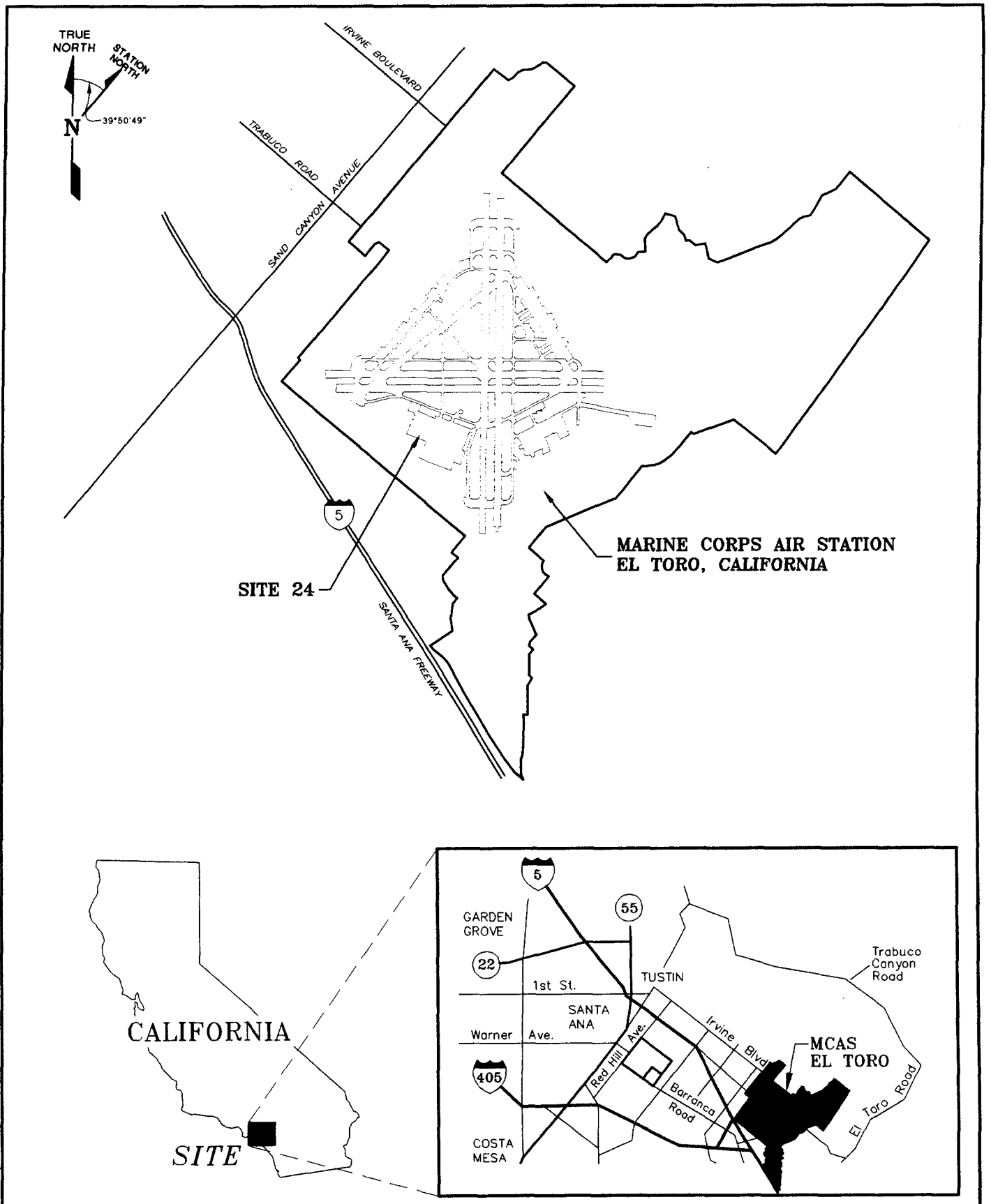
On 30 March, 1998, grouting of the well commenced under the supervision of OHM's field geologist. OCHCA representatives were present at the site to witness the grouting operation. Prior to grouting, the bottom of the well was measured at 446' bgs indicating a continued entry of formation material into the well. A 2-inch diameter tremie pipe was lowered in to the well and the bottom of the tremie pipe was set at 337' bgs. During grouting, 16 cubic yards of neat cement (cement-bentonite mixture) was pumped into the well through the tremie pipe in one continuous lift. This volume exceeded the 13 cubic yard grout volume calculated for the casing, indicating that approximately three cubic yards of grout passed through the slots into the adjacent filter pack or formation. After the tremie pipe was removed, the top of the grout was measured at 3 feet below the top of the well casing.

On 31 March, 1998, the soil surrounding the well casing was excavated to six feet bgs., and the top 5 feet of the well casing was cut and removed leaving the top of the casing at approximately 262 feet elevation. On 1 April, 1998, one cubic yard of Class B Concrete was poured over the top of the well casing, forming a one foot thick mushroom shaped cap. Once the concrete had set the remainder of the excavation was backfilled to the surface grade with soil followed by approximately 15 cubic yards of aggregate base material. Survey coordinates of the well location (provided in Table 1-1) are taken from the Remedial Investigation Phase II Report for IRP Site 24, and a copy of the survey results is presented as Appendix C.

Conclusion

The destruction work performed at well AW-4, followed the guidelines described in California Department of Water Resources Bulletin 74-81 and Bulletin 74-90. In addition, the work was completed in compliance with the requirements set forth by the OCHCA and according to the well destruction permit issued by the OCHCA.

