

# Well Destruction Report

*Former Tank Farm 2 Soil Vapor Extraction Wells  
SVE-01, SVE-01A, SVE-03, SVE-12, SVE-18, SVE-25, SVE-28,  
SVE-31, SVE-32, SVE-33, SVE-49, SVE-52, SVE-54, and SVE-55*

*Marine Corps Air Station*

*El Toro, California*

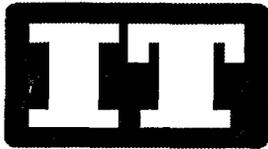
*GSA Contract No. GS-10F-0048J*

*SWDIV Contract No. N68711-00-F-0115*

*Document Control No. GS812380004*

*Revision 0*

*May 7, 2001*



**IT CORPORATION**

*A Member of The IT Group*

11499 Chester Road  
Cincinnati, Ohio 45246

Prepared by:

Mark L. Fishel, R.G. #6700  
Project Geologist



Approved by:

William Sedlak  
Project Manager

## TRANSMITTAL

Date: 10 May 2001

From: Lynn Marie Hornecker *LMH*

To: **Mr. Dan Matsui**  
Orange County Health Care Agency (OCHCA)  
Environmental Health Division  
2009 East Edinger Avenue  
Santa Ana, CA 92705-4720

Subj: Well Destruction Report, Former Tank Farm 2 Soil Vapor Extraction Wells  
Marine Corps Air Station, El Toro

The purpose of this transmittal is to provide you with the well destruction report for vapor extraction wells at the former Tank Farm 2 at the Marine Corps Air Station, El Toro. The former Tank Farm 2 is located in the western section of the Station. The release of petroleum hydrocarbons to the subsurface soils was remediated using soil vapor extraction (SVE) treatment, and the Regional Water Quality Control Board (RWQCB), Santa Ana Region concurred with our request for no further soil remediation in a letter dated 27 March 2000.

Fourteen (14) SVE wells at the former Tank Farm 2 were destroyed in March 2001 under Orange County Health Care Agency (OCHCA) Permit 01-02-31. We have attached a copy of the RWQCB letter pertaining to soil remediation at former Tank Farm 2 and the well destruction report with this transmittal.

We consider all well destruction activities completed in accordance with permit requirements and that no further actions are required. If you have questions, please do not hesitate to call me at (619) 532-0783.

### Attachments

- Regional Water Quality Control Board, Santa Ana Region letter dated 27 March 2000
- Well Destruction Report (IT Corporation, May 2001)

CF: w/attachments

Patricia Hannon  
California Regional Water Quality Control Board, Santa Ana Region  
3737 Main Street, Suite 500  
Riverside, CA 92501-3339

Dean Gould (BRAC Environmental Coordinator, MCAS El Toro)  
Bill Sedlak (IT Corporation)  
Project File (MCAS El Toro)



# California Regional Water Quality Control Board

## Santa Ana Region

ston H. Hickox  
cretary for  
ironmental  
Protection

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>  
3737 Main Street, Suite 500, Riverside, California 92501-3339  
Phone (909) 782-4130 - FAX (909) 781-6288



Gray Davis  
Governor

March 27, 2000

Mr. Dean Gould  
BRAC Environmental Coordinator  
Base Realignment and Closure  
MCAS El Toro  
P.O. Box 51718  
Irvine, CA 92619-1718

### SITE ASSESSMENT AND REMEDIAL ACTION REPORT, TANK FARM 2, MARINE CORPS AIR STATION EL TORO

Dear Mr. Gould:

We have completed our review of the above report dated April 1998 and received at this office April 24, 1998. The report describes the use of vapor extraction to remediate the soil at Tank Farm 2.

Based on the information in the April 1998 Site Assessment And Remedial Action Report, Tank Farm 2, and provided it is true and accurate we concur with the request for no further soil remediation at this site.

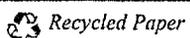
#### Groundwater

From recent discussions with your staff we understand that, groundwater samples were collected from several of the wells at Tank Farm 2 and a report should be out soon. When we receive the report on the groundwater samples, we will make a determination as to whether or not additional monitoring is needed or closure is appropriate for this site.

5000 NVH SD 6 3 21

BRAC OFFICE

*California Environmental Protection Agency*



Mr. Gould

- 2 -

March 27, 2000

If you should have any questions, please call me at (909) 782-4498.

Sincerely,



Patricia A. Hannon  
SLIC/DoD/AGT Section

cc: Dept. of Toxic Substances Control - Triss Chesney  
Naval Facility Engineering Command, SWDIV - Lynn Hornecker  
U. S. EPA, Region IX - Glenn Kistner  
Kutak Rock, Attorneys - Gregory F. Hurley  
Orange County Hall of Administration - Polin Modanlou

2000 MAR 29 P 3:51

BRAC OFFICE

*California Environmental Protection Agency*

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# ***Section 1***

## ***Introduction***

This report describes the well destruction activities performed at Marine Corps Air Station (MCAS) El Toro (station). IT Corporation (IT) was directed by the Navy under Southwest Division Naval Facilities Engineering Command (SWDIV) Contract No. N68711-93-D-1459 and GSA Contract No. GS-10F-0048J to destroy the following 14 vapor extraction wells at former Tank Farm 2:

TF2SVE-01	TF2SVE-31
TF2SVE-01A	TF2SVE-32
TF2SVE-03	TF2SVE-33
TF2SVE-12	TF2SVE-49
TF2SVE-18	TF2SVE-52
TF2SVE-25	TF2SVE-54
TF2SVE-28	TF2SVE-55

Well destruction activities were conducted from March 7 to 9, 2001. The wells were grouted with a cement-bentonite mixture. For ease of discussion, the wells are referred to by the "SVE" designation and number throughout the remainder of this report.

### ***1.1 Site Location***

MCAS El Toro is located approximately 45 miles southeast of Los Angeles in Orange County, California, and 1 mile north of intersection of Interstate 5 Santa Ana Freeway and Interstate 405 San Diego Freeway (Figure 1). The wells were located at former Tank Farm 2 in the southwest portion of the MCAS station (Figure 2).

### ***1.2 Background Information***

OHM Remediation Services Corporation (OHM) installed the soil vapor extraction (SVE) wells in 1996 as part of a remediation project at former Tank Farm 2. Vapor extraction was used to remediate petroleum hydrocarbons in the subsurface soil at former Tank Farm 2 (OHM, 1998).

