

MFA Leasehold EIMP Appendix A - Part 3

3 March 2015

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Sincerely,

ERLER & KALINOWSKI, INC.



Michelle K. King, Ph.D.
President

APPENDIX A

NASA EEC Statements

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EEC Table
(document order)

Site Name	Description	OU
Site 1	Runway Landfill	1
Site 2	Golf Course Landfill #1	1
Site 5	Fuel Farm	
Site 12	Firefighting Training Area	
Site 3	Marriage Road Ditch	2 East
Site 4	Former Industrial	2 East
Site 6	Runway Apron	2 East
Site 7	Hangars 2 & 3	2 East
Site 10	Airfields	2 East
Site 11	Engine Test Stands	2 East
Site 13	Equipment Parking Area	2 East
Site 15	Tanks & Sumps	
Site 19	Tanks 2, 14, 43, and 53	
Site 20	Zook Rd. Fuel Spill	
Site 22	Golf Course Landfill #2	
Site 23	Golf Course Fill Area	
Site 24	Active Petroleum Sites	
Site 25	Stormwater Retention Pond	6
Site 26	East Side Aquifer	5
Site 27/21	Northern Channel/Patrol Rd	
Site 28	West Side Aquifer	
Site 29	Hangar 1	
	Flux Ponds	
	Tanks Other USTs/ASTs	
	Potential New Sites	
	NFA Sites	
	AOI 15	
	Abandoned Navy Fuel System	

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SITE NAME:	Tank Sites				
Version:	Final		Date:	02/08/2015	
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC		NASA Ames Research Center		
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108		M/S 204-15 Bldg. N204, Rm 102B Moffett Field, CA 94035		
Contact	Scott Anderson		Don Chuck		
	scott.d.anderson@navy.mil		Donald.m.chuck@nasa.gov		
	619-532-0938		650-604-0237		
LOCATION					
Facility Name	Moffett Federal Airfield		Site Location		
Facility Address	Mountain View, CA Santa Clara County		Latitude	See attachments	
			Longitude	See attachments	
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
UST/AST	RWQCB, SCCDEH		X	Not Applicable	See attachments
SITE SUMMARY					
<p>The tank sites Existing Environmental Conditions Report covers various underground and aboveground storage tanks that have been removed or closed in place. Detailed information for each tank is provided in the attachments to this document.</p> <p>Figures 1 and 2 provide the locations of the tanks in this report.</p>					

SITE NAME:

Tank Sites

REMEDIAL ACTION

Remedy	Removal & Disposal of Tanks	Begin Date		End Date	
See attachments.					

Land Use Restrictions

Development Issues

See attachments.	See attachments.
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SITE NAME:

Tank Sites

RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
			See attachments for soil and groundwater contamination left in place.

REFERENCES (Chronological Order)

References are provided on attachments.

FIGURES

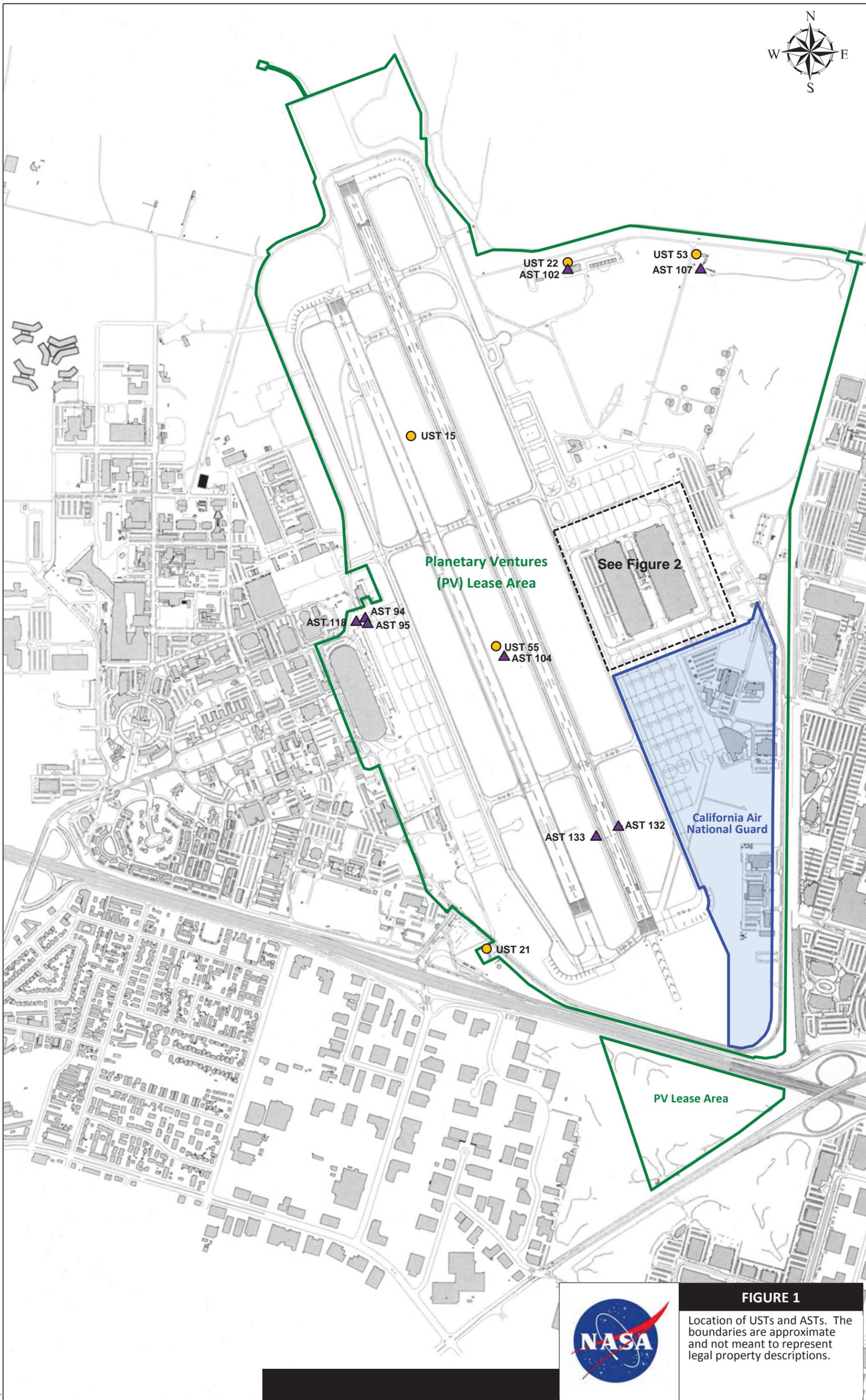


FIGURE 1
Location of USTs and ASTs. The boundaries are approximate and not meant to represent legal property descriptions.

V



 **FIGURE 2**
 Tank locations in the Hangar 2 and 3 area.
 Google Earth Photograph 9/26/2011

ATTACHMENTS

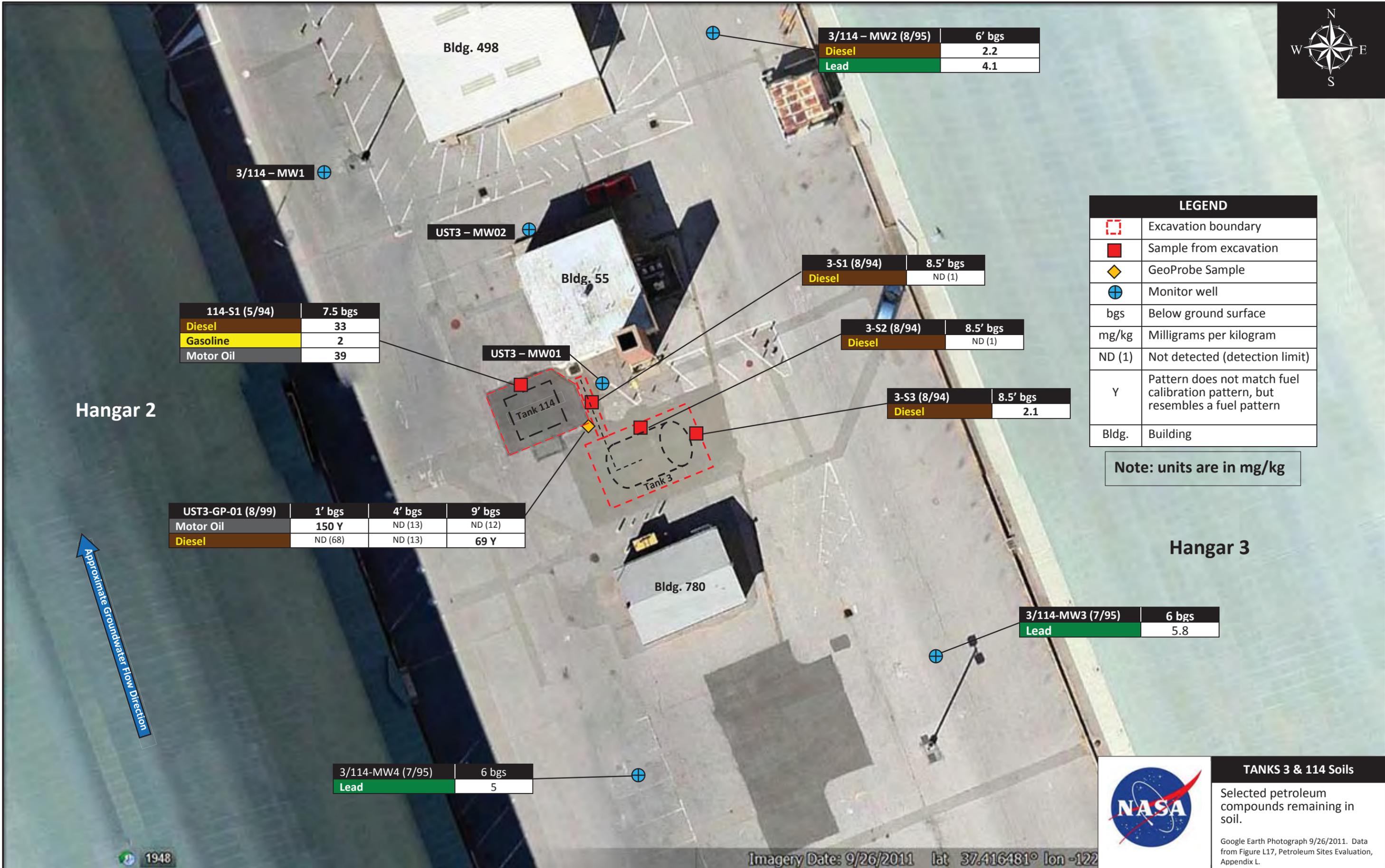
Tank ID:		3		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0928			
LOCATION				
Building No.	55	Latitude (°N)	37.416386	
		Longitude (°W)	122.042897	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	SW Fiberglass	10,000	Fuel Oil	
Use	Stand fuel supply for the boilers in Bldg. 55			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	1980	04/15/1994	X	X
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 3 was removed by the Navy Public Works Center. A backhoe was used to excavate a 35-foot long, 15-foot wide, by 15-foot deep area. The tank was lifted out of the excavation using lifting straps and the backhoe. During removal of the straps from the tank, the tank split into 2 sections. Some contents at the bottom of the tank spilled into the groundwater in the excavation. The spill in the groundwater was removed from the water surface using absorbent socks and towels. Other than the fracture, the tank appeared to be in good conditions with not visible leaks. The piping appeared to be in good shape as well. The excavated soil was placed back in the hole along with clean pea gravel and soil.</p>		<p>Three soil samples (3-S1, 3-S2, and 3-S3) were taken from the excavation sidewalls about 6 inches above the groundwater. A groundwater sample (3-W1) was also taken from the center of the excavation. Samples were analyzed for TPH-e.</p> <p>An investigation was carried out in July 1995 to assess the lateral extent of soil and groundwater contamination for Tanks 3 and 114. Tank 114 is discussed in the Tank 114 EEC. Fourteen GeoProbe borings were advanced. Soil samples were collected at 8 and 9 feet bgs. Fourteen groundwater samples were also collected. Soil and groundwater samples were analyzed for TPH-e as diesel and TPH-p as gasoline (EPA 8015 Modified), BTEX (EPA 8020) and VOCs (EPA 8010).</p> <p>The Navy conducted an additional investigation in August 1999. Soil and groundwater samples were collect from one GeoProbe boring. Samples were analyzed for TPH-e, BTEX, SVOCs, and MTBE. Two monitor wells were installed with a hollow stem auger. Free product had been observed in the well purge water from UST3-MW02. On December 8, 1999, the wells were checked for free product using an interface probe. Free product was not detected.</p> <p>Tank location, sampling points, and remaining soil and groundwater contamination is presented on figures Tank 3 & 114 Soil and Tank 3 & 114 groundwater.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (RWQCB 4/20/2009)
Land Use Restrictions		Development Issues	
<p>The RWQCB issued a NFA letter on 4/20/2009. The NFA determination is based on commercial/industrial land use. The land use is restricted to commercial/industrial use, residential use is not allowed.</p> <p>No additional institutional controls or restrictions were provided in the NFA letter.</p> <p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, July 2002.</p>		<p>Petroleum hydrocarbons could be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Basewide Petroleum Site Evaluation Methodology Technical Memorandum, Appendix L Petroleum Site Evaluation, Moffett Federal Airfield, CA.</i> Tetra Tech EM INC., San Diego, CA. December 16, 2003. • <i>Transmittal of Closure Letter and Site Summary for Underground Storage Tanks 3 and 114 (Water Board Case No. 43D9045), Building 55, NAS Moffett Field, Mountain View, Santa Clara County.</i> RWQCB SF Bay letter to John Hill of the Navy, dtd. 4/20/2009. 			

Tank ID:		114		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	55	Latitude (°N)	37.416418	
		Longitude (°W)	122.053314	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Concrete	2,400	Fuel Oil	
Use	Fuel supply for the boilers in Bldg. 55			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	05/17/1994	X	X
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 114 was removed by the Navy Public Works Center. A backhoe was used to excavate an 18-foot by 12-foot by 15-foot area. The tank was lifted out of the excavation using the backhoe. No visible holes or potential contaminant pathways were observed in the tank and the piping appeared to be in good condition. Groundwater entered the excavation and rose to 7 feet below ground surface (bgs). A sheen was noticed on the groundwater surface. After samples were collected, the excavation was lined with plastic and backfilled with the excavation soil.</p>		<p>A soil sample (114-S1) was collected at the center of the excavation at 7.5 bgs and analyzed for TPH-extractable (TPH-e), Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) and volatile organic compounds (VOCs). One groundwater sample (114-W1) was taken from the excavation and analyzed for TPH-e. Analytical results for 114-S1 indicated the presence of diesel @ 33 mg/kg, gasoline @ 2 mg/kg, and motor oil @ 39 mg/kg. Analytical results for 114-W1 indicated the presence of diesel @ 6000 µg/L, jet fuel @ 2500 µg/L, and motor oil @ 15,000 µg/L.</p> <p>An investigation was carried out in Jul 1995 to assess the lateral extent of soil and groundwater contamination for Tanks 3 and 114. Fourteen GeoProbe borings were advanced. Soil samples were collected at 8 and 9 feet bgs. Fourteen groundwater samples were also collected. Soil and groundwater samples were analyzed for TPH-e as diesel and TPH-p as gasoline (EPA 8015 Modified), BTEX (EPA 8020) and VOCs (EPA 8010).</p> <p>The Navy conducted an additional investigation in August 1999. Soil and groundwater samples were collect from one GeoProbe boring. Samples were analyzed for TPH-e, BTEX, SVOCs, and MTBE. Two monitor wells were installed with a hollow stem auger. Free product had been observed in the well purge water from UST3-MW02. On December 8, 1999, the wells were checked for free product using an interface probe. Free product was not detected.</p>		

Removal	Sampling
	<p>Tank locations, sampling locations, and remaining soil and groundwater contamination are illustrated on figures Tank 3 & 114 Soils and Tank 3 & 114 Groundwater.</p>

Site Management			
Regulatory Agency	RWQC	Closure Status	NFA (RWQCB 4/20/2009)
Land Use Restrictions		Development Issues	
<p>The RWQCB issued a NFA letter on 4/20/2009. The NFA determination is based on commercial/industrial land use. The land use is restricted to commercial/industrial use, residential use is not allowed.</p> <p>No additional institutional controls or restrictions were provided in the NFA letter.</p> <p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, July 2002.</p>		<p>Petroleum hydrocarbons could be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Basewide Petroleum Site Evaluation Methodology Technical Memorandum, Appendix L Petroleum Site Evaluation, Moffett Federal Airfield, CA.</i> Tetra Tech EM INC., San Diego, CA. December 16, 2003. • <i>Transmittal of Closure Letter and Site Summary for Underground Storage Tanks 3 and 114 (Water Board Case No. 43D9045), Building 55, NAS Moffett Field, Mountain View, Santa Clara County.</i> RWQCB SF Bay letter to John Hill of the Navy, dtd. 4/20/2009. 			



3/114 – MW2 (8/95)	6' bgs
Diesel	2.2
Lead	4.1

3/114 – MW1

UST3 – MW02

3-S1 (8/94)	8.5' bgs
Diesel	ND (1)

3-S2 (8/94)	8.5' bgs
Diesel	ND (1)

3-S3 (8/94)	8.5' bgs
Diesel	2.1

114-S1 (5/94)	7.5 bgs
Diesel	33
Gasoline	2
Motor Oil	39

UST3 – MW01

UST3-GP-01 (8/99)	1' bgs	4' bgs	9' bgs
Motor Oil	150 Y	ND (13)	ND (12)
Diesel	ND (68)	ND (13)	69 Y

LEGEND	
	Excavation boundary
	Sample from excavation
	GeoProbe Sample
	Monitor well
bgs	Below ground surface
mg/kg	Milligrams per kilogram
ND (1)	Not detected (detection limit)
Y	Pattern does not match fuel calibration pattern, but resembles a fuel pattern
Bldg.	Building

Note: units are in mg/kg

3/114-MW3 (7/95)	6 bgs
Lead	5.8

3/114-MW4 (7/95)	6 bgs
Lead	5

Hangar 2

Hangar 3

Bldg. 498

Bldg. 55

Bldg. 780

Tank 114

Tank 3

Approximate Groundwater Flow Direction



TANKS 3 & 114 Soils

Selected petroleum compounds remaining in soil.

Google Earth Photograph 9/26/2011. Data from Figure L17, Petroleum Sites Evaluation, Appendix L.

Imagery Date: 9/26/2011 lat 37.416481° lon -122



Hangar 3

LEGEND	
	Excavation boundary
	Tetra Tech GeoProbe Sample
	ERM West GeoProbe Sample
	Monitor well
	Excavation groundwater sample
bgs	Below ground surface
µg/L	Micrograms per liter
ND (1)	Not detected (detection limit)
NS	Not sampled
D ¹	Compounds identified in an analysis at a secondary dilution factor
H ¹	Value is estimated because of a method holding time violation
J ¹	The analyte was positively identified. The numerical value is the approximate concentration of the analyte in the sample.
L ¹	Interval standard recoveries are out of control limits for the analyte in the sample
Y ¹	Pattern does not match fuel calibration pattern, but resembles a fuel pattern
Bldg.	Building

1. Definitions are from Figure L18 in Petroleum Sites Evaluation, Appendix L

Note: units are in µg/L

UST3-MW-02	
Date	Diesel
5/00	ND (100)
8/00	ND (71)
11/00	630 D
2/01	710 H

3/114-W3	
Date	Xylene
7/95	1.6

3/114-W12	
Date	Diesel
7/95	ND (500)

3/114-MW2	
Date	Diesel
8/95	55

3/114-W13		
Date	Toluene	Xylene
7/95	1	1.6

3/114-W11	
Date	Diesel
7/95	ND (500)

UST3 - MW - 01			
Date	Diesel	Motor Oil	
2/00	1000 H	500 L	
5/00	1000 J	500 L	
8/00	2400 D	NS	
11/00	ND (50)	NS	
2/01	ND (95)	ND (54)	

3/114-MW1	
Date	Diesel
8/95	ND (50)
2/00	ND (100)
5/00	ND (100)
8/00	ND (47)
11/00	ND (53)

UST3-GP-02	
Date	Diesel
8/99	1900 Y

114-W1			
Date	Diesel	Jet Fuel	Motor Oil
5/94	6000	2500	15,000

UST3-GP-01	
Date	Diesel
8/99	34,000 Y

3/114-W2		
Date	Toluene	Xylene
7/95	0.9	1.6

3/114-W10	
Date	Diesel
7/95	ND (500)

3-W1	
Date	Diesel
4/94	670

3/114-W9	
Date	Toluene
7/95	0.6

Hangar 2

3/114-W6			
Date	Ethylbenzene	Diesel	Xylene
7/95	1.8	4841	10.8

3/114-W8			
Date	Benzene	Toluene	Xylene
7/95	1.8	2.5	2.9

3/114-W5	
Date	Diesel
7/95	ND (500)

3/114-W4	
Date	Diesel
7/95	ND (500)

3/114-MW3		
Date	Toluene	Diesel
8/95	0.52	57

3/114-W14	
Date	Toluene
7/95	0.6

3/114-W7			
Date	Benzene	Toluene	Xylene
7/95	1.3	1.8	2.2

3/114-MW4	
Date	Diesel
7/95	ND (50)

Approximate Groundwater Flow Direction

Bldg. 498

Bldg. 55

Bldg. 780

Tank 114

Tank 3



TANKS 3 & 114 GROUNDWATER

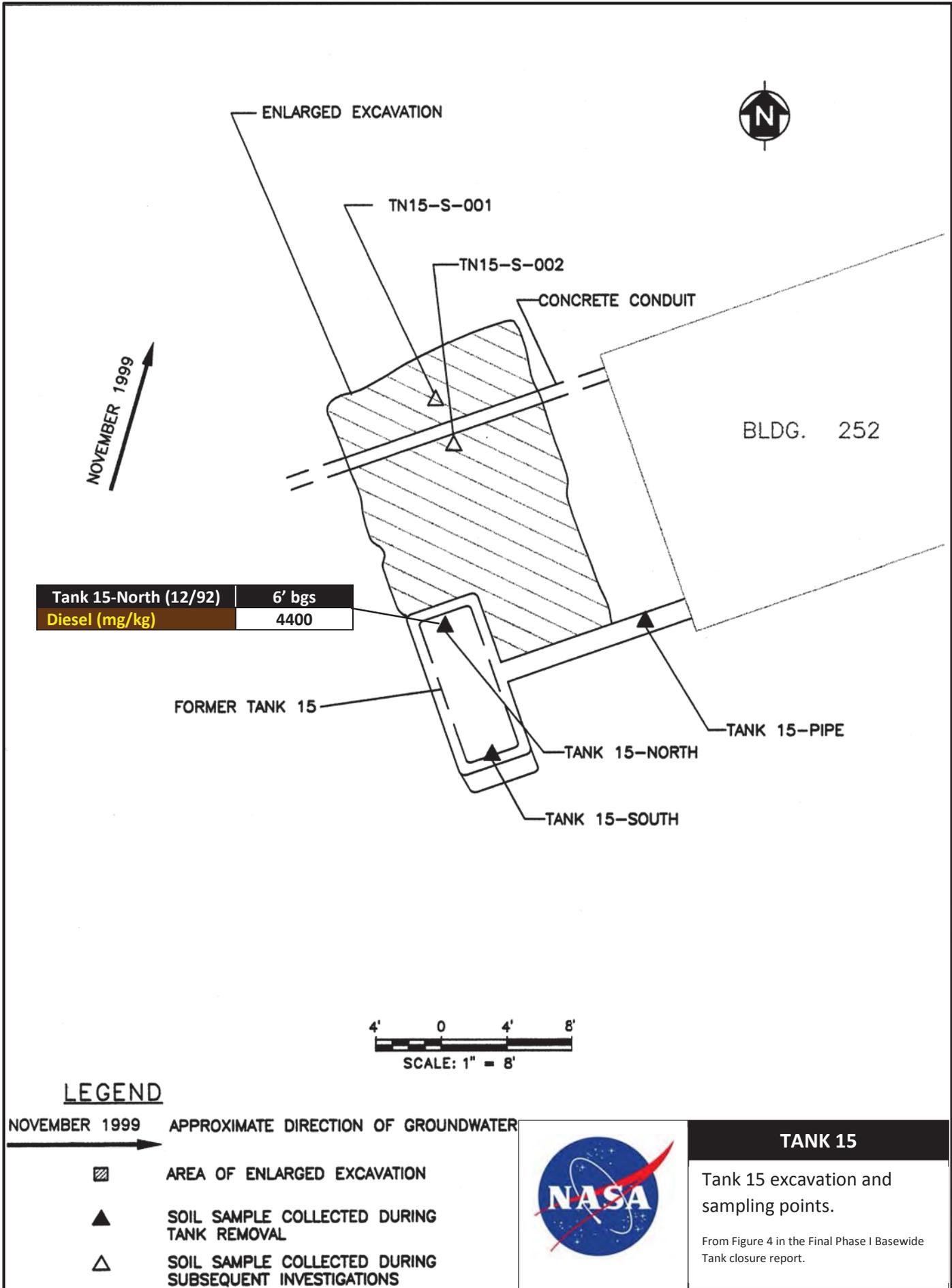
Selected petroleum compounds remaining in groundwater.

Google Earth Photograph 9/26/2011. Data from Figure L18, Petroleum Sites Evaluation, Appendix L.

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Tank ID:		15		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	252	Latitude (°N)	37.420269	
		Longitude (°W)	122.051420	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall Steel	1,000	Diesel	
Use	Emergency generator			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	12/18/1992	X	
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 15 was removed in December of 1992. The tank was observed to be in good condition. Staining and petroleum odors were encountered during the excavation. Three soil samples were taken. No groundwater was encountered. In July 1993, the Navy removed additional soil from the site. The additional excavation was extended northward from the northern end of the original excavation. A concrete electrical conduit was encountered. A soil sample was taken from each side of the conduit. The excavated material was transported to a staging area for later treatment or disposal. The excavation was backfilled with clean materials.</p>		<p>Three soil samples were collected during the initial investigation (see Tank 15 Figure):</p> <ul style="list-style-type: none"> • Tank 15 – South • Tank 15 – North • Tank 15 – Pipe <p>The soil samples were analyzed for TPH-e as diesel and BTEX. Diesel was the only compound detected above soil action levels in Tank 15 – North at 4,400 mg/kg (action level was 400 mg/kg).</p> <p>Two soil samples were collected during the over excavation work done in 1993: TN15 – S – 001 and TN15 – S – 002. No petroleum compounds were detected above detection limits.</p>		

Site Management			
Regulatory Agency	RWQC	Closure Status	NFA (RWQCB 8/8/2000)
Land Use Restrictions		Development Issues	
<p>The RWQCB issued a NFA letter on 8/8/2000.</p> <p>No institutional controls or restrictions were provided in the NFA letter.</p> <p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>The Tank 15 site is located between the runways. Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Phase 1 Basewide Tank Closure Report, Moffett Federal Airfield, CA.</i> Tetra Tech EMI Inc., San Francisco, CA. June 26, 2000. • <i>Transmittal of Closure Letter and Site Summaries for Department of Defense (DoD) Underground Storage Tanks at Moffett Federal Airfield, Moffett Field CA.</i> RWQCB SF Bay letter to Arturo Tamayo of the Navy, dtd. August 8, 2000. 			



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Tank ID:		21		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	454	Latitude (°N)	37.404971	
		Longitude (°W)	122.048883	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall steel	1000	Diesel	
Use	Emergency generator			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	11/22/1995	X	
REMEDIAL ACTION				
Removal		Sampling		
<p>Before the tank was removed, fluids remaining in the tank were removed using a vacuum truck. The tank was then washed with a high-pressure hot water rinse. The rinsate was pumped from the tanks. The fluid was transported to a disposal facility in Redwood City.</p> <p>A backhoe was used to remove soil from the top and sides of the tank. Once the tank was removed from the excavation it was inspected and found to be in good condition. The tank was shipped to a hazardous waste disposal facility in Richmond. The soil in the excavation exhibited petroleum odors. The soil that emitted petroleum odors was transported and stockpiled on the Navy bioremediation pad. The soil was finally used as foundation material at the Site 1 landfill.</p>		<p>Two soil samples were collected from the excavation at the direction of Santa Clara County. One sample was from the southwestern portion of the excavation (T21EX-001) and one from the northeastern portion (T21EX-002). Soil samples were analyzed for TPH-e as diesel, TPH-g as gasoline, BTEX (benzene, toluene, ethylbenzene, and xylene), volatile organic compounds (VOCs), and lead. There was no groundwater in the excavation.</p> <p>In August of 1999, the Navy conducted an investigation at the Tank 21 site. Soil samples were collected between 4 and 10 feet below ground surface (bgs) using a GeoProbe. Four groundwater samples were also collected using the GeoProbe. Both soil and groundwater were analyzed for BTEX, TPH-e, TPH-p, and MTBE. In addition, soil samples were analyzed for semi-volatile organic compounds.</p> <p>Three monitoring wells were installed in the Tank 21 area using a hollow-stem auger: UST21-MW01, UST21-MW02, and UST 21-MW03. Samples for monitoring wells were analyzed for BTEX, TPH-e, TPH-p, and MTBE.</p> <p>TPH-e as diesel was the only constituent detected above the action levels in soil. Diesel was detected at a concentration of 1910 mg/kg and 1040 mg/kg from the excavation samples. In the 1999 investigation, diesel was detected at 1900 mg/kg.</p> <p>In groundwater, benzene was detected at 1.0 µg/L in GeoProbe</p>		

Removal	Sampling
	<p data-bbox="834 170 1528 260">UST21-GP04, 4.2 µg/L at UST21-MW02, and 6.2 in UST21-MW03 at 6.2 µg/L. No other compounds were detected above action levels.</p> <p data-bbox="834 302 1455 359">Sampling points and remaining compounds are shown on figures UST 21 Soil and UST 21 Groundwater.</p>

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (4/19/2006)
Land Use Restrictions		Development Issues	
<p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Basewide Petroleum Site Evaluation Methodology Technical Memorandum, Appendix L Petroleum Site Evaluation, Moffett Federal Airfield, CA.</i> Tetra Tech EM INC., San Diego, CA. December 16, 2003. • <i>Case Closure Letter for Below Listed Underground Storage Tanks, Moffett Federal Airfield, Santa Clara County.</i> RWQCB SF Bay letter to Wilson Doctor of the Navy, dtd. April 19,2006. 			



Macon Rd

Approximate Groundwater Flow Direction

LEGEND	
	Excavation soil sample
	Monitoring well
	GeoProbe location
	Excavation boundary
bgs	Below ground surface
J	The analyte was positively identified. The numerical value is the approximate concentration of the analyte.
ND (X)	Not Detected (Detection Limit)
mg/kg	Milligrams per kilogram
Bldg.	Building

UST21-GP01 (8/99)	4' bgs	9' bgs
Benzo(a)pyrene	ND (0.0025)	0.0098
Diesel	ND (12)	1900
Gasoline	ND (0.62)	2.6 J
Motor Oil	19	ND (120)

UST21-GP-02

UST21-MW03

UST21-GP-03

UST21-MW01

UST21-GP-04

T21EX-001 (11/95)	Unknown depth
Diesel	1910
Gasoline	1.3
Lead	ND (2)
Ethylbenzene	0.01
Toluene	0.0094
Xylene	0.0448

Bldg. 454

T21EX-002 (11/95)	Unknown depth
Diesel	1040
Gasoline	3.9
Lead	ND (2)
Ethylbenzene	0.0115
Toluene	0.0161
Xylene	0.0505

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Imagery Date: 9/26/2011 lat 37.404934° lon -122

1948



TANK 21 SOILS

Tank 21 selected petroleum compounds remaining in soil.

Google Earth photograph 9/26/2011. Data from Figure L19, Petroleum Sites Evaluation, Appendix L.