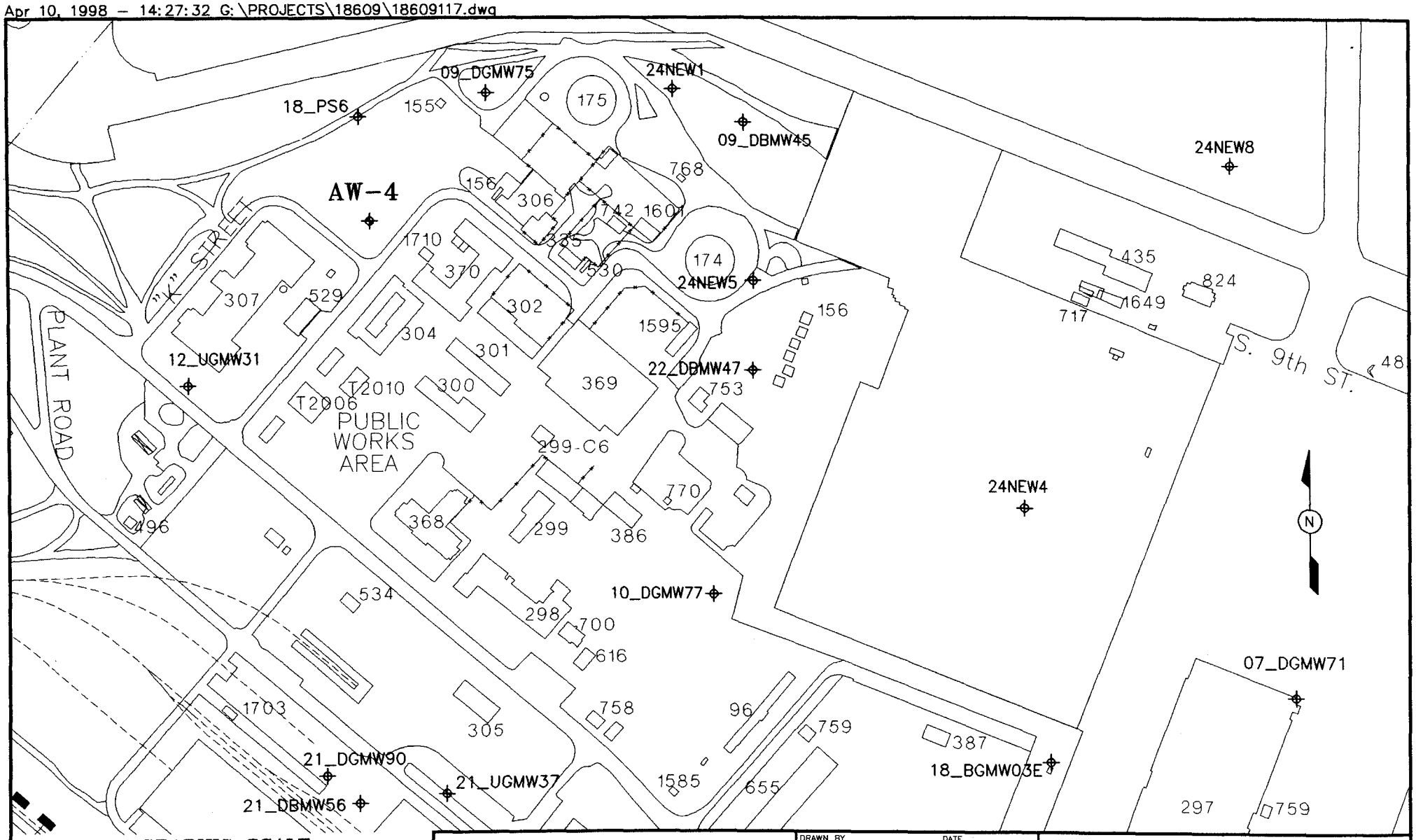
Figures



OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA			DRAWN BY R. PIRMORADIAN	DATE 04/10/98	FACILITY LOCATION MAP SITE 24			
			CHECKED BY	DATE				
			APPROVED BY JRm	DATE 4/10/98				
CONTRACT NAME SWDIV			PROJECT MANAGER	DATE	MARINE CORPS AIR STATION EL TORO, CALIFORNIA			
AUTOCAD FILE No. 18609118.DWG	PLOT SCALE 1=1	SHEET 1	OF 1	SCALE NONE	DOCUMENT CONTROL No. SW5116	OHM PROJECT No. 18609	FIGURE No. FIG 1-1	REVISION 0

