APPENDIX D

SOIL VAPOR ASSESSMENT REPORT

Technical Memorandum

Date: November 25, 2008

To: Kola Olowu, DESC

From: Redwan Hassan, Parsons

Subject: **Results of the Soil Vapor-Gas Assessment**
DFSP Norwalk, 15306 Norwalk Boulevard, Norwalk, California

This soil vapor assessment report has been prepared to summarize the activities conducted at the aboveground storage tank (AST) area at the DFSP Norwalk facility, to compare these results to 2004 and 2005 data, to determine if further vadose zone remediation is warranted, and to recommend remedial alternatives.

Soil Vapor Extraction (SVE) Background and Task Objectives

The currently inactive SVE system in the north-central plume area was operating from 1995 until the first quarter of 2008 and has removed approximately 159,000 gallons of volatile hydrocarbons to date from vadose zone soils through extraction and another estimated 216,000 gallons through biodegradation.

Soil gas monitoring and respiration testing were conducted in order to:

1. Assess the vadose zone soil chemistry, i.e., COPCs, at its current state and compare to initial site conditions;
2. Estimate the performance of the SVE system; and
3. Determine if further vadose zone (VZ) remediation is warranted.

If further VZ remediation is deemed necessary, technology(s) and remedial alternatives are recommended for further evaluation and possible implementation to achieve Site clean-up goals.

Soil Gas Monitoring Procedures

Soil gas monitoring was conducted from September 22 through October 11, 2008. Baseline monitoring consisted of measuring the static pressure and static total volatile hydrocarbons (TVH), oxygen (O_2), and carbon dioxide (CO_2) concentrations at the vapor monitoring probes (VMPs). A portable sampling pump was used to purge each sampling interval and collect a sample in a Tedlar bag. The soil gas was monitored in the field for O_2 and CO_2 using an O_2/explosion meter and for TVH using either an O_2/explosion meter or a PID. Spot checks for gas-phase VOCs were also conducted on 11 existing groundwater wells nearest the perimeter of the site. In addition to field measurements, a total of 14 soil gas samples were collected in summa canisters from the VMPs and analyzed for BTEX (benzene, toluene, ethyl benzene, and xylenes), MTBE (methyl tert-butyl ether), and chlorinated volatile organic compounds using Method TO-15 modified. For the contaminants of potential concern (COPCs), the field and analytical data were used to assess existing levels in the vadose zone and compare concentration changes to baseline data in 2004.

Respiration Test Procedures

An in-situ respiration test is accomplished by injecting air (oxygen) into the contaminated soil mass and then measuring the uptake of oxygen in the soil gas over time. This is the equivalent of a biological oxygen demand (BOD) test for biodegradation in soils. Air can be injected into individual VMPs using a small, one-scfm air pump. An initial oxygen concentration of 10-15 percent is desired to start the test. Once this concentration of oxygen is achieved, the air pump is turned off and the soil gas is periodically sampled and analyzed over a 1 to 3 day period to determine the rate of oxygen uptake. This test assesses if bacteria are present to degrade the hydrocarbons and provides the key data to estimate the initial hydrocarbon degradation rate.

Generally, oxygen concentrations become elevated (near saturated oxygen conditions) in the monitoring locations during system operation as the extraction system vacuum pulls clean air through the subsurface toward the extraction well. Because the SVE system is currently non-operational, a vacuum was induced on selected VMPs for greater than 12-hours each using a portable sampling pump as an equivalent alternative. During respiration testing once the vacuum pump is turned off, oxygen concentrations typically decrease and carbon dioxide concentrations increase as biodegradation of fuel hydrocarbons proceeds. The rate of oxygen utilization is determined from oxygen data obtained during in situ respiration testing. Biodegradation rates can be calculated based on the oxygen utilization rate.

When soil microbes degrade petroleum hydrocarbons they consume a predictable quantity of oxygen and produce carbon dioxide. This process is known as microbial respiration. During microbial respiration, approximately 3.5 pounds of oxygen are consumed for every one pound of hydrocarbon degraded to carbon dioxide. Because changes in soil gas oxygen levels can be easily and reliably measured, oxygen utilization is the primary method for estimating the rate of hydrocarbon biodegradation in the soil.

Field and Analytical Results

Figure 1 shows the VMP locations that were sampled during data collection. A summary of the field test results are provided in Table 1 and representative TO-15 analytical test results for select VMPs are provided in Table 2. Where concentrations were above method detection limits using EPA Method TO-15, and thus detectable, concentrations were generally higher at the deepest locations (27' bgs). The highest concentrations detected during this event were at location VMP-10, however these concentrations were considerably lower, 94 percent on average, compared to the baseline monitoring conducted in 2004. A summary comparison of the BTEX and MTBE sample results from 2004 and 2008 are provided in Table 3. Table 4 summarizes the oxygen utilization rates resulting from the respiration tests and compares them to 2005 results.