Macon Rd

Approximate Groundwater Flow Direction

UST21-MW02		
Date	Benzene	Gasoline
Feb-00	ND (0.5)	NS
May-00	ND (0.5)	ND (50)
Aug-00	4.2	ND (50)
Nov-00	ND (0.5)	50 Z
Feb-01	ND (0.29)	ND (12)

UST21-MW03		
Date	Benzene	Gasoline
Feb-00	ND (0.5)	NS
May-00	ND (0.5)	ND (50)
Aug-00	6.2	ND (50)
Nov-00	ND (0.5)	ND (50)
Feb-01	ND (0.29)	30 J

UST21-GP02		
Date	Diesel	Toluene
Aug-99	260 Y	0.5 J

UST21-GP01				
Date	Benzene	Diesel	Toluene	Xylene
Aug-99	0.5 J	280 Y	0.6	3

UST21 MW01		
Date	Benzene	Gasoline
Feb-00	ND (0.5)	NS
May-00	ND (0.5)	ND (50)
Aug-00	1.8	ND (50)
Nov-00	ND (0.5)	ND (50)
Feb-01	ND (0.29)	ND (50)

UST21-GP03	
Date	Diesel
Aug-99	380 Z

UST21-GP04			
Date	Benzene	Diesel	Toluene
Aug-99	1.0	50 J	1.1

LEGEND	
	Monitoring well
	GeoProbe location
	Excavation boundary
bgs	Below ground surface
J ¹	The analyte was positively identified. The numerical value is the approximate concentration of the analyte.
Y ¹	Pattern does not match calibration fuel pattern, but resembles a fuel pattern.
Z ¹	Unknown single peaks or patterns were detected, but did not resemble a typical fuel pattern.
NS	Not sampled.
ND (X)	Not Detected (Detection Limit)
µg/L	Micrograms per liter
Bldg.	Building

1. Definitions are from Figure L20 in Petroleum Sites Evaluation, Appendix L

Units in µg/L

Bldg. 454



TANK 21 GROUNDWATER

Tank 21 selected petroleum compounds remaining in groundwater.

Google Earth photograph 9/26/2011. Data from Figure L20, Petroleum Sites Evaluation, Appendix L.

© 2015 Google

Imagery Date: 9/26/2011 lat 37.404934° lon -122

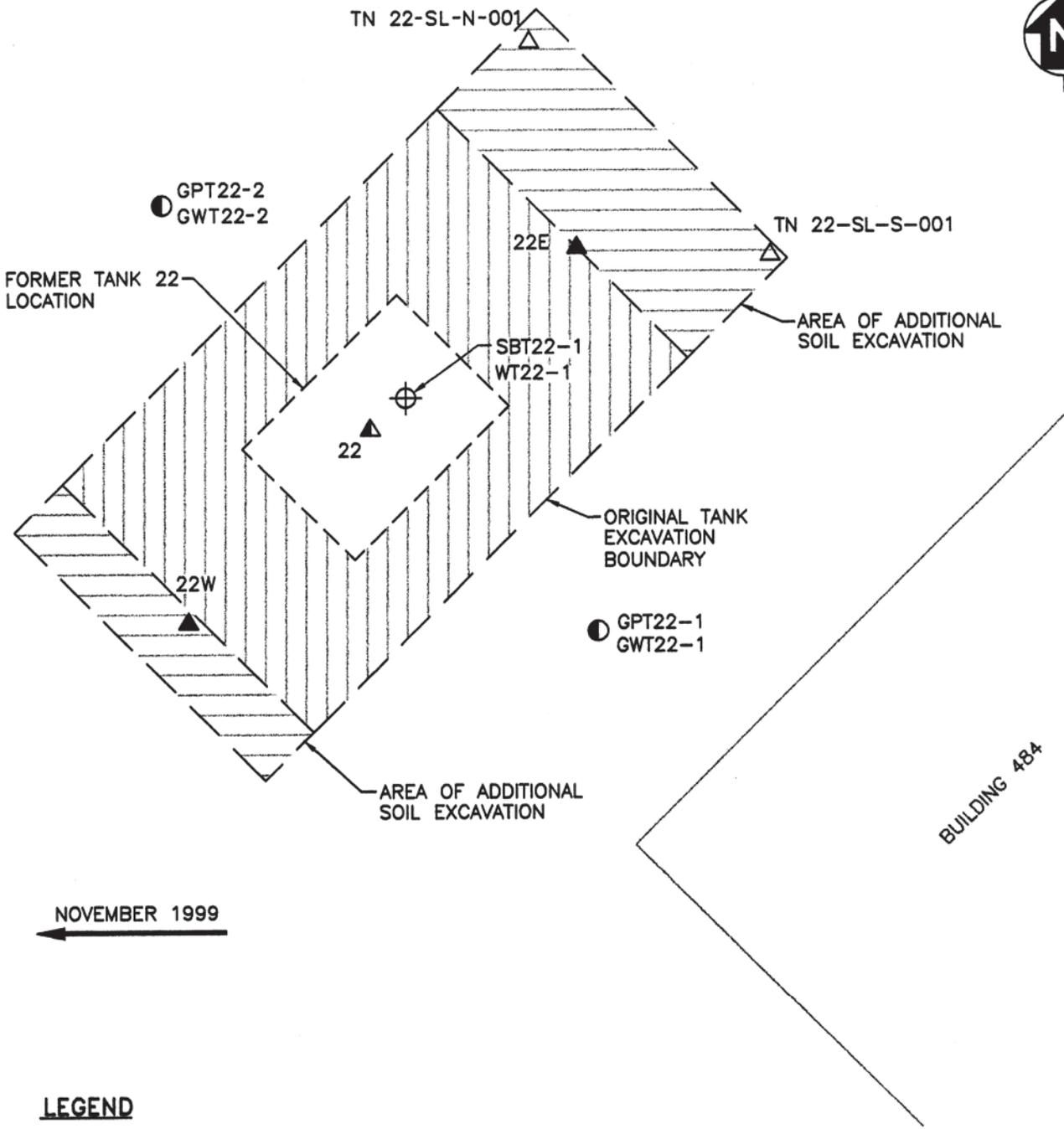
1948

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Tank ID:		22		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	484	Latitude (°N)	37.426332	
		Longitude (°W)	122.045806	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall steel	600	Diesel	
Use	Emergency generator.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	12/18/1992	X	X
REMEDIAL ACTION				
Removal		Sampling		
<p>The tank and associated piping were removed in December 1992. No holes were observed in the tank or piping. In 1993, the Navy conducted additional excavations at either end of the original. Approximately 34 cubic yards of impacted soil were removed and disposed of off-site.</p>		<p>Two soil samples were collected from underneath the tank (22E & 22W) and a water sample (22) from water that had seeped into the excavation. Two additional soil samples were collected by the Navy from the additional excavation: TN22-SL-N-001 and TN22-SL-S-001.</p> <p>In June through August 1995, five soil samples were collected from two hand-auger borings: GPT22-1 and GPT22-2. A soil boring (SBT22-1) was advanced through the center of the tank site and converted into a monitoring well (WT22-1). Soil samples were selected by screening with a photoionization detector (PID). None of the samples indicated any observable petroleum contamination.</p> <p>Soil samples were analyzed for TPH-p (purgeable), TPH-e (extractable), and BTEX (benzene, toluene, ethylbenzene, and xylene). Analyses of the soil samples did not detect concentrations greater than soil action levels.</p> <p>Groundwater samples (GWT22-1 and GWT22-2) were collected from the hand-augured locations. Five groundwater samples were collected from WT22-1 between August 1995 and August 1999.</p> <p>Groundwater samples were analyzed for TPH-p as gasoline, TPH-e as diesel, and BTEX. A groundwater sample from the August 1999 sampling event from WT22-1 was also sampled for</p>		

Removal	Sampling
	<p data-bbox="834 170 1528 296">MTBE. MTBE was not detected. Diesel was detected in WT22-1 in concentration from 130 µg/L to 300 µg/L, which were below the action level of 700 µg/L. Gasoline was detected once at 37 µg/L in February 1996.</p> <p data-bbox="834 331 1484 394">Figure Tank 21 shows the tank excavation site and sampling points.</p>

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (8/8/2000)
Land Use Restrictions		Development Issues	
<p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Phase 1 Basewide Tank Closure Report, Moffett Federal Airfield, CA.</i> Tetra Tech EMI Inc., San Francisco, CA. June 26, 2000. • <i>Transmittal of Closure Letter and Site Summaries for Department of Defense (DoD) Underground Storage Tanks at Moffett Federal Airfield, Moffett Field CA.</i> RWQCB SF Bay letter to Arturo Tamayo of the Navy, dtd. August 8, 2000. 			



NOVEMBER 1999



LEGEND

NOVEMBER 1999

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

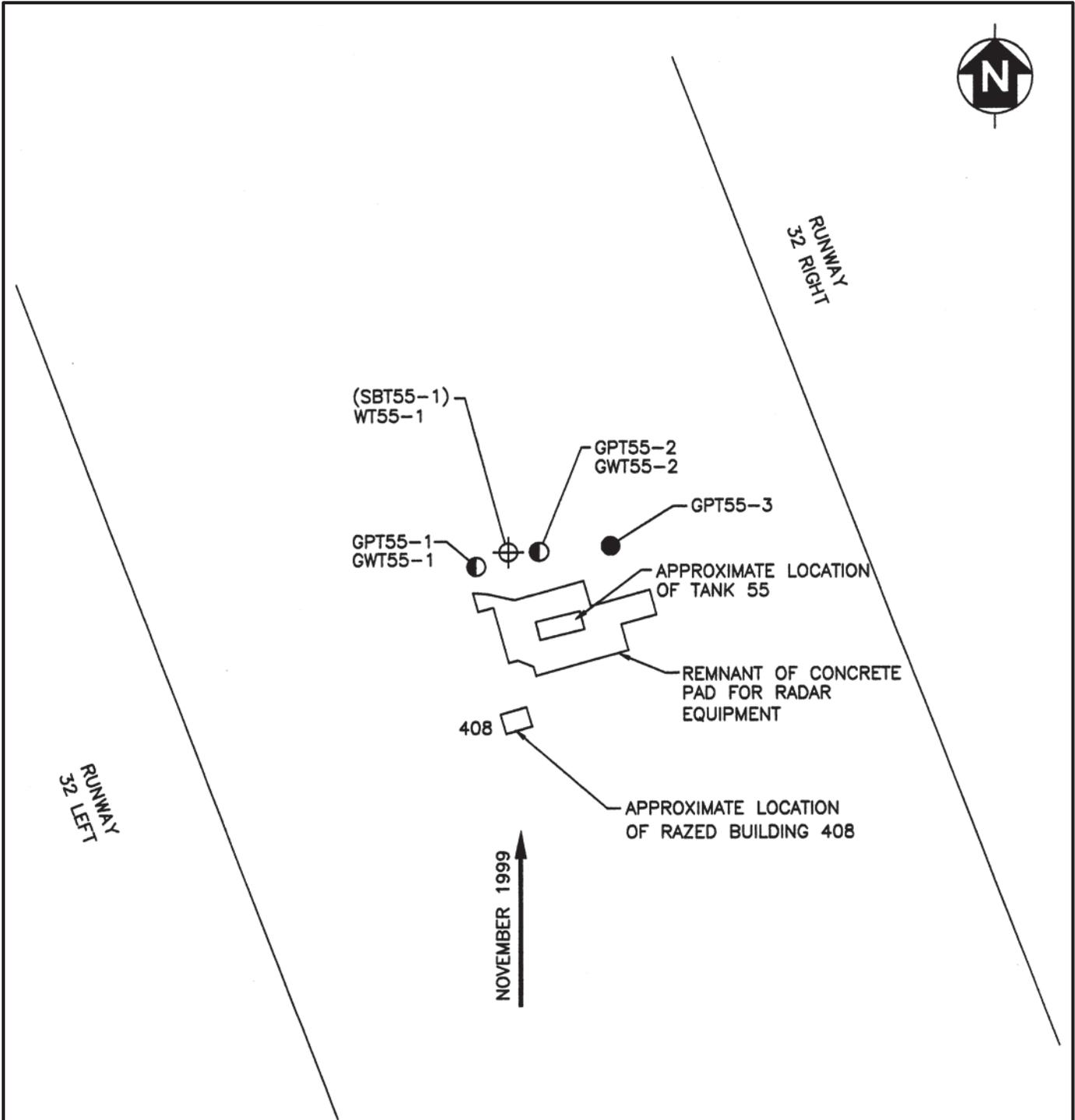
- ▲ SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- △ SOIL SAMPLE COLLECTED DURING SUBSEQUENT EXCAVATION
- ▲ (with circle) WATER SAMPLE COLLECTED DURING TANK REMOVAL
- (with circle) SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION



TANK 22
 Tank 22 excavation and sampling points.
 From Figure 6 in the Phase I Basewide Tank Closure Report

Tank ID:		55		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	408 & 461	Latitude (°N)	37.414972	
		Longitude (°W)	122.048415	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Steel	200	Diesel	
Use	Emergency generator.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	Unknown		
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 55 was reportedly a 200-gallon UST that was taken out of service at an unknown date. A geophysical survey was conducted at the site to locate the tank. No signs of a tank system was identified. No tank removal records are available.</p>		<p>In 1995, three GeoProbe soil borings were installed: GPT55-1 through GPT55-3. Soil was screened with a photoionization detector (PID). No samples were sent to an off-site laboratory for analysis. An additional soil sample was collected during the installation of monitoring well WT55-1. The soil was analyzed for TPH-p gasoline, TPH-e diesel, TPH-e JP-5, and BTEX (benzene, toluene, ethylbenzene, and xylene). Diesel was detected at 49 mg/kg which is below the action level of 400 mg/kg. No other petroleum was detected in the soil.</p> <p>Groundwater samples (GWT55-1 and GWT55-2) were collected from GeoProbe borings GPT55-1 and GPT55-2. Groundwater was not encountered in GPT55-3. Four rounds of groundwater were collected from WT55-1 from August 1995 to May 1997. Samples were analyzed for TPH-e as diesel, TPH-e as JP-5, TPH-p as gasoline, and BTEX. The May 1997 sample was also analyzed for MTBE. An additional sample was taken from WT55-1 in August 1999 and analyzed for MTBE and BTEX. All results were below action levels with an exception of a detection of motor oil at 1600 µg/L in GWT55-2. Benzene was detected in WT55-1 at 6 µg/L in May 1997. MTBE was not detected.</p> <p>Sampling points and tank site are shown on the Tank 55 figure.</p>		

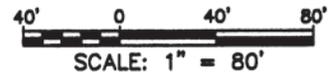
Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (8/8/2000)
Land Use Restrictions		Development Issues	
<p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Phase 1 Basewide Tank Closure Report, Moffett Federal Airfield, CA.</i> Tetra Tech EMI Inc., San Francisco, CA. June 26, 2000. • <i>Transmittal of Closure Letter and Site Summaries for Department of Defense (DoD) Underground Storage Tanks at Moffett Federal Airfield, Moffett Field CA.</i> RWQCB SF Bay letter to Arturo Tamayo of the Navy, dtd. August 8, 2000. 			



LEGEND

NOVEMBER 1999 → APPROXIMATE DIRECTION OF GROUNDWATER FLOW

- LOCATION OF ATTEMPTED GROUNDWATER SAMPLE
- GROUNDWATER SAMPLING LOCATION
- ⊕ MONITORING WELL LOCATION (SOIL BORING IN PARENTHESES)



TANK 55

Approximate location of Tank 55 and sampling points.

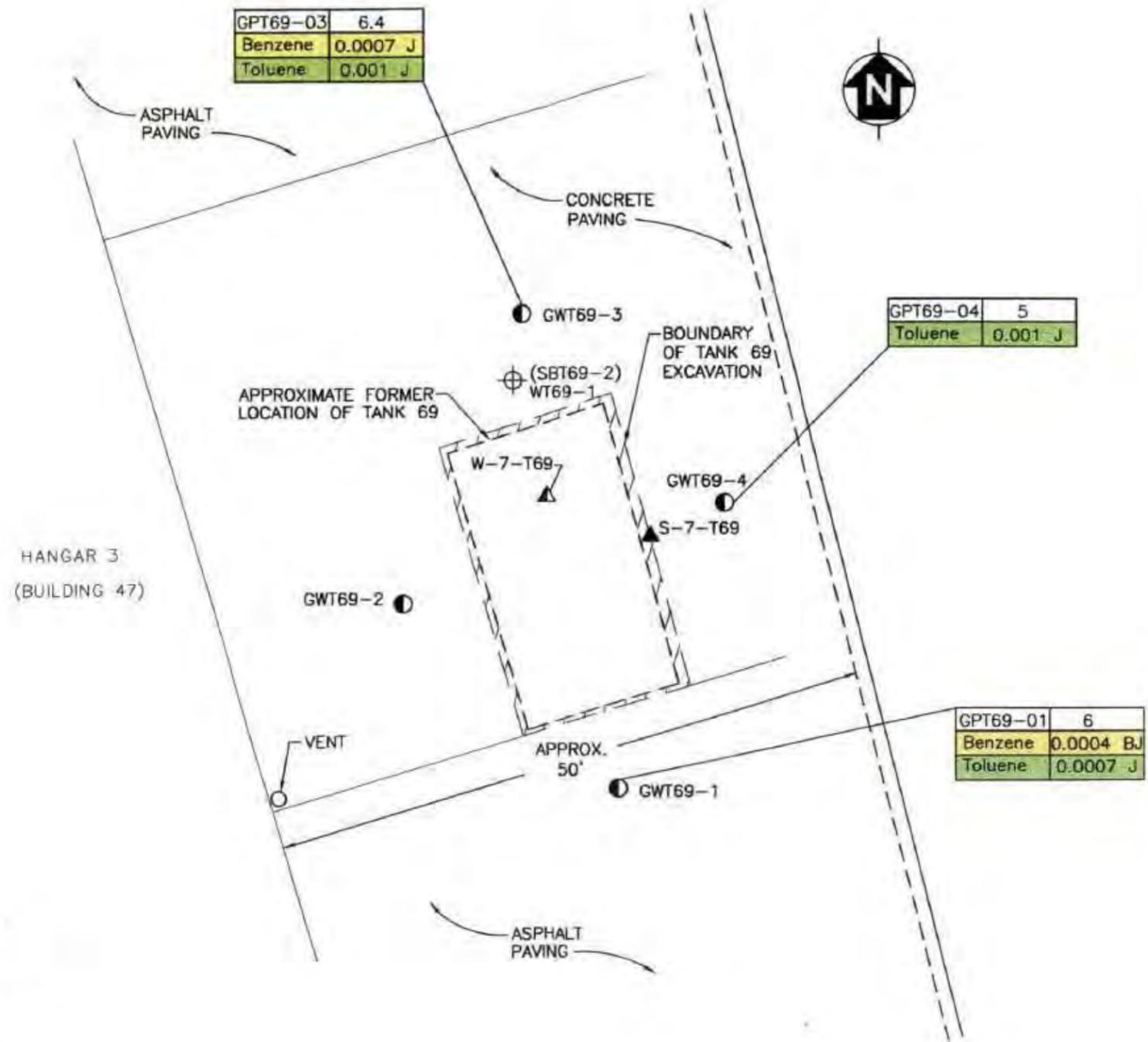
From Figure 9 from the Phase 1 Basewide Tank Closure Report.

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Tank ID:		69		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Hangar 3	Latitude (°N)	37.415912	
		Longitude (°W)	122.040959	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall steel	2000	Wastewater	
Use	Received liquid wastes from maintenance activities in Hangar 3.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	1943	6/15/1991		
REMEDIAL ACTION				
Removal		Sampling		
<p>The tank removal was observed by the Santa Clara County Department of Environmental Health. No chemical contamination was observed during the excavation. The SCCDEH inspection noted a septic odor during the removal.</p>		<p>One soil sample (S-7-T69) and one groundwater sample (W-7-T69) were collected from the excavation. The samples were analyzed for BTEX (benzene, toluene, ethylbenzene, and xylene), TPH-extractable (TPH-e) as diesel and motor oil. The groundwater sample was also analyzed for TPH-purgeable (TPH-g) as gasoline.</p> <p>In July 1995, the Navy conducted sampling at the Tank 69 site. Soil samples were collected from four GeoProbe borings at depths of 5.0 to 6.5 feet below ground surface (bgs). The GeoProbe locations were GPT69-1 through GPT69-4. An additional soil sample was collected at 8 feet bgs in soil boring SBT69-2. SBT69-2 was converted into a monitoring well: MW69-1. Soil samples were analyzed for TPH-e, TPH-p, BTEX, Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and metals.</p> <p>Five rounds of groundwater samples were collected from WT69-1 from August 1995 through August 1999. Samples were sampled for TPH-e, TPH-p, BTEX, VOCs, SVOCs, and metals. In 1999, groundwater was also analyzed for methyl tert-butyl ether (MTBE).</p> <p>Soil sample S-7-T69 did not contain detectable target compounds. Water sample W-7-T69 contained TPH-e as motor oil and diesel at concentrations below the action levels.</p>		

Removal	Sampling
	<p data-bbox="834 170 1523 359">During the 1995 investigation, benzene and toluene were detected at levels below the established action levels. Benzene was detected in two groundwater samples at concentrations below action levels. All petroleum, VOCs, SVOCs, metals in samples for WT69-1 were below action levels. MTBE was not detected.</p> <p data-bbox="834 396 1479 457">Attached figures for Tank 69 soils and groundwater provide sampling locations and detected compounds.</p>

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (7/15/2003)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” (NFA) status applies to releases of petroleum.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Basewide Petroleum Sites Evaluation Methodology Technical Memorandum Draft Appendix D, Moffett Federal Airfield, CA.</i> Tetra Tech EM, Inc., San Francisco, CA. January 20, 2001. • <i>Transmittal of Closure Letter and Site Summary for Underground Storage Tank 69, Moffett Federal Airfield, California (RWQCB Case No. 43D9014).</i> RWQCB letter to Arturo Tamayo, US Navy, dated July 15, 2003. 			

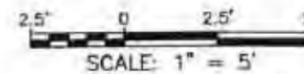


LEGEND

- ▲ GROUNDWATER SAMPLE COLLECTED DURING TANK REMOVAL
- ▲ SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION (SOIL BORING IN PARENTHESES)
- STORM DRAIN SYSTEM
- - - SEWER SYSTEM
- mg/kg MILLIGRAMS PER KILOGRAM
- J CONCENTRATION IS ESTIMATED
- B ORGANIC ANALYTE FOUND IN THE ASSOCIATED BLANK AS WELL AS THE SAMPLE

GPT69-01	6
Toluene	0.0007 J

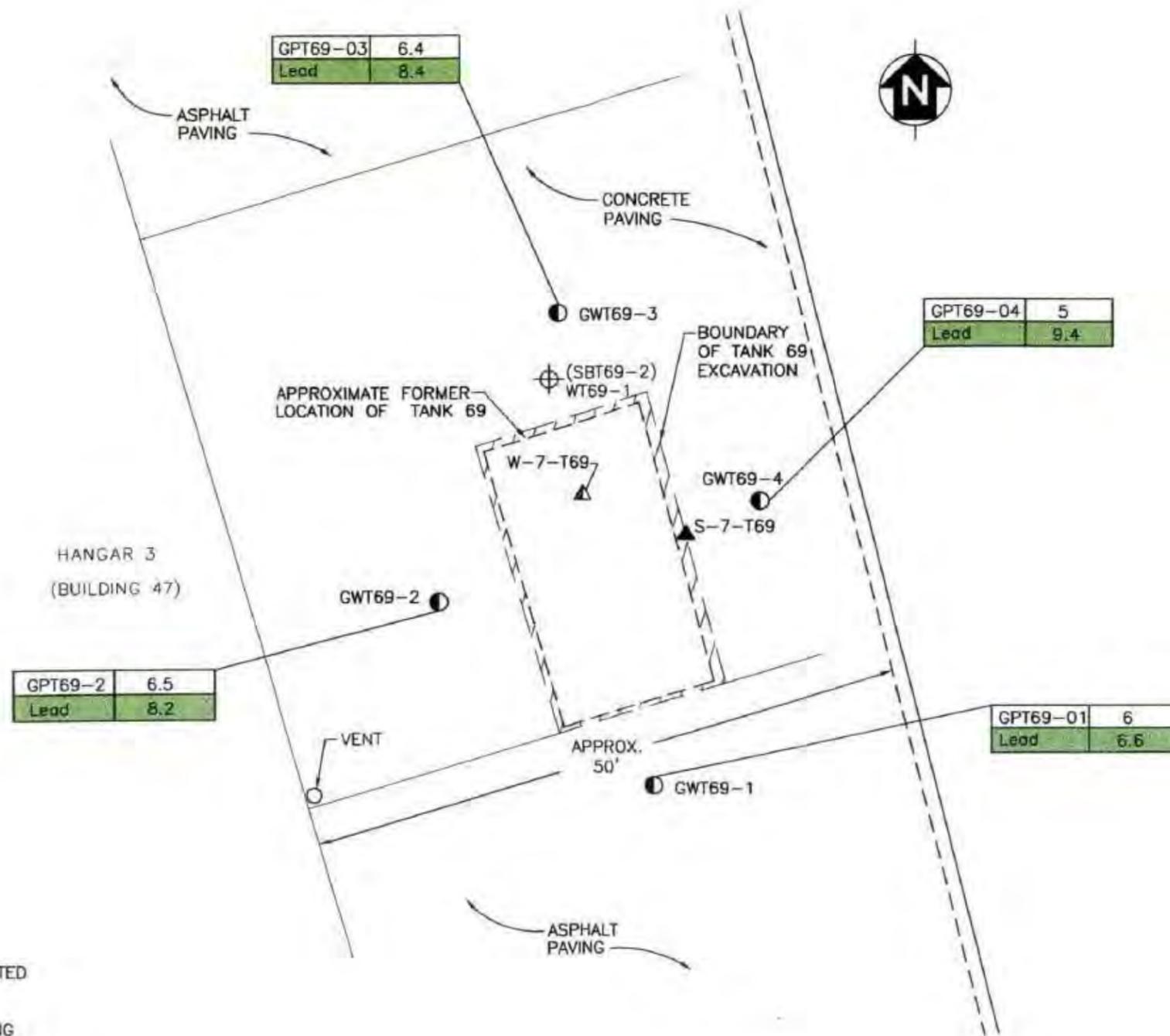
SAMPLE ID
DEPTH IN FEET
CONCENTRATION (mg/kg)
ANALYTE




TANK 69 PETROLEUM SOILS

Tank 69 location, sampling points, and detected petroleum compounds.

From Figure D21 in Appendix D, Basewide Petroleum Site tech Memo



LEGEND

- ▲ GROUNDWATER SAMPLE COLLECTED DURING TANK REMOVAL
- ▲ SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION (SOIL BORING IN PARENTHESES)
- STORM DRAIN SYSTEM
- - - SEWER SYSTEM
- mg/kg MILLIGRAMS PER KILOGRAM

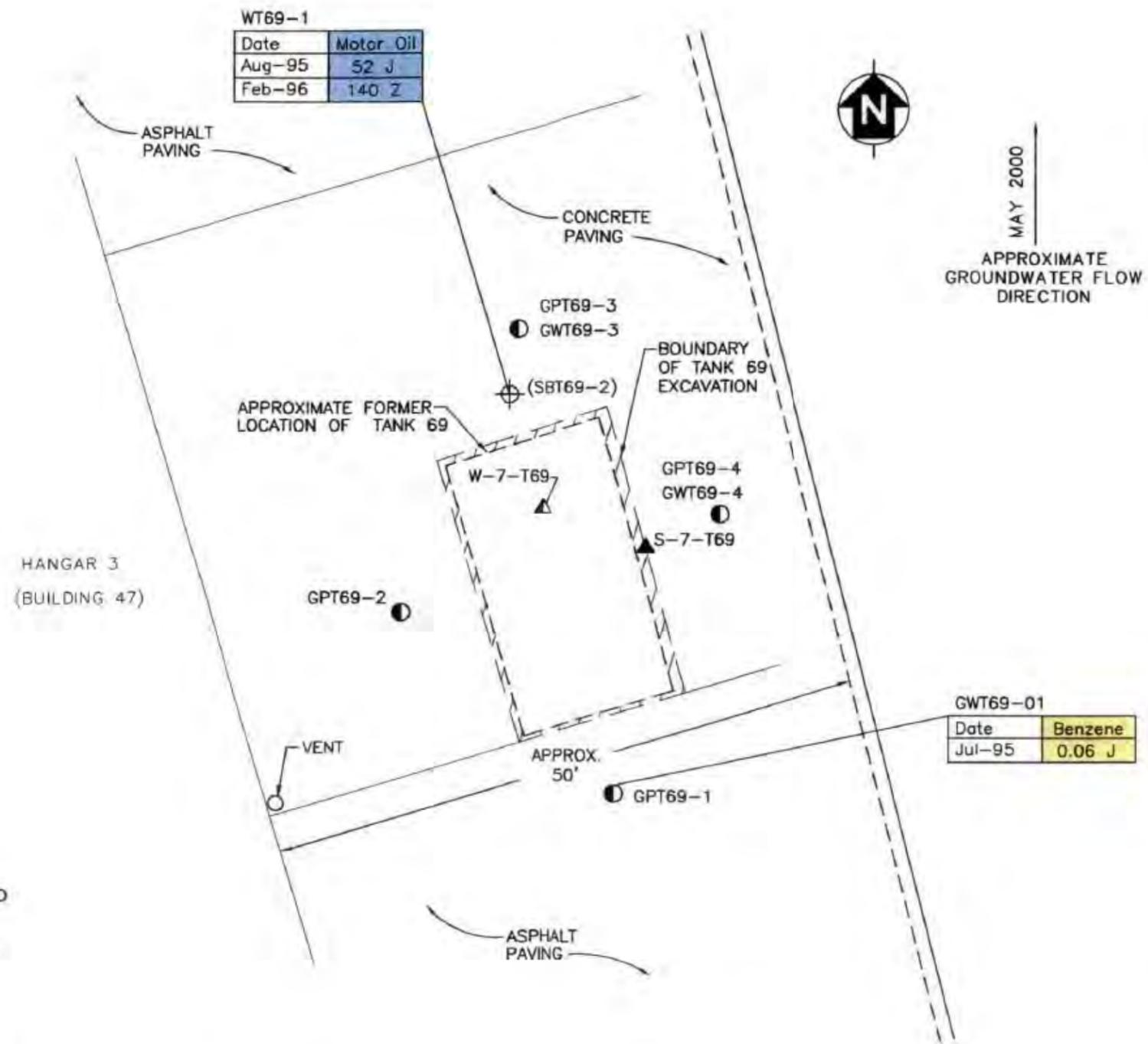
SAMPLE ID	DEPTH IN FEET	CONCENTRATION (mg/kg)	ANALYTE
GPT69-2	6.5	8.2	Lead



TANK 69 CERCLA SOILS

Tank 69 location, sampling points, and detected CERCLA compounds.