Apr 10, 1998 - 15:16:19 G:\PROJECTS\18609\18609118.dwg

Apr 10, 1998 – 14:27:32 G:\PROJECTS\18609\18609117.dwg



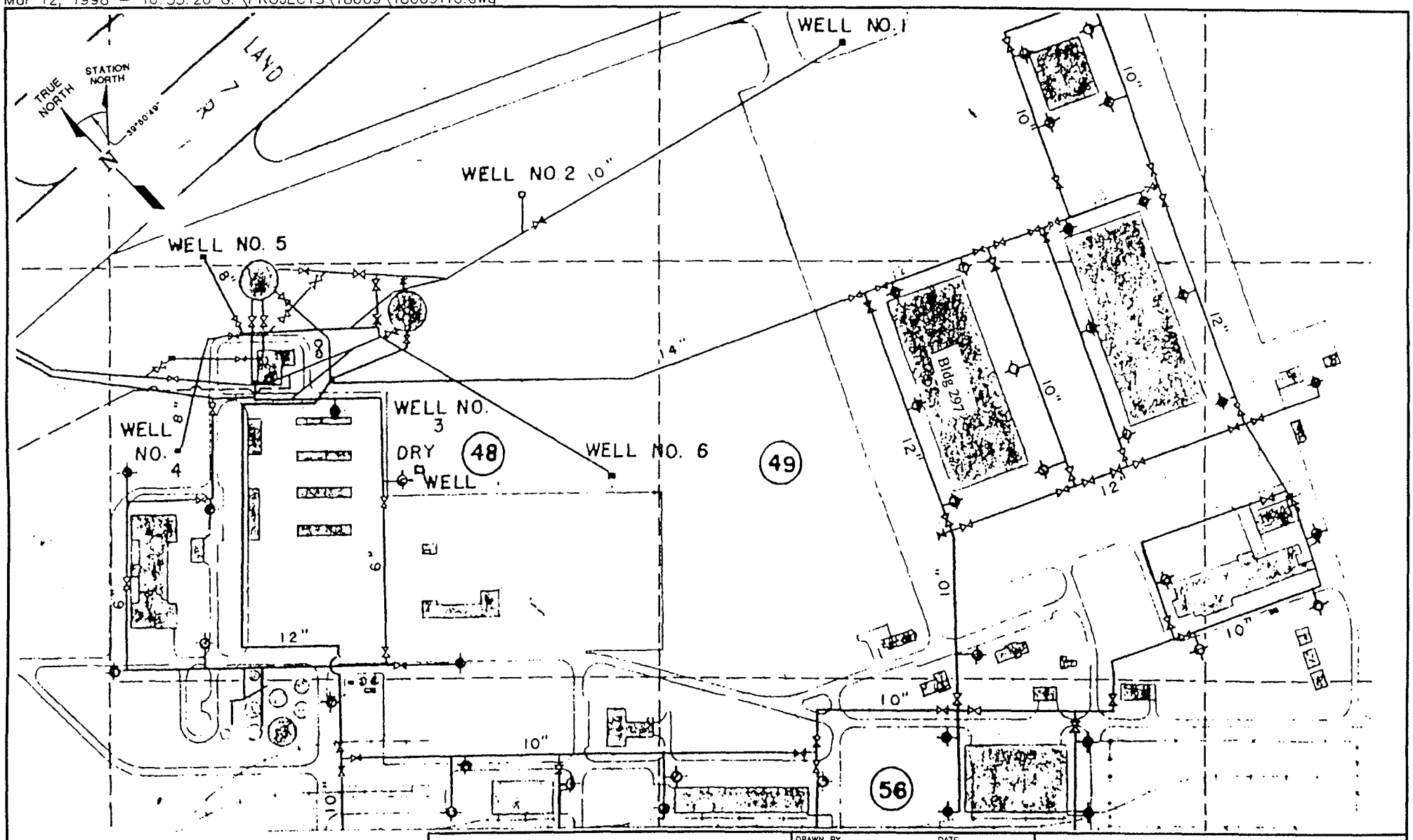
OHM DRAWING 17486133.DWG (WITZEL-YANEZ DESIGN)
XREF DRAWING LOCATED AT: G:\...\17486\17486157.DWG

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation
SAN DIEGO, CA

DRAWN BY R. PIRMORADIAN	DATE 04/10/98	VICINITY MAP	
CHECKED BY	DATE		
APPROVED BY JKM	DATE 4/10/98	MARINE CORPS AIR STATION EL TORO, CALIFORNIA	
PROJECT MANAGER	DATE		

CONTRACT NAME	AUTOCAD FILE No.	PLOT SCALE	SHEET	OF	SCALE	DOCUMENT CONTROL No.	OHM PROJECT No.	FIGURE No.
SWDIV	18609117.DWG	1=1	1	1	AS NOTED	SW5116	18609	FIG 1-2

Mar 12, 1998 – 16:33:20 G:\PROJECTS\18609\18609116.dwg



Reference: Public Works drawing no. PU-1233 "*Modifications to MWD Water Supply Line, Location Plan*", 4/16/54.

OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA	DRAWN BY R. PIRMORADIAN	DATE 03/12/98	WATER SUPPLY LINE				
	CHECKED BY	DATE					
	APPROVED BY	DATE					
CONTRACT NAME SWDIV	PROJECT MANAGER	DATE	MARINE CORPS AIR STATION EL TORO, CALIFORNIA				
AUTOCAD FILE No. 18609116.DWG	PLOT SCALE 1=1	SHEET 1	OF 1	SCALE AS NOTED	DOCUMENT CONTROL No. SW5116	OHM PROJECT No. 18609	FIGURE No. FIG 1-3

Appendix A
Orange County Well Destruction Permit

APPLICATION FOR WELL DESTRUCTION PERMIT

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION

2009 E. EDINGER AVENUE
SANTA ANA, CA 92705-4720

(714) 667-3500
FAX: (714) 972-0749

WELL PERMIT NUMBER 98-03-22

CITY: ~~SANTA ANA~~ UNINCORPORATED IRVINE

DATE: 3-5-98

LOCATION (ADDRESS IF AVAILABLE): SITE 24. Cross Street L Street / 14th Street. WELL AW-4

NAME OF WELL OWNER: MCAS, EL TORO

NAME OF CONSULTING FIRM: OHM SERVICES CORPORATION

ADDRESS: ENGINEERING DIVISION. Bldg. 368

BUSINESS ADDRESS: 2031 MAIN STREET

CITY: SANTA ANA ZIP: TELEPHONE: (714) 726-3127

CITY: IRVINE ZIP: 92714 TELEPHONE: (714) 263-1146

NAME OF DRILLING CO.: EYLIK DRILLING INC. C-57 LICENSE NUMBER: 306291

CITY: LA HABRA ZIP: 90631 TELEPHONE: (562) 697-2565

WELL DEPTH: 500? Feet DIAMETER: 12" Inches

TYPE OF WELL/TOTAL NUMBER: ONE
☒ WATER
☐ CATHODIC
☐ MONITORING
☐ OTHER

No records available

SEALING MATERIAL / ESTIMATE AMOUNT OF SEALING MATERIAL NEEDED: Neat Cement (cement/Bentonite Mixture) 392 ft³ slurry volume

PROPOSED START DATE: 3-9-98

METHOD OF DESTRUCTION: (1) Rehabilitate well, clean inside of well to total depth. Wire Brush, Surge Bail
(2) Video log well to total depth and determine well screen location and condition of well casing.
(3) Perforate section(s) if necessary.
(4) Pressure grout from bottom up using tremie pipe. (5) Excavate top 5' around well cut well casing to 5'. Fill with concrete and restore surface

DIAGRAM OF WELL SITE (Use additional sheets and/or attachments)

See Figure 1.1 and Figure 1.2 + 1.3 attached.