In general, the wells were 4 inches diameter and were constructed from Schedule 40 polyvinyl chloride (PVC). One well, SVE-52, was a dual-completion well with two 2-inch steel casings and stainless steel screens. The 4-inch PVC wells had cut slots of 0.020-inch width. The 2-inch well included a 0.020-inch wire-wrapped screen to provide the equivalent open area of the 4-inch wells. All wells were installed using No. 3 Monterey sand. Former Tank Farm 2 has a dirt surface and, thus, the wellhead completions were simply 3-square-foot concrete pads with a well box in the center.

The vapor extraction wells all had screened intervals completely in the vadose zone; none of the wells reached the water table, which is approximately 131 feet below ground surface, based on four groundwater monitoring wells present at the site. The well screens were designed for the

areas of contamination and, therefore, varied from well to well. The wells were connected directly to the SVE collection system.

Table 1 presents well construction details, including depths, screened intervals, and survey coordinates.

## ***Section 2***

### ***Well Destruction Activities***

On February 28, 2001, before the start of well destruction activities, an approved Well Destruction Permit 01-02-31 was obtained from Orange County Health Care Agency (OCHCA) for the wells at former Tank Farm 2 (SVE-01, SVE-01A, SVE-03, SVE-12, SVE-18, SVE-21, SVE-25, SVE-28, SVE-31, SVE-32, SVE-33, SVE-49, SVE-52, SVE-54, and SVE-55). A copy of the permit is presented in Appendix A. In addition, OCHCA was notified of the schedule to allow representatives to witness the well destruction activities.

The well destruction activities were initiated on March 7, 2001, and concluded on March 9, 2001. Layne Christensen Company, IT's subcontractor for well destruction, mobilized a hollow-stem auger drill rig to the station on March 7, 2001. The following procedure was followed during the well abandonment for all wells:

- The drill rig was set up over the well to be abandoned and the 3- by 3-foot concrete pad was removed.
- The drill crew then opened the well and measured the total depth for grouting purposes.
- A 1-inch-diameter tremie pipe was lowered into the bottom of the well, and the drill crew then mixed the grout (consisting of a 95/5 percent cement/bentonite mixture) and pumped it into the well using positive pressure.
- Once the well was pressure grouted to approximately 5 feet below ground surface, the drill rig overdrilled (the upper 5 feet) using a 10-inch-diameter auger.
- The well casing was destroyed and the upper 5 feet of the well was then grouted to the surface.

Photographs of the well destruction activities are presented in Appendix B.

#### **Activities on March 7, 2001**

The drill rig was set up on well cluster SVE-52, SVE-12, and SVE-49 (Figure 2) located on the western side of former Tank Farm 2. Well SVE-52 was a dual-completion well with two 2-inch carbon steel casings and stainless steel screens. The deep well (95 to 120 feet below ground surface) and the shallow well (45 to 75 feet below ground surface) were both pressure grouted to approximately 5 feet below ground surface. After grout placement, the upper 5 feet of the well was overdrilled to remove the upper 5 feet of metal casing. The drill crew then grouted the upper 5 feet of the boring to a surface grade completion. The total volume of grout used to abandon SVE-52 was approximately 100 gallons. Table 2 lists the calculated volume of grout for each well and gravel pack and the actual volume used.

Wells SVE-12 and SVE-49 were both single wells constructed of 4-inch-diameter PVC pipe to depths of 90 and 50 feet below ground surface, respectively; the total volumes of grout used to abandon these wells were approximately 125 and 80 gallons, respectively. The drill crew experienced problems removing the upper 5-foot sections of the PVC casing because the casing

broke off at different lengths. The problem was solved by overdrilling with a plugged lead auger to grind up the PVC pipe. This method was more effective than pulling out the upper casing.

### **Activities on March 8, 2001**

The drill rig was set up on well cluster SVE-55, SVE-54, SVE-01, SVE-01A, and SVE-03 (Figure 2) located on the northern side of former Tank Farm 2. All the wells consisted of 4-inch-diameter Schedule 40 PVC pipe. The drill rig was first set up on SVE-55, and the drill crew removed the stand-up PVC casing and destroyed the concrete pad. After pressure grouting, the well was overdrilled with the plugged lead auger and the upper 5 feet of the well was destroyed. After the auger was removed, the drill crew added the final bentonite grout to surface grade. The volume of grout used to abandon SVE-55 was approximately 150 gallons. The drill crew next abandoned wells SVE-54, SVE-01, SVE-01A and SVE-03 in that order. The volumes of grout used to abandon these wells were approximately 95 gallons for SVE-54, 120 gallons for SVE-01, 70 gallons for SVE-01A, and 155 gallons for SVE-03. OCHCA inspectors arrived on site to observe and approve the abandonment of wells SVE-01, SVE-01A, and SVE-03.

SVE-28 was the final well to be abandoned on March 8, 2001. It was part of the eastern well cluster at former Tank Farm 2 (SVE-25). The volume of grout used to abandon the well was approximately 60 gallons.

### **Activities on March 9, 2001**

The drill crew set up the drill rig on SVE-25 and began abandonment. The aboveground PVC pipe was removed and destroyed, as was the concrete pad. The concrete and PVC pipe were disposed of as municipal waste in a nonhazardous landfill. The volume of grout used to abandon SVE-25 was approximately 90 gallons. The drill crew added grout to top off the grout that had settled overnight.

The drill rig was then set up on well cluster SVE-18, SVE-31, and SVE-32 (Figure 2) located on the southeastern side of former Tank Farm 2. The drill rig was first set up on SVE-18 and the aboveground PVC pipe and concrete pad were removed. The well was then opened and measured and the tremie pipe was lowered into the well. The grout mixture was pumped into the well to about 5 feet below ground surface. The upper 5 feet of the well was then overdrilled and filled with final grout to surface grade. The volume of grout used was approximately 80 gallons. The drill crew then abandoned wells SVE-31 and SVE-32; the volumes of grout used were 70 and 60 gallons, respectively.

Well SVE-33 (Figure 2) was the last to be abandoned. The drill rig was set up on the well, and the stand-up PVC pipe and concrete pad were destroyed and removed. The well was then opened and measured and the tremie pipe was lowered into the well. Grout was pumped into the well by positive pressure to 5 feet below ground surface. The upper 5 feet was then overdrilled and filled with the final grout mixture to surface grade. The total volume of grout used was approximately 75 gallons.

All concrete wellhead debris was consolidated for removal and off-site disposal as municipal waste. All well abandonment locations were topped off to surface grade with additional grout as the mixture settled.

The debris was removed and placed into Waste Management trash disposal bins on March 19 and 20, 2001, and the bins were collected by Waste Management on March 23, 2001.