A review of the representative sample results in the vicinity and south of the Truck Fill Stand, shows relatively high levels of benzene south of the Site, specifically at locations VMP-1 through VMP-5 (Figures 2 and 3). The concentrations at this southern location are lower at VMP-1 and relatively higher by VMP-4, which suggests that the nearby SVE system belonging to Kinder Morgan is re-capturing some of the adjacent VOC hydrocarbon plume. This is further confirmed by presence of MTBE at location VMP-3.

In general results obtained via EPA Method TO-15 and supported by PID readings show lower VOCs concentrations across the Site, where samples were collected during this investigative effort. This suggests that the SVE system previously designed for the Site has helped reduce the quantities of on-site VOCs in the vadose zone.

However, this reduction in VOC concentrations may also be due to a combination of factors, such as:

- The operation of the SVE system along the southern edge of the property;
- Displacement of the on-site plume towards the east and northwest. Of particular note and with reference to Figure 2 and Table 5, a "spot check" for VOCs at GMW-45, MW-13, GMW-57, and GMW-60 using a PID meter shows indications of this possible migration at the northeast corner of the site;
- Rise of groundwater level of approximately 1.5 to 2-ft from 2004 to present, which may have consequently trapped the COPCs in water, and making less likely to impact (via volatilization) the vadose zone; and
- Natural bio-attenuation of these VOCs.

Conclusions and Preliminary Recommendations

The results obtained during this VOCs measurement campaign are very promising and clearly show a substantial decrease in concentrations across the Site. The result behind this decrease in concentrations, however, may be due to a combination of factors. The most plausible reason behind this reduction in VOCs concentrations is the effect of both on-site SVE, and the adjacent SVE systems.

Assuming that the levels of VOCs remain unchanged over the next few months, it is highly recommended to initiate source removal and neutralization of VOCs and the heavier, longer chain hydrocarbons via in-situ treatment using chemical oxidation and intermittent biological treatment in order to prevent re-contamination of the vadose zone by these VOCs, and thus an increase of their respective concentrations. As an initial step, this could be conducted as a pilot study over a limited area of the Site in the suggested vicinity of Tank 80008/VMP-10. This would serve to further eliminate the source and inhibit further VOC migration.

In conjunction with the in-situ treatment, SVE of other select areas such as near Tank 80002, could be re-initiated using gas-phase granular activated carbon (GAC), which is currently permitted under the existing SCAQMD air permit for the Site. Along with the existing two 2,000 lb vessels currently at the Site, additional vessels would be necessary to accommodate air flow requirements and the affirmed absorption of VOCs to limit the potential for breakthrough. Alternately, a newer gas phase treatment technology – referred to as "Non Thermal Plasma" (NTP, ref. http://www.airphaser.com/index.html) could potentially be implemented which converts/oxidizes VOC compounds mostly into CO_2 and water at operating temperatures less than 300 degrees F. The NTP system has a very high removal efficiency. The equipment costs are similar to that of a regenerative thermal oxidizer (RTO) and the operating cost is about 70% of a RTO. However, it uses electricity and not natural gas.

An additional issue that may arise is related to the consequence of the plume displacement in groundwater. This plume may cause VOCs to impact areas that were initially "clean". If this scenario would to be considered, it is recommended to proceed with a soil gas "screening" of the Site by using Gore Technology Survey. This method will allow detection of VOCs plumes in the entire Site, and will guide the decision making process. In addition, this screening will determine the shape and size of the VOCs impact, and will help identify potential displacement of the initial source in groundwater.

TABLES

TABLE 1. SOIL GAS FIELD MONITORING DATA

Location	*Depth*	*Date*	*Sample Time*	*Pressure (in. H2O)*	*O2 (%)*	*CO2 (%)*	*TVH Field (ppmv)*	*PID (ppmv)*	*Sample Time for Summa (TO-15)*	*Comment*
TRUCK FILL STATION										
VMP-1	9	9/22/2008	1123	4.5	19.3	0.1	1,650			TVH Zero = 1450
	20	9/22/2008	1139	1.8	18.7	0.1	1,500		1140	TVH Zero = 1100
	28	9/22/2008	In water							
VMP-2	11	9/19/2008	1420	0.65	6.6	7	1,100	151		TVH Zero = 370
	19	9/19/2008	1429	1.5	15.4	2.5	1,450	106	1430	TVH Zero = 350
	27	9/19/2008	1448	3.75	7.9	6.3	13,000	2,803	1449	TVH Zero = 240
VMP-3	7	9/18/2008	1650	40	0	18.6	0	32	1729	
	16	9/18/2008	1710	40	0	18.5	*	2,647	1716	
	28	9/18/2008								In water