☑ SITE PLAN ATTACHED

I HEREBY AGREE TO COMPLY IN EVERY RESPECT WITH ALL REQUIREMENTS OF THE HEALTH CARE AGENCY AND WITH ALL ORDINANCES AND LAWS OF THE COUNTY OF ORANGE AND OF THE STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, RECONSTRUCTION AND DESTRUCTION.

X Lynn Marie Hornecker — APPLICANT'S SIGNATURE — DATE: 12 March 1998

Lynn Marie Hornecker — PRINT NAME

(619) 532 4162 — PHONE NUMBER — (619) 532 4160 — FAX NUMBER

FOR ACCOUNTING USE ONLY:

HSO NO. _____ CHECK NO. _____

DATE 3-16-98 AMOUNT EXEMPT

INTL. _____

APPROVAL BY OTHER AGENCIES:

JURISDICTION _____

REMARKS _____

AUTHORIZED SIGNATURE _____ DATE _____

DISPOSITION OF PERMIT (DO NOT FILL IN):

☒ APPROVED SUBJECT TO THE FOLLOWING CONDITIONS:

A. ☐ NOTIFY THIS AGENCY AT LEAST 48 HOURS PRIOR TO START

B. ☐ SUBMIT TO THE AGENCY A WELL DESTRUCTION REPORT. PLEASE REFERENCE PERMIT NUMBER.

C. ☒ OTHER Notify This Agency Prior to Pressure Grouting

☐ DENIED _____

PERMIT ISSUED BY: [signature] DATE: 3-16-98

DAN NIATSUI — PRINT NAME — 714 667-3758 — PHONE NUMBER

WHEN SIGNED BY ORANGE COUNTY HEALTH CARE AGENCY REPRESENTATIVE, THIS APPLICATION IS A PERMIT.

F272-09.1543 (R9/96)

P.3/6

Appendix B
Phase II Remedial Investigation Analytical Data

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

Extracts
-AW-4-

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT OPERABLE UNIT 2A – SITE 24 MARINE CORPS AIR STATION EL TORO, CALIFORNIA Volume I

CTO-0073/0314
March 1997

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

REGISTERED GEOLOGIST
EXP. 9/97
G. Patrick Brooks
No. 6347
STATE OF CALIFORNIA

Signature: G. Patrick Brooks
G. Patrick Brooks, R.G., CTO Leader

Date: 3/11/97

Table 4-14
VOC[a] Concentrations Detected in Groundwater
VOC Source Area – Site 24
(concentrations in µg/L[b])

Location	Sample Number	Sample Depth or Screen Interval	Sample Collection Date	Lab	1,1-DCE[c]	1,2-DCA[d]	Benzene	Bromo-dichloro-methane	Bromoform	CT[e]	Chloroform	Chloro-Methane	cis-1,2-DCA	Dibromo-chloro-methane	PCE[f]	Toluene	Xylenes	TCE[g]	Acetone	2-Butanone
09DBMW45	73W1060	121.4 - 161.4	20 November 1995	CAS[h]	20[i,j]	5 U[k]	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	7.2	5 U	10 U	920	NA[l]	NA
	73W1060	121.4 - 161.4	20 November 1995	Inchcape[m]	8 U	8 U	8 U	8 U	8 U	3 J[n]	10	8 U	8 U	8 U	3 J	8 U	8 U	900 D[o]	40 U	40 U
24ABDN4	73W1002	ND[p]	23 August 1995	CAS	1 U	1.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	12	NA	NA
24AS1	73W1068	155 - 160	28 November 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	730	NA	NA
	73W1068	155 - 160	28 November 1995	Inchcape	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	42 U	980	210 U	210 U
24AS2A	73W1074	155 - 160	29 November 1995	CAS	19	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	750	NA	NA
	73W1074	155 - 160	29 November 1995	Inchcape	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	71 U	1,200	360 U	360 U
24HCPT55	73W1001	126	23 August 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	160	NA	NA
	73W1003	155	23 August 1995	Inchcape	20	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	980	NA	NA
	73W1004	168	23 August 1995	CAS	1 U	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	34	NA	NA
24HCPT64	73W1013	105	25 August 1995	CAS	1 U	0.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.2	0.5 U	1 U	18	NA	NA
	73W1014	105	29 August 1995	Inchcape	1 U	2	1 U	1 U	1 U	0.6 J	4	1	1 U	1 U	2	1 U	1 U	33 E[q]	51	12
	73W1014	105	29 August 1995	CAS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	73W1015	105.5	29 August 1995	CAS	1 U	2.6	0.5 U	0.5 U	0.5 U	0.5 U	5.5	1 U	0.5 U	0.5 U	2	0.5 U	1 U	29	NA	NA
	73W1018	136	29 August 1995	CAS	1 U	1.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.1	0.5 U	1 U	7.6	NA	NA
	73W1019	136.5	29 August 1995	Inchcape	1 U	1 U	1 U	1 U	1 U	1 U	1	1 U	1 U	1 U	3	1 U	1 U	13	27	6
	73W1019	136.5	29 August 1995	CAS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	73W1021	170	30 August 1995	CAS	1 U	0.9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	NA	NA
24HCPT66	73W1007	123	25 August 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	370	NA	NA
	73W1007	123	25 August 1995	Inchcape	1 U	2	1 U	1 U	1 U	1	1	1	1 U	1 U	2	1 U	1 U	640 E	58 B[r]	9
	73W1008	142	25 August 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	220	NA	NA
	73W1009	156	25 August 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	190	NA	NA
	73W1010	174	25 August 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	220	NA	NA
24HCPT74	73W1024	123.5	26 September 1995	CAS	1 U	0.5 U	0.5 U	0.7	0.5 U	0.7	0.5 U	1 U	0.5 U	0.5 U	2.8	0.5 U	1 U	42	NA	NA
	73W1025	149	26 September 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	250	NA	NA
24HCPT77	73W1029	142	27 September 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5	NA	NA
	73W1030	161	27 September 1995	CAS	10 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	400	NA	NA
	73W1030	161	27 September 1995	Inchcape	19J	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	36 U	560	180 U	180 U
	73W1031	188	28 September 1995	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	5.7	NA	NA
	73W1031	187 - 188	28 September 1995	Inchcape	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U
24HCPT81	73W1079	121	20 December 1995	Inchcape	36	NA	NA	9.1	NA	7.3	NA	NA	NA	NA	27	NA	NA	1,300	NA	NA
	73W1080	148	20 December 1995	CAS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	830	NA	NA
	73W1082	166	21 December 1995	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.3	0.5 U	1 U	63	NA	NA
	73W1084	169.5	21 December 1995	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	11	NA	NA
24HCPT82	73W1087	119	17 January 1996	CAS	3.5	0.5 U	0.5 U	0.5 U	0.5 U	0.7	0.5 U	1 U	0.5 U	0.5 U	1.3	0.5 U	1 U	42	NA	NA
	73W1091	146	17 January 1996	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	11	0.5 U	1 U	0.5 U	0.5 U	3	0.5 U	1 U	15	NA	NA
	73W1092	156	17 January 1996	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	5.3	0.5 U	1 U	0.5 U	0.5 U	0.9	0.5 U	1 U	3.4	NA	NA
	73W1094	167.5	17 January 1996	CAS	1 U	0.5 U	0.5 U	0.5 U	0.5 U	2.9	0.5 U	1 U	0.5 U	0.5 U	0.9	0.5 U	1 U	3.6	NA	NA