## *Section 3*

# *Conclusions*

Well abandonment and destruction activities at former Tank Farm 2 were performed from March 7 to March 9, 2001.

The volume of grout used to abandon each well was within the volume range estimated or higher in all cases (Table 2). The estimated volume required was the total volume of grout that would fill the casing and the voids in the sand pack surrounding the screen and was determined based on the casing and borehole diameters and lengths. The introduction of the estimated volume or more indicates that the sand pack should be significantly filled with grout to reduce any pathways through the borehole.

The destruction of wells SVE-01, SVE-01A, SVE-03, SVE-12, SVE-18, SVE-25, SVE-28, SVE-31, SVE-32, SVE-33, SVE-49, SVE-52, SVE-54, and SVE-55 was conducted in accordance with the guidelines presented in California Department of Water Resources (DWR) Bulletins 74-81 and 74-90 (DWR, 1981 and 1990). In addition, the work was completed in compliance with the requirements set forth in the well destruction permit issued by the OCHCA, as witnessed by OCHCA inspectors.

## *Section 4*

# *References*

California Department of Water Resources, 1981, *Water Well Standards: State of California, Bulletin 74-81*, pp. 52-57.

California Department of Water Resources, 1990, *California Well Standards, Bulletin 74-90*, pp. 60-65.

DWR, see California Department of Water Resources.

OHM, see OHM Remediation Service Corp.

OHM Remediation Service Corp., 1998, *Site Assessment and Remedial Action Report Tank Farm 2 MCAS El Toro*, April.

# Figures

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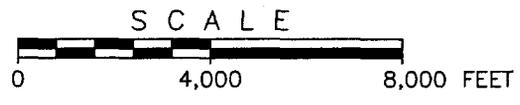
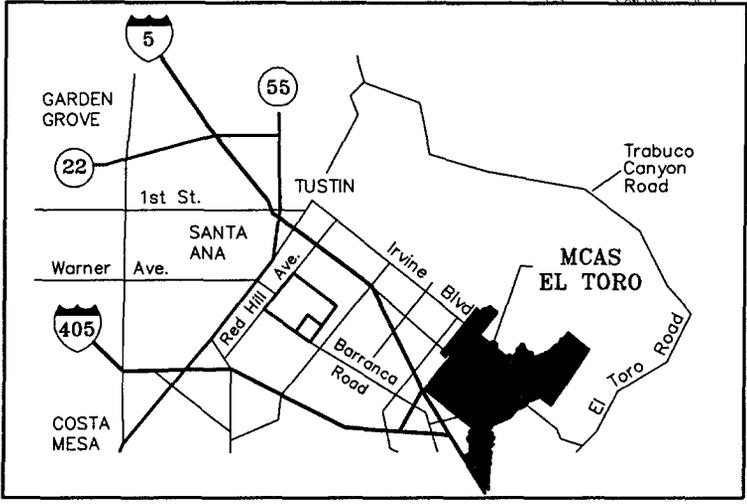
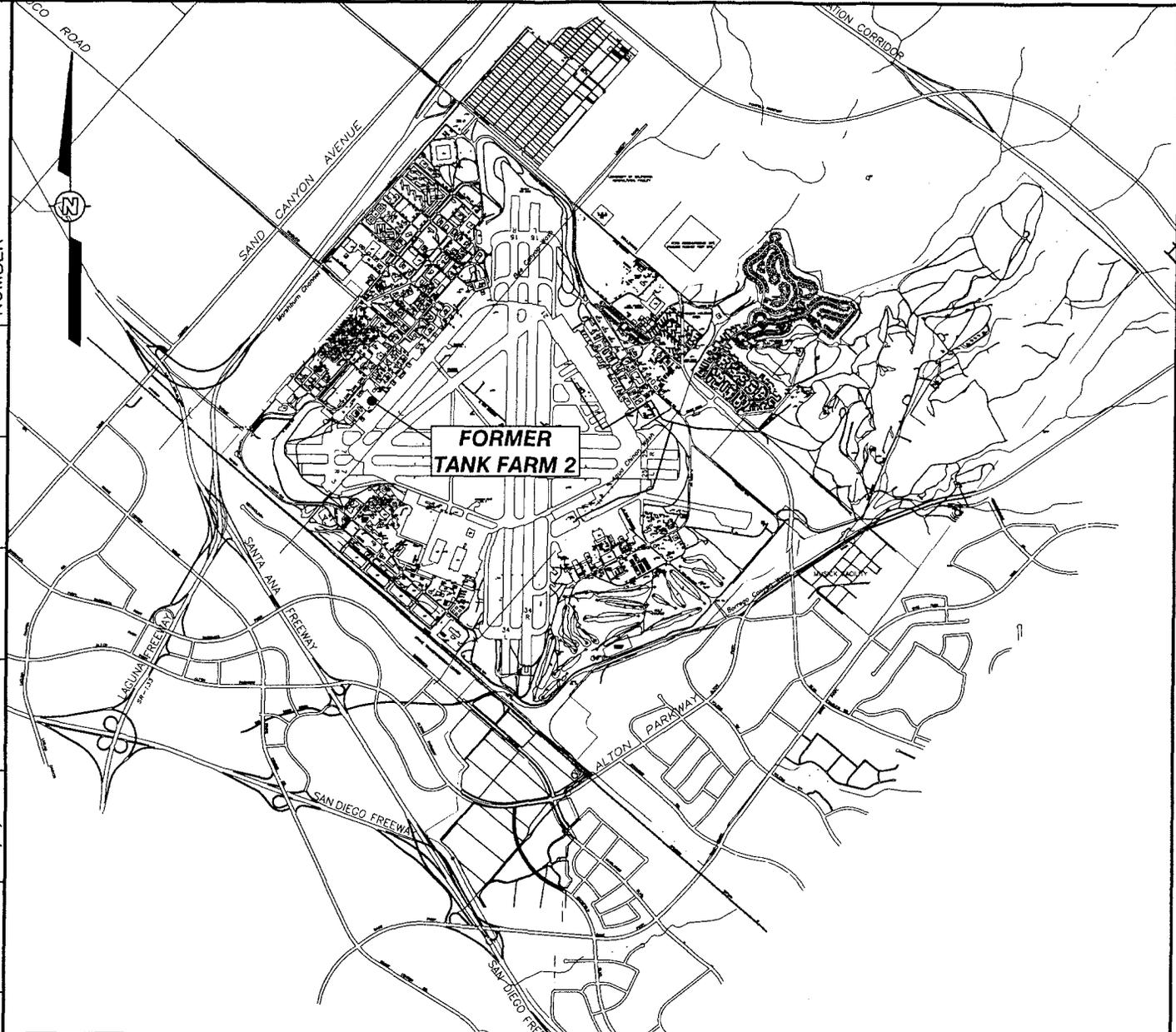
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PROJECT NUMBER: 812380