From Figure D22 in Appendix D, Basewide Petroleum Site tech Memo



LEGEND

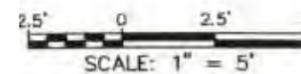
- ▲ GROUNDWATER SAMPLE COLLECTED DURING TANK REMOVAL
- ▲ SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION (SOIL BORING IN PARENTHESES)
- STORM DRAIN SYSTEM
- - - SEWER SYSTEM
- μg/L MICROGRAMS PER LITER
- J CONCENTRATION IS ESTIMATED
- Z DID NOT RESEMBLE TYPICAL FUEL PATTERN

SAMPLE ID

ANALYTE

Date	Benzene
Jul-95	0.06 J

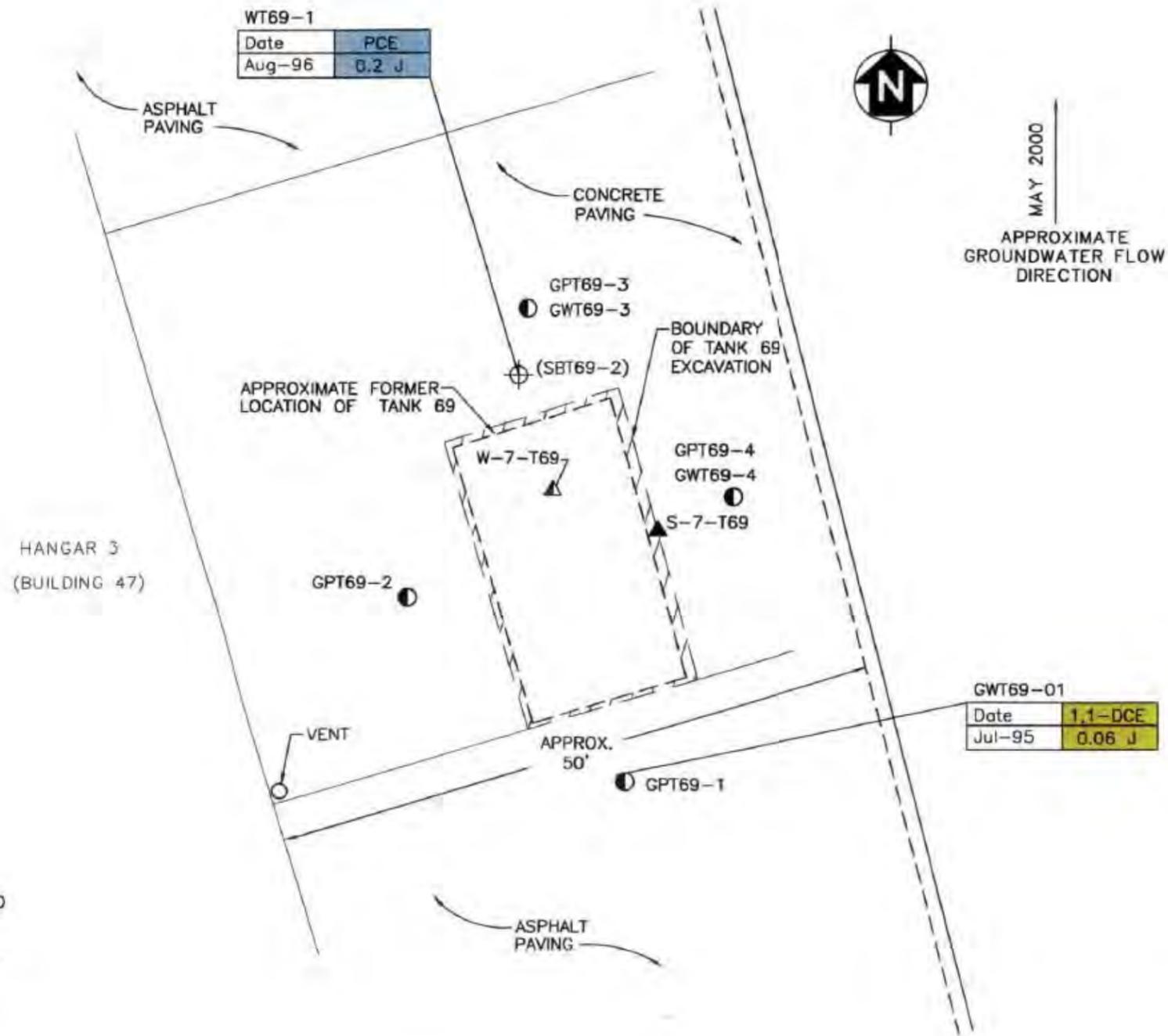
CONCENTRATION (μg/L)




TANK 69 GROUNDWATER PETROLEUM

Tank 69 location, sampling points, and detected petroleum compounds.

From Figure D23 in Appendix D, Basewide Petroleum Site tech Memo



LEGEND

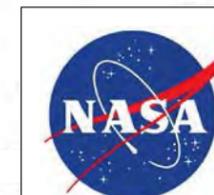
- ▲ GROUNDWATER SAMPLE COLLECTED DURING TANK REMOVAL
- ▲ SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION (SOIL BORING IN PARENTHESES)
- STORM DRAIN SYSTEM
- - - SEWER SYSTEM
- μg/L MICROGRAMS PER LITER
- DCE DICHLOROETHENE
- PCE TETRACHLOROETHENE
- J CONCENTRATION IS ESTIMATED

SAMPLE ID

ANALYTE

WT69-1	Date	PCE
	Aug-96	0.2 J

CONCENTRATION (μg/L)



TANK 69 GROUNDWATER CERCLA

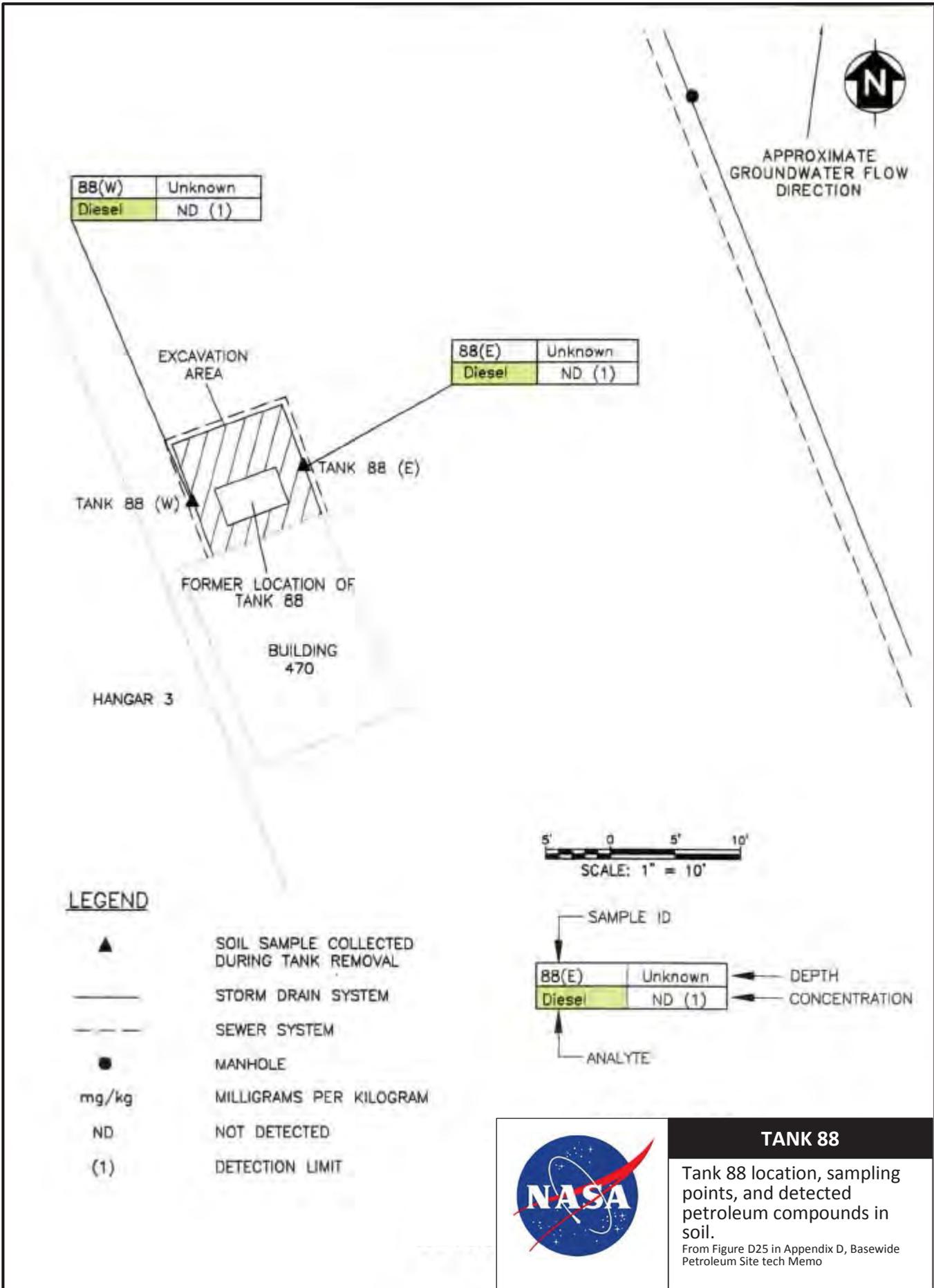
Tank 69 location, sampling points, and detected CERCLA compounds.

From Figure D24 in Appendix D, Basewide Petroleum Site tech Memo

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Tank ID:		88		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Hangar 3	Latitude (°N)	37.416104	
		Longitude (°W)	122.041075	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall steel	550	Solvents	
Use	Received solvent wastes from maintenance activities in Hangar 3			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	12/18/1992		
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 88 was removed in December 1992. The tank was empty at the time the tank was removed, no holes were observed in the tank, soil staining and hydrocarbon odors were not observed, and no water was observed in the excavation.</p>		<p>Two soil samples were taken from the excavation: 88(W) and 88(E). The samples were analyzed for BTEX (benzene, toluene, ethylbenzene, and xylene), TPH-extractable as diesel, and volatile organic compounds (VOCs).</p> <p>No contamination was detected at Tank 88. Neither petroleum compounds nor CERCLA constituents were found in any of the samples.</p> <p>Tank 88 figure illustrates tank location, sampling points, and detected petroleum compounds.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (7/11/2003)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” (NFA) determination is based on a future land use of industrial/commercial. Residential use is restricted.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Basewide Petroleum Sites Evaluation Methodology Technical Memorandum Draft Appendix D, Moffett Federal Airfield, CA.</i> Tetra Tech EM, Inc., San Francisco, CA. January 20, 2001. • <i>Transmittal of Closure Letter and Site Summary for Underground Storage Tank 88, Moffett Federal Airfield, California (RWQCB Case No. 43D9018).</i> RWQCB letter to Arturo Tamayo, US Navy, dated July 15, 2003. 			



TANK 88

Tank 88 location, sampling points, and detected petroleum compounds in soil.

From Figure D25 in Appendix D, Basewide Petroleum Site tech Memo

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Tank ID:		94, 95, 118		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Flying Club	Latitude (°N)	See removal summary	
		Longitude (°W)	See removal summary	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
See removal summary	See removal summary	See removal summary	See removal summary	
Use	Storage and dispensing of aviation gasoline (AVGAS)			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	See removal summary	See removal summary	X	X
REMEDIAL ACTION				
Removal		Sampling		
<p>Tanks 94, 95, and 118 were used by the NAS Moffett Field Flying Club for the storage and dispensing AVGAS. The physical data on the tanks:</p> <ul style="list-style-type: none"> • Tank 94 [37.415543° N, 122.053297° W] <ul style="list-style-type: none"> ○ Type: AST ○ Construction: Single-wall steel ○ Capacity: 560 gallons ○ Installation: unknown ○ Removal: 4/14/1993 • Tank 95 [37.415532° N, 122.053290° W] <ul style="list-style-type: none"> ○ Type: AST ○ Construction: Single-wall steel ○ Capacity: 560 gallons ○ Installation: unknown ○ Removal: 4/14/1993 • Tank 118 [37.415530° N, 122.053314° W] <ul style="list-style-type: none"> ○ Type: AST ○ Construction: Double-wall steel ○ Capacity: 1000 gallons ○ Installation: 1993 ○ Removal: 1994 <p>Tanks 94 and 95 were removed by the Navy in 1993 and replaced by Tank 118. Tank 118 was removed by the Flying Club when it was closed in 1994 with the transfer of NAS Moffett Field to NASA. No leaks, spills, or stains were reported for 118.</p>		<p>Soil samples were taken from below Tanks 94 & 95. Elevated concentrations of TPH-extractable characterized as motor oil were detected at 11,100 mg/kg and 1710 mg/kg. It was thought at the time that the detection of motor oil may have been due to asphalt in the samples.</p> <p>In 2001, three soil borings (TN094-01, TN095-01, and TN118-01) were drilled and sampled. Samples were analyzed for gasoline-range organics (GRO), BTEX (benzene, toluene, ethylbenzene, and xylene), polynuclear aromatic hydrocarbons (PAHs), and methyl tert-butyl ether (MTBE). Results were below the respective Environmental Screening Level (ESL).</p> <p>Grab groundwater samples were also collected in 2001 from the three borings and an upgradient boring (TN095-02) and two downgradient borings (TN094-02 and TN118-02). Groundwater was sampled for GRO, BTEX, PAHs, and MTBE. GRO and benzene concentrations exceed the ESLs.</p> <p>As a follow-up investigation, four groundwater monitoring wells were installed: WT94-01, WT94-02, WT118-01 and WT118-02. The wells were sampled for eight events and analyzed for GRO, BTEX, PAHs, and MTBE. Concentrations of TPH-purgeable and benzene were detected exceeding the ESL.</p> <p>An additional investigation was conducted in September 2009. Shallow soil samples were collected at 1- and 2-foot intervals</p>		

Removal	Sampling
	<p>at each AST site. The soil samples were analyzed for TPH-extractable, GRO, BTEX, PAHs, and MTBE. Most results were below detection limits, and all samples were below the respective ESL.</p> <p>A round of groundwater samples was also collected in 2009 from the four monitoring wells. The groundwater samples were analyzed for TPH-extractable. All results were below detection limits.</p> <p>Tanks 94, 95, 118 figure show tank locations and sampling points.</p>

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (12/19/2011)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” (NFA) designation was based on industrial/commercial land use. The site may not be developed for residential use.</p> <p>Land use must also conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>The site is in proximity to the airfield. Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Completion Report and Request for Closure or No Further Action for Moffett Petroleum Sites.</i> Tetra Tech EC, Inc., San Diego, CA. June 2011. • <i>No Further Action for Aboveground Storage Tanks (ASTs) 94, 95, and 118, Former Naval Air Station Moffett Field, Mountain View, Santa Clara County.</i> RWQCB letter to Scott Anderson, US Navy, dtd. 12/19/2011. 			



LEGEND

- AST95-SB-1 ● SHALLOW SOIL BORING (TPH-e, GRO, BTEX, PAHs, AND MTBE RESULTS BELOW DETECTION LIMITS OR ESLs)
- AST 118 🏠 FORMER AST LOCATION
- WT118-02 ⊕ MONITORING WELL LOCATION
- TN094-02 ● HISTORICAL GROUNDWATER SAMPLE LOCATION
- TN094-01 📍 HISTORICAL SOIL AND GROUNDWATER SAMPLE LOCATION
- ➡ APPROXIMATE GROUNDWATER FLOW DIRECTION
- ▨ AREA OF KNOWN WEATHERED ASPHALT LAYER
- ▭ BUILDING

NOTES:

- AST - ABOVEGROUND STORAGE TANK
- BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- ESL - ENVIRONMENTAL SCREENING LEVEL
- GRO - GASOLINE-RANGE ORGANICS
- MTBE - METHYL TERT-BUTYL ETHER
- PAH - POLYNUCLEAR AROMATIC HYDROCARBON
- TPH-e - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS



TANKS 94, 95, & 118

Location of tanks and sampling points.

From Figure 3-1 in the Final Completion Report and Request for Closure

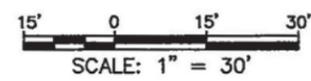
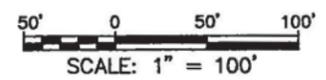
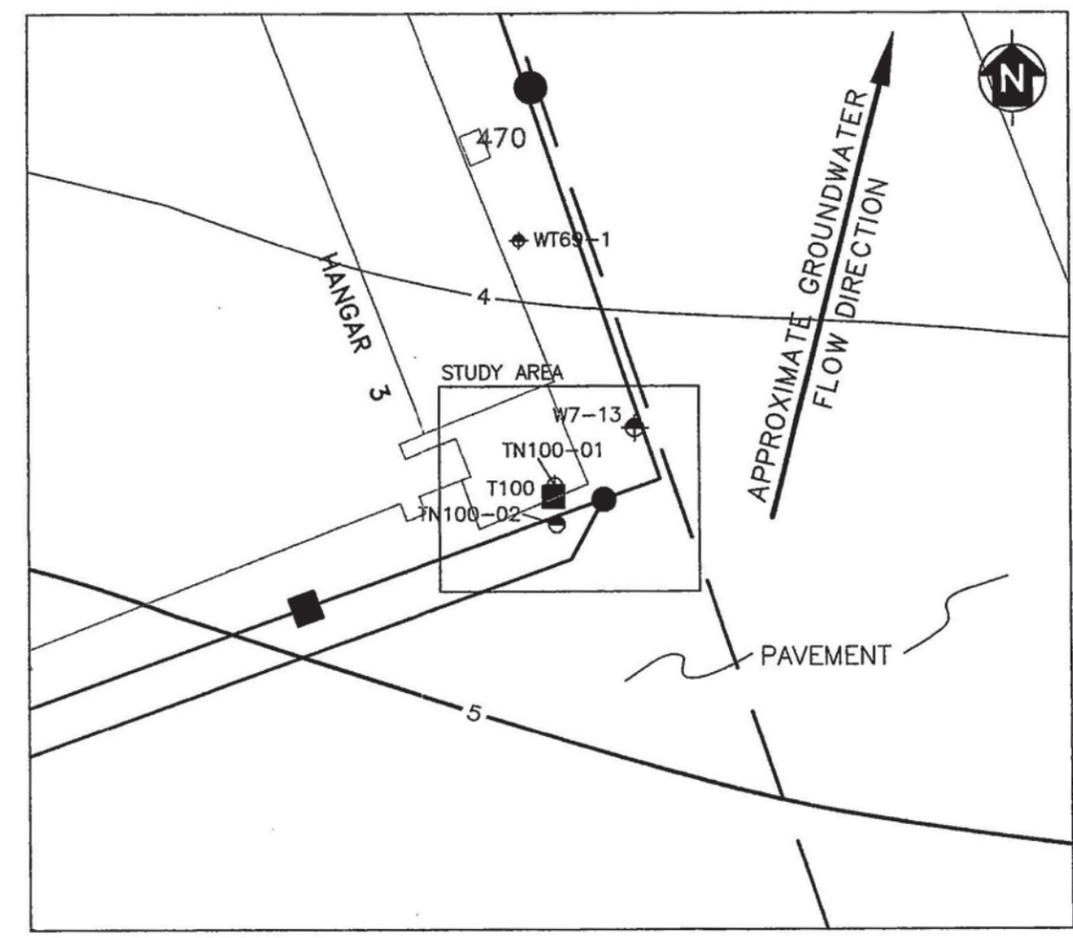
Tank ID:		100		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Hangar 3	Latitude (°N)	37.415664	
		Longitude (°W)	122.041022	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
AST	Single-wall steel	200	Diesel	
Use	Emergency generator.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	12/18/1992		
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 100 was located at the southeastern corner of Hangar 3. The tank was removed on 12/18/1992. Indentations were visible on the pavement that were believed to be from the tank stand.</p>		<p>One soil sample (TN100-01) was collected from a bore hole located next to the indentations in the pavement. The sample was taken at a depth of 10 feet. The soil sample was analyzed for TPH-extractable (TPH-e), polynuclear aromatic hydrocarbons (PAHs), and BTEX (benzene, toluene, ethylbenzene, and xylene).</p> <p>Three groundwater samples were collected: 100 µg/L TPHd (estimated), 390 µg/L TPHmo, and 24 µg/L PCE. The samples were analyzed for TPH-e, PAHs, and BTEX.</p> <p>Constituents in soil and groundwater did not exceed action levels. Sampling results and locations are provided in Figure Tank 100.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (9/9/2008)
Land Use Restrictions		Development Issues	
<p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Phase III Basewide Tank Closure Report, No Further Action Sites.</i> Tetra Tech EM, Inc., San Francisco, CA. December 16, 2003. • <i>No Further Action, Aboveground Storage Tanks 100, 102, 129, 132, and 133 Water Board Case Nos. 43D9030, 43D9031, 43D9032, and 43D9033, NAS Moffett Field, Moffett Field, Santa Clara County.</i> RWQCB ltr. To Darren Newton, US Navy. September 9, 2008. 			

MEDIUM		UNITS	
SAMPLE I.D.	GROUNDWATER (µg/L)		DEPTH IN FEET OR DATE
	TN100-02	Dec-01	
ANALYTE		CONCENTRATION	
Diesel		33 J	

SOIL (mg/kg)	
TN100-01	8
Napthalene	0.0277 J
Toluene	0.026
Xylenes	0.002

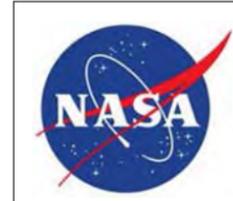
GROUNDWATER (µg/L)	
TN100-02	Dec-01
Diesel	33 J



LEGEND

- STORM DRAIN
- CATCH BASIN
- SANITARY SEWER
- MANHOLE
- ABOVEGROUND STORAGE TANK (AST)
- GROUNDWATER MONITORING WELL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- GROUNDWATER SAMPLE LOCATION
- GROUNDWATER ELEVATION CONTOUR, MAY 2000
- J THE ASSOCIATED NUMERICAL VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.
- µg/L MICROGRAMS PER LITER
- mg/kg MILLIGRAMS PER KILOGRAM

NOTE: MONITORING WELL WT69-1 WAS SAMPLED DURING INITIAL INVESTIGATION.



TANK 100
 Tank & sampling locations with soil & groundwater results.
 From Figure 17 in Phase III Basewide Tank Closure Report, No Further Action

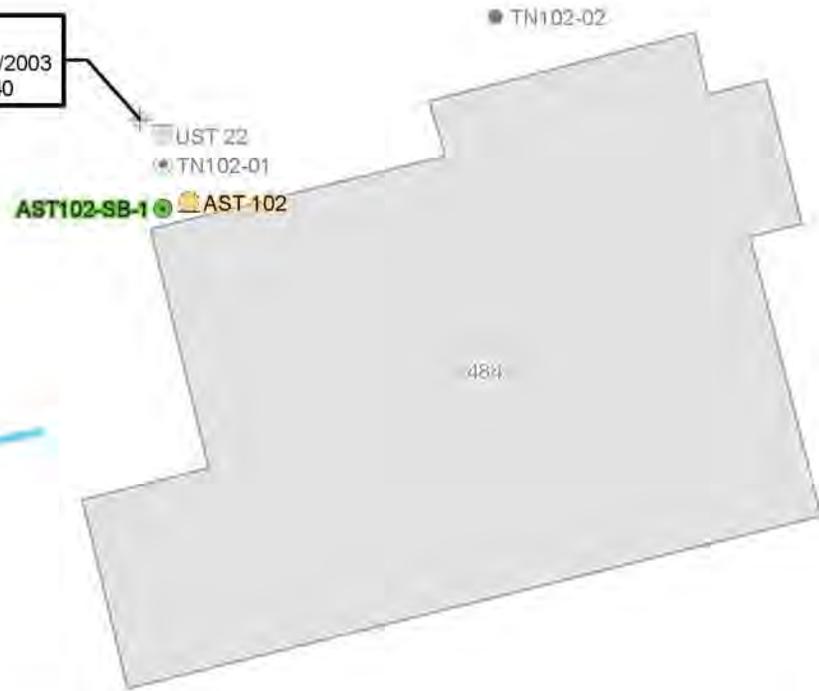
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Tank ID:		102		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	484	Latitude (°N)	37.426624	
		Longitude (°W)	122.045852	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
AST	Single-wall steel	55	Diesel	
Use	Emergency generator.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	4/15/1995		
REMEDIAL ACTION				
Removal		Sampling		
<p>Tank 102 was located on the northwest corner of Bldg. 484. Tank 102 replaced Tank 22 as the fuel supply for an emergency generator in Bldg. 484. The tank was taken out of service and removed on 4/15/1995. A former Navy employee noted that a spill occurred at Tank 102. No historical data were located for AST 102.</p>		<p>Three soil borings were drilled in 2001: TN102-01, TN102-02, and TN102-03. Soil and groundwater samples were collected from TN102-01. Groundwater samples were also collected from borings TN102-02 and TN102-03. Soil and groundwater samples were analyzed for TPH-extractable (TPH-e), BTEX (benzene, toluene, ethylbenzene, and xylene), and polynuclear aromatic hydrocarbons (PAHs).</p> <p>Groundwater was sampled from monitoring wells WSW-1 and WT22-1.</p> <p>An additional investigation was conducted in 2009. Boring AST102-SB1 was advanced off the western edge of the concrete pad. One shallow soil sample was collected from 1 to 2 feet below ground surface (bgs). The soil sample was analyzed for TPH-e, BTEX, and PAHs.</p> <p>Analyses from the sampling events did not detect any contamination exceeding action levels.</p> <p>See Figure Tank 102.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (12/5/2011)
Land Use Restrictions		Development Issues	
<p>The “no further action” (NFA) designation was based on industrial/commercial land use. Residential land is restricted.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Completion Report and Request for Closure or No Further Action for Moffett Petroleum Sites.</i> Tetra Tech EC, Inc., San Diego, CA. June 2011. • <i>No Further Action for Aboveground Storage Tank (AST) 102, Former Naval Air Station Moffett Field, Mountain View, Santa Clara County.</i> RWQCB letter to Scott Anderson, US Navy. December 5, 2011. 			

WT22-1					
SAMPLE DATE	12/10/2001	6/12/2002	10/8/2002	1/13/2003	4/16/2003
TPH-e (µg/L)	ND	140 H	270	270	140

WSW-1				
SAMPLE DATE	6/13/2002	10/10/2002	1/13/2003	4/14/2003
TPH-e (µg/L)	25 J	86 J	ND	220 J



LEGEND

- AST102-SB-1 ● SHALLOW SOIL BORING (TPH-e, BTEX, AND PAHs RESULTS BELOW DETECTION LIMITS OR ESLs)
- AST 102 🗑️ FORMER AST LOCATION
- UST 22 🗑️ FORMER UST LOCATION
- WSW-1 📍 MONITORING WELL LOCATION
- TN102-03 ● HISTORICAL GROUNDWATER SAMPLE LOCATION
- TN102-01 ● HISTORICAL SOIL AND GROUNDWATER SAMPLE LOCATION
- ➡️ APPROXIMATE GROUNDWATER FLOW DIRECTION
- ▭ BUILDING

NOTES:

- AST - ABOVEGROUND STORAGE TANK
- BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- ESL - ENVIRONMENTAL SCREENING LEVEL
- H - ESTIMATED VALUE BECAUSE OF HOLDING TIME VIOLATION
- J - ESTIMATED VALUE
- ND - NOT DETECTED
- PAH - POLYNUCLEAR AROMATIC HYDROCARBON
- TPH-e - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS
- UST - UNDERGROUND STORAGE TANK



TANK 102

Location of Tank 102 and sampling points.

From Figure 3-7 in Final Completion Report & Request for Closure or No Further Action

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Tank ID:		104		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	408	Latitude (°N)	37.414939	
		Longitude (°W)	122.048720	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
AST	Single-wall steel	191	Diesel	
Use	Emergency generator			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	4/15/1994		
REMEDIAL ACTION				
Removal		Sampling		
<p>The Navy removed the tank in 1995. The Santa Clara County Department of Environmental Health (SCCDEH) observed the removal. No staining was observed on the concrete pad where Tank 104 was located. SCCDEH did not request collection of samples.</p>		<p>No samples were taken during the removal. There are no chemical data available.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (11/4/08)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” determination is based on an industrial/commercial land use. Residential use is restricted.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Tank 104 site is located between runways 32R and 32L. Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Phase III Basewide Tank Closure Report, No Further Action Sites.</i> Tetra Tech EM, Inc., San Francisco, CA. December 16, 2003. • <i>No Further Action, Aboveground Storage Tank (AST) 104, Water Board Case No. 43D9602, NAS Moffett Field, Moffett Field, CA.</i> RWQCB letter to Darren Newton, US Navy, dated November 4, 2008. 			



RUNWAY

WT55-1
GPT55-1
GPT55-2

408
CONCRETE PAD

T104

APPROXIMATE GROUNDWATER
FLOW DIRECTION

5

6

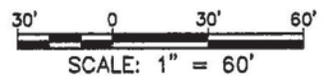
GRASS

LEGEND

-  ABOVEGROUND STORAGE TANK (AST)
-  PREVIOUS BORING (TANK 55 INVESTIGATION)
-  GROUNDWATER MONITORING WELL
-  GROUNDWATER ELEVATION CONTOUR, MAY 2000
-  STORM DRAIN
-  CATCH BASIN

NOTES: NO COMPOUNDS DETECTED IN SOIL OR
GROUNDWATER

NO SANITARY SEWER



TANK 104

Tank 104 location. Sample points were for Tank 55.

From Figure 20 in the Phase III Basewide Tank Closure Report.

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Tank ID:		107	
Version:	Final	Date:	02/28/2015
RESPONSIBLE PARTY			
Organization	National Aeronautics and Space Administration		
Address	M/S 204-15 Bldg. N204, Room 102B Moffett Field, CA 94035		
Contact	Donald Chuck Donald.M.Chuck@nasa.gov 650-604-0237		
LOCATION			
Building No.	Golf Course Maintenance Yard	Latitude (°N)	37.426281
		Longitude (°W)	122.040189
Physical Description			
Type	Construction	Capacity (gallons)	Contents
AST	Single-wall steel	340	Gasoline
Use	Fuel storage and supply for landscaping equipment		
SITE SUMMARY			
Current Status	Date Installed	Date Removed	Contamination
Removed	Unknown	6/17/1995	Soil Groundwater
REMEDIAL ACTION			
Removal		Sampling	
<p>Tank 107 was supported on stilts within a concrete containment structure inside a bermed enclosure at the golf course maintenance yard. The tank and containment structure were removed June 17, 1995. Tank removal documents are not available.</p> <p>See Tank 107 figure for location.</p>		<p>Sampling data is not available.</p>	

Site Management			
Regulatory Agency	SCCDEH	Closure Status	Open
Land Use Restrictions		Development Issues	
<p>SCCDEH: Santa Clara County Department of Environmental Health</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Final Phase III Basewide Tank Closure Report, No Further Action Sites.</i> Tetra Tech EM Inc., San Francisco, CA. July 22, 2002. 			



NORTHERN CHANNEL

NORTH PATROL ROAD DITCH

NORTH PATROL ROAD

MARRIAGE ROAD DITCH

W3-23

W53-2

471 399

W53-1

APPROXIMATE GROUNDWATER FLOW DIRECTION

359

MARRIAGE ROAD

T107

376

409



SCALE: 1" = 60'

LEGEND



ABOVEGROUND STORAGE TANK (AST)



GROUNDWATER MONITORING WELL



GROUNDWATER ELEVATION CONTOUR, MAY 2000

NOTES: NO COMPOUNDS DETECTED IN SOIL OR GROUNDWATER



TANK 107

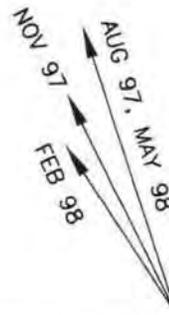
Tank location.