(table continues)

Appendix C
Land Survey Coordinates

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Extracts
-AW-4-

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT OPERABLE UNIT 2A – SITE 24 MARINE CORPS AIR STATION EL TORO, CALIFORNIA Volume I

CTO-0073/0314
March 1997

Prepared by.

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

REGISTERED GEOLOGIST
EXP. 9/97
G. Patrick Brooks
No. 6347
STATE OF CALIFORNIA

Signature: G. Patrick Brooks
G. Patrick Brooks, R.G., CTO Leader

Date: 3/11/97

Appendix F
LAND SURVEY COORDINATES

Appendix F is a table of survey coordinates recorded as Cogo Points which include abandoned wells, soil gas, core penetrometer, HydroPunch sample, soil vapor extraction, soil vapor piezometer, hand auger, groundwater monitoring well, surface soil, and air sparging well locations.

LAND SURVEY SERVICES

ENGINEERING DOCUMENTATION
(PRELIMINARY)

FOR

PARCEL-SPECIFIC ENVIRONMENTAL BASELINE SURVEY
(CTO-073)
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

SUBCONTRACT 22214-P01-013-TSC

DECEMBER 7, 1995

PREPARED FOR:

BECHTEL NATIONAL, INC.

PREPARED BY:

ENTECH
ENGINEERS, INC.
• Engineers • Architects • Planners

1356 E. Edinger Ave., Santa Ana, CA 92705-4428 (714) 836-1013
Offices in Other U.S. Cities

Cogo Points

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Point	North	East	Grade	Description
1	2,186,446.760	6,110,424.940	272.780	25-SG-4
2	2,186,446.090	6,110,423.760	272.740	25-CPT-4
3	2,186,230.970	6,110,324.950	266.840	25-B-1
4	2,186,528.090	6,110,586.590	276.990	25-B-3
5	2,186,231.330	6,110,327.100	266.730	25-CPT-1
6	2,186,233.020	6,110,325.840	266.640	25-SG-1
7	2,186,261.250	6,110,289.600	269.260	25-CPT-2
8	2,186,471.770	6,110,625.300	269.570	25-SG-2
9	2,186,471.770	6,110,625.300	275.420	25-B-2
10	2,186,473.540	6,110,627.270	275.350	25-CPT-3
11	2,186,472.420	6,110,632.010	275.390	25-SG-3
12	2,186,941.300	6,110,298.870	273.190	24-SG-2
13	2,186,942.960	6,110,296.730	273.190	24-CPT-2
14	2,187,416.790	6,110,454.340	284.150	24-CPT-5
15	2,187,414.990	6,110,458.070	284.100	24-SG-5
16	2,187,519.250	6,110,673.410	283.150	24-SG-6
17	2,187,520.320	6,110,674.910	283.230	24-CPT-6
18	2,187,834.770	6,110,532.540	288.930	24-CPT-7
19	2,187,838.200	6,110,529.520	288.880	24-SG-7
20	2,188,432.770	6,110,130.400	292.740	24-SG-17
21	2,188,435.650	6,110,131.600	292.740	24-CPT-17
22	2,188,434.010	6,110,129.150	292.760	24-SV-9-NAIL
23	0.000	0.000	292.300	24-SVE-9-2" P.V.C.
24	0.000	0.000	292.190	24-SVE-9A-2" P.V.C.
25	0.000	0.000	292.390	24-SVP-9-1/2" P.V.C.
26	0.000	0.000	292.750	24-SV9-RIM
27	2,188,254.750	6,110,273.240	292.180	24-SV10-NAIL
28	0.000	0.000	291.980	24-SVE-10-4" P.V.C.
29	0.000	0.000	291.950	24-SVP-10A-1/2" P.V.C.
30	0.000	0.000	292.010	24-SVP-10-1/2" P.V.C.
31	0.000	0.000	292.170	24-SV-10-RIM
32	2,188,251.470	6,110,268.050	292.110	24-CPT-14
33	2,188,174.700	6,110,423.750	291.030	24-SV-5 NAIL
34	0.000	0.000	290.760	24-SVE-5-2" P.V.C.
35	0.000	0.000	290.770	24-SVE-5A-2" P.V.C.
36	0.000	0.000	290.980	24-SV-5-RIM
37	2,188,178.340	6,110,422.020	291.010	24-SG-13
38	2,188,174.960	6,110,421.450	290.950	24-CPT-13
39	2,188,504.990	6,110,443.490	291.340	24-SV-11-NAIL
40	0.000	0.000	291.220	24-SVE-11-2" P.V.C.
41	0.000	0.000	291.200	24-SVE-11A-2" P.V.C.
42	0.000	0.000	291.070	24-SVP-11-1/2" P.V.C.
43	0.000	0.000	291.340	24-SV-11-RIM
44	2,188,505.590	6,110,441.680	291.360	24-SG-59
45	2,188,503.080	6,110,443.870	291.340	24-CPT-59
46	2,188,145.180	6,110,646.310	291.420	24-CPT-12