FIGURE 1  
FACILITY LOCATION MAP  
FORMER TANK FARM 2  
MARINE CORPS AIR STATION  
EL TORO, CALIFORNIA

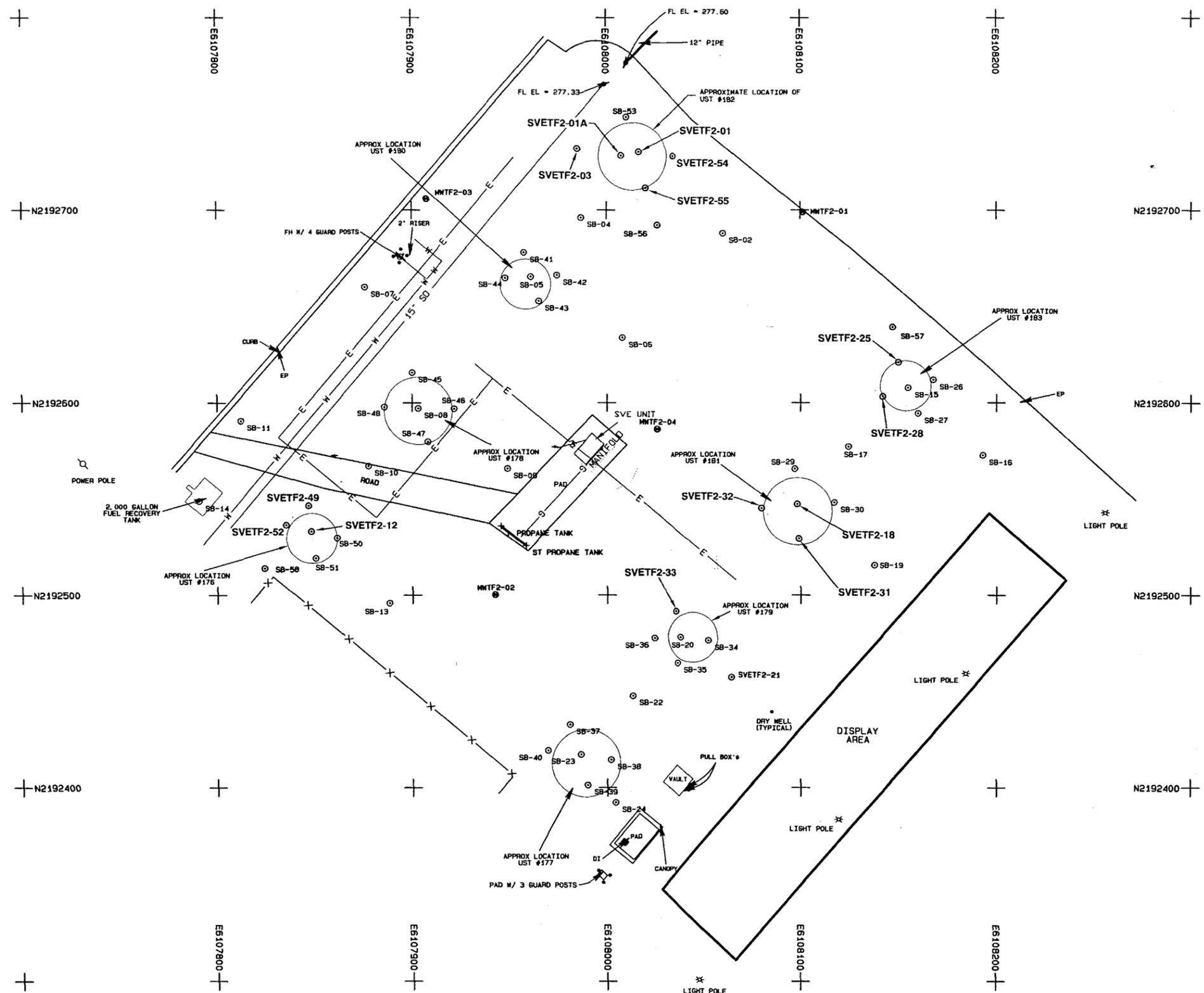
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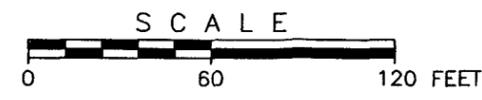


**EXPLANATION**

- x- FENCE LINE
- 15\"/>
- E- APPROX. LOCATION OF U/G ELECTRIC LINE
- W- APPROX. LOCATION OF U/G WATER LINE
- FORMER TANK LOCATIONS
- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL

**NOTE:**  
 LOCATION OF UNDERGROUND UTILITIES AND UST TANKS WAS COMPILED FROM USMCAS EL TORO FACILITIES MANAGEMENT DEPARTMENT DRAWING C-1 PROVIDED BY OHM.

MADE FROM:  
 C-1 DRAWING PROVIDED BY OHM, COMPILED FROM USMCAS EL TORO FACILITIES MANAGEMENT DEPARTMENT TOWILL DRAWING FF2\_04