TABLE 1. SOIL GAS FIELD MONITORING DATA

Location	Depth	Date	Sample Time	Pressure (in. H2O)	O2 (%)	CO2 (%)	TVH Field (ppmv)	PID (ppmv)	Sample Time for Summa (TO-15)	Comment
TANK FARM AREA										
VMP-4	8	9/24/2008	1402	>100	17.7	1.9	2,700	11	1410	TVH Zero = 1350
	18	9/24/2008	1407	40	0	19.2	9,800			TVH Zero = 1350 YVH
	27	9/24/2008	1415	71	0	17.4	> 50,000			TVH Zero = 1800
VMP-5	7	9/25/2008	1000	>100	10	8	9,300		1005	TVH Zero = 1950
	15	9/25/2008	1008	3.5	1.7	13.7	> 50,000		1012	TVH Zero = 2350
	25	9/25/2008								Obstruction at 6 feet BGS
VMP-6	8									No access due to vegetation (Palm trees)
	18									No access due to vegetation (Palm trees)
	27									No access due to vegetation (Palm trees)
VMP-7	8									No access due to vegetation (Palm trees)
	18									No access due to vegetation (Palm trees)
	27									No access due to vegetation (Palm trees)
VMP-8	7	9/25/2008	1104							Obstruction at 4 feet BGS
	15	9/25/2008	1106	5	0	17.1	> 50,000	544	1115	TVH Zero = 350
	25	9/25/2008	1112						X	MP in water - no summa sample collected
VMP-9	10	9/24/2008	1036	20	17.5	1.5	1,000	11		TVH Zero = 300
	15	9/24/2008	1041	2	0	12.1	> 50,000	481	1045	TVH Zero = 400
	25	9/27/2008	1047	. 100	10.8	7.4	> 50,000		*	TVH Zero = 700
VMP-10	8	9/22/2008	1302	0	10.2	6.7	1,050		1310	TVH Zero = 380
	18	9/22/2008	1338	11	13.2	5.3	43,000		1341	TVH Zero = 500
	27	9/22/2008	1356	42	0	17.7	> 50,000		1359	TVH Zero = 800
VMP-11	7									No access due to vegetation (Palm trees)
	18								X	No access due to vegetation (Palm trees)
	27								X	No access due to vegetation (Palm trees)
VMP-12	8									No access due to vegetation (Palm trees)
	18									No access due to vegetation (Palm trees)
	27									No access due to vegetation (Palm trees)

TABLE 1. SOIL GAS FIELD MONITORING DATA

Location	Depth	Date	Sample Time	Pressure (in. H2O)	O2 (%)	CO2 (%)	TVH Field (ppmv)	PID (ppmv)	Sample Time for Summa (TO-15)	Comment
TANK FARM AREA										
VMP-13	8								X	No access due to vegetation (Palm trees)
	18								X	No access due to vegetation (Palm trees)
	27									No access due to vegetation (Palm trees)
VMP-14	8	9/24/2008	1039	50	18	2	2,500	8		TVH Zero = 1800
	18	9/24/2008	1043	50	0	14.1	2,050	92		TVH Zero = 1500
	27	9/24/2008	1048	50	0	14.4	11,500	334		TVH Zero = 1500
VMP-15	8	9/24/2008	1013	> 100	18.2	1.5	3,150			TVH Zero = 2050
	18	9/24/2008							X	Obstruction at 6 feet BGS, no summa sample collecte
	27	9/24/2008	1019	70	0	14.8	> 50,000		1027	TVH Zero = 2400
VMP-16	8								X	No access due to vegetation (Palm trees)
	18									No access due to vegetation (Palm trees)
	27									No access due to vegetation (Palm trees)
VMP-17	8	9/24/2008	1310	50	17.5	1.2	2,100			TVH Zero = 1200
	18	9/24/2008	1316	100	13.5	3	1,900			TVH Zero = 1300
	27	9/24/2008	1321	100	1.6	7	1,150			TVH Zero = 1350
VMP-18	8	9/24/2008	1331	90	18.4	0.6	2,100			TVH Zero = 1450
	18	9/24/2008	1336	> 100	17.6	1	2,400			TVH Zero = 1550
	27	9/24/2008	1340	> 100	17.1	1.1	2,400			TVH Zero = 1550