From Figure 23 in the Phase III Basewide Tank Closure Report

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Tank ID:		131		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0928			
LOCATION				
Building No.	Hangar 2	Latitude (°N)	37.414805	
		Longitude (°W)	122.043525	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
UST	Single-wall steel	100	Gasoline	
Use	Unknown. Possibly for an emergency generator.			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	1943	11/25/1995	X	X
REMEDIAL ACTION				
Removal		Sampling		
<p>A backhoe was used to remove soil from the top of the tank and from the sides. The tank was observed to be rusted during the removal. The excavated soils exhibited hydrocarbon odors. The excavated soils were transported to the Navy's bioremediation pad for storage. The soil was ultimately used in the foundation layer for the Site 1 landfill cap.</p>		<p>Three soil samples were taken from the excavation: TK131-EX-001, TK131-EX-002, and TK131-SP-001. The soil samples were analyzed for TPH-extractable (TPH-e) as diesel, TPH-purgeable (TPH-p), and BTEX (benzene, toluene, ethylbenzene, and xylene).</p> <p>In August 1999, the Navy conducted an investigation in the area of Tank 131. Using direct-push technology, three borings were advanced: UST131-GP-01 through UST131-GP-03. Sample depths were determined using a photoionization detector. Two soil samples were collected from UST131-GP-01 and analyzed for TPH-p, TPH-e, BTEX, methyl tert-butyl ether (MTBE), BTEX, and polynuclear aromatic hydrocarbons (PAHs).</p> <p>Groundwater samples were collected from the three 1999 borings. The groundwater was analyzed for TPH-p, TPH-e, and BTEX.</p> <p>The analyses of soil samples taken from the excavation (TK131-EX-001 and -002) indicated the presence of diesel, gasoline, and BTEX. The highest gasoline concentration was 8120 mg/kg in sample TK131-EX-001. The same boring contained the highest concentration of diesel at 1080 mg/kg. Only motor oil was detected in the 1999 investigation.</p> <p>Groundwater analysis indicated the presence of diesel at 100 µg/L. Tank and sample locations are presented in the figures Tank 131 soil and Tank 131 groundwater.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (12/23/2004)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” (NFA) was based on industrial/commercial land use. Residential development is restricted.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Basewide Petroleum Site Evaluation Methodology Technical Memorandum Draft Final, Appendix K Petroleum Site Evaluation.</i> Tetra Tech EM, Inc., San Francisco, CA. January 5, 2001. • <i>Transmittal of Closure Letter and Site Summary for Underground Storage Tanks 1, 32, 47-50, 56A – 56D, 79 – 84, 97, and 131, Moffett Federal Airfield, Moffett Federal Airfield, Moffett Field, CA (RWQCB Case No. 43D9027, 43D9028, 43D9037, and 43D9038),</i> RWQCB letter to Arturo Tamayo, US Navy, dated December 23, 2004. 			



LOCAL GROUNDWATER FLOW DIRECTION
(18° TO 33° WEST OF NORTH)

HANGAR 2

TK131-EX-001	4.0 FT.
Benzene	29.2
Toluene	154
Ethylbenzene	48.6
Xylene	257
Diesel	1,080
Gasoline	8,120

TK131-EX-002	4.0 FT
Benzene	2.4
Toluene	34.2
Ethylbenzene	27.4
Xylene	176
Diesel	650
Gasoline	4,400

UST131-GP-01	4.0-5.0 FT
Motor Oil ¹	6

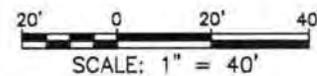
UST131-GP-01
FORMER LOCATION
TANK 131

UST131-GP-03
50'U

LEGEND

- EXISTING MONITORING WELL
- DIRECT-PUSH SAMPLE LOCATION
- SOIL SAMPLE LOCATION
- 50'D DISTANCE DOWNGRADIENT
- 20'U DISTANCE UPGRADIENT
- A — A' CROSS-SECTION LINE
- STORM DRAIN SYSTEM
- - - SEWER SYSTEM
- CATCH BASIN
- mg/kg MILLIGRAMS PER KILOGRAM
- FT FEET
- ¹ ESTIMATED CONCENTRATION

W7-1



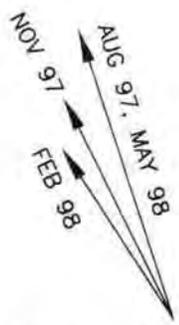
SAMPLE ID	DEPTH
UST1-GP-01	1.5-2.0 FT
Motor Oil	18
ANALYTE	CONCENTRATION



TANK 131 SOILS

Sample location and selected petroleum constituents remaining in soil.

From Figure K4 in Appendix K of the Petroleum Methodology Report



LOCAL GROUNDWATER FLOW DIRECTION
(18° TO 33° WEST OF NORTH)

HANGAR 2

UST131-GP-02
50'D

UST131-GP-01

FORMER LOCATION
TANK 131

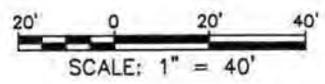
UST131-GP-03
50'U

W7-1

UST131-GP-02	8/31/99
Diesel ¹	100

LEGEND

- EXISTING MONITORING WELL
- DIRECT-PUSH SAMPLE LOCATION
- $\mu\text{g/L}$ MICROGRAMS PER LITER
- 50'D DISTANCE DOWNGRADIENT
- 20'U DISTANCE UPGRADIENT
- STORM DRAIN SYSTEM
- SEWER SYSTEM
- CATCH BASIN
- ¹ PATTERN DOES NOT MATCH CALIBRATED FUEL PATTERN



SAMPLE ID	DATE
UST131-GP-02	8/31/99
Diesel	100

ANALYTE CONCENTRATION



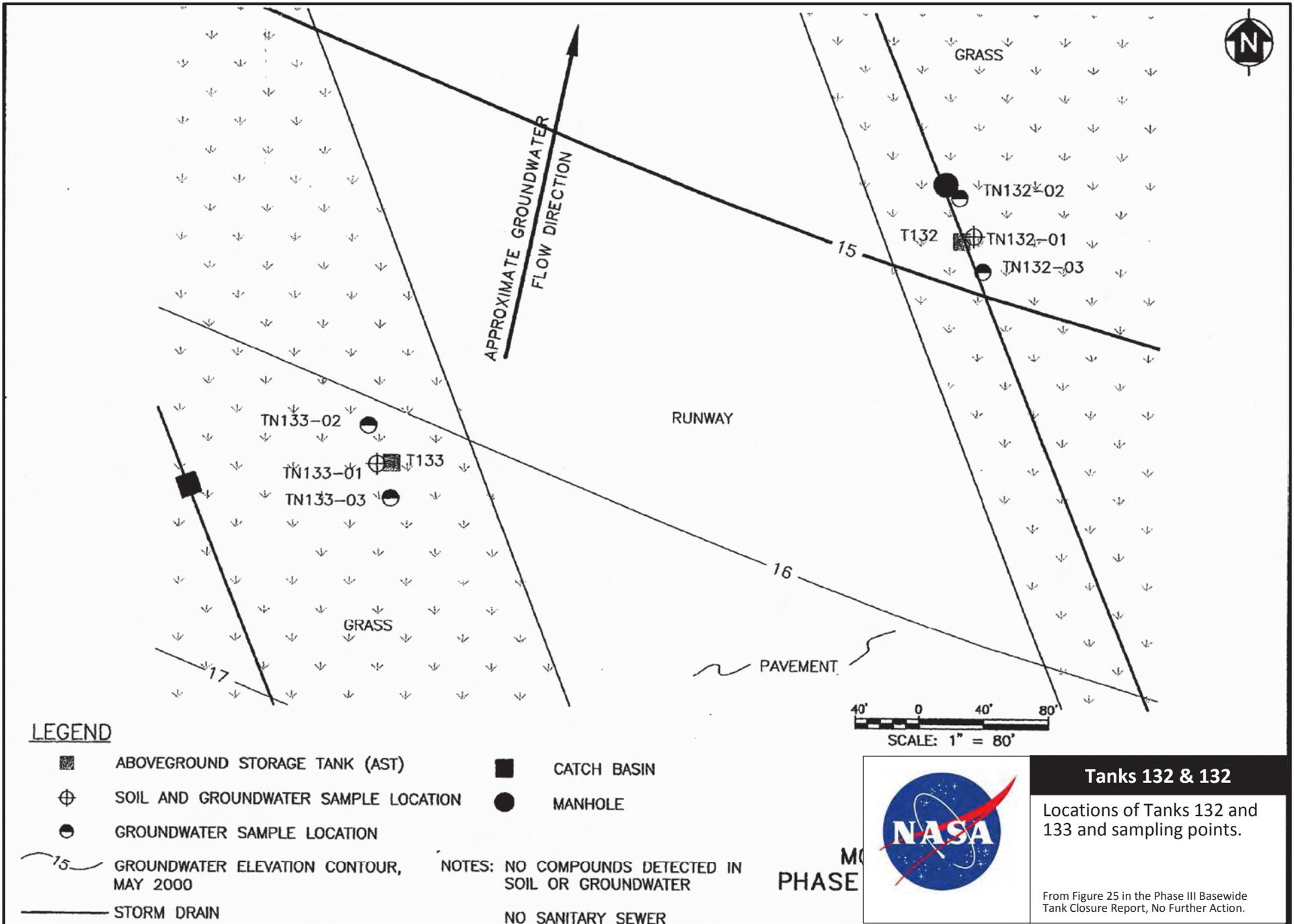
TANK 131 GROUNDWATER

Selected contaminant concentrations in groundwater.

From Figure K8 in Appendix K of the Petroleum Site Evaluation

Tank ID:		132 & 133		
Version:	Final	Date:	02/28/2105	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Runway 32R	Latitude (°N)	See removal summary	
		Longitude (°W)	See removal summary	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
AST	Single-wall steel	426	Hydraulic fluid	
Use	Operation of and aircraft arresting cable			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Removed	Unknown	3/1/1994		
REMEDIAL ACTION				
Removal		Sampling		
<p>Tanks 132 [37.408402°N, 122.044725° W] and 133 [37.408753° N, 122.043605° W] were part of an arresting cable installation on Runway 32R. The hydraulic fluid operated brakes to slow aircraft using the arresting cable.</p> <p>There are no documents or records on the removal of the tanks and arresting cable system.</p>		<p>Direct Push Technology (DPT) was used to advance three borings at each ATS site:</p> <p>AST 132:</p> <ul style="list-style-type: none"> • TN132-01 • TN132-02 • TN132-03 <p>AST 133:</p> <ul style="list-style-type: none"> • TN133-01 • TN133-02 • TN133-03 <p>Soil samples were collected and analyzed for TPH-extractable. Groundwater samples were also collected and analyzed for TPH-extractable. No constituents were detected in either soil or groundwater.</p> <p>Tank and sample locations are shown on the Tanks 123-133 figure.</p>		

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (9/9/2008)
Land Use Restrictions		Development Issues	
<p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Tank locations are adjacent to either side of Runway 32 R. Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>	
References			
<ul style="list-style-type: none"> • <i>Phase III Basewide Tank Closure Report, No Further Action Sites.</i> Tetra Tech EM, Inc., San Francisco, CA. December 16, 2003. • <i>No Further Action, Aboveground Storage Tanks 100, 102, 129, 132, and 133 Water Board Case Nos. 43D9030, 43D9031, 43D9032, and 43D9033, NAS Moffett Field, Moffett Field, Santa Clara County.</i> RWQCB ltr. To Darren Newton, US Navy. September 9, 2008. 			



LEGEND

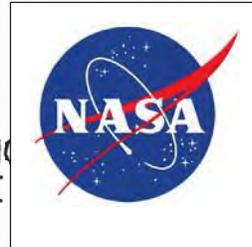
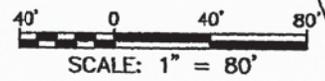
- ABOVEGROUND STORAGE TANK (AST)
- SOIL AND GROUNDWATER SAMPLE LOCATION
- GROUNDWATER SAMPLE LOCATION
- CATCH BASIN
- MANHOLE

GROUNDWATER ELEVATION CONTOUR, MAY 2000

STORM DRAIN

NOTES: NO COMPOUNDS DETECTED IN SOIL OR GROUNDWATER

NO SANITARY SEWER



Tanks 132 & 132

Locations of Tanks 132 and 133 and sampling points.

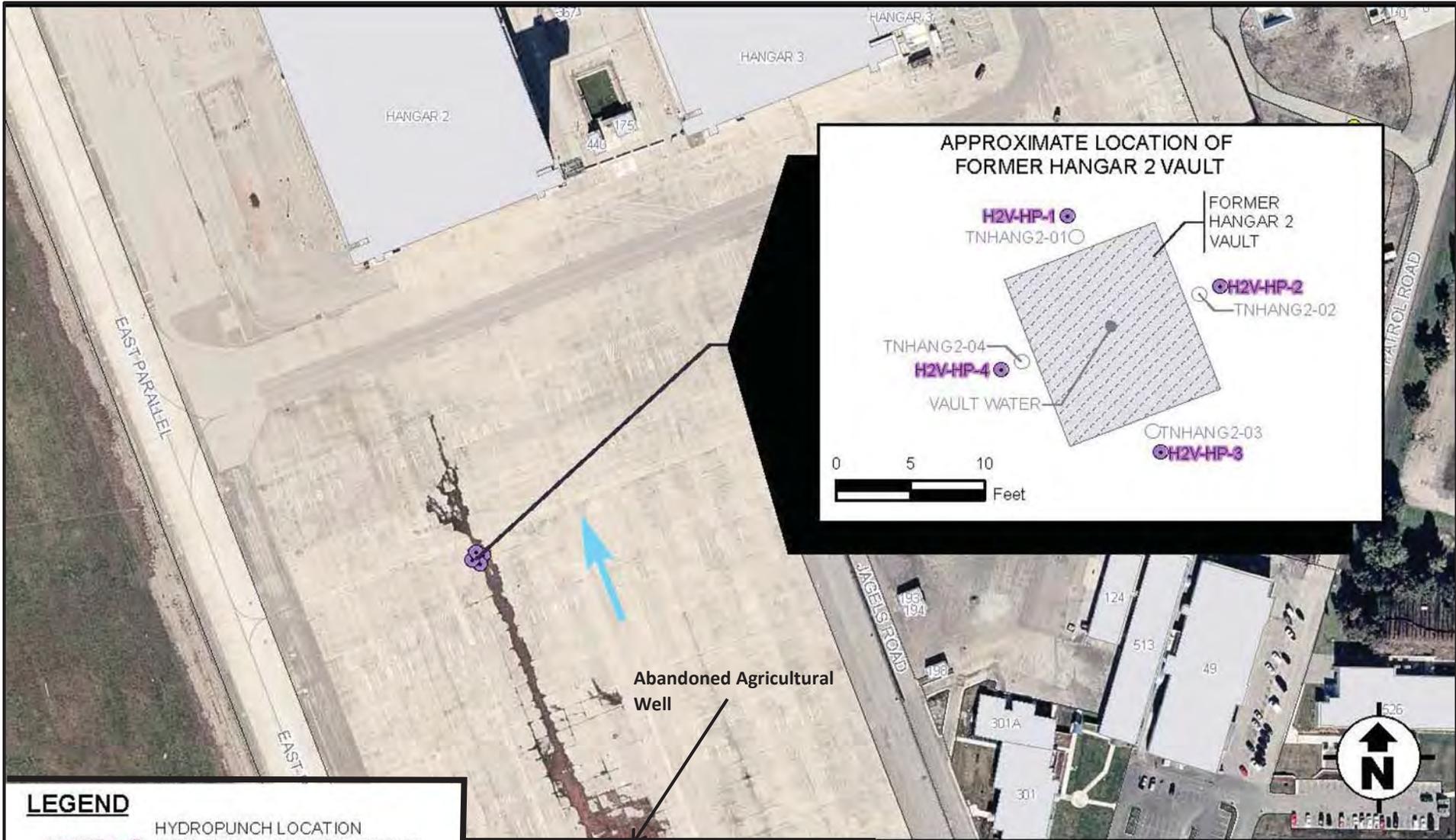
From Figure 25 in the Phase III Basewide Tank Closure Report, No Further Action.

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Tank ID:		Hangar 2 Vault		
Version:	Final	Date:	02/28/2015	
RESPONSIBLE PARTY				
Organization	Department of the Navy, BRAC			
Address	1455 Frazee Road, Suite 900 San Diego, CA 92108			
Contact	Scott Anderson			
	Scott.d.anderson@navy.mil			
	619-532-0938			
LOCATION				
Building No.	Hangar 2	Latitude (°N)	37.413709	
		Longitude (°W)	122.042981	
Physical Description				
Type	Construction	Capacity (gallons)	Contents	
Vault	Concrete	Not Applicable	Not Applicable	
Use	Defueling connection point to receive fuel from aircraft and return fuel to fuel farm storage tanks			
SITE SUMMARY				
Current Status	Date Installed	Date Removed	Contamination	
			Soil	Groundwater
Closed in place	1943	December 2001		X
REMEDIAL ACTION				
Removal		Sampling		
<p>Hangar 2 vault was an underground concrete vault approximately 7 feet by 7 feet by 15 feet deep discovered in 1999 that was formerly used to service pipelines within the vault. Eight steel pipes ranging from 10 to 12 inches in diameter were observed in the eastern and western walls of the vault (four on each wall). The end of each pipe was sealed with a welded steel cap. A geophysical assessment indicates that the underground piping may extend 3 feet beyond the western wall and approximately 400 feet beyond the eastern wall. Field investigations found that at least two of the lines were pressurized with compressed air or nitrogen.</p> <p>Upon opening the vault, it was found to be filled with water. The source of the water was likely from an abandoned agricultural well that had become artesian. The well was located south of the Hanger 2 vault. A sample of the water was taken before the water was pumped out and disposed of.</p> <p>The walls of the vault were pressure-washed. The rinse water was not sampled. Once the rinse water was removed from the vault, the vault was closed in place by filled the structure with cement.</p>		<p>After the Hangar 2 vault was discovered in 1999, a sample of the water was collected through an inspection port and analyzed for gasoline range organics (GRO), TPH-extractable (TPH-e), volatile organic compounds (VOCs), methyl tert-butyl ether (MTBE), and polynuclear aromatic hydrocarbons (PAHs).</p> <p>During the closure in 2001, the water was pumped from the site and two water samples were collected: VHANG2-01 and VHANG2-02. The water samples were analyzed for GRO, TPH-e, VOCs, MTBE, and PAHs.</p> <p>Soil boring were advanced on all four sides of the vault. Soil samples were collected approximately two feet below ground surface (bgs): TNHANG2-01 through TNHANG2-04. The soil samples were analyzed for MTBE, TPH-purgeable (TPH-p), TPH-e, PAHs, and VOCs.</p> <p>Analyses of the 1999 water sample indicated the presence of the following compounds above Environmental Screening Levels (ESLs):</p> <ul style="list-style-type: none"> • TPH-e (diesel) @ 2200 µg/L • GRO @ 300 µg/L • Tetrachloroethene (PCE) @ 11 µg/L • Trichloroethene (TCE) @ 8 µg/L <p>Analyses of water samples from 2001 indicated the presence of</p>		

Removal	Sampling
	<p>the following compounds exceeding ESLs:</p> <ul style="list-style-type: none">• TPH-e (diesel) @ 100 µg/L in VHANG2-02• TPH-e (motor oil) @ 390 µg/L in VHANG2-02• PCE @ 24 µg/L in VHANG2-01 <p>The diesel concentration in VHANG2-02 was estimated due to method holding time violation. The motor oil concentration was out of quality control limit.</p> <p>Concentrations in the soil samples did not exceed ESLs.</p> <p>Grab groundwater samples were collect on each side of the vault on October 2009 using HydroPunch®. The water samples were analyzed for GRO, TPH-e, and VOCs. None of the concentrations for the analyzed compounds were reported above the detection limits.</p> <p>Hangar 2 Vault location and sampling points are illustrated on the Hangar 2 Vault figure.</p>

Site Management			
Regulatory Agency	RWQCB	Closure Status	NFA (12/7/2011)
Land Use Restrictions		Development Issues	
<p>The “No Further Action” determination is based on a commercial/industrial land use. Residential use is restricted.</p> <p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>Due to the vault location near the airfield, development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19. In general, all building must be shorter than limits set by the FAA; the farther from the center of the runway, the taller the buildings can be. The height restrictions are reviewed as part of the building permit process.</p>		<p>Unknown contamination in soils could be encountered during subsurface work. Additionally, abandoned pipeline may also be encountered during subsurface work.</p>	
References			
<p><i>Final Phase III Basewide Tank Closure Report, No Further Action Sites.</i> Tetra Tech EM, Inc., San Francisco, CA. December 16, 2003.</p> <p><i>Final Completion Report and Request for Closure or No Further Action for Moffett Petroleum Sites, Moffett Field, CA.</i> Tetra Tech EM, Inc., San Diego, CA. June 2011.</p> <p><i>No Further Action for Hangar 2 Vault, Former Naval Air Station Moffett Field, Mountain View, Santa Clara County.</i> RWQCB letter to Scott Anderson, US Navy, dated December 7, 2011.</p>			



LEGEND

- H2V-HP-1 ● (GRO, TPH-e, AND VOC RESULTS BELOW DETECTION LIMITS)
- VAULT WATER ● HISTORICAL GROUNDWATER SAMPLE LOCATION
- TNHANG2-01 ○ HISTORICAL SOIL SAMPLE LOCATION
- ➡ APPROXIMATE GROUNDWATER FLOW DIRECTION
- ▭ BUILDING

NOTES:
 GRO - GASOLINE-RANGE ORGANICS
 TPH-e - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS
 VOC - VOLATILE ORGANIC COMPOUND



HANGAR 2 VAULT
 Location of Hangar 2 Vault and sampling points.
 From Figure 3-7 in Final Completion Report & Request for Closure or No Further Action

SITE NAME:	Potential Additional Cleanup Liabilities				
Version:	Final	Date:	02/28/2014		
RESPONSIBLE PARTY					
Organization	To Be Determined (TBD)				
Address					
Contact					
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See Site Summaries		
	Santa Clara County	Longitude	See Site Summaries		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
TBD	TBD	X			Investigation
SITE SUMMARY					
<p>The Potential Additional Cleanup Liability sites were discovered during NASA review of aerial photographs of the former Naval Air Station Moffett Field (NASMF) and NASA Ames Research Center (NASA Ames). These sites had not been investigated previously during the Navy's studies at NASMF. Based on visual evidence and apparent use, it is likely that they may be potential releases of contamination to the environment. Eight sites were found during the review. Four of these sites are within the Planetary Ventures (PV) planned lease area (Figure 1):</p> <p>Potential Site (PS) 1: Outdoor Storage Area (37.422989° N, 122.055305° W) PS 3: Hangar 1 Subsurface (37.411757° N, 122.053558° W) PS 6: Former Sewage Treatment Plant (37.426556° N, 122.040164° W) PS 8: Former Hazardous Waste Storage Area (37.410661° N, 122.052072° W)</p> <p>In 2009, NASA undertook a preliminary investigation at these sites. The objective of the investigation was to:</p> <ul style="list-style-type: none"> Gather soil and groundwater chemical data to determine if previous site activities resulted in potential sources of contamination. Gather groundwater chemical data to better define the extent of known groundwater contamination. Gather lithological data to better define the subsurface stratigraphy in the A1- and A2-aquifer zones. 					

SITE SUMMARY

These objectives were achieved by performing the following activities.

- Collecting soil samples at two-foot intervals using a Geoprobe rig to identify potential surface releases.
- Collecting samples of first-encountered groundwater from selected Geoprobe borings.
- Collecting samples of groundwater from prominent water-bearing zones in the A1- and A2-aquifer zones using HydroPunch technology.
- Collecting continuous soil cores from above the saturated zone using the Geoprobe technology to provide lithological data.
- Obtaining continuous soil logs using Cone Penetrometer Testing (CPT) to provide lithological data.

An internal Draft Report of Findings was prepared but never submitted. Maps of the findings were distributed to the Navy and regulatory agencies.

PS-1: Outdoor Storage Area.

PS-1 was located near the northwestern portion of the runways, adjacent to NASA's Vertical Takeoff and Landing (VTOL) Pad. The storage area was found in a 1950 aerial photograph of Moffett Field (Figure 2). An enlarged view of the aerial photograph discloses that the area was used for the outdoor storage of drums and other miscellaneous items (Figure 2). The actual period of use is not known and there are no records of what materials were stored at PS1.

Groundwater and soil samples were taken at PS-1. The soil and groundwater sample analyses are provided in Tables 1 and 2.

Groundwater sample results indicated the presence of VOCs and TPH-MO. The sampling locations and results are on Figure 3. Soil sample results indicated only TPH-MO was present in two of the three sampling locations: 5.5 mg/kg @ 0' at PS1-1 and 68 mg/kg @ 9' at PS1-2 (Figure 4).

PS-3: Hangar 1 Subsurface

PS-3 is located at Hangar 1. Throughout the history of Moffett Field, Hangar 1 was used for parking and servicing aircraft, including piston engines, jets, and turbine (turboprop) (Figure 5). Maintenance often required the use of solvents. Aircraft, including the *USS Macon*, were also refueled within the hangar as evidenced by the former fuel pits described in Navy Installation Restoration (IR) Site 24. Spills and leaks have very likely occurred during this time. Solvents and fuels may have migrated to the subsurface of the hangar through floor cracks, drains, sumps, etc. The subsurface area of the hangar has not been investigated to determine whether or not contamination is present.

In addition to samples under the hangar floor, sampling was done in the soil areas on the eastern side of Hangar 1. These areas have since been remediated by the Navy as part of the Site 29 Non-Time- Critical Removal Action (NTCRA). The soil areas will no longer be discussed in this existing environmental conditions (EEC) report.

SITE SUMMARY

Groundwater and soil samples were taken from below the concrete floor in Hangar 1. The sampling locations were at the southwestern end of the hangar. Sample analyses are listed in Tables 1 & 2.

Six points were sampled for groundwater using HydroPunch. Analyses of the samples indicated the presence of VOCs. The maximum concentration for PCE was 7800 µg/L at PS3-5 (40'). The maximum TCE concentration was 630 µg/L at the same sample point and interval. The locations of the sampling points (Figure 6) are close to the Traffic Island site in Site 28. The groundwater at the Traffic Island is also contaminated with high levels of PCE and TCE. The high concentrations seen below the surface of the hangar are likely result of the Traffic Island rather than a source from the hangar.

Analytical results of the soils at these six points revealed low levels of TCE and TPH.

The sampling points and analytical results are provided in Figure 4.

PS-6: Former Sanitary Sewer Treatment Plant

The former sanitary sewer treatment plant was located next to the present golf course maintenance yard (Figure 1). The plant was constructed in 1948 to replace a septic tank that was previously used to manage sanitary sewage. The treatment plant consisted of two Imhoff tanks and three sludge drying beds. Sewage entered the plant through a grit chamber and comminutor. The comminutor was a device that shredded any solids in the sewage. The sewage was then pumped into the Imhoff tanks where solids settled to the bottom of the tanks where anaerobic digestion occurred. Liquid waste passed through a weir into discharge pipes and eventually into the Northern Channel. After digestion, the resulting sludge was then pumped to three sludge drying beds. Some of the liquid waste was also mixed with the sludge and was discharged to 4-inch joint tile pipes under the sludge drying beds. Figure 8 illustrates the treatment system. Operation of the plant ended in 1967. Sewage was then pumped through a pressurized sanitary sewer lint to the Sunnyvale public-owned treatment works (POTW).

Five Geoprobe borings were installed to a depth of eight feet bgs. Soil Samples were collected at two-foot intervals and analyzed as provided in Table 1. A sample of first-encountered groundwater was collected from selected Geoprobe borings. Samples were analyzed for the compounds in Table 2.

All but one of the borings had levels of arsenic that exceeded ESLs. Concentrations ranged from <2.5 mg/kg to 4.2 mg/kg. Sample results for all compounds detected are shown in Figure 9.

Analytical results of groundwater at both sampling location had exceedences of ESL for mercury, chromium, copper, lead, nickel, zinc, arsenic, and selenium. Sample point and results are shown in Figure 10.

SITE NAME:

Potential Additional Cleanup Liabilities

SITE SUMMARY

PS-8: Former Hazardous Waste (HazWaste)/Hazardous Materials (HazMat) Storage Yard

The HazWaste/HazMat storage yard was located south of Hangar 1 (Figure 11). The area was a fenced-off location where HazMat for aircraft washing and maintenance was stored in lockers. Mainly lubricant and hydraulic oils were stored there. Solvents and detergents were also likely stored in the yard for use in the nearby wash rack. HazWaste mainly consisted of waste oil stored in bowsers (Figure 12).

Seven Geoprobe borings (Figure 13) were installed to a depth of eight feet bgs. Soil samples were collected at two-foot intervals and were analyzed for the compounds in Table 1. Three CPT borings were installed to a depth of 60 feet adjacent to selected Geoprobe borings. Based on the CPT logs, HydroPunch groundwater samples were collected and analyzed for the compounds listed in Table 2.

Soil analyses indicated the presence of total petroleum hydrocarbons and metals. Sample results of detected compounds are shown in Figure 13.

Groundwater analyses indicated the presence of VOCs, total petroleum hydrocarbons, and metal. Several of the VOC and metal concentrations exceeded ESLs. Sample point and results are shown in Figure 14.

No further investigations were done at these sites and none are currently planned. A report of findings needs to be completed for this investigation for the potential additional cleanup liabilities.

SITE NAME:		Potential Additional Cleanup Liabilities			
REMEDIAL ACTION					
Remedy	TBD	Begin Date	TBD	End Date	TBD
Currently there are no remedial actions planned for these sites.					
Land Use Restrictions			Development Issues		
No land use restrictions have been placed on these sites.		<p>Development at these sites may require additional investigation to ensure that there will not be exposures to contamination.</p> <p>PS-1: development is unlikely due to the proximity to the runways and taxiways. Only a portion of PS-1 lies within the lease.</p> <p>PS-3: additional sampling should be done to determine whether additional soil contamination exists below the hangar floor. This will be especially true if the present concrete floor is removed and replaced.</p> <p>PS-6: development will be dependent on planned changes in the golf course. Residential use is prohibited due to the proximity of jurisdictional wetlands. Exposure to contamination is likely if any excavations are done at the site.</p> <p>PS-8: development needs to take into account that any excavation could potentially expose contaminated soils. Any groundwater contamination due to PS-8 is commingled with the Regional Plume.</p>			

SITE NAME:

Potential Additional Cleanup Liabilities

RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
			Residual contamination is shown on the soil and groundwater sampling figures for each PS.