GS-812380004  
 PROJECT NUMBER: 812380

FIGURE 2  
**SITE MAP**  
 FORMER TANK FARM 2  
 MARINE CORPS AIR STATION  
 EL TORO, CALIFORNIA

**Table 1**

**Summary of Well Construction Details**

Well ID No.	Boring Depth (feet)	Well / Borehole Diameter (inches)	Screen Interval (feet bgs)	Screen Slot Size (inches)	Material of Casing/Screen	Depth of Filter Pack Interval (feet)	Depth of Bentonite Seal Interval (feet)	Depth of Grout Seal Interval (feet)	Survey Coordinates
									NAD 83 Controls
TF2SVE-01	115	4 / 11.5	58.0-88.0	0.020	PVC / PVC	57.0-88.0	54.0-57.0	0-54.0	Northing = 2192729.984.3391 Easting = 6108016.352 Elev: Top of casing = 283.900 feet Elev: Ground surface = 281.442 feet
TF2SVE-01A	40	4 / 11.5	18.0-38.0	0.020	PVC / PVC	15.0-39.5	12.0-15.0	0-11.5	Northing = 2192728.229 Easting = 6108007.432 Elev: Top of casing = 281.228 feet Elev: Ground surface = 284.132 feet
TF2SVE-03	135	4 / 11.5	100-120	0.020	PVC / PVC	98.0-121.0	94.5-98.0	0-93.5	Northing = 2192731.914 Easting = 6107985.382 Elev: Top of casing = 281.015 feet Elev: Ground surface = 283.590 feet
TF2SVE-12	110	4 / 11.5	50.0-70.0 80.0 - 90.0	0.020	PVC / PVC	46.0-73.0 79.0- 92.0	43.0-46.0 73.0-79.0	0-43.0	Northing = 2192532.892 Easting = 6107848.258 Elev: Top of casing = 278.003 feet Elev: Ground surface = 280.707 feet
TF2SVE-18	80	4 / 11.5	25.0-55.0	0.020	PVC / PVC	22.5-57.0	18.0-22.5	0-18.0	Northing = 2192547.462 Easting = 6108098.080 Elev: Top of casing = 282.477 feet Elev: Ground surface = 285.185 feet
TF2SVE-25	70	4 / 11.5	30.0-60.0	0.020	PVC / PVC	25.0-62.5	20.5-24.8	0-20.5	Northing = 2192620.978 Easting = 6108149.852 Elev: Top of casing = 286.387 feet Elev: Ground surface = 283.841 feet
TF2SVE-28	40	4 / 11.5	20.0-30.0	0.020	PVC / PVC	18.0-32.0	14.0-18.0	0-13.75	Northing = 2192603.283, Easting = 6108141.652 Elev: Top of casing = 283.450 feet Elev: Ground surface = 286.088 feet
TF2SVE-31	50	4 / 11.5	20.0-40.0	0.020	PVC / PVC	18.0-42.0	15.0-18.0	0-15.0	Northing = 2192529.479 Easting = 6108099.300 Elev: Top of casing = 282.448 feet Elev: Ground surface = 285.119 feet

**Table 1**

**Summary of Well Construction Details**

Well ID No.	Boring Depth (feet)	Well / Borehole Diameter (inches)	Screen Interval (feet bgs)	Screen Slot Size (inches)	Material of Casing/Screen	Depth of Filter Pack Interval (feet)	Depth of Bentonite Seal Interval (feet)	Depth of Grout Seal Interval (feet)	Survey Coordinates
									NAD 83 Controls
TF2SVE-32	40	4 / 11.5	20.0-30.0	0.020	PVC / PVC	18.0-32.0	15.0-18.0	0-15.0	Northing = 2192545.323 Easting = 6108079.720 Elev: Top of casing = 282.465 feet Elev: Ground surface = 285.353 feet
TF2SVE-33	55	4 / 11.5	25.0-45.0	0.020	PVC / PVC	22.5-47.0	20.0-22.5	0-20.0	Northing = 2192491.820 Easting = 6108035.179 Elev: Top of casing = 281.187 feet Elev: Ground surface = 284.053 feet
TF2SVE-49	52	4 / 11.5	25.0-50.0	0.020	PVC / PVC	22.5-52.0	18.5-22.5	0-18.5	Northing = 2192546.663 Easting = 6107846.698 Elev: Top of casing = 277.974 feet Elev: Ground surface = 280.756 feet
TF2SVE-52 <sup>a</sup>	122	2 / 11.75	45.0-75.0 95.0-120.0	0.020	LCS / SS	43.0-76.0 100.0-125.5	89.0-90.0 42.0-43.0	0-41.0 90.0-100.0	Northing = 21925336.767 Easting = 6107835.288 Elev: Top of casing = 277.629 feet Elev: Ground surface = 281.024 feet
TF2SVE-54	67	4 / 11.5	40.0-65.0	0.020	PVC / PVC	38.0-67.0	35.0-38.0	0-35.0	Northing = 2192727.687 Easting = 610834.062 Elev: Top of casing = 282.265 feet Elev: Ground surface = 282.265 feet
TF2SVE-55	121.5	4 / 11.5	89.0-119.0	0.020	PVC / PVC	85.5-121.0	81.5-86.0	0-81.0	Northing = 2192711.296 Easting = 6108021.002 Elev: Top of casing = 281.455 feet Elev: Ground surface = 284.391 feet

<sup>a</sup>SVE-52 is a dual-completion well.

bgs – below ground surface

LCS – low carbon steel

NAD – North American Datum

PVC – polyvinyl chloride

SS – stainless steel

**Table 2****Summary of Well Destruction Details**

Well No.	Boring Depth (feet)	Well / Borehole Diameter (inch)	Volume in Casing (gallons)	Estimated Volume of Casing and Sand Pack (gallons)	Actual Grout Used for Abandonment (gallons)
SVE-01	115	4 / 11.5	57.4	109-120	120
SVE-01A	40	4 / 11.5	26.1	52-58	70
SVE-03	135	4 / 11.5	78.3	122-131	155
SVE-12	110	4 / 11.5	58.8	121-133	125
SVE-18	80	4 / 11.5	32.6	71-95	80
SVE-25	70	4 / 11.5	39.2	88-98	90
SVE-28	40	4 / 11.5	19.6	45-50	60
SVE-31	50	4 / 11.5	26.1	57-63	70
SVE-32	40	4 / 11.5	19.6	45-50	60
SVE-33	55	4 / 11.5	29.4	67-74	75
SVE-49	52	4 / 11.5	32.6	65-72	80
SVE-52	122	2 / 11.75	31.8	100-120	100
SVE-54	67	4 / 11.5	42.4	76-83	95
SVE-55	121.5	4 / 11.5	77.7	117-124	150

*The volume of casing and sand pack was estimated using a porosity of 25 to 30 percent for the estimated volume of the sand pack, assuming full penetration.*