Cogo Points

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Point	North	East	Grade	Description
47	2,188,146.360	6,110,642.220	291.450	24-SG-12
48	2,188,248.540	6,110,939.990	299.030	24-CPT-76
49	2,188,251.740	6,110,940.290	299.100	24-SG-76
50	2,188,023.080	6,110,927.120	297.050	24-CPT-75
51	2,188,017.850	6,110,926.510	297.120	24-SG-75
52	2,188,305.700	6,110,311.690	292.450	24-HA-1
53	2,188,292.890	6,110,307.080	292.350	24-HA-2
54	2,188,296.600	6,110,294.230	292.630	24-HA-3
55	2,188,510.580	6,110,617.390	294.080	24-CPT-15
56	2,188,598.780	6,110,786.060	293.520	24-CPT-16
57	2,188,596.980	6,110,788.680	293.510	24-SG-16
58	2,188,799.210	6,110,868.810	293.260	24-CPT-26
59	2,188,799.010	6,110,875.050	293.250	24-SG-26
60	2,188,767.920	6,110,595.710	293.500	24-CPT-25
61	2,188,767.090	6,110,594.470	293.470	24-SG-25
62	2,188,507.990	6,110,616.490	294.080	24-SG-15
63	2,189,448.930	6,111,051.270	304.180	24-CPT-33
64	2,189,448.500	6,111,053.030	304.350	24-SG-33
65	2,189,277.040	6,110,986.680	300.950	24-CPT-32
66	2,189,276.260	6,110,985.320	300.930	24-SG-32
67	2,189,423.660	6,110,642.920	296.490	24-CPT-35
68	2,189,424.720	6,110,639.930	296.480	24-SG-35
69	2,189,544.460	6,110,279.780	292.900	24-CPT-36
70	2,189,543.460	6,110,280.360	292.900	24-SG-36
71	2,189,736.320	6,110,169.710	290.400	ABAND. WELL #1 TOP CASING
72	2,189,310.740	6,110,414.780	294.650	24-CPT-34
73	2,189,311.750	6,110,412.040	294.640	24-SG-34
74	2,188,891.610	6,110,166.010	290.480	24-SV-8-NAIL
75	0.000	0.000	290.190	24-SVE-8-2" P.V.C.
76	0.000	0.000	290.270	24-SVE-8A-2" P.V.C.
77	0.000	0.000	290.210	24-SVP-8-1/2" P.V.C.
78	0.000	0.000	290.510	24-SV-8-RIM
79	2,188,886.480	6,110,163.950	290.520	24-CPT-58
80	2,188,885.890	6,110,165.850	290.560	24-SG-58
81	2,188,872.410	6,109,955.730	286.490	24-SV-7-NAIL
82	0.000	0.000	286.110	24-SVE-7-2" P.V.C.
83	0.000	0.000	286.020	24-SVE-7A-2" P.V.C.
84	0.000	0.000	286.090	24-SVP-7-1/2" P.V.C.
85	0.000	0.000	286.480	24-SV-7-RIM
86	2,188,875.640	6,109,954.100	286.560	24-CPT-69
87	2,188,874.530	6,109,956.780	286.480	24-SG-69
88	2,189,064.500	6,110,005.270	285.810	24-SV-1-NAIL
89	0.000	0.000	285.460	24-SVE-1-4" P.V.C.
90	0.000	0.000	285.770	24-SV-1-RIM
91	2,189,063.730	6,110,003.380	285.770	24-CPT-31
92	2,189,065.930	6,110,004.300	285.840	24-SG-31