REFERENCES (Chronological Order)

Internal document: Report of Findings for Potential New Sites

FIGURES

FIGURES

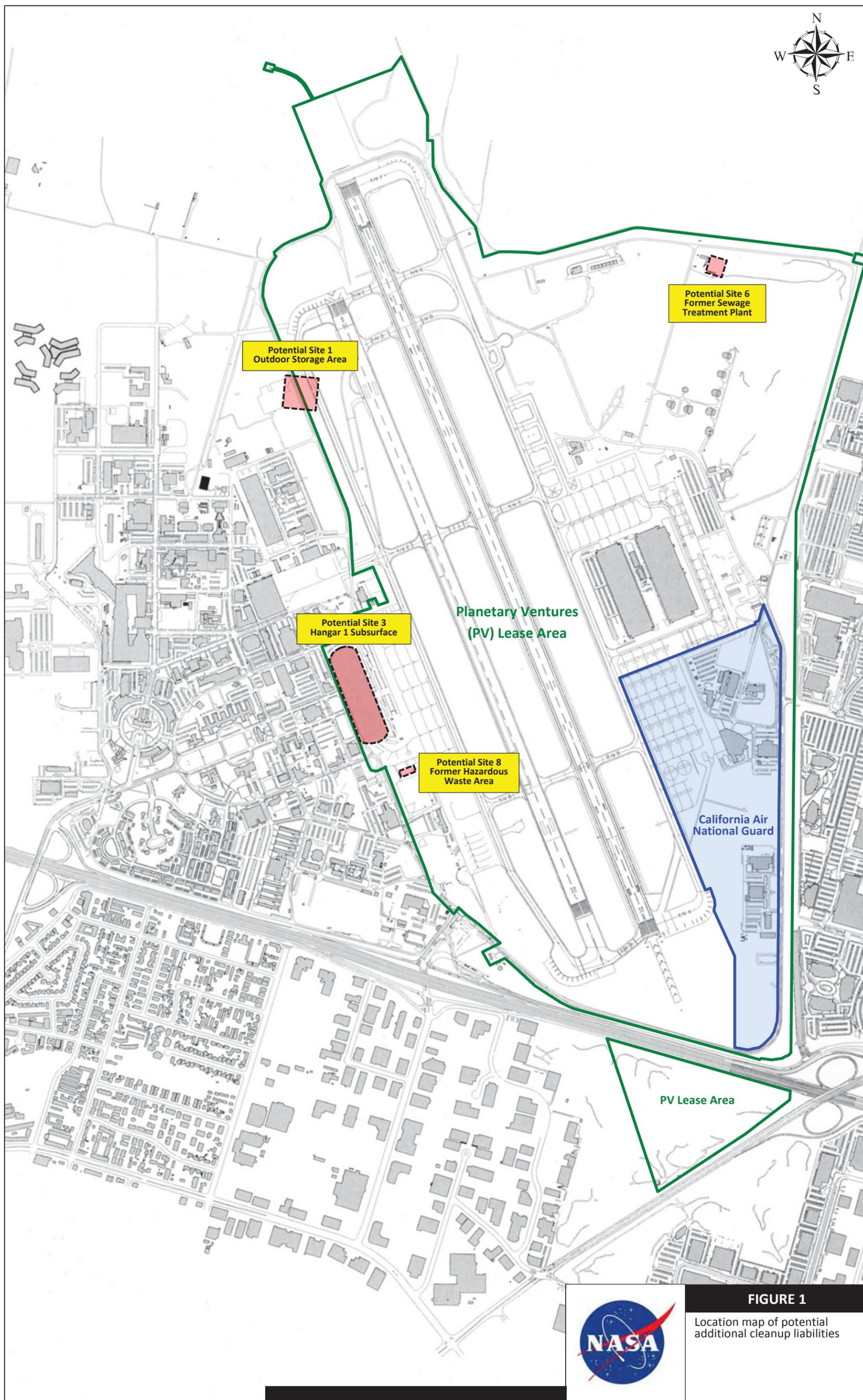
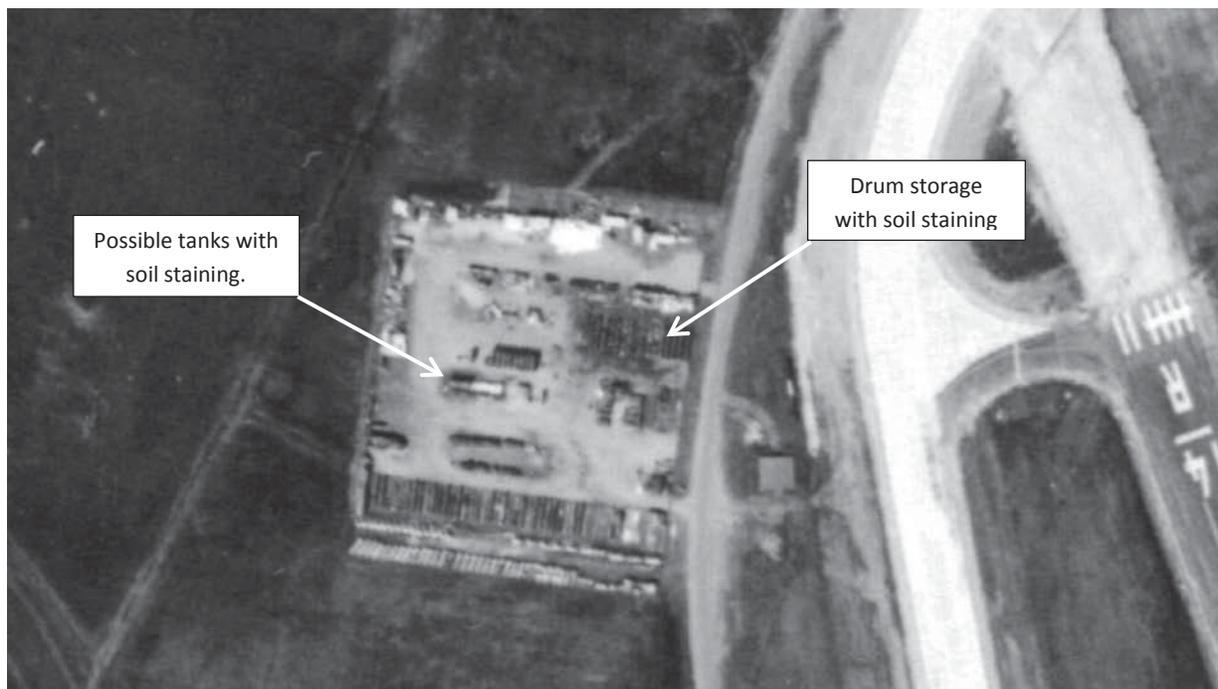


FIGURE 1

Location map of potential additional cleanup liabilities



1950 aerial photograph of Moffett Field. PS-1 is circled.



Close up view of PS-1 from 1950 aerial photograph.

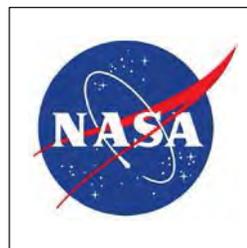


FIGURE 2

1950 aerial views of PS-1.

Photo: CIV-17G-146, 4/1/1950

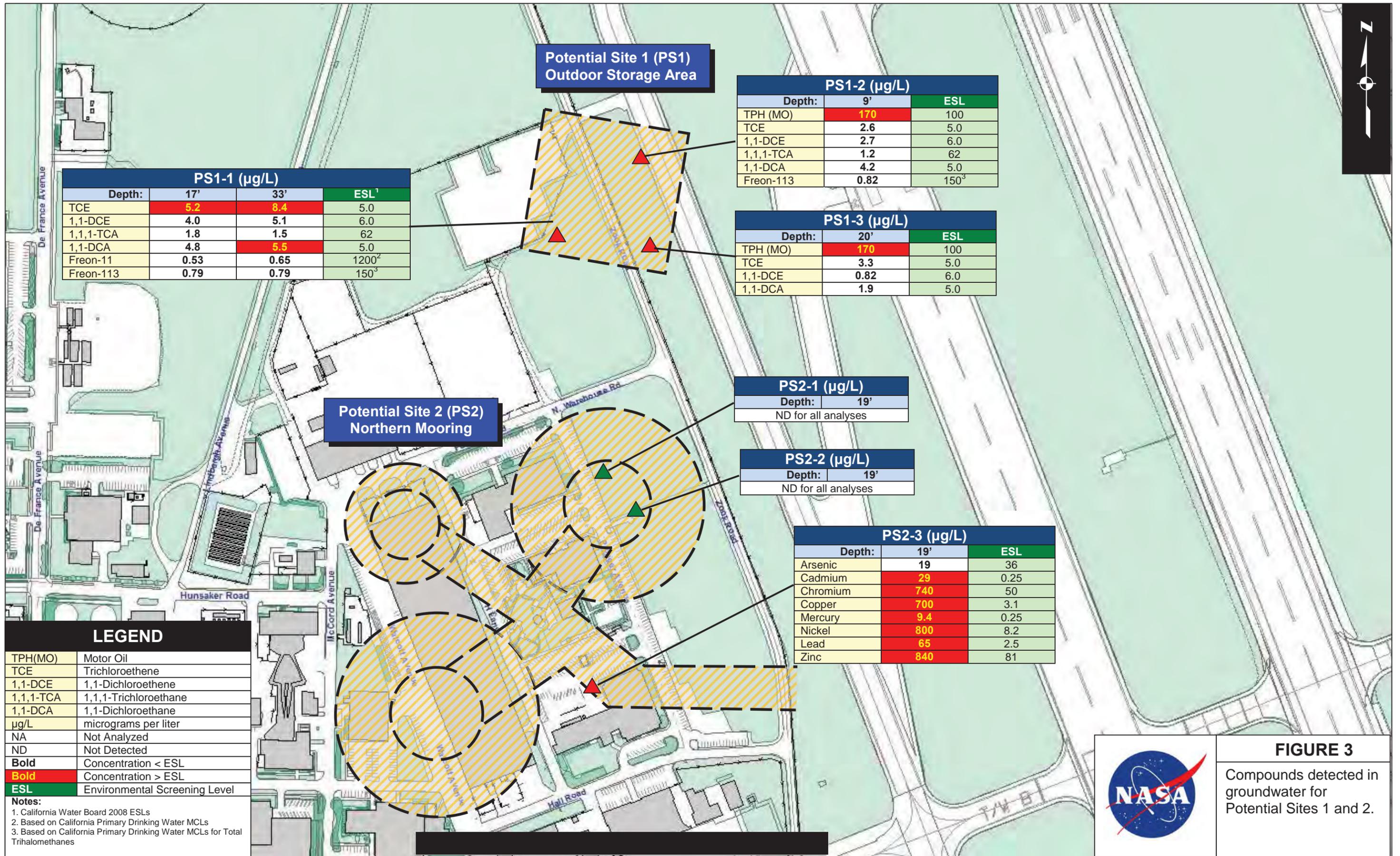
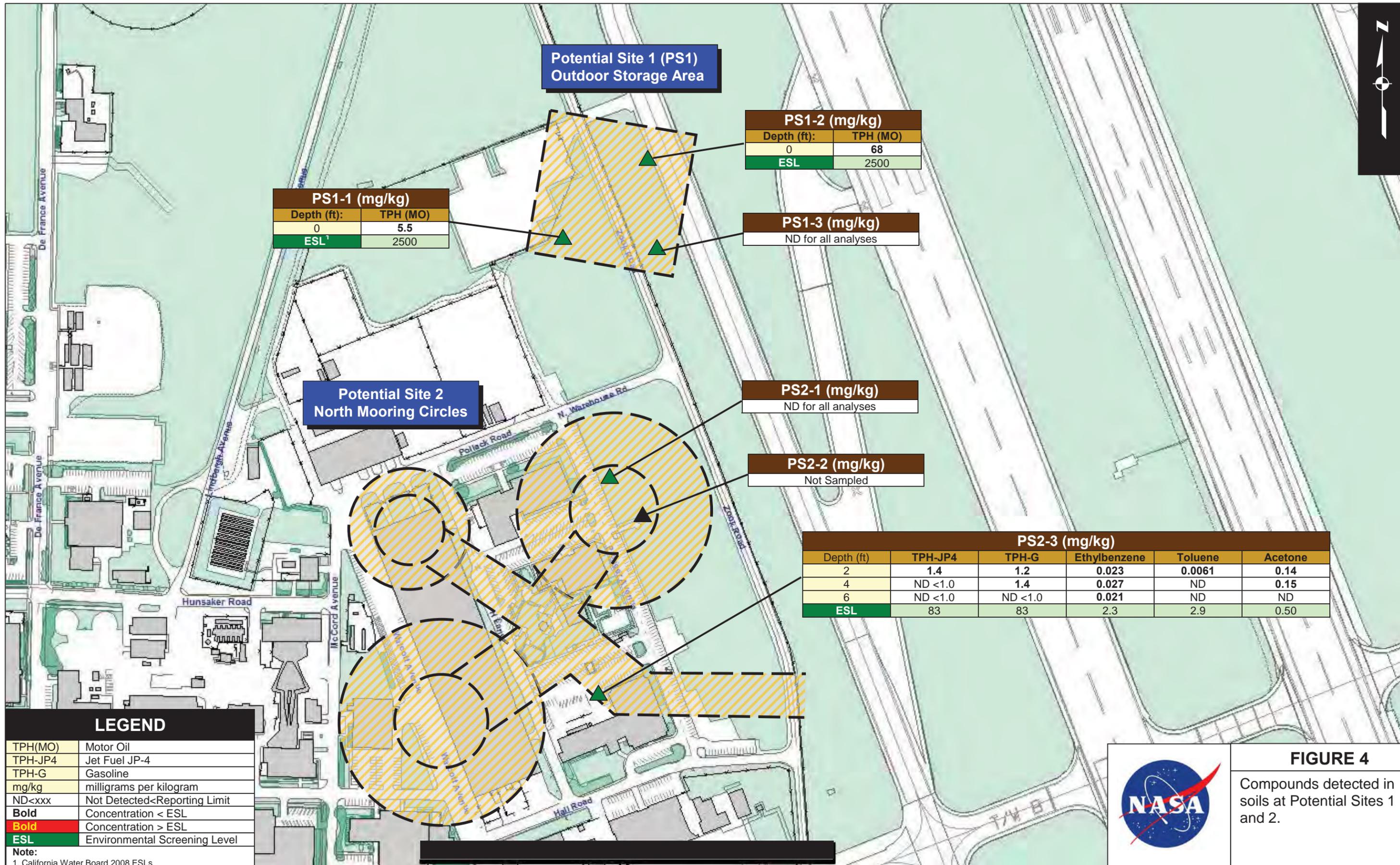


FIGURE 3
Compounds detected in groundwater for Potential Sites 1 and 2.





LEGEND

TPH(MO)	Motor Oil
TPH-JP4	Jet Fuel JP-4
TPH-G	Gasoline
mg/kg	milligrams per kilogram
ND<xxx	Not Detected<Reporting Limit
Bold	Concentration < ESL
Bold	Concentration > ESL
ESL	Environmental Screening Level

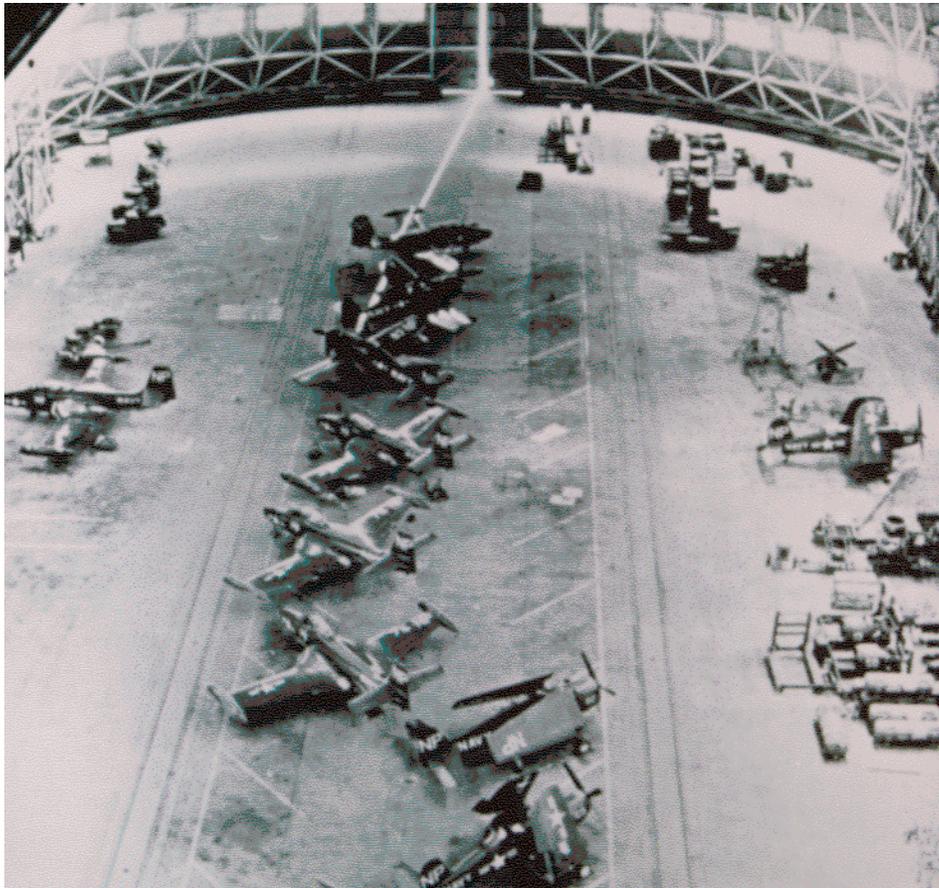
Note:
1. California Water Board 2008 ESLs

FIGURE 4
Compounds detected in soils at Potential Sites 1 and 2.





Photograph of B-26 aircraft undergoing maintenance in Hangar 1



Jet and piston-engine aircraft being maintained and repaired in Hangar 1



FIGURE 5

Aircraft undergoing maintenance and repair in Hangar 1 at different time intervals.

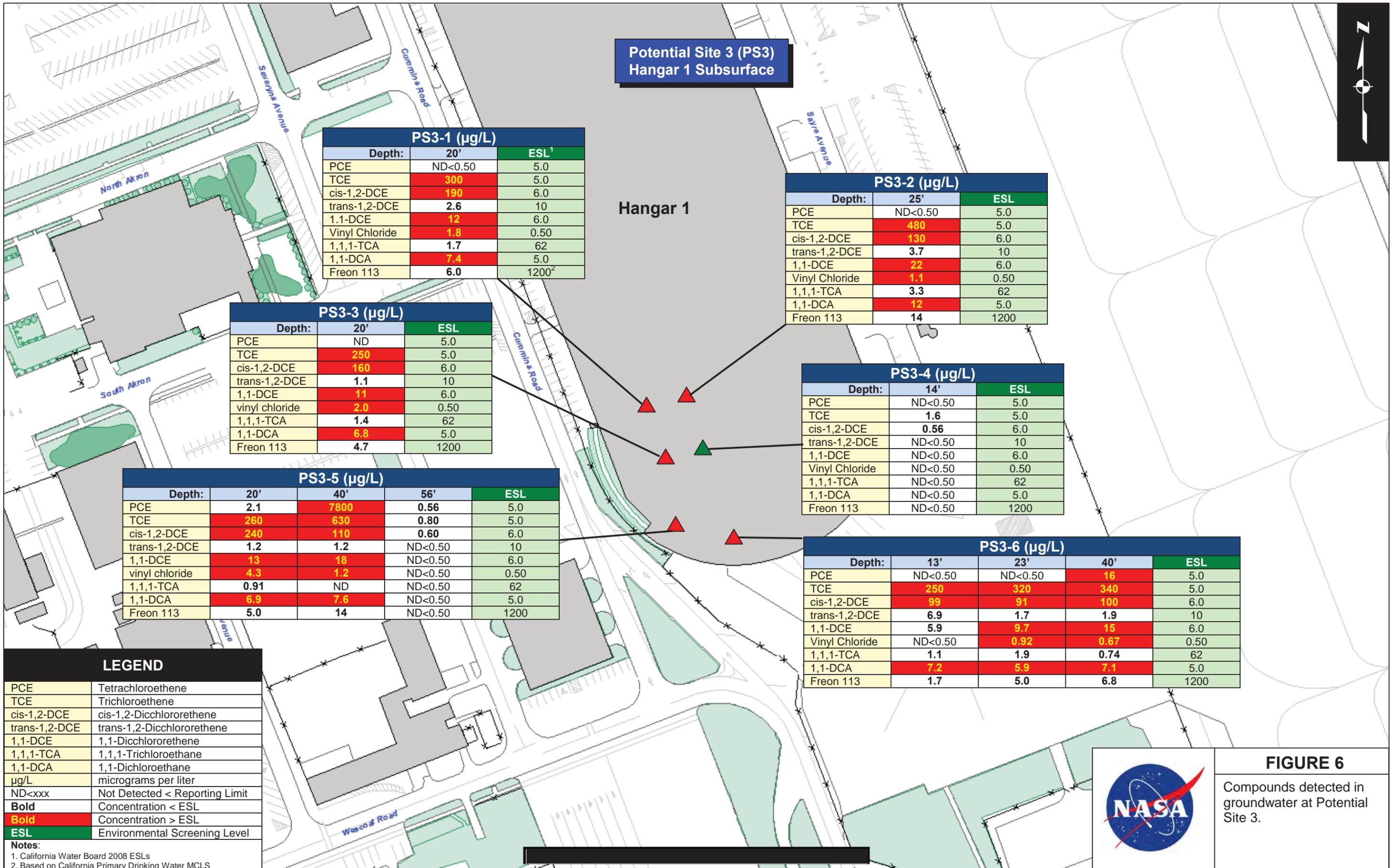
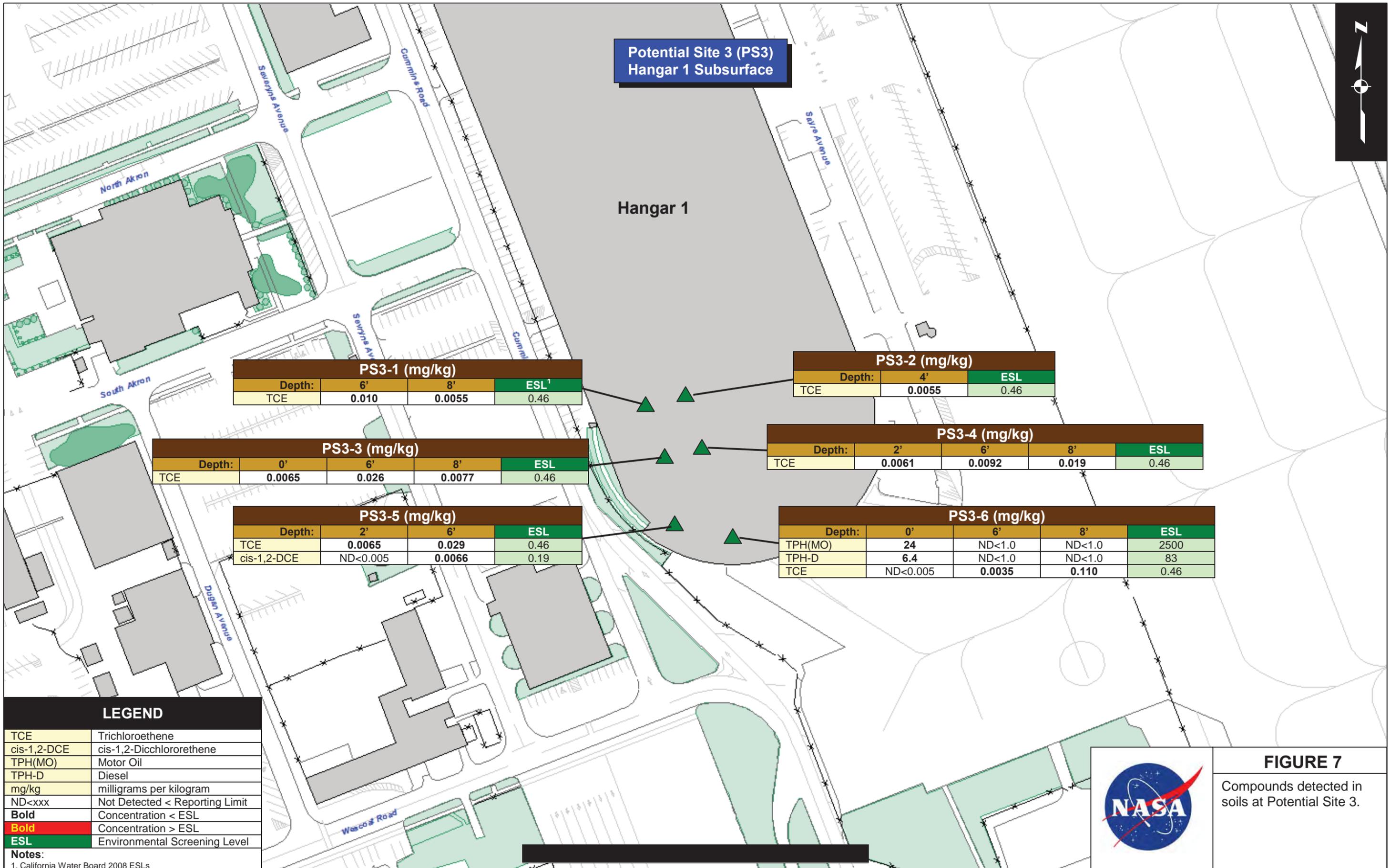


FIGURE 6

Compounds detected in groundwater at Potential Site 3.





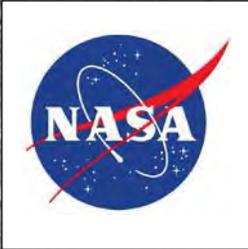
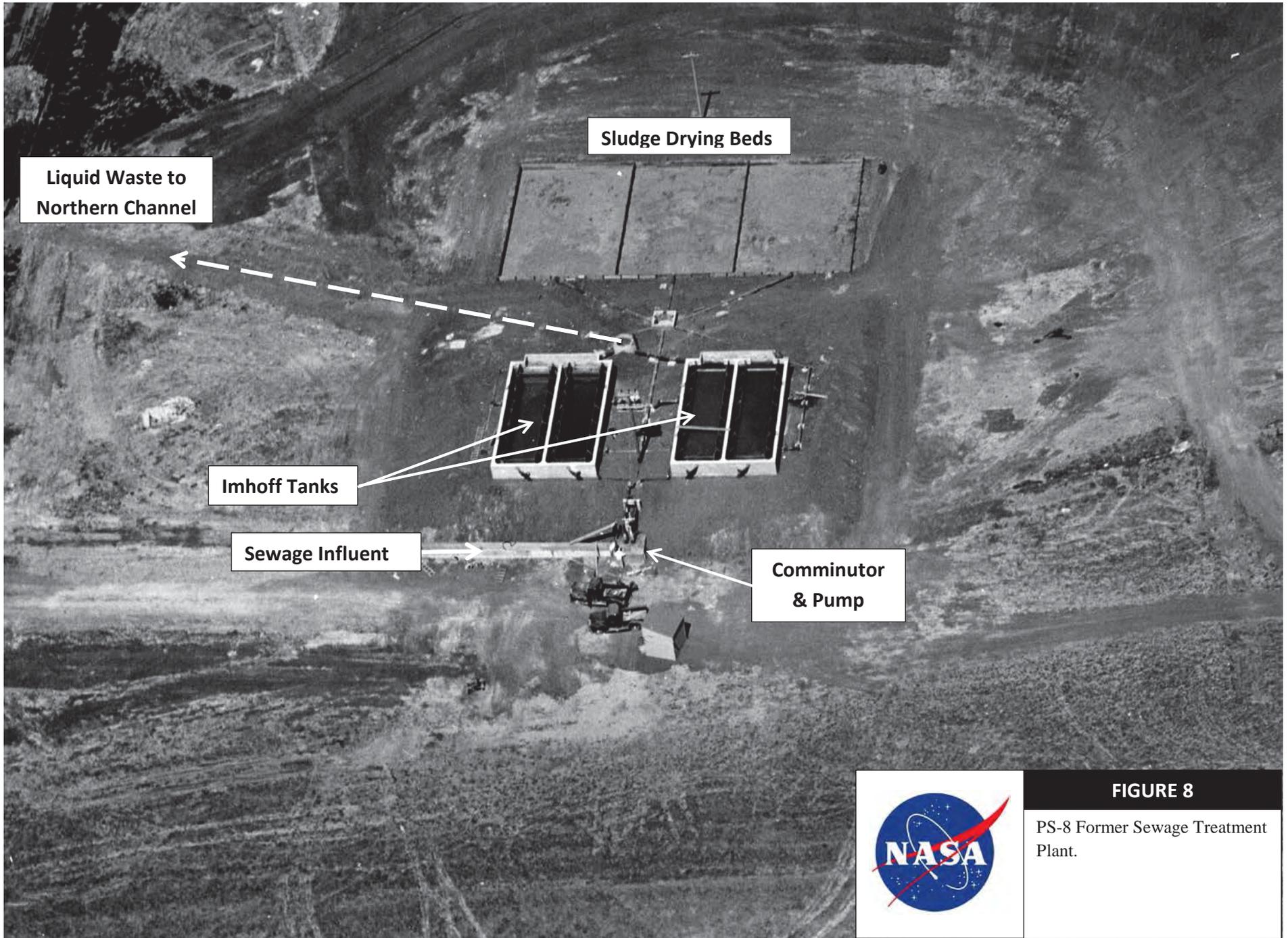


FIGURE 8

PS-8 Former Sewage Treatment Plant.



Figure 9
Soil sampling results for
PS-6

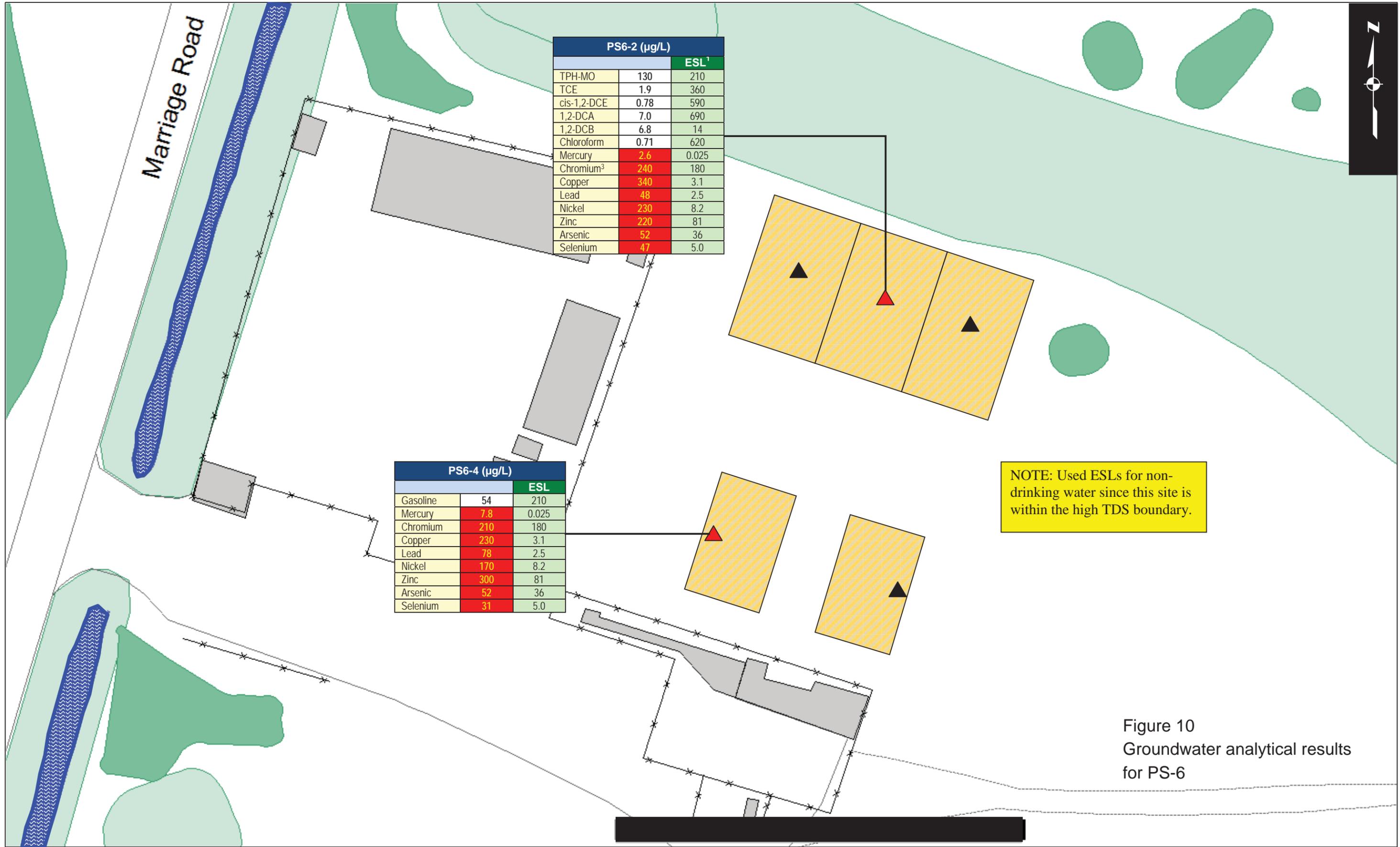


Figure 10
Groundwater analytical results
for PS-6



PS-8 HazWaste/
HazMat Storage

1987 aerial view of Hangar 1 with PS-8 located at the southern end of the hangar.



Close up view of PS-8 from above aerial photograph.

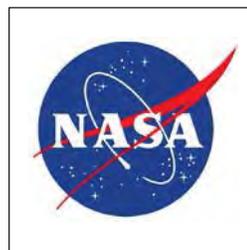


FIGURE 11

1987 aerial views of PS-8, the former HazWaste/HazMat storage area.

US Navy Photograph



Bowser

Red gasoline tank

Photograph of a waste oil bowser connected to an aircraft tug. A red fuel tank can also be seen in the background.