TABLE 1. SOIL GAS FIELD MONITORING DATA

Location	Depth	Date	Sample Time	Pressure (in. H2O)	O2 (%)	CO2 (%)	TVH Field (ppmv)	PID (ppmv)	Sample Time for Summa (TO-15)	Comment
EASTERN AREA										
VMP-20	5	9/26/2008	935	47	20.9	0.4	2,050			TVH Zero = 1700
	10	9/26/2008	939	97	17.2	0.8	2,400			TVH Zero = 1900
	22.5	9/26/2008	943	97	12.7	4	2,100			TVH Zero = 1850
VMP-21	5	9/25/2008	1405	5	205	0.1	1,400	5		TVH Zero = 500
	10	9/25/2008	1409	20	18.6	0.7	1,500	5		TVH Zero = 850
	22.5	9/25/2008	1412	10	9.8	4.3	1,200	6		TVH Zero = 700
VMP-22	5	9/25/2008	1340	6	19.8	0.3	1,300	4		TVH Zero = 600
	10	9/25/2008	1344	80	18.7	0.4	1,200	5		TVH Zero = 600
	22.5	9/25/2008	1349	> 100	8.3	2.5	1,200	5		TVH Zero = 850
VMP-23	5	9/25/2008	1354	30	20	0.1	1,300	5		TVH Zero = 140
	14.5	9/25/2008	1358	50	18.2	0.4	1,200	5		TVH Zero = 1000
	22	9/25/2008	1402	50	11.8	2	1,000	5		TVH Zero = 700
VMP-24	5	9/26/2008	921	48	20.9	0.1	1,950			TVH Zero = 1700
	15	9/26/2008	924	96	19	0.5	2,200			TVH Zero = 1900
	23	9/26/2008	928	96	14.6	2.4	2,550			TVH Zero = 2000
VMP-25	5	9/26/2008	851	72	19.3	1.5	2,250			TVH Zero = 1500
	16.5	9/26/2008	855	97	17.4	1.9	2,450			TVH Zero = 1700
	23	9/26/2008	858	97	14.4	4.1	2,200			TVH Zero = 1800
VMP-26	5	9/26/2008	905	48	20.3	0.9	2,450			TVH Zero = 1800
	15	9/26/2008	909	98	18.8	0.9	2,550			TVH Zero = 1900
	23	9/26/2008	913	93	15.4	2.4	2,500			TVH Zero = 1900
VMP-27	5	9/26/2008	947	47	19.3	1.1	2,100			TVH Zero = 1500
	15.5	9/26/2008	950	93	17.3	1	2,000			TVH Zero = 1900
	23	9/26/2008	954	98	14.8	2	2,100			TVH Zero = 1900
VMP-28	5	9/26/2008	957	44	17.7	1.7	2,100	3		TVH Zero = 1700
	15.5	9/26/2008	1001	96	16.6	1.2	2,000	3		TVH Zero = 1800
	23	9/26/2008	1005	97	11.8	3.8	2,150	3		TVH Zero = 1750

TABLE 2. SOIL GAS VOC TEST RESULTS

	Vapor Monitoring Wells													
Constituent	*VMP-1-20*	*VMP-2-19*	*VMP-2-27*	*VMP-3-7*	*VMP-3-16*	*VMP-4-8*	*VMP-5-7*	*VMP-5-15*	*VMP-8-15*	*VMP-9-15*	*VMP-10-8*	*VMP-10-18*	*VMP-10-27*	*VMP-15-27*
Benzene	**1.4**	**1.7**	**74**	**4.4**	**15**	**76**	< 19	**120**	< 230	< 62	**9.6**	**37,000**	**340,000**	**100**
Toluene	**3.6**	**1.9**	**36**	**7**	< 6.3	**250**	< 19	**2,400**	**1,600**	**380**	**20**	**47,000**	**210,000**	**350**
Ethylbenzene	< 0.76	**0.97**	**59**	**4.5**	**22**	**48**	< 19	**190**	< 230	< 62	**6.9**	**4,600**	**24,000**	< 82
o-Xylene	< 0.76	**0.83**	**14**	**3.3**	< 6.3	**66**	< 19	**170**	< 230	< 62	**8.2**	**2,200**	**17,000**	< 82
p/m-Xylene	< 3.0	< 2.9	< 49	< 10	< 25	**230**	< 77	< 470	< 910	< 250	**23**	**9,300**	**68,000**	< 330
total xylenes	< 3.0	**0.83**	**14**	**3.3**	< 25	**296**	< 77	**170**	< 910	< 250	**31.2**	**11,500**	**85,000**	< 330
Methyl-t-Butyl Ether (MTBE)	< 3.0	< 2.9	< 49	**12**	< 25	< 32	< 77	< 470	< 910	< 250	< 2.8	< 2900	< 3100	< 330
1,1,1-Trichloroethane	< 0.76	< 0.74	< 12	**7.5**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
1,1-Dichloroethane	< 0.76	< 0.74	< 12	**2.6**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
1,2,4-Trimethylbenzene	< 1.5	< 1.5	< 24	< 5.1	< 13	< 16	< 38	< 240	< 460	< 120	**1.5**	< 1500	< 1500	< 160
1,2-Dibromoethane	< 0.76	< 0.74	< 12	**2.6**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
1,2-Dichloropropane	< 0.76	< 0.74	< 12	**2.9**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
1,3,5-Trimethylbenzene	< 0.76	< 0.74	< 12	**3.1**	< 6.3	**9.9**	< 19	< 120	< 230	< 62	**1.3**	< 740	< 760	< 82
2-Butanone	**3.5**	< 1.5	< 24	**5.6**	< 13	**17**	< 38	< 240	< 460	< 120	< 1.4	< 1500	< 1500	< 160
4-Ethyltoluene	< 0.76	< 0.74	< 12	**4.2**	**22**	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
Acetone	**43**	**11**	< 49	**22**	**27**	**200**	**110**	**3,500**	< 910	**530**	**65**	< 2900	< 3100	< 330
c-1,2-Dichloroethene	< 0.76	< 0.74	< 12	**5**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
c-1,3-Dichloropropene	< 0.76	< 0.74	< 12	**2.7**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
Carbon Disulfide	< 0.76	< 0.74	< 12	< 2.6	< 6.3	< 8.0	< 19	**1,500**	**1,100**	**240**	< 0.70	< 740	< 760	**190**
Chlorobenzene	< 0.76	< 0.74	< 12	**2.7**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
Chloroform	< 0.76	**1.1**	< 12	< 2.6	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
t-1,2-Dichloroethene	< 0.76	< 0.74	< 12	**2.9**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82
Tetrachloroethene	< 0.76	< 0.74	< 12	**89**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	**2.7**	< 740	< 760	< 82
Trichloroethene	< 0.76	< 0.74	< 12	**5.2**	< 6.3	< 8.0	< 19	< 120	< 230	< 62	< 0.70	< 740	< 760	< 82