Cogo Points

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Point	North	East	Grade	Description
93	2,189,100.640	6,109,901.330	285.550	24-SV-6-NAIL
94	0.000	0.000	285.020	24-SVE-6-2" P.V.C.
95	0.000	0.000	285.280	24-SVP-6A-2" P.V.C.
96	0.000	0.000	285.210	24-SVP-6-1/2" P.V.C.
97	0.000	0.000	285.540	24-SV-6-RIM
98	2,189,104.510	6,109,904.480	285.640	24-CPT-61
99	2,189,105.510	6,109,901.710	285.610	24-SG-61
100	2,188,566.300	6,109,899.990	286.290	24-SG-23
101	2,188,567.150	6,109,898.060	286.220	24-CPT-23
102	2,188,642.600	6,109,792.360	286.790	24-SV-14-NAIL
103	0.000	0.000	286.480	24-SVE-14-2" P.V.C.
104	0.000	0.000	286.370	24-SVP-14-1/2" P.V.C.
105	0.000	0.000	286.510	24-SVP-14A-1/2 P.V.C.
106	0.000	0.000	286.810	24-SV-14-RIM
107	2,188,528.510	6,109,719.170	286.790	24-HA-5
108	2,188,561.300	6,109,565.900	286.710	24-HA-6
109	2,188,579.320	6,109,573.140	286.690	24-HA-7
110	2,188,595.220	6,109,579.600	286.680	24-HA-8
111	2,188,324.280	6,109,684.550	284.330	24-CPT-60
112	2,188,500.430	6,109,310.610	280.730	24-CPT-21
113	2,188,507.210	6,109,314.850	280.760	24-SG-21
114	2,188,779.480	6,109,570.180	285.080	24-SV-2-NAIL
115	0.000	0.000	284.700	24-SVE-2-2" P.V.C.
116	0.000	0.000	284.560	24-SVE-2A-2" P.V.C.
117	0.000	0.000	284.680	24-SVP-2-1/2" P.V.C.
118	0.000	0.000	285.080	24-SV-2-RIM
119	2,188,777.470	6,109,573.950	285.200	24-SG-27
120	2,188,778.340	6,109,571.550	285.120	24-CPT-27
121	2,189,108.270	6,109,689.190	284.370	24-SV-4-NAIL
122	0.000	0.000	284.050	24-SVE-4-2" P.V.C.
123	0.000	0.000	284.390	24-SV-4-RIM
124	2,189,108.260	6,109,687.480	284.350	24-CPT-30
125	2,189,110.220	6,109,688.210	284.340	24-SG-30
126	2,188,846.760	6,109,778.910	286.840	24-SV-3-NAIL
127	0.000	0.000	286.490	24-SVE-3-2" P.V.C.
128	0.000	0.000	286.470	24-SVE-3A-2" P.V.C.
129	0.000	0.000	286.820	24-SV-3-RIM
130	2,188,929.950	6,109,456.420	280.890	24-CPT-29
131	2,189,028.200	6,109,221.380	279.180	24-CPT-38
132	2,189,024.090	6,109,218.860	279.120	24-SG-38
133	2,189,188.930	6,109,536.710	281.450	24-CPT-37
134	2,189,184.430	6,109,533.410	281.450	24-SG-37
135	2,189,288.260	6,109,708.980	284.520	24-CPT-63
136	2,189,284.370	6,109,705.600	284.460	24-SG-63
137	2,189,234.970	6,109,460.600	282.100	24-NEW-4-NAIL
138	0.000	0.000	282.110	24-NEW-4-RIM

Cogo Points

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Point	North	East	Grade	Description
139	0.000	0.000	281.770	24-NEW-4-4" P.V.C.
140	2,189,218.760	6,109,280.740	280.790	24-CPT-39
141	2,189,215.800	6,109,279.480	280.790	24-SG-39
142	2,189,463.360	6,108,893.900	277.480	24-CPT-44
143	2,189,712.910	6,109,001.130	279.840	24-CPT-49
144	2,189,719.490	6,108,836.240	279.630	24-NEW-5-NAIL
145	0.000	0.000	279.240	24-NEW-5-TOP 4" P.V.C.
146	0.000	0.000	279.630	24-NEW-5-RIM
147	0.000	0.000	279.420	24-NEW-5-GROUND
148	2,189,738.940	6,108,822.880	278.770	24-CPT-66
149	2,189,736.700	6,108,823.620	278.870	24-SG-66
150	2,189,058.570	6,109,127.150	278.270	24-CPT-40
151	2,189,132.460	6,108,959.650	276.950	24-SV-13-NAIL
152	0.000	0.000	276.510	24-SVE-13
153	0.000	0.000	276.680	24-SVP-13
154	0.000	0.000	276.890	24-SV-13-RIM
155	2,188,798.330	6,110,370.480	292.710	24-HA-4
156	2,189,196.390	6,108,789.570	274.890	24-CPT-42
157	2,189,221.200	6,108,838.910	276.020	ABANDONED WELL NO.6
158	2,189,129.290	6,108,962.980	276.960	24-CPT-41
159	2,189,128.680	6,108,964.620	276.990	24-SG-41
160	2,189,571.340	6,109,356.560	283.190	24-CPT-45
161	2,189,757.560	6,109,776.790	287.720	24-CPT-46
162	2,189,754.490	6,109,774.980	287.800	24-SG-46
163	2,189,822.010	6,109,523.150	288.010	24-CPT-47
164	2,189,822.980	6,109,301.160	284.870	24-CPT-48
165	2,189,824.620	6,109,269.920	284.970	24-SG-48
166	2,190,053.800	6,109,189.330	284.215	ABANDONED WELL NO.2
167	2,190,078.220	6,109,192.250	284.760	24-CPT-52
168	2,190,082.640	6,109,193.930	284.860	24-SG-52
169	2,190,173.610	6,108,981.540	282.430	24-CPT-53
170	2,190,175.610	6,108,976.660	282.375	24-SG-53
171	2,190,576.730	6,108,983.540	285.365	24-NEW-7-NAIL
172	0.000	0.000	285.135	24-NEW-7-4" P.V.C.
173	0.000	0.000	285.405	24-NEW-7-RIM
174	0.000	0.000	285.315	24-NEW-7-GROUND
175	2,190,269.720	6,109,711.470	291.915	24-NEW-8-NAIL
176	0.000	0.000	291.505	24-NEW-8-4" P.V.C.
177	0.000	0.000	291.875	24-NEW-8-RIM
178	0.000	0.000	291.615	24-NEW-8-GROUND
179	2,190,294.150	6,108,799.310	281.335	24-NEW-1-NAIL
180	0.000	0.000	281.135	24-NEW-1-4" P.V.C.
181	0.000	0.000	281.335	24-NEW-1-RIM
182	0.000	0.000	281.215	24-NEW-1-GROUND
183	2,190,278.170	6,108,804.550	281.365	24-CPT-55
184	2,190,277.100	6,108,806.540	281.405	24-SG-55