# *Appendices*

*Appendix A*  
*Well Destruction Permit*

**APPLICATION FOR WELL DESTRUCTION PERMIT**

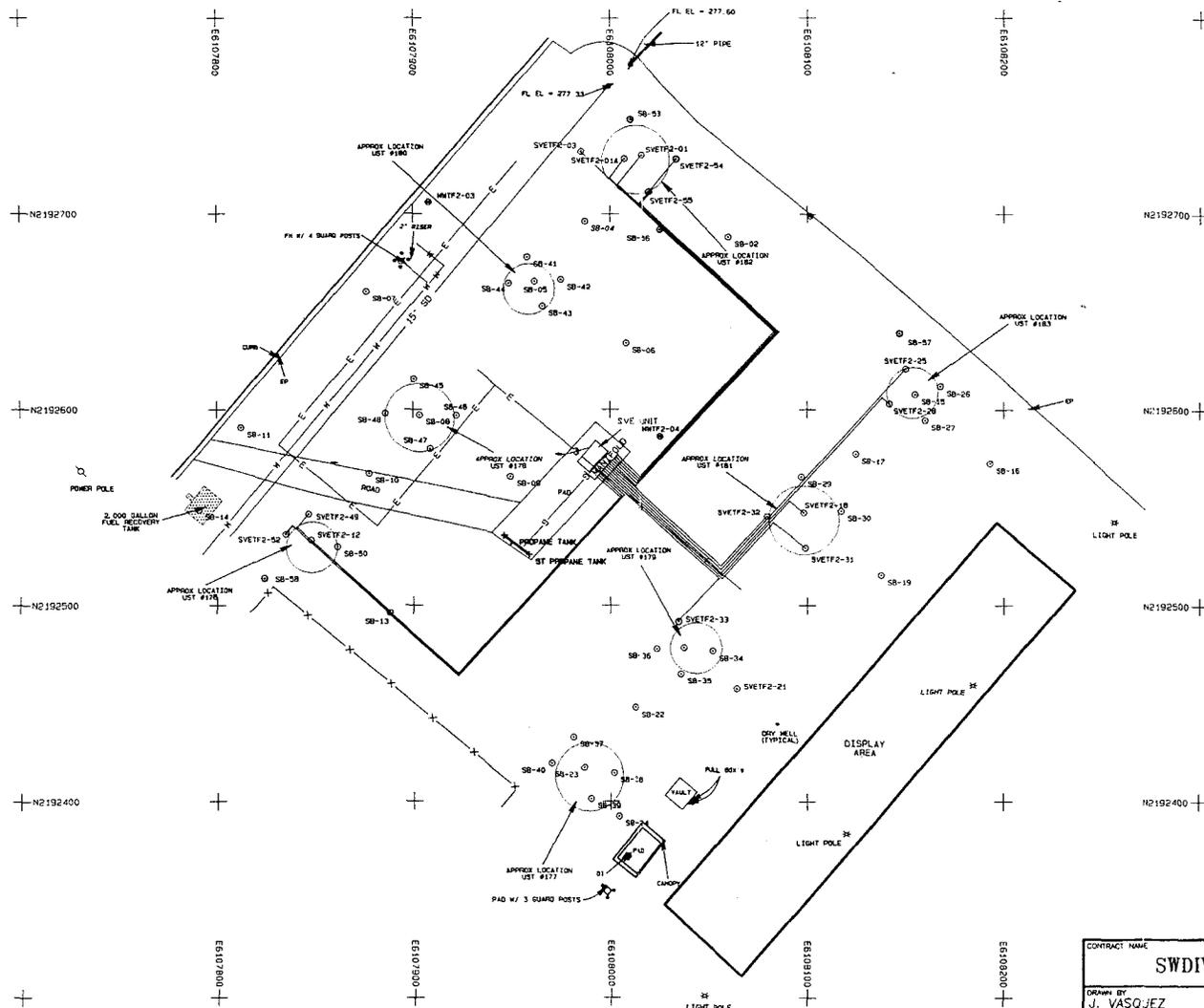
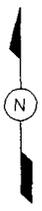
ORANGE COUNTY HEALTH CARE AGENCY  
 ENVIRONMENTAL HEALTH DIVISION  
 1000 S. COLLEGE AVENUE  
 SANTA ANA, CA 92705  
 (714) 837-3000  
 (714) 837-3000

CITY: <u>Unincorporated Irvine</u>		DATE:
WELL LOCATION (ADDRESS IF AVAILABLE): <u>Tank Farm 2 MCAS ELTORO (See site map) (ETMLCAS)</u>		
NAME OF WELL OWNER: <u>MCAS ELTORO</u>		NAME OF CONSULTING FIRM: <u>I.T. Corp</u>
ADDRESS: <u>Engineering Division Bldg 368</u>		CLIENT ADDRESS: <u>3347 Michelson Dr #200</u>
CITY: <u>SANTA ANA 92709 (949) 726-2556</u>	TELEPHONE: <u>(949) 726-3127</u>	CITY: <u>IRVINE 92612 (949) 660-5446</u>
NAME OF DRILLING CO. <u>Layne Christensen Co.</u>	OSP LICENSE NUMBER: <u>51011</u>	TYPE OF WELL/TOTAL NUMBER: <u>15</u> WATER (4) - 4 inch dia CATHODIC MONITORING 1 - Dual depth OTHER SVE
CITY: <u>Fontana 92337</u>	TELEPHONE: <u>(909) 890-2833</u>	PROPOSED START DATE:
SEALING MATERIAL / ESTIMATE AMOUNT OF SEALING MATERIAL NEEDED:		WELL DEPTH: _____ Feet
METHOD OF DESTRUCTION: 1) Set tronic pipe at well bottom 2) Pressure grout through tronic pipe from bottom up, in one continuous lift to 6 feet b.g.s. (BENTONITE Grout)		3) Expand casing (Grout) 4) Cut well casing to 5ft deep. 5) Pour concrete plug over well casing 6) Backfill top of excavation with soil
LOCATION OF WELL SITE (Any additional should attach coordinates)  <u>See: site map location map</u> <u>See Well construction Table</u> <u>See</u>		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.
APPROVAL BY OTHER AGENCIES:		APPLICANT'S SIGNATURE: <u>Lynn M. Harned</u> DATE: <u>2/22/01</u>
FOR ACCOUNTING USE ONLY: KSP NO. <u>2-28-01</u> GROUP NO. _____ DATE: <u>2/28</u> AMOUNT: <u>EXLADJ</u>		REGISTERED PROFESSIONAL ENGINEER SIGNATURE: <u>Lynn M. Harned</u> PHONE NUMBER: <u>619 532 0783</u> FAX NUMBER: <u>619 532 0780</u>
APPROVAL BY OTHER AGENCIES:		DEPOSITION (IF PERMIT (DO NOT FILL IN): <input checked="" type="checkbox"/> APPROVED SUBJECT TO THE FOLLOWING CONDITIONS: A. <input checked="" type="checkbox"/> NOTIFY THE AGENCY AT LEAST 48 HOURS PRIOR TO START B. <input type="checkbox"/> SUBMIT TO THE AGENCY A WELL DESTRUCTION REPORT. PLEASE REFERENCE PERMIT NUMBER. C. <input type="checkbox"/> OTHER: _____ <input type="checkbox"/> DENIED
APPROVAL BY OTHER AGENCIES:		PERMIT CHECKED BY: <u>DAI MATSU</u> DATE: <u>2-28-01</u> PHONE NUMBER: <u>714 667-3758</u>