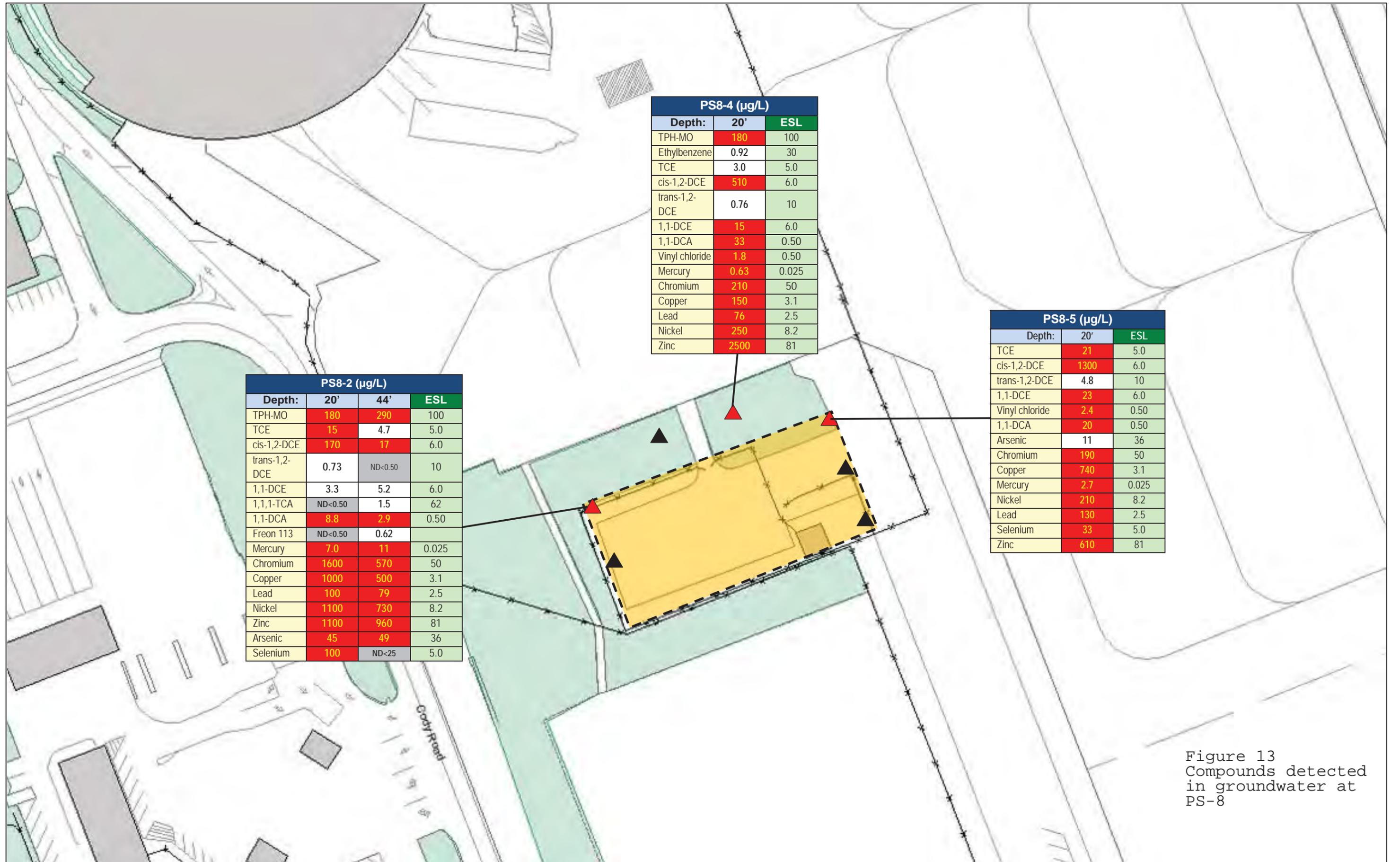


Additional photograph of waste oil bowsters parked at PS-8.



FIGURE 12

Photographs of typical waste oil bowsters stored at PS-8.

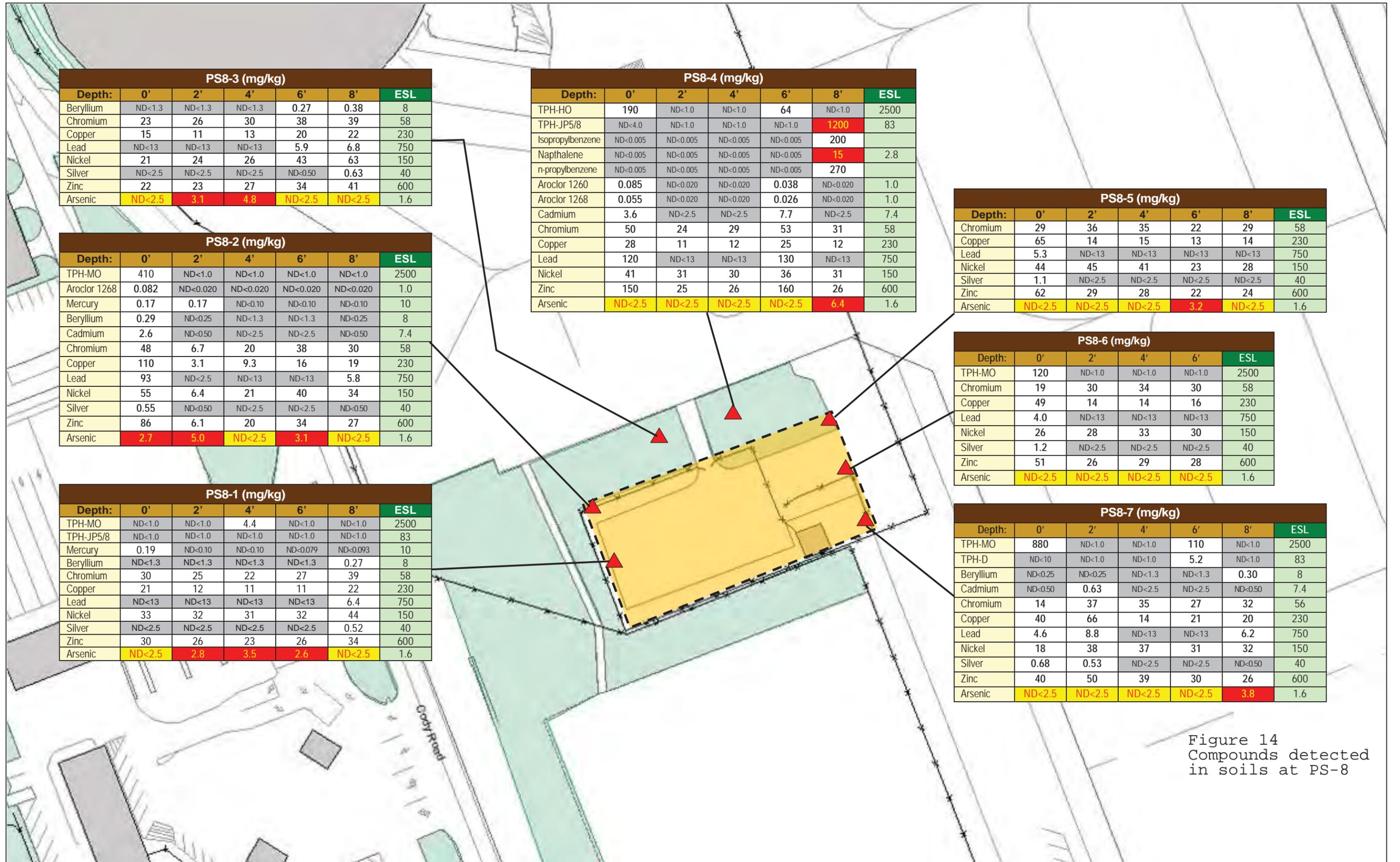


PS8-2 (µg/L)			
Depth:	20'	44'	ESL
TPH-MO	180	290	100
TCE	15	4.7	5.0
cis-1,2-DCE	170	17	6.0
trans-1,2-DCE	0.73	ND<0.50	10
1,1-DCE	3.3	5.2	6.0
1,1,1-TCA	ND<0.50	1.5	62
1,1-DCA	8.8	2.9	0.50
Freon 113	ND<0.50	0.62	
Mercury	7.0	11	0.025
Chromium	1600	570	50
Copper	1000	500	3.1
Lead	100	79	2.5
Nickel	1100	730	8.2
Zinc	1100	960	81
Arsenic	45	49	36
Selenium	100	ND<25	5.0

PS8-4 (µg/L)		
Depth:	20'	ESL
TPH-MO	180	100
Ethylbenzene	0.92	30
TCE	3.0	5.0
cis-1,2-DCE	510	6.0
trans-1,2-DCE	0.76	10
1,1-DCE	15	6.0
1,1-DCA	33	0.50
Vinyl chloride	1.8	0.50
Mercury	0.63	0.025
Chromium	210	50
Copper	150	3.1
Lead	76	2.5
Nickel	250	8.2
Zinc	2500	81

PS8-5 (µg/L)		
Depth:	20'	ESL
TCE	21	5.0
cis-1,2-DCE	1300	6.0
trans-1,2-DCE	4.8	10
1,1-DCE	23	6.0
Vinyl chloride	2.4	0.50
1,1-DCA	20	0.50
Arsenic	11	36
Chromium	190	50
Copper	740	3.1
Mercury	2.7	0.025
Nickel	210	8.2
Lead	130	2.5
Selenium	33	5.0
Zinc	610	81

Figure 13
Compounds detected
in groundwater at
PS-8



PS8-3 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
Beryllium	ND<1.3	ND<1.3	ND<1.3	0.27	0.38	8
Chromium	23	26	30	38	39	58
Copper	15	11	13	20	22	230
Lead	ND<13	ND<13	ND<13	5.9	6.8	750
Nickel	21	24	26	43	63	150
Silver	ND<2.5	ND<2.5	ND<2.5	ND<0.50	0.63	40
Zinc	22	23	27	34	41	600
Arsenic	ND<2.5	3.1	4.8	ND<2.5	ND<2.5	1.6

PS8-4 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
TPH-HO	190	ND<1.0	ND<1.0	64	ND<1.0	2500
TPH-JP5/8	ND<4.0	ND<1.0	ND<1.0	ND<1.0	1200	83
Isopropylbenzene	ND<0.005	ND<0.005	ND<0.005	ND<0.005	200	
Naphthalene	ND<0.005	ND<0.005	ND<0.005	ND<0.005	15	2.8
n-propylbenzene	ND<0.005	ND<0.005	ND<0.005	ND<0.005	270	
Aroclor 1260	0.085	ND<0.020	ND<0.020	0.038	ND<0.020	1.0
Aroclor 1268	0.055	ND<0.020	ND<0.020	0.026	ND<0.020	1.0
Cadmium	3.6	ND<2.5	ND<2.5	7.7	ND<2.5	7.4
Chromium	50	24	29	53	31	58
Copper	28	11	12	25	12	230
Lead	120	ND<13	ND<13	130	ND<13	750
Nickel	41	31	30	36	31	150
Zinc	150	25	26	160	26	600
Arsenic	ND<2.5	ND<2.5	ND<2.5	ND<2.5	6.4	1.6

PS8-5 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
Chromium	29	36	35	22	29	58
Copper	65	14	15	13	14	230
Lead	5.3	ND<13	ND<13	ND<13	ND<13	750
Nickel	44	45	41	23	28	150
Silver	1.1	ND<2.5	ND<2.5	ND<2.5	ND<2.5	40
Zinc	62	29	28	22	24	600
Arsenic	ND<2.5	ND<2.5	ND<2.5	3.2	ND<2.5	1.6

PS8-2 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
TPH-MO	410	ND<1.0	ND<1.0	ND<1.0	ND<1.0	2500
Aroclor 1268	0.082	ND<0.020	ND<0.020	ND<0.020	ND<0.020	1.0
Mercury	0.17	0.17	ND<0.10	ND<0.10	ND<0.10	10
Beryllium	0.29	ND<0.25	ND<1.3	ND<1.3	ND<0.25	8
Cadmium	2.6	ND<0.50	ND<2.5	ND<2.5	ND<0.50	7.4
Chromium	48	6.7	20	38	30	58
Copper	110	3.1	9.3	16	19	230
Lead	93	ND<2.5	ND<13	ND<13	5.8	750
Nickel	55	6.4	21	40	34	150
Silver	0.55	ND<0.50	ND<2.5	ND<2.5	ND<0.50	40
Zinc	86	6.1	20	34	27	600
Arsenic	2.7	5.0	ND<2.5	3.1	ND<2.5	1.6

PS8-6 (mg/kg)					
Depth:	0'	2'	4'	6'	ESL
TPH-MO	120	ND<1.0	ND<1.0	ND<1.0	2500
Chromium	19	30	34	30	58
Copper	49	14	14	16	230
Lead	4.0	ND<13	ND<13	ND<13	750
Nickel	26	28	33	30	150
Silver	1.2	ND<2.5	ND<2.5	ND<2.5	40
Zinc	51	26	29	28	600
Arsenic	ND<2.5	ND<2.5	ND<2.5	ND<2.5	1.6

PS8-1 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
TPH-MO	ND<1.0	ND<1.0	4.4	ND<1.0	ND<1.0	2500
TPH-JP5/8	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	83
Mercury	0.19	ND<0.10	ND<0.10	ND<0.079	ND<0.093	10
Beryllium	ND<1.3	ND<1.3	ND<1.3	ND<1.3	0.27	8
Chromium	30	25	22	27	39	58
Copper	21	12	11	11	22	230
Lead	ND<13	ND<13	ND<13	ND<13	6.4	750
Nickel	33	32	31	32	44	150
Silver	ND<2.5	ND<2.5	ND<2.5	ND<2.5	0.52	40
Zinc	30	26	23	26	34	600
Arsenic	ND<2.5	2.8	3.5	2.6	ND<2.5	1.6

PS8-7 (mg/kg)						
Depth:	0'	2'	4'	6'	8'	ESL
TPH-MO	880	ND<1.0	ND<1.0	110	ND<1.0	2500
TPH-D	ND<10	ND<1.0	ND<1.0	5.2	ND<1.0	83
Beryllium	ND<0.25	ND<0.25	ND<1.3	ND<1.3	0.30	8
Cadmium	ND<0.50	0.63	ND<2.5	ND<2.5	ND<0.50	7.4
Chromium	14	37	35	27	32	56
Copper	40	66	14	21	20	230
Lead	4.6	8.8	ND<13	ND<13	6.2	750
Nickel	18	38	37	31	32	150
Silver	0.68	0.53	ND<2.5	ND<2.5	ND<0.50	40
Zinc	40	50	39	30	26	600
Arsenic	ND<2.5	ND<2.5	ND<2.5	ND<2.5	3.8	1.6

Figure 14
Compounds detected
in soils at PS-8

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SITE NAME:	No Further Action Sites				
Version:	Final	Date:	02/28/2015		
RESPONSIBLE PARTY					
Organization	Department of the Navy, BRAC				
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108				
Contact	Scott Anderson				
	scott.d.anderson@navy.mil				
	619-532-0938				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location			
Facility Address	Mountain View, CA	Latitude	See Site Summaries		
	Santa Clara County	Longitude	See Site Summaries		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
CERCLA	EPA/RWQCB		X	Station-Wide No Action Sites 2002	NFA
SITE SUMMARY					
<p>Upon completion of the Station-Wide Feasibility Study, six sites were proposed as No Action Sites (NFA – NFA is being used instead of NAS for No Action Sites in order to avoid confusion with Naval Air Station). The Proposed Plan for the No Action decision was provided to the public in December 2001. The no action sites include:</p> <ol style="list-style-type: none"> 1. N. Weapons Storage Bunkers (37.426306° N, 122.044984° W) 2. S. Weapons Storage Bunkers (37.422473° N, 122.040985° W) 3. Upland Soils (ecological risk) 4. Human Health Risk Assessment (HHRA) Exposure Area 4158 (37.426497° N, 122.049621° W) <p><u>Weapons Storage Bunkers</u></p> <p>There are two groups of weapons storage bunkers: the Northern Weapons Storage Bunkers and the Southern Weapons Storage Bunkers. The weapons storage bunkers are located in two fenced areas in the northeastern portion of Moffett Field (Figures 1 & 2).</p> <p><u>Northern Weapons Storage Bunkers</u></p> <p>The Northern Weapons Storage Bunkers covers an area of approximately 5 acres and contains seven magazines which were used for the storage of Navy high-explosive weapons and hazardous material used with the weapons. The exact nature of the weapons and hazardous materials was classified by the Navy. Each magazine is constructed using a heavy-gauge, corrugated steel arch that forms its roof and sides; the floors are concrete without drains. The magazines are each approximately 30 feet long, 20 feet wide and 20 feet high and are covered with soil. With the exception of one bunker in use by the California Air Nation Guard (CANG) for the storage of ammunition; the remainder of the magazines are no longer in use.</p>					

SITE SUMMARY

In 1994 NASA conducted a survey of the bunkers. The survey consisted of 214 wipe samples at various locations within all of the rooms. The purpose of the samples was to determine whether or not there were releases of radioactive materials. All samples were indiscriminant from background levels. NASA determined that the bunkers were available for unrestricted use as per Nuclear Regulatory Guidelines. Five air particulate samples were also taken during the survey. No airborne activity was detected. The survey also found that the cement apron on the southern side of the bunkers was free of staining and did not contain significant cracks.

In 1996, the Navy conducted an investigation of the Northern Weapons Storage Bunkers in the immediate vicinity as part of the field activities for the Station-Wide Remedial Investigation (RI).

Four soil samples were collected from three soil borings (SU5-008, SU5-009, and SBSW-001) (Figure 2). Groundwater samples were taken from borings SBU5-008 and SBU5-009. Each sample was analyzed for Volatile Organic Compounds (VOC). The results of these two borings were used to identify the extent of the Site 26 plume.

Two soil samples from boring SBSW-001 were analyzed for a full suite of contaminants:

- VOCs
- Semi-Volatile Organic Compounds (SVOC)
- Total Petroleum Hydrocarbons
- Pesticides
- Polychlorinated Biphenyls (PCB)
- Metals

Lab results did not indicate the presence of VOCs, SVOCs, TPH compounds, pesticides or PCBs above the analytical reporting limit and metal concentrations were consistent with background levels.

The Navy conducted a soil gas survey within the secured area in 1989 (Figure 2). VOCs were not found in the soil gas survey.

Two diesel storage tanks were located in the Northern Weapons Storage Bunkers: Tank 22 and Tank 102 (Figure 2). The tanks were removed and are addressed in the Tank Summary EEC.

The no action remedy was included in the 2002 Navy ROD.

Southern Weapons Storage Bunkers

The Southern Weapons Storage Bunkers covers an area of approximately 10 acres and contains nine high-explosive magazines (Figure 2). Each magazine is constructed using a heavy-gauge, corrugated steel arch that forms its roof and sides; the floors are concrete without drains. The magazines are each approximately 30 feet long, 20 feet wide and 20 feet high and are covered with soil.

SITE SUMMARY

Based on the Navy's historical use of the bunkers, the Southern Weapons Storage Bunkers were not tested for radioactive contamination. The Navy determined that there were no sources of contamination or evidence of contamination associated with the Southern Weapons Storage Bunkers based on historical use. Soil samples, groundwater samples, or soil gas measurements were not collected for chemical analysis. Groundwater in the area of the weapons storage bunkers is addressed as part of Site 26. Southern Weapons Storage Bunkers are currently being used by CANG, with the exception of one used by NASA.

The no action remedy was included in the 2002 Navy ROD.

Upland Soils (Ecological Risk)

Upland soils are areas of the NASA ARC that support upland plant communities and include virtually all areas at the Site that are not covered by concrete, pavement, ditches, marshes, or wetlands (Figure 1). Certain areas of upland soils are actively managed as burrowing owl habitat.

A Site-Wide Ecological Assessment ("SWEA") was carried out in two phases to assess potential risks for flora and fauna at Moffett Field. The SWEA indicated that there was a potential risk to burrowing owls by metals and pesticides.

The SWEA used analytical data from 225 soil samples collected from the upper 3 feet of upland soils throughout the Naval Air Station Moffett Field. PAHs were detected infrequently with total PAH concentrations less than 1 mg/kg at all sites. Petroleum hydrocarbons were detected infrequently and with the exception of one sample, the detected concentrations were less than the maximum detected value of 660 mg/kg. PCBs were detected in less than 12% of the upland soil samples that were not collected in landfills. Organochlorine pesticides were detected at a maximum frequency of 26% in upland soils samples; reference information indicates that the pesticides were applied by the Navy and the Santa Clara County Vector Control District. Metals concentrations were generally within background levels except for certain metals in a few upland soil samples. Spatial analyses of the concentrations of several metals did not identify any horizontal or vertical trends that would indicate a source of the metals.

The no action remedy was included in the 2002 Navy ROD.

HHRA Exposure Area 4158

HHRA Exposure Area 4158 is located slightly south of the Engine Test Area (IR Site 11) (Figure 3). Soil samples collected in 1988 as part of the IR Site 11 (covered in the OU2 East EEC) investigation from the center of HHRA Exposure Area 4158 were analyzed for COCs. Habitat in the area of the Exposure Area 4158 is classified as upland soil and the area was included in the ecological risk assessment for upland soils, which found no unacceptable ecological risks.

Ten shallow soil samples (0.5 – 1 feet bgs) were collected and analyzed for SVOCs and metals, two samples collected from deeper depths (5 – 6 feet bgs) were analyzed for TPH, and four soil samples collected from depths between 1.5 feet bgs and 5 to 6 feet bgs were analyzed for VOCs. PAHs were the primary analytes

SITE NAME:

No Further Action Sites

SITE SUMMARY

detected in soil and had concentrations ranging up to a maximum 950 µg/kg. 1,1,1-TCA was detected at a maximum concentration of 3 µg/kg; no other VOCs were detected in soil samples. No metals were detected above background and/or California Regional Water Quality Control Board Environmental Screening Levels.

The no action remedy was included in the 2002 Navy ROD.

Table 1 provides a summary for the human health and ecological risks for the above sites.

SITE NAME: **No Further Action Sites**

REMEDIAL ACTION

Remedy	No Action	Begin Date		End Date	

Land Use Restrictions

No land use restrictions are required by the ROD.

Development in the weapons storage area would be limited since they exist within the golf course. Any development would need to be compatible with the current use as described in the Programmatic Environmental Impact Statement, Mitigated Alternative 5.

Developments at HHRA Exposure Area 4158 is limited due to the proximity of the runways, HHRA 4158 is also adjacent to jurisdictional wetlands. Development must also comply with the Programmatic Environmental Impact Statement, Mitigated Alternative 5.

Development Issues

Contact with chemicals left in place during subsurface work.

The EIMP must be followed.

SITE NAME:

No Further Action Sites

RESIDUAL CONTAMINATION

Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
			See Table 1.

REFERENCES (Chronological Order)

- *Survey of Navy Weapons Bunkers and Labs, Moffett Field, CA.* Chemical Waste Management, Fremont, CA. January 12, 1994.
- *Final Phase II Site-Wide Ecological Assessment Report, Moffett Federal Airfield, CA.* PRC and MW, San Francisco, CA. July 1997.
- *Draft Final Addendum to the Revised Final Station-Wide Feasibility Study, Moffett Federal Airfield, CA.* Tetra Tech EM Inc., San Francisco, CA. July 6, 2001.
- *Moffett Federal Airfield Proposed Plan for No Further Action Sites.* Tetra Tech EMI, San Francisco, CA. December 2001.
- *Final Station-Wide No Action Sites Record of Decision, Moffett Federal Airfield, CA.* Department of the Navy, BRAC PMO West, San Diego, CA. August 22, 2002.

**Table 1¹: Summary of Human Health and Ecological Risks at the No Further Action Sites
Moffett Federal Airfield**

SITE	SCENARIO	HUMAN HEALTH RISK				ECOLOGICAL RISK			RATIONALE FOR NO FURTHER ACTION
		Cancer	Non-Cancer	Risk Drivers	Acceptable Risk	Receptor	Risk Drivers	Acceptable Risk	
Weapons Storage Bunkers	Residential	1.0E-05	1.6E-01	Acetone, arsenic, nickel, and thallium	Yes	Burrowing owl	VOCs	Yes	No risks were identified
	Occupational	NA	1.2E-06		Yes				
Upland Soils	Recreational	NA	NA	NA	Yes	American kestrel Burrowing owl	Cr, Pb, Zn, total DDT, & chlordane	Yes	No source of contamination was identified & the most sensitive avian receptors do not appear to be affected adversely by the risk drivers
	Occupational	NA	NA		Yes				
HHRA Exposure Area 4158	Residential	9.2E-05	9.5E-01	Benzo(a)pyrene, Cd, Mn, and indeno(1,2,3-c,d)pyrene	Yes	NA	NA	NA	No significant risk was identified
	Occupational	2.5E-05	1.6E-01		Yes				

Notes:

- From Table 1, Draft Final Addendum to the Revised Final Station-Wide Feasibility Study.

Cd – cadmium

Cr – chromium

DDT – Dichlorodiphenylchloroethane

Mn – manganese

NA – Not Applicable

Pb – lead

Zn – zinc

FIGURES

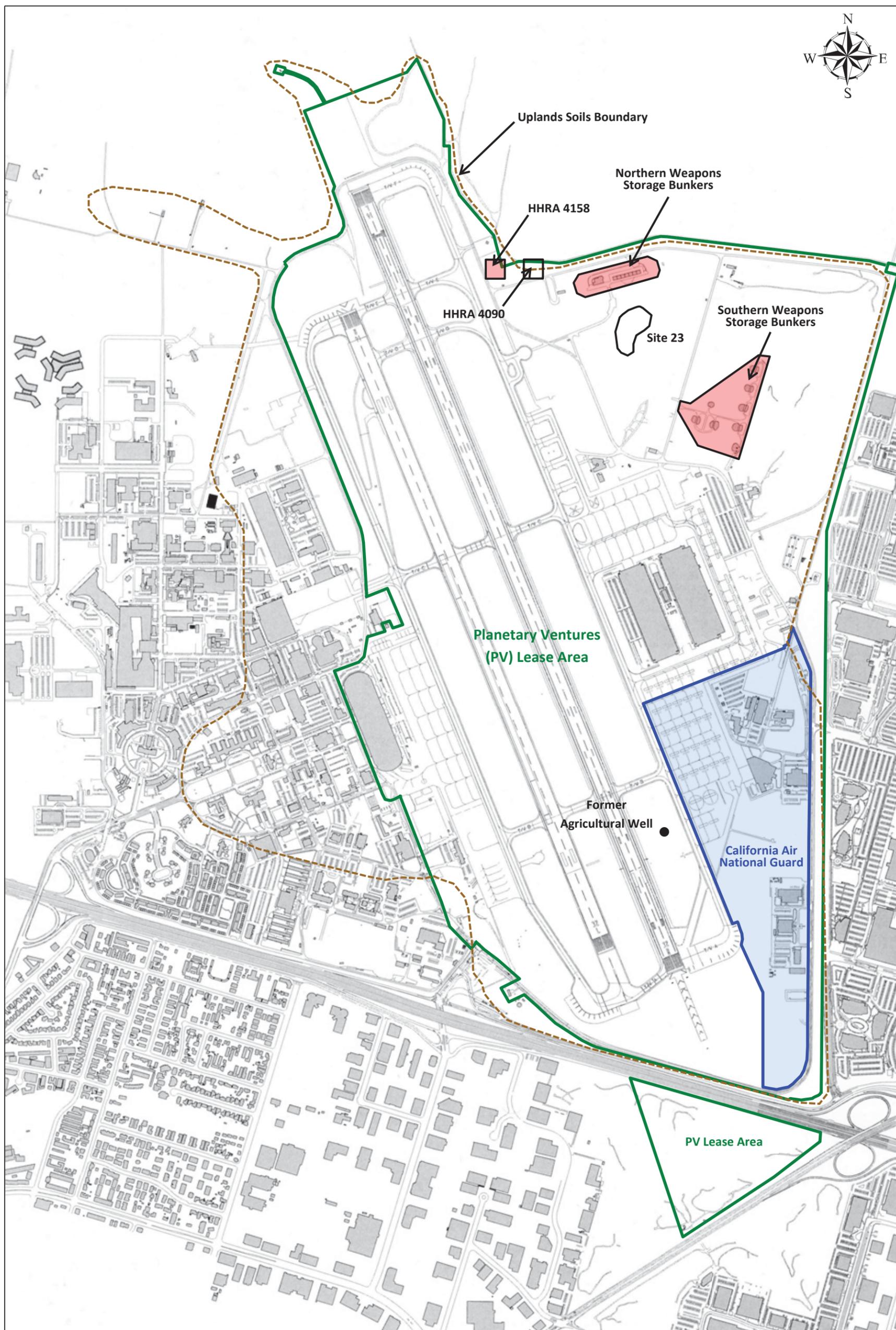


FIGURE 1

No Action Sites. The boundaries are approximate and not meant to represent legal property descriptions.





FIGURE 3

Human Health Risk Assessment (HHRA) Exposure Area 4158 and sampling locations installed 11/9/1988.

Google Earth photograph 9/26/2011.

SITE NAME:	Area of Investigation (AOI) 15 NASA Fuel Supply Lines				
Version:	Final	Date:	03/01/2015		
RESPONSIBLE PARTY					
Organization	NASA Ames Research Center				
Address	MS 204-15 N204, Room 102B Moffett Field, CA				
Contact	Donald Chuck				
	donald.m.chuck@nasa.gov				
	650-604-0237				
LOCATION					
Facility Name	Moffett Federal Airfield	Site Location¹			
Facility Address	Mountain View, CA	Latitude	37.418580° N		
	Santa Clara County	Longitude	122.050528° W		
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum	SCCDEH ²	X			SCDEH Review
SITE SUMMARY					
<p>Notes:</p> <p>Location latitude and longitude is between Runways 32L & 32R where the fuel line runs. SCCDEH = Santa Clara County Department of Environmental Health</p> <p>Area of Investigation (AOI) 15 covers the NASA fuel distribution lines. A portion of AOI 15 is located within the Planetary Ventures (PV) Lease Area. The Lease Area segment runs from a connection to the Navy fuel system near UST (day tank), underneath the airfield onto to NASA Ames where it connected to the NASA Ames fuel storage tanks. The lines have been removed or closed in place. Details of the system and removal and analytical results are provided in Attachment 1.</p>					

SITE NAME:	Area of Investigation (AOI) 15 NASA Fuel Supply Lines
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REMEDIAL ACTION					
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Remedy	Excavation and removal of close in place	Begin Date		End Date	
See Attachment 1					

Land Use Restrictions	Development Issues
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<p>Land use must conform to the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, Mitigated Alternative 5, of July 2002. Under the PEIS, residential use is prohibited.</p> <p>AOI 15 is located below the airfield area. Development must comply with airfield height restrictions as provided in 14 CFR Part 77, especially §77.17 and §77.19.</p>	<p>Petroleum hydrocarbons in soil may be encountered during subsurface work.</p>
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ATTACHMENT

National Aeronautics and Space Administration



FUEL SUPPLY PIPELINE CLOSURE REPORT OF FINDINGS

**NASA Ames Research Center
Moffett Field, CA**

December 2010

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FUEL SUPPLY PIPELINE CLOSURE
REPORT OF FINDINGS

NASA Ames Research Center
Moffett Field, California

December 2010

Prepared for:

NASA Ames Research Center
Office of Environmental Services
Mail Stop N237-4
Moffett Field, California 94035-1000

Prepared by:



Integrated Science Solutions, Inc.
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LIST OF APPENDENCIES

Appendix A	Santa Clara County Hazardous Materials Compliance Division Underground Storage Tank System Closure Permit Application
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LIST OF ATTACHMENTS

Attachment A	Evergreen Oil Inc. Rinsate Recycling Receipt
Attachment B	Sims Metal Recycling Receipt

1.0 INTRODUCTION

The Environmental Services Division at National Aeronautics and Space Administration (NASA) Ames Research Center (NASA Ames) has requested that ISSi prepare this Report of Findings (ROF) for closure of the NASA Ames underground fuel supply piping system. The purpose of this ROF is to present a timeline of piping removal, removal, soil sampling activities and analytical results performed along the fuel supply pipeline removal project at NASA Ames.