TABLE 3. COMPARISON OF 2004 AND 2008
CHEMICALS OF CONCERN

Location	*Sample Date*	*Benzene (ppbv)*	*Toluene (ppbv)*	*Ethylbenzene (ppbv)*	*Total Xylenes (ppbv)*	*MTBE (ppb)*
VMP-1-20	04/19/04	31	140	150	480	< 10
VMP-1-20	09/22/08	**1.4**	**3.6**	< 0.76	< 3.0	< 3.0
% Change		95%	97%	99.7%	99.7%	70%
VMP-2-19	04/19/04	720	2300	5500	6800	< 1900
VMP-2-19	09/19/08	**1.7**	**1.9**	**0.97**	**0.83**	< 2.9
% Change		100%	100%	99%	99%	100%
VMP-2-27	04/19/04	40000	67000	23000	64000	< 8400
VMP-2-27	09/19/08	**74**	**36**	**59**	**14**	< 49
% Change		99.8%	99.9%	99.7%	100%	99%
VMP-3-7	04/19/04	6600	4900	34000	53000	< 2500
VMP-3-7	09/18/08	**4.4**	**7**	**4.5**	**3.3**	**12**
% Change		99.9%	99.9%	100.0%	100.0%	99%
VMP-3-16	04/19/04	13000	5800	71000	76000	< 3500
VMP-3-16	09/18/08	**15**	< 6.3	**22**	< 25	< 25
% Change		99.9%	99.9%	100%	100%	99%
VMP-4-8	11/17/04	5,200	530	1,200	2,940	< 640
VMP-4-8	09/24/08	**76**	**250**	**48**	**296**	< 32
% Change		99%	53%	96%	90%	95%
VMP-5-7	11/17/04	NA	NA	NA	NA	NA
VMP-5-7	09/25/08	< 19	< 19	< 19	< 77	< 77
% Change		NA	NA	NA	NA	NA
VMP-5-15	11/17/04	NA	NA	NA	NA	NA
VMP-5-15	09/25/08	**120**	**2,400**	**190**	**170**	< 470
% Change		NA	NA	NA	NA	NA
VMP-8-15	11/17/04	NA	NA	NA	NA	NA
VMP-8-15	09/25/08	< 230	**1,600**	< 230	< 910	< 910
% Change		NA	NA	NA	NA	NA
VMP-9-15	11/17/04	NA	NA	NA	NA	NA
VMP-9-15	09/25/08	< 62	**380**	< 62	< 250	< 250
% Change		NA	NA	NA	NA	NA
VMP-10-8	11/17/04	NA	NA	NA	NA	NA
VMP-10-8	09/22/08	**9.6**	**20**	**6.9**	**31.2**	< 2.8
% Change		NA	NA	NA	NA	NA
VMP-10-18	11/17/04	NA	NA	NA	NA	NA
VMP-10-18	09/22/08	**37,000**	**47,000**	**4,600**	**11,500**	< 2900
% Change		NA	NA	NA	NA	NA
VMP-10-27	11/17/04	1,400,000	1,100,000	56,000	136,000	< 46,000
VMP-10-27	09/22/08	**340,000**	**210,000**	**24,000**	**85,000**	< 3100
% Change		76%	81%	57%	38%	93%
VMP-15-27	09/24/08	**100**	**350**	< 82	< 330	< 330
Minimum %		76%	81%	57%	38%	70%
Average %		99%	92%	99%	98%	94%
Maximum %		99.9%	99.9%	100.0%	100.0%	99.8%

MTBE = methyl-t-butyl ether
ppbv = parts per billion by volume
ppmv = parts per million by volume
% = percent
NA = not analyzed