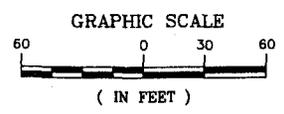
WELL PERMIT NUMBER 01-02-51

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

Sept. 19, 1997 -- 10:51 E:\PROJECTS\18292\18292057.dwg



- EXPLANATION**
- X- FENCE LINE
  - 15' SD- APPROX. LOCATION OF U/G 15' S.D. LINE
  - E- APPROX. LOCATION OF U/G ELECTRIC LINE
  - W- APPROX. LOCATION OF U/G WATER LINE
  - TANK LOCATIONS
  - ⊙ MONITORING WELL
  - ⊙ SOIL VAPOR EXTRACTION WELL



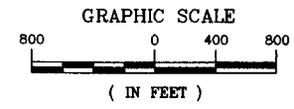
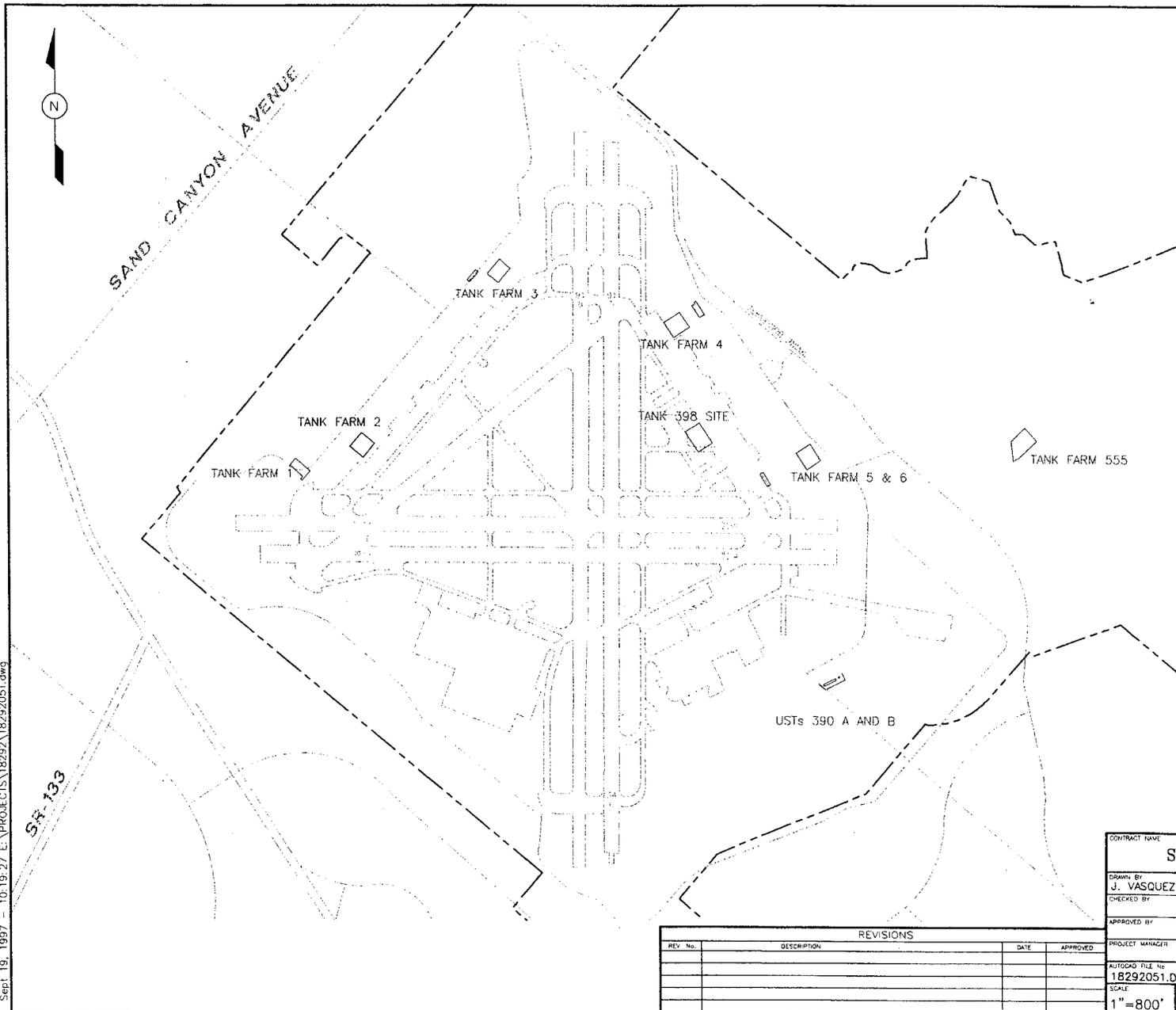
**NOTE:**  
 LOCATION OF UNDERGROUND UTILITIES AND UST TANKS  
 WAS COMPILED FROM USMCAS EL TORO FACILITIES  
 MANAGEMENT DEPARTMENT DRAWING C-1 PROVIDED BY  
 BY OHM.  
 MADE FROM TOWILL DRAWING FF2\_04

REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED

CONTRACT NAME <b>SWDIV</b>		OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA	
DRAWN BY <b>J. VASQUEZ</b>	DATE <b>09/19/97</b>	<b>SITE MAP TANK FARM 2</b>	
CHECKED BY	DATE		
APPROVED BY	DATE		
PROJECT MANAGER	DATE		
AUTOCAD FILE NO. <b>18292057.DWG</b>		MARINE CORPS AIR STATION, EL TORO SANTA ANA, CALIFORNIA	
SCALE <b>1"=60'</b>	SHEET <b>1</b>	OF <b>1</b>	DOCUMENT CONTROL NO. <b>SW4232</b>
OHM PROJECT NO. <b>18292</b>		DRAWING NO. <b>FIG 2-</b>	