As shown in Figures 2 through 6, select portions of the pipeline were excavated and removed, while other portions were closed-in-place.

2.0 BACKGROUND

Jet fuel was supplied through a system of piping that originated on the east side of the Moffett Field runways and terminated on the west side of the runways within NASA Ames. The supply piping historically supplied jet fuel through a 6-inch to 3-inch pipeline system for use in NASA aircraft and a facility boiler. The 6-inch section of the supply system originally provided jet fuel to four underground storage tanks (USTs) located on the south side of the N211 tarmac, to the east of N243. The fuel in these USTs was used primarily for aircraft; however, all three of these USTs were removed in 1996. The 3-inch portion of the fuel supply piping, which originated at one of these USTs, provided fuel for the boiler at the N234A ArcJet test facility. Figure 1 shows an aerial view of the NASA Ames fuel supply pipeline system.

2.1 NASA FUEL SUPPLY PIPELINE SYSTEM

The NASA fuel supply pipeline system was installed in 1977, and utilized until the four USTs that were part of the NASA portion of the system were removed in 1996. The 6-inch portion of the pipeline system was originally connected on the east side of the Moffett Field runways at Building 953 to the Navy fuel supply system. The 6-inch piping was subsequently disconnected post 1996 from the Navy fuel supply system.

The piping, composed of joint welded, seamless stainless steel, epoxy-coated inside and exterior wrapped with coal tar enamel, glass and felt, was buried between 2 to 4 feet below ground surface (bgs). The piping was located beneath a mixture of open grass and dirt covered areas, asphalt parking lots and roads, and active aircraft runways, taxiways and tarmacs. Where the piping traverses beneath the runways, taxiways and the N211 tarmac, the piping resides within a larger, secondary metal piping, with the 6-inch piping inside a 10-inch metal pipe while the 3-inch piping inside a 6-inch metal piping. There are shrink type boot fittings between the larger and smaller diameter piping plus centralizers for these sections.

Figure 1



Aerial View of Fuel Supply Pipeline System

3.0 PIPELINE REMOVAL

In preparation for removal of the NASA fuel supply pipeline system, a number of planning tasks were completed including meetings with Santa Clara County Environmental Health Department Hazardous Material Compliance Division (County), internal reviews of pipeline documents, historical document searches by both the County and NASA, and an underground utility locator scan of the existing pipeline and adjacent areas.

3.1 CLOSURE PREPARATION

To best accomplish closure of the fuel supply pipeline system, meetings with Santa Clara County were held prior to initiation of closure activities. A summary of these meetings are included in the following.

3.1.1 Meetings with Santa Clara County

NASA Ames contractor and Civil Servant staff met with the County in June and July 2010 to determine the NASA plan for fuel supply pipeline removal and closure relative to County closure requirements for the pipeline system.

June 17, 2009 Meeting with County

Santa Clara County Environmental Health Department Hazardous Materials Specialists Mary Anne Baker and Rick Gatdula met with the NASA Ames Environmental Services Support contractor ISSi at 10 A.M. on Wednesday June 17, 2009 to discuss the status and closure requirements for the NASA Ames Fuel Supply Pipeline. A pipeline history summary was provided at the meeting detailing the general history of the pipeline and current status.

July 29 Meeting with County

An underground utility locator scan of the pipeline system and adjacent utilities, completed on July 14, 2009, was posted on site facility maps, and forwarded to the County prior to the July 29 meeting.

As per discussions completed with the County on Wednesday July 29 regarding the NASA AOI 15 Fuel Supply Pipeline closure proposal to the County, listed in the following sections are the agreed work components relative to the excavation, removal and testing of the AOI 15 pipeline. Based on the field locations of both the 3-inch and 6-inch portions of the pipeline run, select portions of the pipeline will be excavated and removed while unexcavated pipeline portions will be pressure tested, then capped and closed-in-place. The pipeline operating pressure for the 3-inch pipeline has been determined to be 50 pounds per square inch (psi); therefore, pipeline pressure tests were conducted at 75 psi for 30-minutes for those 3-inch pipeline portions that are closed-in-place. The pipeline operating pressure for the 6-inch pipeline has been determined to be 80 psi; therefore, pipeline tests were conducted at 120 psi for 30 minutes for those 6-inch pipeline sections closed-in-place.

The proposed excavation verses closed-in-place portions of the piping are shown on the included maps, where the sections proposed for excavation are highlighted in bold yellow with EXV-# designations, and the sections proposed to be closed-in-place are highlighted in bold cyan with CIP-# designations. [Note: EXV-# = excavated section number; CIP-# = close-in-place section number].

As per the California Bay Area Regional Water Quality Control Board (RWQCB), confirmation soil samples for excavated pipeline sections were every 20 lineal feet, plus at each piping bend and joint. Based on the depth to groundwater in the

pipeline areas and the depth of pipeline burial, groundwater was not encountered during the excavation efforts.

3.1.2 Pipeline Location and Removal

WEST SIDE PIPELINE SECTION

The western portion of the fuel supply pipeline, approximately 2,700 feet in length, composed of 3-inch, joint-welded stainless steel, was buried between approximately three to four feet below ground surface (bgs). The pipeline was located beneath a combination of grass, open soil, and weed covered areas, plus asphalt and concrete paved surfaces. The proposal for this portion of the piping system was a combination of excavation (EXV) and close-in-place (CIP). The 3-inch pipeline sections were flushed prior to pressure testing and capping (See figures 2 through 4).

Building N242 Area

Approximately 200 feet of 3-inch piping located at the south wall of N234A and crosses Mark Ave, turns 45 degrees south and runs parallel along the east curb of Mark Avenue was closed-in-place (CIP-1). The section of pipe along the curb was beneath a grassy area, but was too close to nearby utilities to excavate safely (See Figure 2).

Approximately 40 feet of 3-inch piping (EXV-1) was excavated and removed from the grassy area south of N242, located on the east side of Mark Avenue north of Boyd Road. Approximately 150 feet of 3-inch piping (CIP-2) located beneath the paved parking lot along the north side of Boyd Road between N242 and N240 was closed-in-place.

Approximately 100 feet of 3-inch piping (EXV-2) was excavated and removed from the grassy area to the southeast of N242, adjacent to the north side of Boyd Road.

Building N240A Area

Approximately 300 feet of 3-inch piping (CIP-3) buried beneath Boyd Road and the grassy, tree covered area located on the east side of N240 and N240A was pressure tested, capped and closed in place (See Figure 2). This pipeline portion is located between excavation sections EXV-2 and EXV-3 (see N248B below).

Building N248B Area

Approximately 300 feet of 3-inch piping (EXV-3) was excavated and removed from the dirt covered area located adjacent to the north side of N248B, immediately south of Hall Road (See Figure 3).

Building N248 Area

Approximately 270 feet of 3-inch piping (CIP-4) located in the asphalt covered area immediately adjacent to the north side of N248 was pressure tested, capped and closed-in-place (See Figure 3). This pipeline portion is located between proposed excavation sections EXV-3 and EXV-4 (see N248D below).

N248D Area

Approximately 170 feet of 3-inch piping (EXV-4) in the dirt covered area located to the north and northwest of N248D, on the south side of Hall Road, was excavated and removed.

Approximately 440 feet of 3-inch piping (CIP-5) located beneath Building N248D and the concrete paved aircraft tarmac area south of N248D was pressure tested, capped and closed-in-place (See Figure 4). This pipeline portion is located between proposed excavation sections EXV-4 and EXV-5 (see South N211 Aircraft Tarmac Area below).

South N211 Aircraft Tarmac Area

Approximately 255 feet of 3-inch piping (EXV-5), located in the dirt area on the southeast side of the N211 Aircraft Tarmac Area, to the west of the Moffett Fire Station Building 580, was excavated and removed (See Figure 4). The 6-inch piping, that ran parallel to the 3-inch piping at this location, was excavated at the same time. The 3-inch pipeline had previously been cut and capped just northeast of the adjacent covered pump station during a previous project.

The 6-inch pipeline continued to the covered pumping station where it surfaced above ground. The 6-inch piping was cut and capped at this location (see Figure 4).

AIRFIELD AND EAST SIDE PIPELINE SECTION

The eastern portion of the fuel supply pipeline, approximately 4,100 feet in length, was composed of 6-inch, joint-welded stainless steel buried between approximately three to four feet bgs. The 6-inch pipeline is located beneath the active airfield runways, taxiways, inter runway and taxiway areas, and the west side (N211) tarmac. The inter runway/taxiway areas are composed of a combination of soil and weed surface cover. The proposal for the 6-inch piping portion of the system was a combination of excavation (EXV) and close-in-place (CIP). Those pipeline sections closed-in-place were flushed prior to pressure testing and capping.

Approximately 400 feet of 6-inch pipeline was excavated (EXV-5 and EXV-6) and removed from the grass and dirt covered areas and disposed of offsite. The other 3,700 feet of 6-inch pipeline were closed-in-place (CIP-5 & 6). The CIP sections include those at the western N211 tarmac area (CIP-5), across runway/taxiway areas, and the eastern tarmac area (CIP-6) north of Hangar 2 (see Figures 5 and 6).

3.1.3 *Underground Utility Location*

An underground utility locator scan of the fuel supply pipeline system and adjacent utilities was completed on July 14, 2009. The located utilities were then posted on site facility maps that show site infrastructure, including buildings, roads, parking lots, and open spaces. ISSi personnel also reviewed available NASA Geographic Information Systems (GIS) data and as-built drawings for the presence of underground utilities.

3.1.4 *Permitting*

An “Underground Storage Tank System Closure Permit Application” was filed with the Santa Clara County Hazardous Materials Compliance Division (HMCD) on June 11, 2009. A copy of the Closure Permit is included in Appendix A.

A NASA internal Safety Permit was filed with NASA Ames’ Facility Engineering Branch prior to start of pipeline excavations.

3.2 TESTING, EXCAVATION AND CAPPING

3.2.1 *Pipeline Flushing and Testing*

In accordance with the Closure Plan, the pipeline sections that were closed-in-place were flushed prior to testing and capping. Flushed liquids were captured and containerized prior to analysis and proper disposal. No flushed liquids were found to contain fuels or other hazardous contaminants.

On February 23, 2010, the 3-inch and 6-inch pipeline was rinsed and flushed with water-based bio-solve. The rinsate was pumped from the fuel line, into a 4,900-gallon storage tank, sampled, and sent to Evergreen Oil, Inc. for analysis by the subcontractor. Analytical results indicated that the rinsate was considered a non-hazardous liquid, which was then transported to Evergreen Oil, Inc. for recycling on March 31, 2010. A copy of the recycling receipt is presented in Attachment A.

3.2.2 *Pipeline Pressure Testing*

As described in the Closure Plan, the operating pressures for the 3-inch piping was determined to be 50 psi, and the 6-inch piping to be 80 psi; therefore, the test pressures applied to the 3-inch and 6-inch CIP sections were 75 psi and 120 psi, respectively, for a 30 minute duration. It was determined that if piping will not hold 150% of operating pressure, piping will need to hold at a minimum 100% of operating pressure to pass close-in-place requirements.

On February 26, 2010, pressure testing of the 3-inch and 6-inch pipeline was performed by ICS Norcal. The 3-inch pipeline was tested at a pressure of 75 psi for 30 minutes and no leaks were detected. The 6-inch pipeline was tested at a

pressure of 120 psi for 30 minutes and no leaks were detected. Santa Clara County Department of Environmental Health witnessed the pressure test and provided an Official Notice of Inspection (Figure 7).

3.2.3 Pipeline Removal

On March 5, 2010 approximately 200 feet of 6-inch piping and 150 feet of 3-inch piping was removed from the west side area adjacent to the N211 aircraft tarmac area (See Fig 6). On March 9, 2010, approximately 380 feet of 3-inch piping was removed from the west side area near Building N248D. Excavations were completed using primarily a small-sized bucket excavator or backhoe.

On August 17th 2010, approximately 150 feet of 6-inch piping was removed from the east side tarmac area north of Hangar 2 and 3. This section began above ground at the pumping station and dropped to a depth of 4 feet 2 inches bgs and extended west toward the taxi ways. The surface portion of the 6-inch pipeline was dismantled and removed at the pumping station. The buried portion of the 6-inch piping was excavated and cut at the point where it went below the concrete tarmac (See Figure 6). A concrete slurry was used to cap the end of remaining pipe (CIP-6).

The removed piping was certified clean by an industrial hygienist, placed into a flatbed trailer and transported to Sims Metal for recycling. A copy of the metal recycling receipt is included as Attachment B.

Excavated soils were staged as near as possible to the excavations, and following soil sampling and analysis, were placed back into the excavations. No engineered backfill was required. Compaction was ensured by using wheel compaction from the backhoe.

3.2.4 Soil Sampling

The Closure Plan stated that confirmation soil samples were to be collected from the bottom of the excavated pipeline trenches and from any soils that were determined to be contaminated during excavation efforts. Soils analysis included JP5 and JP8.

On March 5, 2010 and March 9, 2010, forty-two (42) soil samples were collected at locations beneath the 3-inch diameter fuel pipeline (15PL3-01 through 15PL3-43) to determine potential soil contaminant levels prior to backfilling the fuel line trench in this area. These 42 soil samples were collected in the soil and grassy areas listed as EXV-1 through EXV-4 (See Figures 2, 3, & 4) at a depth of four feet below ground surface. All excavated soils produced during soil sampling activities were stockpiled along trench areas parallel to the pipeline.

On August 18, 2010, ten soil samples (15PL6-1 through 15PL6-10) were collected at locations beneath the 6-inch diameter fuel pipeline to determine potential soil

contaminant levels prior to backfilling the fuel line trench in this area. Soil samples were collected from a depth of five feet below ground surface.

The 42 initial soil samples and the additional ten soil samples discussed above were collected using a slam bar, and samples were contained in 2" by 4" brass tubes. The ends of the tubes were covered with Teflon sheets and capped with polyurethane caps. Subsurface soil materials consisted primarily of native clay material.

On September 13, 2010 through September 15, 2010 an additional 75 soil samples (15PL6-11 through 15PL6-85) were collected at accessible locations beneath the 6-inch diameter fuel pipeline running beneath the airfield runways and taxiways. The samples were collected and analyzed to determine if contaminated soils were present beneath the 6-inch pipeline that was to be abandoned in place.

The 75 soil samples discussed above were collected using Geoprobe direct push technology, and samples were contained in sections of 2" plastic tubing. Soil samples were collected from a depth of approximately five feet below ground surface, near the base of the closed-in-place 6-inch piping. The ends of the tubing were covered with Teflon tape and capped with polyurethane caps. Subsurface soil materials consisted primarily of native clay material.

Following collection, the soil samples were labeled, logged into a chain of custody, placed on ice and securely stored. The soil samples were relinquished to California Laboratory Services (CLS Labs) under chain of custody protocols. All 127 soil samples were analyzed for jet propulsion fuels 5 and 8 (JP5/JP8).

3.2.5 Analytical Results

As per the approved closure plan, soils analysis included JP5 and JP8. Analytical results indicate that JP5/JP8 concentrations in the soil samples levels were either non-detect or below clean-up levels. The site action level for JP5/JP8 is 400 mg/kg.

Three sample locations along the 3-inch pipeline portion (15PL3-20, 15PL3-26, & 15PL3-36) contained JP5/JP8 at low levels that did not exceed 11 mg/kg (see Table 1). The analytical results for a duplicate sample collected at location 15PL3-37 (Figure 4) were consistent with its sample counterpart (15PL3-32). All other 3-inch pipeline results were non-detect.

Analytical results were non-detect for all 75 samples collected along the east side 6-inch pipeline section.

TABLE 1
DETECTED CONCENTRATIONS
3-INCH PIPELINE

Sample Identification	Sample Depth	JP5 / JP8 (mg/kg)
15PL3-20	4'	5.9
15PL3-26	4'	1.8
15PL3-36	4'	11
<i>Remediation Level¹</i>	<i>400mg/kg</i>	

¹ = NASA's site-specific soil remediation levels

3.2.6 Pipeline Capping

The remainder of the pipeline sections were capped post pressure testing to prevent intrusion of foreign material into the CIP pipeline sections.

3.3 BACKFILLING AND COMPACTION

Following the collection of soil samples from the pipeline excavations, the excavations were backfilled and compacted using a hand-operated compactor. Based on the analytical results of the soil samples, the excavated soil was used to backfill the trenches created when sections of 3-inch and 6-inch piping were removed.

3.4 RESURFACING

Following backfilling and compaction activities, the pipeline excavation areas were returned to original site conditions.

3.5 DISPOSAL

Excavated pipeline sections were certified clean by an industrial hygienist, placed on plastic sheets prior to transporting offsite for recycling.

4.0 CONCLUSION/RECOMENDATION

All accessible portions of the former NASA Ames fuel supply pipeline have been excavated and removed, while the remaining unexcavated pipeline is clean and capped. Analytical results indicate sub-pipeline soils are not contaminated or where detected, below site cleanup levels. Based on the forgoing, NASA Ames has met the Santa Clara County Department of Environmental Health requirements for closure of the former fuel supply pipeline.

FIGURES

(Figure 1, Aerial View of Fuel Supply Pipeline Runs, included in text, Page 2.)

Figure 2



EXV-1 through EXV-3 & CIP-1 through CIP-3

Figure 3



EXPLANATION:

- FUEL PIPELINE EXCAVATION (EXV-3 and EXV-4)
- FUEL PIPELINE CLOSED IN PLACE (CIP-3 through CIP-5)
- SAMPLE LOCATIONS (15PL3-08 through 28)



Sample Locations 2 of 5 Drawings

EXV-3 through EXV-4 & CIP-3 through CIP-4

Figure 4



EXV-4 through EXV-5 & CIP-4 through CIP-6

Figure 5



CIP-5 through CIP-6

Figure 6



EXV-6 & CIP-6

APPENDIX A

Santa Clara County Hazardous Materials Compliance Division
Underground Storage Tank System Closure Permit Application

County of Santa Clara
Department of Environmental Health
Hazardous Materials Compliance Division
 1555 Berger Drive, Suite 300
 San Jose, CA 95112-2716
 (408) 918-3400; Fax (408) 280-6479
 www.EHinfo.org/hazmat

<i>Agency Use Only</i>		
Received by: _____;	Date: _____	
Fee Received: \$ _____;	Date: _____	
Receipt No.: _____;	SR No.: _____;	PE: 2336

UNDERGROUND STORAGE TANK SYSTEM CLOSURE PERMIT APPLICATION

For use by Unidocs Member Agencies or where approved by your Local Jurisdiction

1. Facility Name (Tank Site): NASA Ames Research Center Bldg. No.: Multiple
 Address: NASA Ames Research Center City: Moffett Field Zip: 94035
 EPA ID No.: CA1800005034 Contact Person: Donald Chuck Phone No.: (650) 604-0237
2. Tank Owner's Name: NASA Ames Research Center
 Address: M/S 237-14 City: Moffett Field Zip: 94035
3. Tank Operator's Name: N/A - piping only
 Address: _____ City: Moffett Field Zip: 94035
4. Applicant's Name: Donald Chuck
 Address: M/S 237-14 City: Moffett Field Zip: 94035
 Contact Person: Maureen Cruzen Phone No.: (650) 604-1885
5. Tank Closure Contractor Business Name: TBD
(As registered with the Contractors State License Board at www.cslb.ca.gov)
 Address: TBD City: _____ Zip: _____
 CSLB License No.: TBD Contact Person: _____ Phone No.: ()
 Business License (if required): on file; attached; not applicable
6. Firm that will take soil/water samples: TBD Phone No.: ()
7. State-certified laboratory that will analyze samples: California Laboratory Services Phone No.: (916) 638-7301

This box is for agency use only

Laboratory analyses shall test for:										
	TPHG	TPHD	BTEX, MTBE, TAME, ETBE, DIPE, TBA, EDB, EDC (EPA 8260)	Organic Lead (DHS-LUFT)	O&G	Cl HC	Metals (Cd, Cr, Pb, Ni, Zn (ICAP or AA)	PCB, PCP, PNA, Creosote (EPA 8270)	pH	Other (Specify)
Tank 1										JP-5
Tank 2										JP-8
Tank 3										
Tank 4										
Tank 5										
Tank 6										

Additional analyses may be required by inspector in field.

8. Name of Licensed Transporter of Tanks: TBD

EPA ID No.: _____ Phone No.: (_____) _____

9. Destination of Tanks and Piping: Kettleman Hills Facility, Kettleman City, CA

10. Tank System:	<u>Size (gallons)</u>	<u>Substance(s) Previously Contained</u>
Tank 1	_____	_____
Tank 2	_____	_____
Tank 3	_____	_____
Tank 4	_____	_____
Tank 5	_____	_____
Tank 6	_____	_____

If the owner/operator does not have a current Hazardous Materials Business Plan (HMBP) which includes these tanks on file with the local agency, provide an 8-1/2" x 11" plot plan of the tanks to be closed. Indicate the nearest cross street to the facility, buildings immediately adjacent to the tanks, location(s) of tanks to be closed, and location of nearby utilities.

This Underground Tank Closure Permit expires 6 months from the date of application. If tanks have not been closed within 6 months, a new closure permit application and appropriate fees may be required.

Facility closure inspections must be scheduled at least 48 hours in advance. Call the appropriate local agency to make necessary arrangements.

I certify that I have read the tank closure guidelines and declare that the above information is correct to the best of my knowledge. The owner of the tank(s) described above is aware of the pending closure. I agree to comply with all applicable city and county ordinances and state laws relating to hazardous materials/wastes, and hereby authorize representatives of local agencies to enter upon the within mentioned property for inspection purposes.

Donald Chuck *Donald Chuck* 6/11/2009
Applicant/Agent's Name (Print) Applicant/Agent's Signature Date

These boxes are for agency use only

THIS APPROVAL CONSTITUTES A PERMIT FOR REMOVAL OF THE ABOVE LISTED TANKS.

Agency: County of Santa Clara DETH Date: 2/23/2010
Print Name: Ric Gardula Sign Name: *[Signature]*

THIS CERTIFIES THAT ALL TANK SYSTEM CLOSURE ACTIVITIES ARE COMPLETE.*

Agency: _____ Date: _____
Print Name: _____ Sign Name: _____

* If contamination of any detectable concentration is found, contact the leaking underground storage tank Local Oversight Program (LOP) and/or Regional Water Quality Control Board for cleanup and/or remediation requirements.

**Planning Clearance Application
NASA Ames Research Center**

Planning Clearance Application Number: 10PCA016

Date of Application: 10-29-2009

Name of Proposed Construction Project: NASA Fuel Pipeline Closure

Name of Applicant: Luke T Metz

Company/Organization of Applicant: SAIC/JQ

Business Address of Applicant: M/S T20G Moffett Field, CA 94035

Business email address of Applicant: luke.t.metz@nasa.gov

Business telephone number of Applicant: 650-604-2753

Name of Organization or Company for which the proposed construction work is to be performed:
Innovative Construction Solutions, Inc.

NASA Ames Research Center Project Manager (POC): Don Chuck (4-0237)

Building, Facility or Location where the proposed construction work is to be performed: _____

The proposed construction work is (check the most appropriate classification):

- New exterior construction, site work only and no structures or buildings
- New exterior construction, site work and structures or buildings
- New interior construction including remodel and renovation. No exterior construction or modifications involved.
- New interior construction of systems only (electrical, data, fire alarm, security, plumbing, fire protection, process piping)
- Demolition, site work only and no structures or buildings
- Demolition, site work and/or structures or buildings

A description of the proposed construction work: Excavate and remove approximately 1,000 feet of 3-inch welded steel pipeline from the western portion of the site. Excavate and remove approximately 2,100 feet of 6-inch pipeline from the eastern portion. Unexcavated portions (due to location and accessibility) will be capped prior to backfilling and compaction. Refer to maps for excavation (EXV) and close in place (CIP) locations.

Purpose for performing the proposed construction work: Closure as per Santa Clara County / RWQCB requirements

Square Feet and/or acres of the area of construction work: Approximately 6,800 square feet

How long will the proposed construction work/improvements be required for the intended use:
Approximately 25 Days

What is the current use and/or most recent use of the area where the construction work is to take place:
Runways, Taxiways, Tarmac, Road, Parking, Grass & Dirt Area

Schedule for starting and completing the proposed construction work: 11/16/09 - 12/23/09

Current estimated cost of all proposed construction work: \$250,000

Funding for the proposed improvements:

What is the source of funding for the proposed construction work: JQ

Is the funding already committed for the proposed construction work? YES

If the funding is not already committed, when will the funding be committed and available? _____

Is there any uncertainty that that funding will be available for the proposed construction work? NO

Note: Additional information may be requested by the Ames Planning Office depending on the information provided above by the applicant.

By submitting the Planning Clearance Application to the NASA Ames Construction Permit Office, the Applicant attests that the information provided on the Planning Clearance Application is true and correct to the best knowledge of the Applicant on the date the Planning Clearance Application is submitted.

Planning Clearance Application
NASA Ames Research Center

Planning Clearance Review Determination Document

Planning Clearance Application Number: 10PCA016

Date of Application: October 29, 2009

Name of Proposed Improvement Project: NASA Fuel Pipeline Closure

Name of Applicant: Luke Metz (4-2753)

Company/Organization of Applicant: SAIC/JO

Planning Clearance Reviewer:

Name of Planning Clearance Reviewer: Rocci Caringello

Organization Planning Clearance Reviewer: Code JCM

Business email address of Planning Clearance Reviewer: tony.r.caringello@nasa.gov

Business telephone number of Planning Clearance Reviewer: 650-603-9506

Date Planning Clearance Review is completed: 11/24/09

Planning Clearance Review Fee Required: NO

Has the Planning Clearance Review Fee been paid? N/A

Determination of Planning Clearance Review Determination (Planning Clearance Reviewer to select one of the below):

Approved:

Approved with Conditions of Approval:

Disapproved:

Conditions of Approval: NASA Form 1046 required at completion of project

Reasons for Disapproval: _____

Planning Reviewer signature: Rocci Caringello date: 11/24/09

ATTACHMENT A



Evergreen Environmental Services

dedicated to the protection of the environment

To schedule a pickup, call
800-596-9455

Send payment to:

Evergreen Oil, Inc.
Dept. LA 23234
Pasadena, CA 91185-3234

WORK ORDER/SERVICE AGREEMENT

No 564613

Sales Order # SH0219675

Date: 3/31/10

6880 Smith Ave., Newark, CA EPA# CAD982413262
16540 S. San Pedro St., Carson, CA EPA# CAD982413262

GENERATOR/JOB LOCATION

BILLING INFORMATION

NAME <u>Innovative Construction</u>				NAME <u>Innovative Construction</u>				CASH <input type="checkbox"/> CHECK <input type="checkbox"/>	
ADDRESS <u>26120 Eden Landing Rd</u>				ADDRESS <u>Hayward, CA 94545</u>				CUSTOMER CODE NO. <u>ENVTL145</u>	
CITY	STATE	ZIP	CO.	CITY	STATE	ZIP	CO.	PO #	
PHONE NO. ()				PHONE NO. ()				CUSTOMER EPA ID NO.	

PRODUCT	WASTE CODE	MANIFEST NUMBER	QUANTITY	UNITS	PRICE	AMOUNT
Used oil, Non-RCRA Hazardous Lubricating	CA221			Gal.		
Waste, Liquid Industrial	CA221			Gal.		
Used Automotive Antifreeze, Non-RCRA Hazardous Waste Liquid	CA134			Gal.		
RQ Waste Combustible Liquid, N.O.S. NA 1993 III (Oil contaminated with halogens)	CA221 F001/F002			Gal.		
Oil & Water, Non-RCRA Hazardous Waste Liquid	CA223			Gal.		
Non Hazardous Water	NH	03301001	993	Gal.	\$	\$
Waste Solids and Sludges				Gal.		
Wash Out				Each		
Pressure Washer/Steam Cleaner				Day		
Transportation				Hrs.		
Fuel Surcharge				%		
Glycol Bulk 50/50/Specify Product				Gal.		
Glycol Bulk Conc./Specify Product				Gal.		

TEST: Clor D Tech 4000 _____ ppm Clor D Tech 1000 Pass Fail

Retain sample # Required	Total Charges
Field Service Work Description:	
Other:	
Other:	

TSDf Consolidated Manifest

<input type="checkbox"/> Evergreen Oil, Inc. 6880 Smith Ave. Newark, CA 94560 CAD980887418	<input type="checkbox"/> Evergreen Oil, Inc. - Davis Road 30B Davis, CA 95616 CAD982446874	<input type="checkbox"/> Evergreen Oil, Inc. - Fresno 4139 N. Valentine Fresno, CA 93722 CAD982446882
<input type="checkbox"/> Evergreen Env. Svc. 16604 S. San Pedro Carson, CA 90746 CAD981696420	<input type="checkbox"/> Evergreen Oil, Inc. - Santa Maria 745 A West Betteravia Santa Maria, CA 93454 CAD982446858	

DRIVER CHECKLIST

Time In _____ Time Out _____

Tank/Drum Properly Labeled

Accumulation Start Date Marked

House Keeping - Tank/Drum Clean

Other Services Checked: Oil, Filters/Drums, Antifreeze

Called in other services needed Oil, Filters/Drums, Antifreeze

Source: Collection Station Government
 Marine Agricultural Industrial

Generator certifies that it has established a program to reduce the volume and quantity & toxicity of the hazardous waste to the degree determined by generator to be economically practicable.
I hereby certify that I have read and have the authority to bind the above listed generator to the terms on the reverse side of this form.

IMPORTANT NOTICE REGARDING THE DISPOSITION OF YOUR OIL.

Per California Health and Safety Code Section 25250.9, Evergreen hereby advises customer that customer's shipment of used oil may be transported to a facility that is required to comply with federal regulations applicable to management of used oil, but that is not required to comply with the more stringent requirements applicable to hazardous waste management facilities. California facilities that handle or process used oil are required to meet those more stringent requirements, and some out-of-state facilities that process used oil also meet those requirements. These include more stringent leak detection and prevention requirements, engineering certifications of tank integrity, and financial assurances for closure and accidental releases. It is lawful to send used oil to out-of-state facilities that comply only with federal used oil management standards and not these more stringent requirements. This notification is for information purposes only.