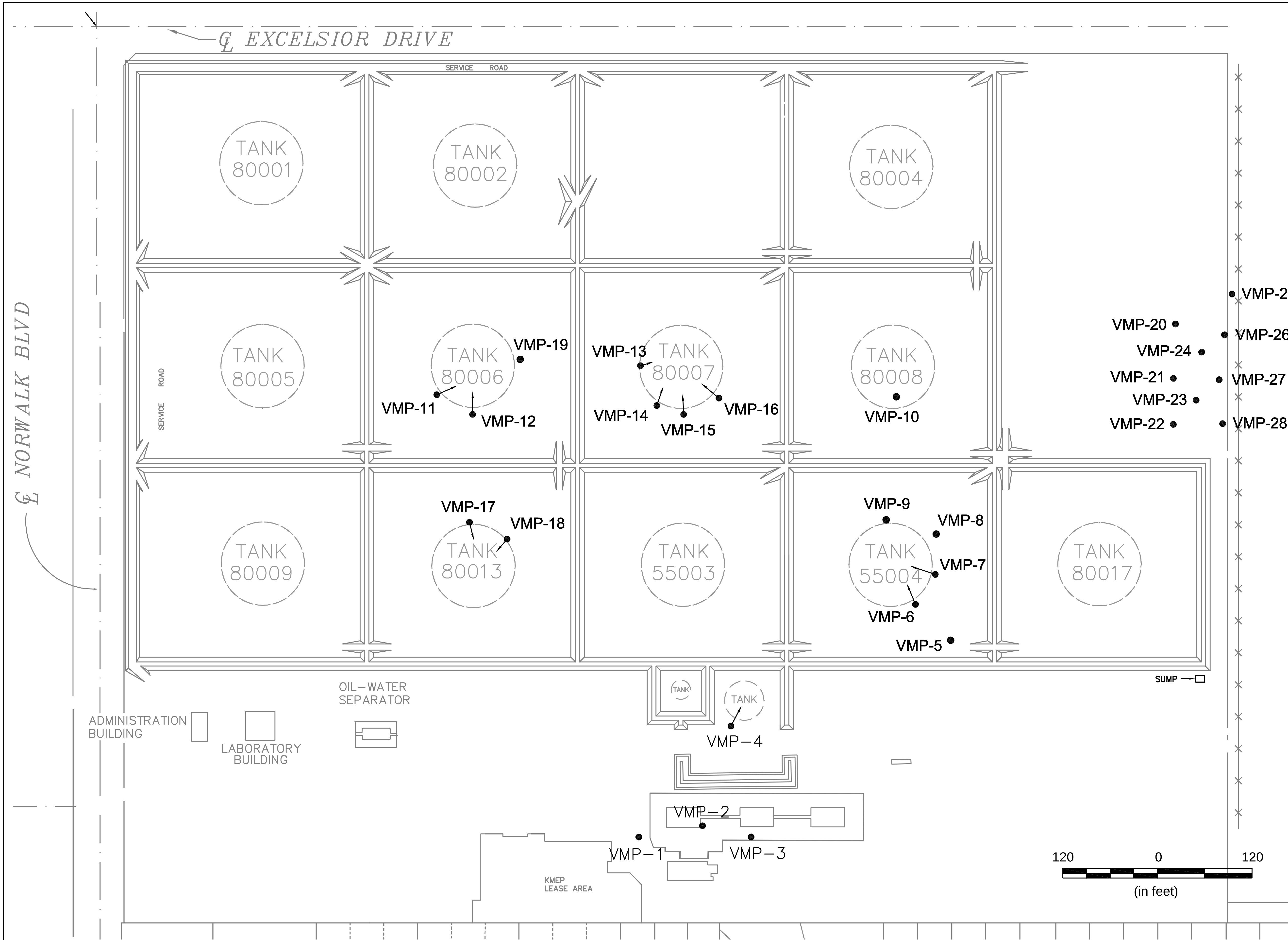
TABLE 4. OXYGEN UTILIZATION RATE

Location	***Date***	***Rate (%/day)***
VMP-2-11	Mar-05	1.78
	Oct-08	0.26
VMP2-19	Mar-05	2.36
	Oct-08	2.17
VMP-3-7	Oct-08	2.47
VMP-3-16	Mar-05	1.73
	Oct-08	7.79
VMP-8-15	Mar-05	1.02
	Oct-08	4.06
VMP-9-15	Mar-05	0.58
	Oct-08	no rate
VMP-14-8	Mar-05	no rate
	Oct-08	0.23

TABLE 5. PID "SPOT CHECK" OF MONITORING WELLS

Date	*Location*	*Level ppmv*	*Notes*
11/13/2008	GMW-38	ND	
11/13/2008	GMW-58	0.5-4.5	Reading fluctuating (well with product in dissolved phase)
11/13/2008	GMW-60	0.1-0.5	
11/13/2008	GMW-57	0.8-2.3	13.7 ppmv peak reading
11/13/2008	MW-13	ND	
11/13/2008	GMW-45	73.5	Stablizing at 18.0 (Historically Clean)
11/13/2008	GMW-06	ND	
11/13/2008	GMW-12	ND	
11/13/2008	GMW-08	ND	
11/13/2008	GMW-04	ND	
11/13/2008	GW-08	ND	
11/13/2008	GMW-21	700-2100	Strong product odor. Free product not detected with IP (last gauging). Well has shock absorbent