**EXPLANATION:**

- MCAS EL TORO BOUNDARY
- L 16 RUNWAY NUMBER



Sept 19, 1997 - 10:19:27 E:\PROJECTS\18292\18292051.dwg

CONTRACT NAME <b>SWDIV</b>		 <b>OHM Remediation Services Corp.</b> <small>A Subsidiary of OHM Corporation SAN DIEGO, CA</small>	
DRAWN BY <b>J. VASQUEZ</b>	DATE <b>09/19/97</b>	<b>SITE LOCATION MAP TANK FARM 2</b>  <b>MARINE CORPS AIR STATION, EL TORO SNATA ANA, CALIFORNIA</b>	
CHECKED BY	DATE		
APPROVED BY	DATE		
PROJECT MANAGER	DATE		
AUTOCAD FILE No. <b>18292051.DWG</b>		DOCUMENT CONTROL No. <b>SW4232</b>	DWG PROJECT No. <b>18292</b>
SCALE <b>1"=800'</b>		SHEET OF <b>1 1</b>	DRAWING No. <b>FIG 1-2</b>

REVISIONS			
REV. No.	DESCRIPTION	DATE	APPROVED

**TABLE 2-1 SOIL VAPOR EXTRACTION WELL CONSTRUCTION DATA, TANK FARM 2  
MCAS, EL TORO**

Construction Details by Depth (details per well completion logs and reported in feet unless otherwise noted)											Reference Point Elevation <sup>(a)</sup>	
Well ID Number	Date Installed	Total Depth (ft. bgs)	Borehole Diameter (inches)	Screen Diameter (inches)	Screen Slot Size (inches)	Screen Material	Screened Interval (ft. bgs)	Blank Casing (ft. bgs)	Blank Casing Material	Grout/Concrete Seal (ft. bgs)	(ft. bgs)	
											Top of Casing	Well Box Rim Surface
TF2SVE-01	4/22/96	115	11 1/2	4	0.020	PVC	58-88	0-58	PVC		283.9	281.442
TF2SVE-01A	4/23/96	40	11 1/2	4	0.020	PVC	18-38	0-18	PVC	0-12	281.228	284.132
TF2SVE-03	5/8/96	135	11 1/2	4	0.020	PVC	100-120	0-100	PVC	0-98	281.015	283.59
TF2SVE-12	4/10/96	110	11 1/2	4	0.020	PVC	50-70/ 80-90	0-50/ 70-80	PVC	0-43	278.003	280.707
TF2SVE-18	5/2/96	80	11 1/2	4	0.020	PVC	20-50	0-20	PVC	0-18	282.477	285.185
TF2SVE-21	5/3/96	80	11 1/2	4	0.020	PVC	50-80	0-100	PVC			
TF2SVE-25	5/21/96	70	11 1/2	4	0.020	PVC	30-60	0-30	PVC	0-21	286.387	283.841
TF2SVE-28	5/22/96	40	11 1/2	4	0.020	PVC	20-30	0-20	PVC	0-14	283.45	286.088
TF2SVE-31	5/29/96	50	11 1/2	4	0.020	PVC	25-40	0-25	PVC	0-15	282.448	285.119
TF2SVE-32	5/28/97	40	11 1/2	4	0.020	PVC	20-30	0-20	PVC	0-15	282.465	285.353
TF2SVE-33	6/3/96	55	11 1/2	4	0.020	PVC	25-45	0-25	PVC	0-20	281.187	284.053
TF2SVE-49	6/13/96	52	11 1/2	4	0.020	PVC	25-50	0-25	PVC	0-18.5	277.974	280.756
TF2SVE-52**	6/16/97	122	11 3/4	2	0.020	SS	95-120/ 45-75	0-45/ 75-95	LCS		277.629	281.024
TF2SVE-54	6/16/97	67	11 1/2	4	0.020	PVC	40-65	0-40	PVC	0-35	282.265	284.599
TF2SVE-55	6/19/97	121.5	11 1/2	4	0.020	PVC	89-119	0-89	PVC	0-81	281.455	284.391

**Explanation:**

- (a) Reference point northing, easting, and elevation data collected by Towill Surveying of Tustin, California. Data collected August 6, 1996, with the exception of 398RW-02 and 398SVE-34. Those wells were surveyed on November 1, 1996.
- SS stainless steel
- PVC polyvinyl casing
- LCS low carbon steel
- bgs below ground surface
- ID Identification
- \* seal comprised of volclay grout and bentonite chips
- \*\* dual- casing well
- NAD 83 Northing and easting coordinate system for Marine Corps Air Station El Toro.

# *Appendix B*

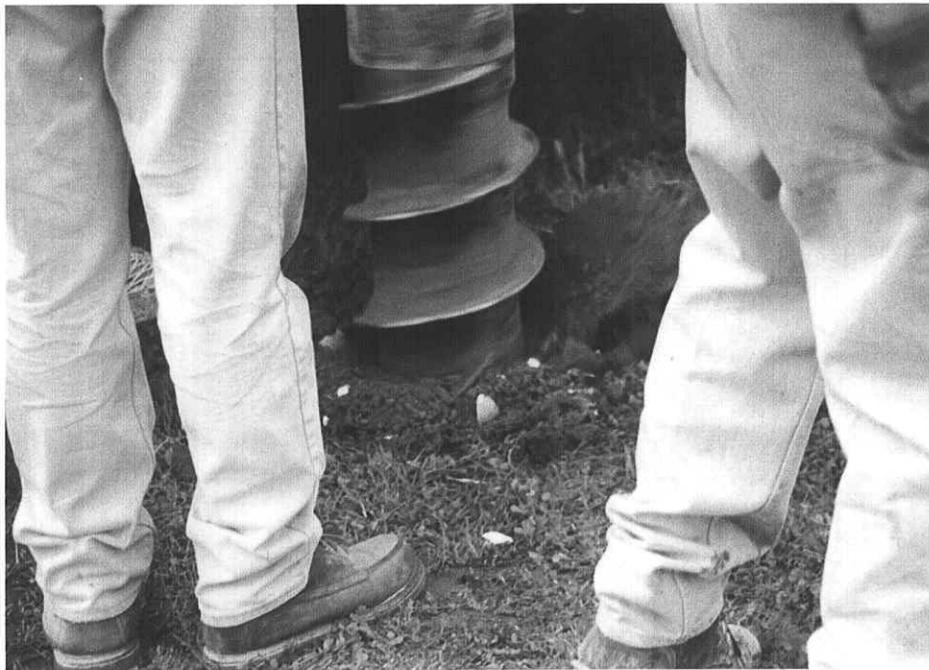
## *Photographs*



Tank Farm 2 Wells SVETF2-12 and SVETF2-49 Following Original Installation (April 1996)



Pressure Grouting SVETF2-12 for Abandonment (March 2001)



Removal of Top Five Feet of Casing by Overdrilling Casing



View of Former SVE Well Prior to Grouting Top Five Feet