Driver Signature <u>Cherie Well</u>	Print Name Cherie Well	Route #	Date	Generator's Signature	Print Name	Date
--	---------------------------	---------	------	-----------------------	------------	------

ATTACHMENT B

TICKET# SHP DATE COMMODITY		GROSS	TARE	NET	ADJ	RD CT/WT	RD EXT	PRICE UM	FRT EXT	TOTAL AMT
TIPFW 03/19/10 Tin Scrap		16680	10740	5940	0	0.0	0.00	140.0000 NT	0.00	415.80
SUPPLIER CP019P TOTALS (Pounds):				5940	0	TOTAL AMOUNT DUE SUPPLIER: \$		415.80		

ICS NORCAL

 **SIMS METAL MANAGEMENT**
699 Seaport Blvd.
Redwood City, CA 94063
(650) 369-4161

Date: 03/19/10
Check No: 19081115

10-260 ~~00000000~~

Comerica Debit SIMS
mate credit 10260

 **ENTERED**

Sims Metal Management Recycling Receipt

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SITE NAME:	Abandoned Fuel Distribution System				
Version:	Final	Date:	02/28/2015		
RESPONSIBLE PARTIES					
Organization	Department of the Navy, BRAC		Defense Logistics Agency Energy		
Address	1455 Frazee Rd., Suite 900 San Diego, CA 92108		8725 John J. Kingman Rd. Fort Belvoir, VA 22060		
Contact	Scott Anderson		Joseph E. Vogel		
	scott.d.anderson@navy.mil		Joseph.Vogel@dla.mil		
	619-532-0938		703-767-8781		
LOCATION					
Facility Name	Moffett Federal Airfield		Site Location		
Facility Address	Mountain View, CA Santa Clara County		Latitude	See site summaries	
			Longitude	See site summaries	
Regulatory Program	Lead Agency(ies)	Site Status			
		Open	Closed	ROD	Current Phase
Petroleum	RWQCB/SCCDEH	X			UST 17 NFA
SITE SUMMARY					
<p>SCCDEH – Santa Clara County Department of Environmental Health has oversight for closure of the abandoned fuel system.</p> <p>RWQCB – Oversight of closure of UST 17 only.</p> <p>Site Description</p> <p>The abandoned fuel distribution system was used to supply fuel to aircraft at the former Naval Air Station Moffett Field (NASMF). The system was installed between 1953 and 1957 to replace the fuel storage and distribution system on the west side of the former NASMF (Figure 1).</p> <p>The system was operated by the Navy until June, 1994, when operations were taken over by the Defense Logistics Agency (DLA). The site was designated as Defense Fuel Supply Point (DFSP) Moffett Field. The main function of the DFSP is to supply fuel to Department of Defense (DoD) customers. DLA ceased operations at the now abandoned fuel distribution system in 2003 and replaced its fueling operations with a contractor-owned, contractor-operated (COCO) system. The COCO system consists of 3 new aboveground storage tanks located east of Hangar 3 (Figure 2) for storage and dispensing fuel. The COCO facility started operations on December 1, 2003. The COCO facility is currently in operation.</p> <p>The system consists of the following components (Figures 2 & 3):</p> <ul style="list-style-type: none"> • A fuel wharf located on Guadalupe Slough to receive fuel from fuel barges (outside lease area) (37.435763° N, 122.027539° W) • Four field-constructed, steel, underground bulk storage tanks, each with a capacity of 567,000 gallons (Site 5N) (37.418330° N, 122.038541° W) • A fuel truck loading rack (37.415839° N, 122.038650° W) • Approximately 11,000 feet of pipeline connecting all of the system components (aboveground portion of pipeline is outside of the lease area) • A field-constructed, underground, 105,000 gallon, day tank (37.420669° N, 122.044528° W) 					

SITE NAME:**Abandoned Fuel Distribution System****SITE SUMMARY**

- Fuel filtering system (37.420565° N, 122.044730° W)
- A high-speed fueling system with four fueling hydrants (Site 24) (37.420732° N, 122.047214° W)

Under an agreement between DoD and NASA, fuel was supplied to NASA via a pipeline from the day tank under the runways to NASA fueling stations. The NASA fuel ceased operations in the early 1990s. The fuel line was closed in 2011. The majority of the line under the runways was closed in place. The NASA fuel line is named NASA Area of Investigation (AOI) 15 and covered under the AOI 15 EEC.

The abandoned system handled jet fuels including JP-4, JP-5, and JP-8. JP-4 and JP-5 were used by the Navy. Beginning in 1995, DLA began using JP-8 at DFSP Moffett.

Portions of the former fueling system are covered under the Navy's Installation Restoration Program (IRP): Site 5 and Site 24. Site 5 includes the bulk storage tanks while Site 24 covers the high-speed aircraft fueling hydrants.

Fuel was delivered to the former NASMF by barge to a wharf on the Guadalupe Slough (Figure 4). The fuel was then pumped through two 10-inch steel pipelines to the bulk storage tanks. A portion of the pipeline was aboveground from the wharf to the Northern Channel and is not part of the lease area. From the Northern Channel, the pipeline ran underground to the bulk storage tanks (Site 5). From the bulk storage tanks, fuel was pumped through an 8-inch steel underground pipeline to Tank 16 (facility 253) (Figure 5), the day tank. From the day tank the fuel was pumped to the high-speed fuel hydrants (Site 24) for fueling and defueling from aircraft.

Current Conditions of the abandoned fuel distribution system**Fuel Wharf**

The aboveground fuel lines from the wharf to the Northern Channel were removed by NASA in 2012. The underground portion of the pipelines remains in-place. There has not been soil sampling or investigation to date. The wharf was investigated by the Navy in 1995. The results were reported in the *Active Petroleum Sites Technical Memorandum*.

Field-Constructed Bulk Storage Tanks.

The bulk storage tank area is covered under IRP Site 5N.

Fuel Truck Loading Ramp

The fuel truck loading rack consists of a covered platform that consist of several bays to allow fuel to be loaded into tank trucks. The trucks were loaded using piping and hoses with connectors. The truck loading rack is currently inactive.

Pipelines

Approximately 11,000 feet of piping connects the components of the fuel system:

- The fuel wharf
- The bulk storage tanks
- The day tank
- High-speed fueling hydrants

SITE SUMMARY

Day Tank Area

The Day Tank Area consists of UST 16, the former UST 17, an aboveground storage tank (AST), Tank 90, fuel filters and water separators, and associated piping (Figure 5). UST 16 is a field-constructed tank with a capacity of 105,000 gallons. UST 16 stored JP-5. The tank was filled daily from the bulk storage tanks. Fuel from the day tank was then used for fueling of aircraft at Site 24.

AST 90 is a 5,000 gallon single-wall steel tank. Water and waste fuel was pumped to AST 90 for later disposal. AST 90 originally located at Site 12, the firefighting training area. AST 90 was moved to the site to replace UST 17 which was removed.

Fuel Filtering System

The fuel filters and water separators consisted of aboveground steel vessels. Filters removed any particles that may have been in the fuel before the fuel was delivered to the hydrants. The water separators removed any water that may have been in the fuel before delivery to the fueling hydrants. Particles and water collected were removed from the filters and separator on a regular basis and discarded as waste fuel. Waste fuel was originally disposed of in UST 17 before it was removed. UST 17 was a 4200 gallon steel single-wall tank encased in a concrete shell. The tank was removed in July 1993 (Figure 6). Waste fuel was later sent to AST 90.

High-Speed Fueling System

The high-speed fueling system consisted of hydrants to fuel and defuel aircraft. The High-Speed Fuel System is part of Installation Restoration Site 24 and is discussed in more detail in the Site 24 Existing Environmental Condition Report.

Nature & Extent of Contamination

During the removal of UST 17, two sidewall samples were taken: 17A & 17B. The following petroleum compounds were detected:

Compound	17A (mg/kg)	17B (mg/kg)
Gasoline	890	940
Benzene	1.4	ND (0.005U)
Ethylbenzene	4.2	2.0
Toluene	ND (0.005U)	ND (0.005U)
Xylenes	11	11

From June to August 1995, the Navy conducted an investigation related to contamination associated with UST 17. Ten soil samples were collected from ten soil borings, GPT17-1 to GPT17-10 (Figure 7). Three additional soil samples were collected from soil borings that were advanced to install three monitoring wells (SBT17-1 to SBT17-3). Soil samples were analyzed for TPH-purgeable, TPH-extractable, and benzene, toluene, ethylbenzene, and xylenes (BTEX). Groundwater samples were collected from 10 hand-augured locations, GWT17-1 to GWT17-10, and analyzed for TPH-p, TPH-e, and BTEX.

SITE NAME:

Abandoned Fuel Distribution System

SITE SUMMARY

The three monitoring wells, WT17-1 to WT17-3, were sampled during six sampling events between August 1995 and May 1997. The samples were analyzed for TPH-p, TPH-e, BTEX, and methyl tertiary butyl ether (MTBE).

Ethylbenzene, gasoline, JP-5, and xylene were detected in samples from 6 to 7.5 feet below ground surface (bgs). Gasoline was detected @ 1000 mg/kg, JP-5 @ 730 mg/kg, ethylbenzene @ 16 mg/kg, and xylene @ 9.1 mg/kg. In addition, TPH-e as other heavy compounds was detected @ 1700 mg/kg and TPH-e as other light components @ 890 mg/kg. Figure 8 presents selected petroleum constituents that remain in soil.

Results of groundwater monitoring wells indicated that petroleum constituents were detected including gasoline, JP-5, diesel, and benzene. Groundwater sampling results for selected chemical concentrations are presented in Figure 9.

There are no known dry wells at the day tank area. The condition of UST 17 could not be determined as it was destroyed during removal of the concrete casing. Former Naval Air Station employees have stated in interviews that fuel spills were often associated with the fuel filters and water separators adjacent to UST 16 (Figure 5). AST 90 is located on a concrete pad with secondary containment.

The Navy proposed closure of UST 17. The Regional Water Quality Control Board concurred in a letter dated January 4, 2005.

SITE NAME:		Abandoned Fuel Distribution System			
REMEDIAL ACTION					
Remedy	To be determined	Begin Date	N/A	End Date	N/A
<p>The US Army Corps of Engineers is currently developing closure plans for DLA. The plans include removal of the bulk storage tanks, aboveground storage tank, the day tank, filtering systems, the pipelines, and High-Speed Fuel hydrant system. No schedule has been developed to date.</p> <p>The planned removal by DLA does not include the remediation of any soil or groundwater associated with the fuel system.</p> <p>No remedial action was required for UST 17.</p> <p>The truck loading rack will not be removed.</p>					
Land Use Restrictions			Development Issues		
<p>UST 17 was closed based on industrial use screening levels thus prohibiting residential development at the site.</p> <p>Land use is restricted to conform to the November 2002 Record of Decision for NASA's Development Plan (as outlined by Mitigated Alternative 5 of the July 2002 Development Plan, Final Programmatic EIS).</p> <p>The day tank area is within Site 26 and the institutional controls from Site 26 pertain to the area.</p>			<p>Development within the facilities of the abandoned fuel distribution system may encounter soil and groundwater contamination. Site 5, Site 24, and the day tank area will require a soils management plan for the petroleum contamination still present. Current closure plans include closing pipelines in place.</p> <p>The EIMP must be followed.</p>		

SITE NAME:	Abandoned Fuel Distribution System
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RESIDUAL CONTAMINATION		
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Compound	Residual Concentration (max)		Notes
	Soil (mg/kg)	Groundwater (µg/L)	
Gasoline	1000	460,000	Residual contamination listed is from the UST 17 removal and investigation. See Figures 8 and 9 for soil and groundwater results and locations.
Benzene	0.46	880	
Toluene	1.8	ND	
Ethylbenzene	16	3.9	
Xylene	9.1	1000	
Other heavy components	1700	88,000	
Other light components	890	81,000	
JP-5	730	5500	
Naphthalene	3.8	480	
Diesel		18,000	
Kerosene		85,000	
Motor oil		84	
2-methylnaphthalene		560	
MTBE		ND	

REFERENCES (Chronological Order)

- *Draft Installation Restoration Program Petroleum Sites Investigation Technical Memorandum for USTs No. 17, 22, 41A, 55, 57, 69, 86A/B, and 87, Moffett Federal Airfield, CA.* PRC Environmental Management, Inc., Denver, CO. December 11, 1995.

- *Active Petroleum Sites Investigation Revised Draft Technical Memorandum, Moffett Federal Airfield, CA.* PRC Environmental Management Inc., San Francisco, CA. March 29, 1996.

- *Base-Wide Petroleum Site Evaluation Methodology Technical Memorandum, Draft Final Appendix H, Tanks 17 and 87 Petroleum Evaluation, Moffett Federal Airfield, CA.* Tetra Tech EM Inc., San Diego, CA. April 22, 2003.

- *Transmittal of Closure Letter and Site Summary for Underground Storage Tanks 17 and 87, Moffett Federal Airfield, Moffett Field, CA (RWQCB Case No. 43D9043 and 43D9044).* Regional Water Quality Control Board, San Francisco Bay, Oakland, CA. January 4, 2005.

FIGURES

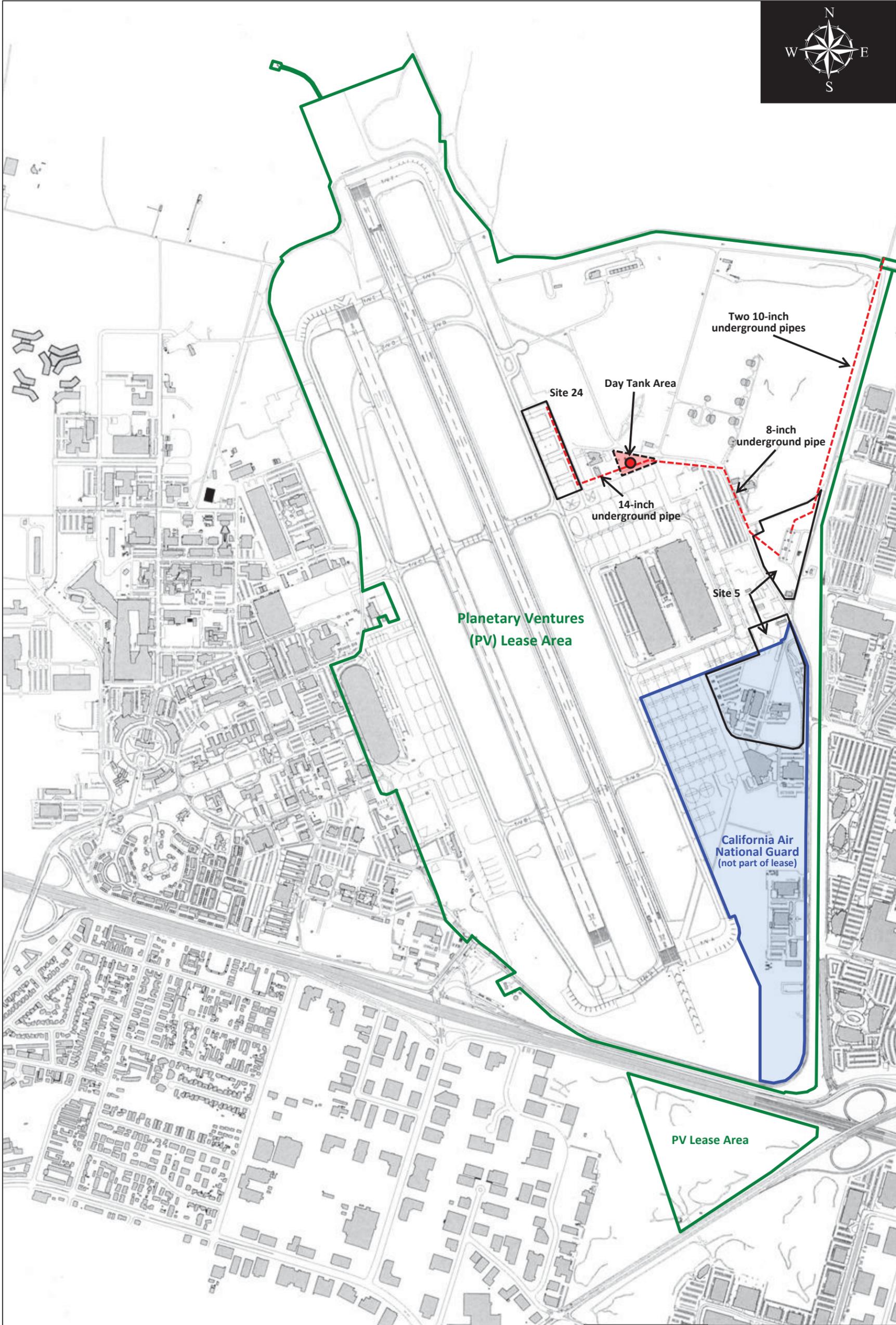


FIGURE 1
Abandoned fuel distribution system. The boundaries are approximate and not meant to represent legal property descriptions.



California Air National Guard Area (Not part of the lease)

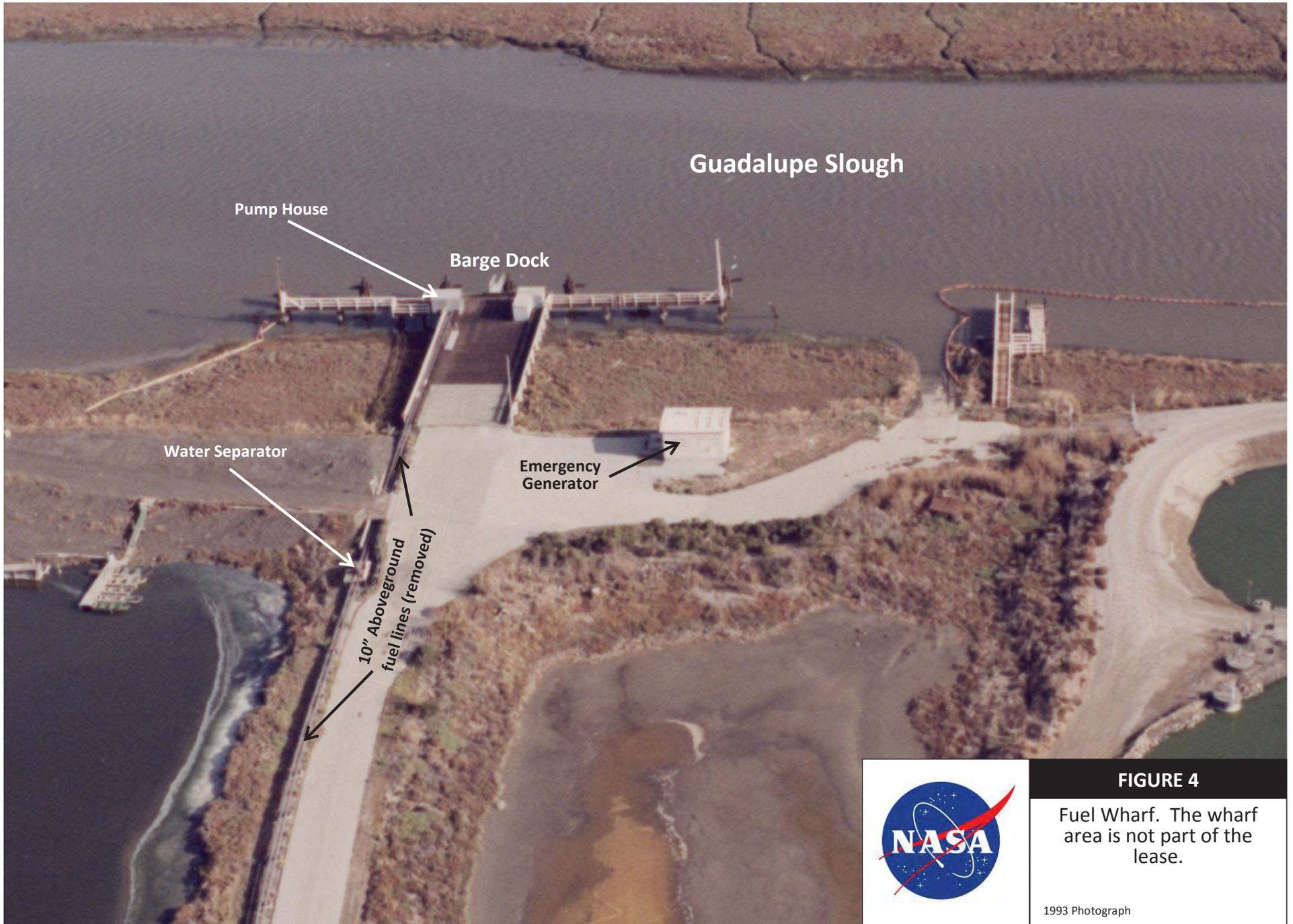


FIGURE 2
Fuel distribution system from the fuel wharf to Site 5 bulk storage tanks

Google Earth Photograph 9/26/2011



 **FIGURE 3**
Fuel distribution system
from Site 5 bulk storage
tanks to Site 24
Google Earth Photograph 9/26/2011





8" Underground Fuel Line from Site 5 Bulk Storage Tanks

14" Fuel Line to Site 24

6" NASA Fuel Line (removed) (AOI 15)



FIGURE 5

Day Tank Area

Google Earth Photograph

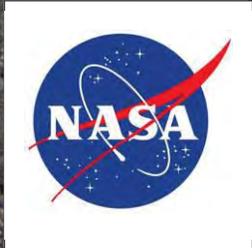
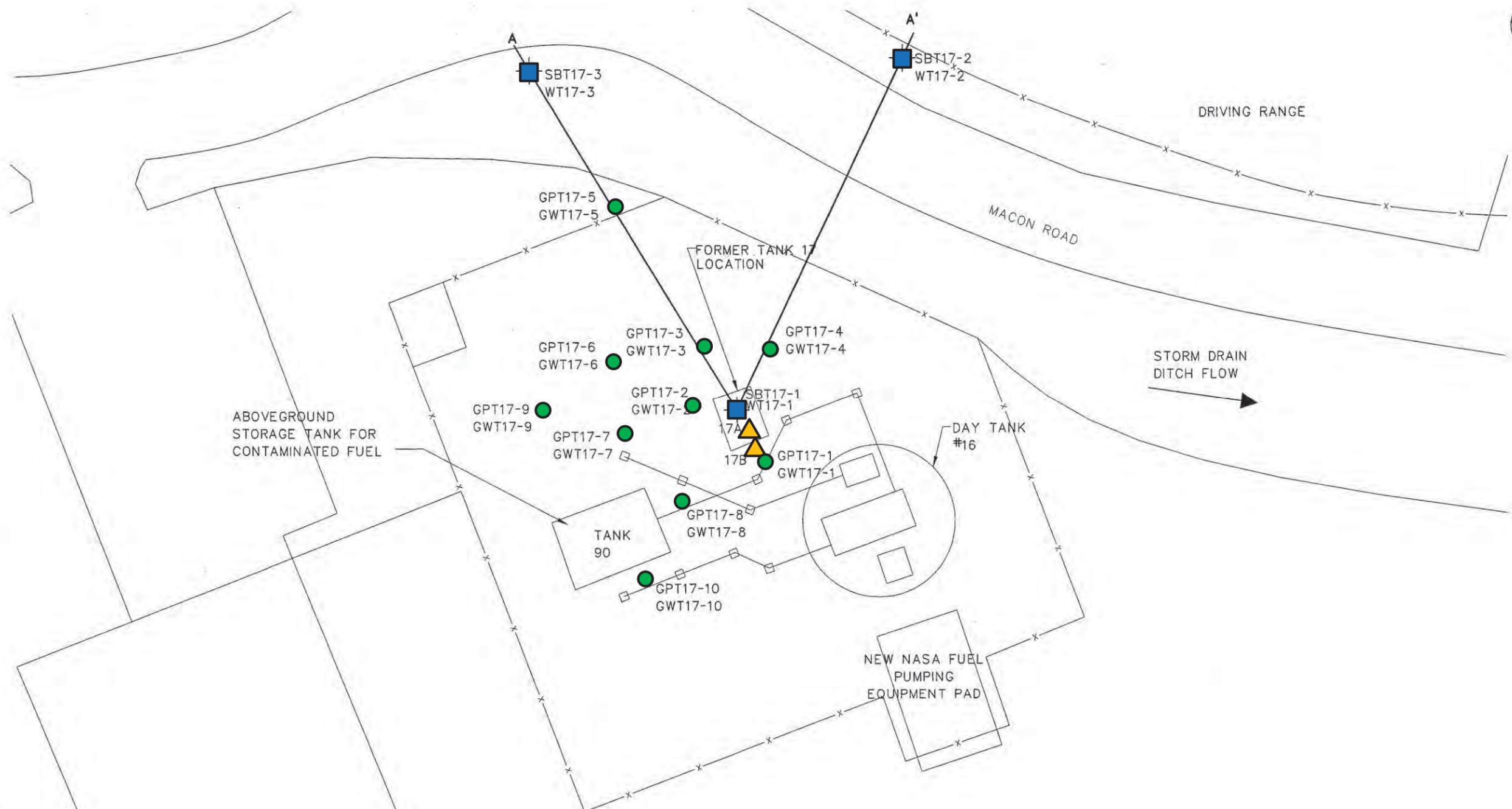


FIGURE 6
Removal of UST 17
Navy photograph July 1993



LEGEND

- SOIL SAMPLE COLLECTED DURING TANK REMOVAL
- SOIL AND GROUNDWATER SAMPLE LOCATION
- SOIL BORING AND MONITORING WELL LOCATION
- ABOVEGROUND PIPING
- CROSS SECTION LOCATION
- FENCE

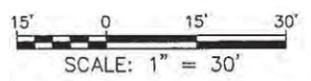


FIGURE 7
UST 17 Sampling Locations

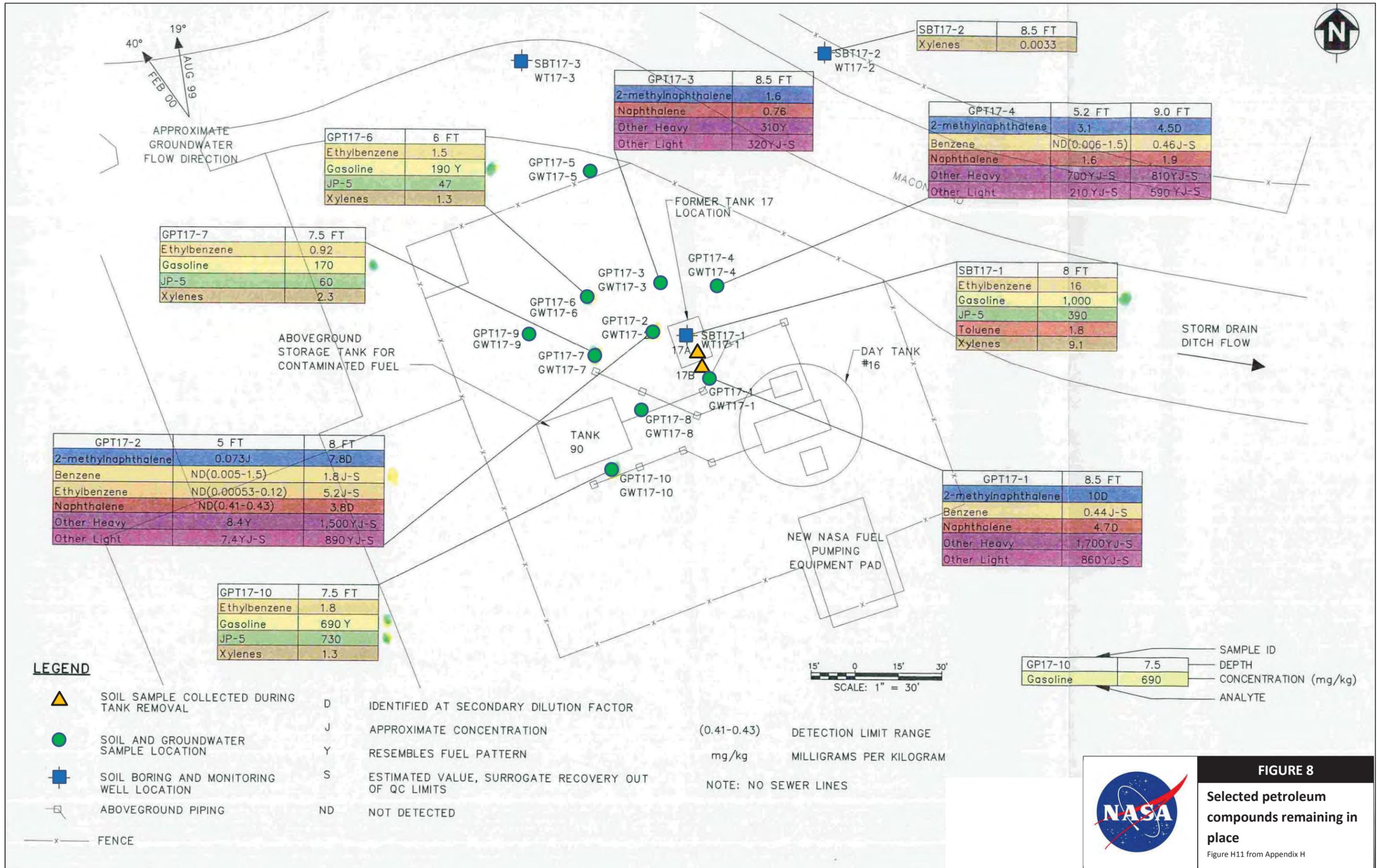
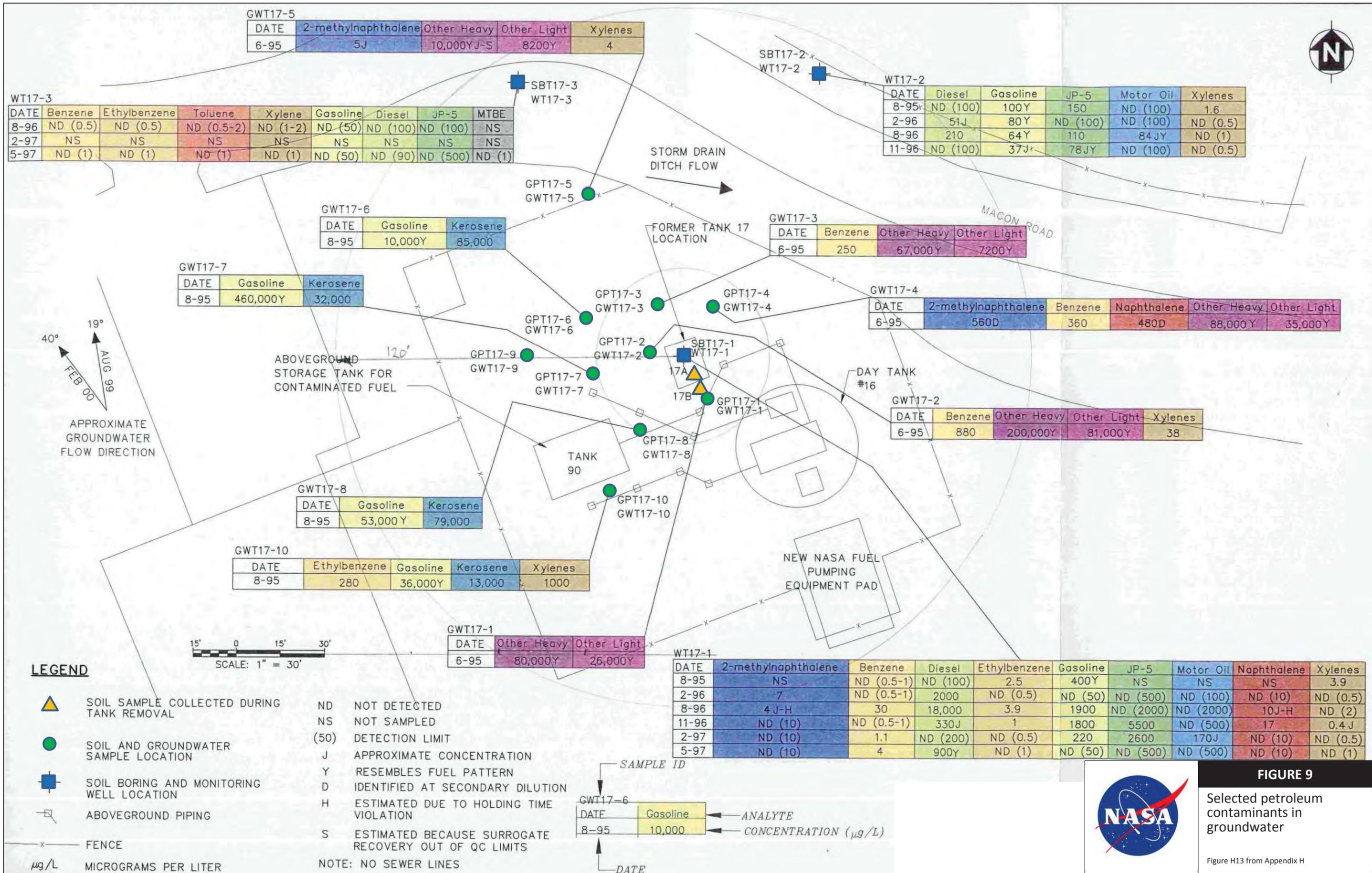


FIGURE 8
Selected petroleum compounds remaining in place
 Figure H11 from Appendix H



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