Cogo Points

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Point	North	East	Grade	Description
185	2,190,268.820	6,108,815.790	281.515	24-AS-2
186	2,190,284.980	6,108,826.880	281.515	24-AS-1-NAIL
187	0.000	0.000	281.365	24-AS-1-2" P.V.C.
188	0.000	0.000	281.375	24-AS-1A-2" P.V.C.
189	0.000	0.000	281.535	24-AS-1-RIM
190	0.000	0.000	281.355	24-AS-1-GROUND
191	2,190,258.330	6,108,803.980	281.645	24-AS-2-NAIL
192	0.000	0.000	281.375	24-AS-2A1
193	0.000	0.000	281.365	24-AS-2A2
194	0.000	0.000	281.670	24-AS-2A-RIM
195	0.000	0.000	281.545	24-AS-2A-GROUND
196	2,189,568.960	6,108,491.010	269.920	24-CPT-51
197	2,189,570.080	6,108,492.770	269.940	24-SG-51
198	2,190,467.370	6,108,350.980	275.855	ABANDONED WELL NO.5
199	2,190,139.360	6,107,948.520	267.680	24-CPT-57
200	2,190,139.340	6,107,946.110	267.680	24-SG-57
201	2,189,922.130	6,107,827.840	263.880	24-CPT-56
202	2,189,922.750	6,107,829.090	263.780	24-SG-56
203	2,189,849.530	6,107,957.020	266.820	ABANDONED WELL NO.4
204	0.000	0.000	267.350	ABANDONED WELL NO.4 GROU
205	2,189,639.990	6,107,363.310	255.120	24-SG-73
206	2,189,606.020	6,107,410.090	255.520	24-SG-70
207	2,189,552.320	6,106,529.670	257.730	25-B-4
208	2,189,643.760	6,106,883.820	260.380	24-SG-71
209	2,189,591.070	6,106,916.930	261.080	24-SG-72
210	2,187,880.740	6,108,922.680	264.320	24-CPT-10
211	2,187,878.810	6,108,920.900	264.320	24-SG-10
212	2,188,792.000	6,108,794.020	276.230	24-CPT-28
213	2,188,794.230	6,108,796.400	276.230	24-SG-28
214	2,188,610.860	6,109,171.790	280.690	24-CPT-22
215	2,188,607.620	6,109,171.160	280.660	24-SG-22
216	2,188,390.300	6,108,892.570	266.980	24-CPT-20
217	2,188,391.760	6,108,889.770	267.180	24-SG-20
218	2,188,232.630	6,109,265.480	276.630	24-CPT-18
219	2,188,230.920	6,109,268.170	276.580	24-SG-18
220	2,188,287.340	6,108,827.590	265.600	24-CPT-19
221	2,188,285.880	6,108,828.270	265.600	24-SG19
222	2,188,041.330	6,109,722.570	285.150	24-CPT-11
223	2,188,038.510	6,109,721.710	285.070	24-SG-11
224	2,187,628.510	6,109,297.300	266.160	24-NEW-6-NAIL
225	0.000	0.000	266.140	24-NEW-6-RIM
226	0.000	0.000	265.580	24-NEW-6-4" P.V.C.
227	0.000	0.000	266.030	24-NEW-6-GROUND
228	2,187,531.980	6,110,150.430	281.810	24-CPT-8
229	2,187,526.300	6,110,144.410	281.810	24-SG-8
230	2,187,385.890	6,109,961.840	270.710	24-CPT-4

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Point	North	East	Grade	Description
231	2,187,382.780	6,109,961.740	270.610	24-SG-4
232	2,186,808.260	6,109,614.830	268.830	24-B-1
233	2,186,808.940	6,109,617.230	268.820	24-CPT-1
234	2,186,947.920	6,109,697.550	268.280	24-SS-1
235	2,186,806.210	6,109,615.470	268.800	24-SG-1
236	2,187,230.540	6,109,681.070	270.080	24-CPT-3
237	2,187,232.890	6,109,682.610	269.970	24-SG-3
238	2,187,358.190	6,109,867.040	268.310	24-SVE-12-NAIL
239	0.000	0.000	269.960	24-SVE-12-RIM
240	0.000	0.000	269.840	24-SVE-12-2" P.V.C.
241	0.000	0.000	267.980	24-SVE-12-GROUND
242	2,187,621.850	6,109,935.770	283.880	24-CPT-9
243	2,187,618.950	6,109,932.870	283.880	24-SG-9
244	2,187,348.080	6,109,874.400	267.530	24-SS-1A
245	2,186,985.780	6,109,729.580	268.430	24-SS-2
246	2,188,275.990	6,108,931.220	266.690	24-SS-3
247	2,189,731.100	6,108,876.870	280.300	24-SS-4
248	2,189,504.310	6,109,668.610	286.220	24-SS-5
249	2,189,745.730	6,110,140.390	291.000	24-SS-6
250	2,188,993.330	6,110,952.930	294.610	24-SS-7
251	2,188,097.970	6,110,473.770	291.230	24-SS-8
252	2,187,881.030	6,110,024.620	288.610	24-SS-9-10
253	2,187,888.930	6,110,026.760	288.510	34-CPT-79 ← 24-CPT-79
254	2,187,886.650	6,110,027.960	288.410	24-SG-79
255	2,187,639.980	6,109,309.380	266.030	24-SS-2A
256	2,187,334.260	6,109,867.300	269.350	24-CPT-B2
257	2,187,625.760	6,109,300.380	266.080	24-CPT-84
258	2,188,838.610	6,109,784.050	286.820	24-SG-81
259	2,187,937.500	6,109,897.710	292.100	24-CPT-78
260	2,187,938.270	6,109,894.970	292.000	24-SG-78
261	2,187,849.840	6,110,115.110	292.300	24-SG-80
262	2,187,851.170	6,110,116.030	292.300	24-CPT-80
263	2,190,227.350	6,109,122.150	277.860	24-HCPT-77
264	2,190,001.810	6,108,596.900	269.870	24-HCPT-74
265	2,190,004.080	6,108,597.940	269.870	24-CPT-74
266	2,187,968.390	6,109,907.710	291.630	"CHINON" U.S.G.S. NEAR BLDG. 44