FIGURES



PARSONS

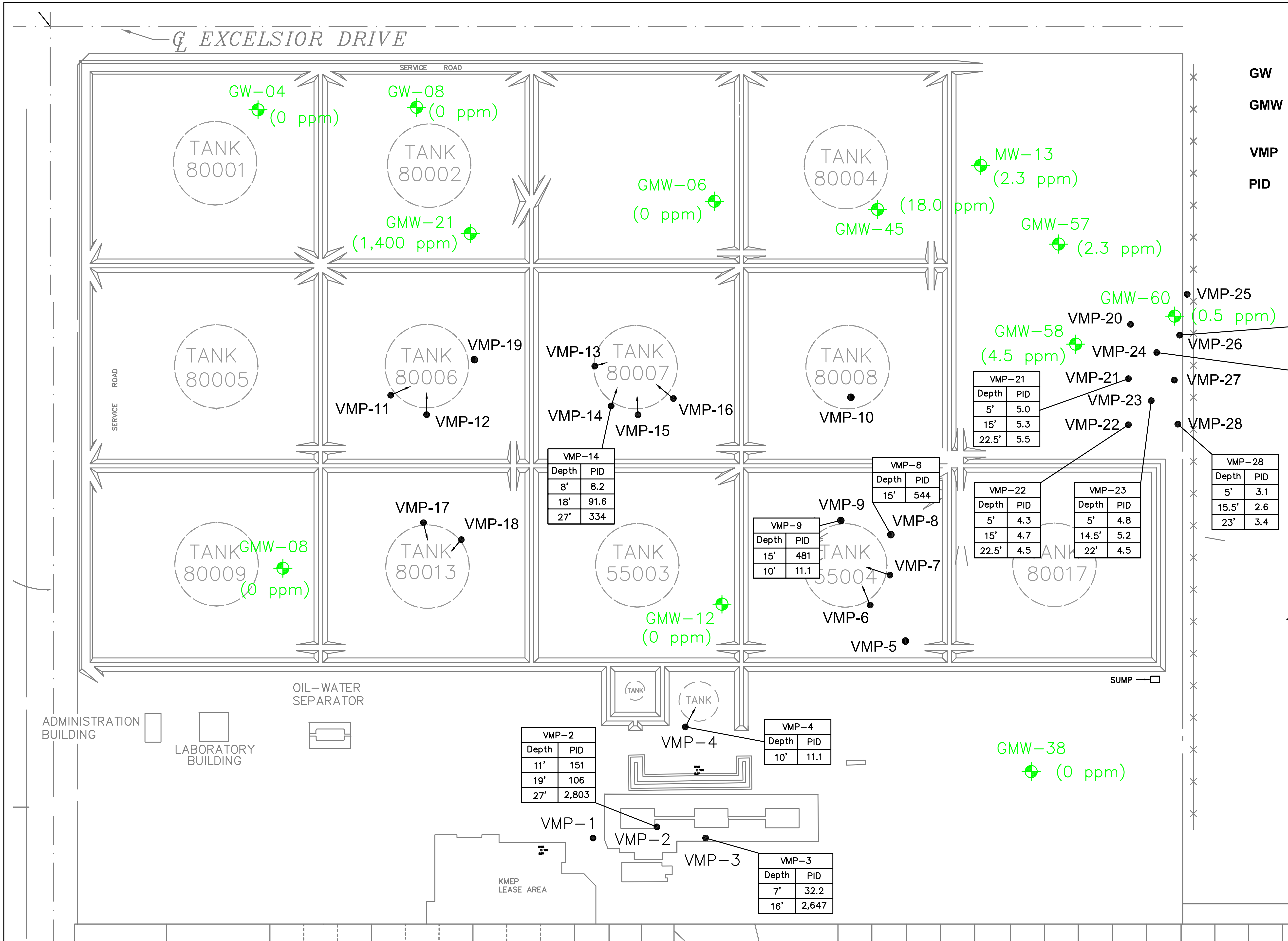
ABOVEGROUND STORAGE TANKS
DEFENSE FUEL SUPPLY POINT

NORWALK, CALIFORNIA

FIGURE 1

VAPOR MONITORING PROBE SAMPLING LOCATONS

k:\depts\dept48\desc 07–2008\norwalk\ACO–0006 ves respirometry test\figures\Figure 1 Vapor Monitoring Probe Sampling Locations.dwg



VMP–26	
Depth	PID
5'	0
15'	0
23'	0

VMP–24	
Depth	PID
5'	2.9
15'	3.0
23'	

VMP–21	
Depth	PID
5'	5.0
15'	5.3
22.5'	5.5

VMP–28	
Depth	PID
5'	3.1
15.5'	2.6
23'	3.4

VMP–14	
Depth	PID
8'	8.2
18'	91.6
27'	334

VMP–8	
Depth	PID
15'	544

VMP–9	
Depth	PID
15'	481
10'	11.1

VMP–22	
Depth	PID
5'	4.3
15'	4.7
22.5'	4.5

VMP–23	
Depth	PID
5'	4.8
14.5'	5.2
22'	4.5

VMP–4	
Depth	PID
10'	11.1

VMP–2	
Depth	PID
11'	151
19'	106
27'	2,803

VMP–3	
Depth	PID
7'	32.2
16'	2,647

LEGEND

GW Groundwater Extraction Well

GMW Groundwater Monitoring Well (xxx ppm VOCs by PID)

VMP Vapor Monitoring Point Well

PID Photo Ionization Detector (readings in ppmv using hexane as calibration gas)

140 0 140

(in feet)

PARSONS

ABOVEGROUND STORAGE TANKS
DEFENSE FUEL SUPPLY POINT

NORWALK, CALIFORNIA

FIGURE 2
SOIL GAS MONITORING RESULTS
PID Readings (ppmv)

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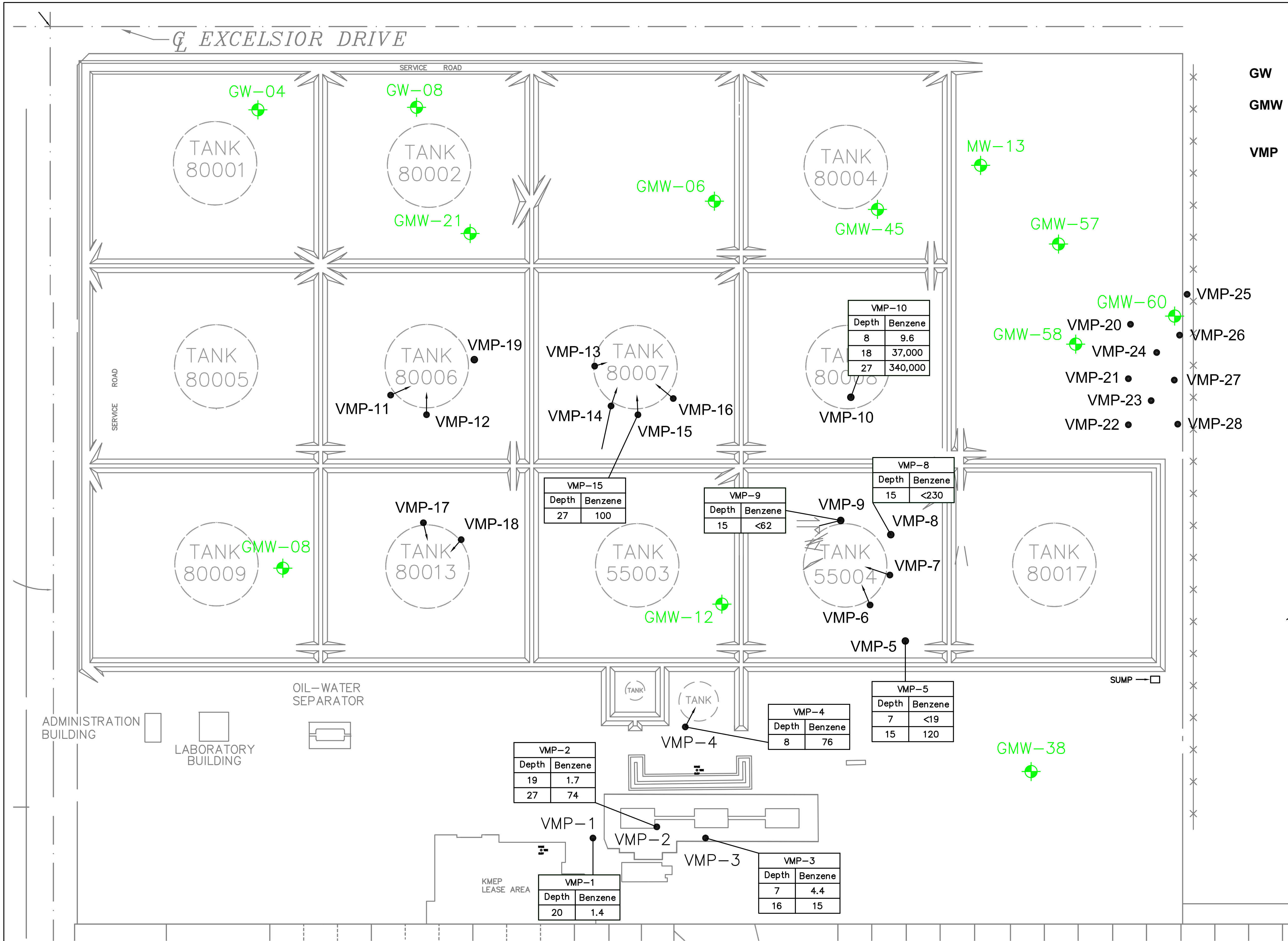

LEGEND

GW Groundwater Extraction Well

GMW Groundwater Monitoring Well (xxx ppm VOCs by PID)

VMP Vapor Monitoring Point Well

N

140 0 140

(in feet)

PARSONS

ABOVEGROUND STORAGE TANKS
DEFENSE FUEL SUPPLY POINT

NORWALK, CALIFORNIA

FIGURE 3

SOIL GAS MONITORING RESULTS

Benzene (ppbv)

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