ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

LHM

CALIFORNIA REGIONAL WATER

MAR 2 1989

QUALITY CONTROL BOARD

February 27, 1989

Ms. Katherine Chesick
Alameda County Department of
Environmental Health
80 Swan Way
Room 200
Oakland, CA 94621

SUBJECT: ADDENDUM TO UNAUTHORIZED RELEASE REPORT FOR THE CARNATION DAIRY FACILITY LOCATED AT 1310 15th STREET IN OAKLAND, CA.

REF: AGE PROJECT NO. 004-88-059

Dear Ms. Chesick:

Enclosed are two copies of the amendment to the Unauthorized Release Report for the Carnation Dairy Facility in Oakland. The analytical results from the soil and groundwater sampling and as-built drawings of the recovery system are included. If you have any questions, please contact me at (916) 451-0952.

Sincerely,

Good aggressive work.

Where are the boring logs/well installation details?

Mary L. Scruggs
Project Manager

MLS/jc
cc: Mr. Howard Shmuckler, Carnation Company
Mr. Jim Person, Carnation Company
Ms. Lisa McCann, RWQCB
Mr. Don Dalke, RWQCB

UPDATE No. 1

AMENDMENT TO UNAUTHORIZED RELEASE REPORT FOR CARNATION DAIRY FACILITY LOCATED AT 1310 14TH STREET IN OAKLAND, CALIFORNIA

FEBRUARY 27, 1989

AGE PROJECT No. 004-88-059

UPDATE NO. 1
AMENDMENT TO UNAUTHORIZED RELEASE REPORT
FOR THE CARNATION DAIRY FACILITY LOCATED AT
1310 14TH STREET IN OAKLAND, CALIFORNIA

FEBRUARY 27, 1989

AGE Project No. 004-88-059

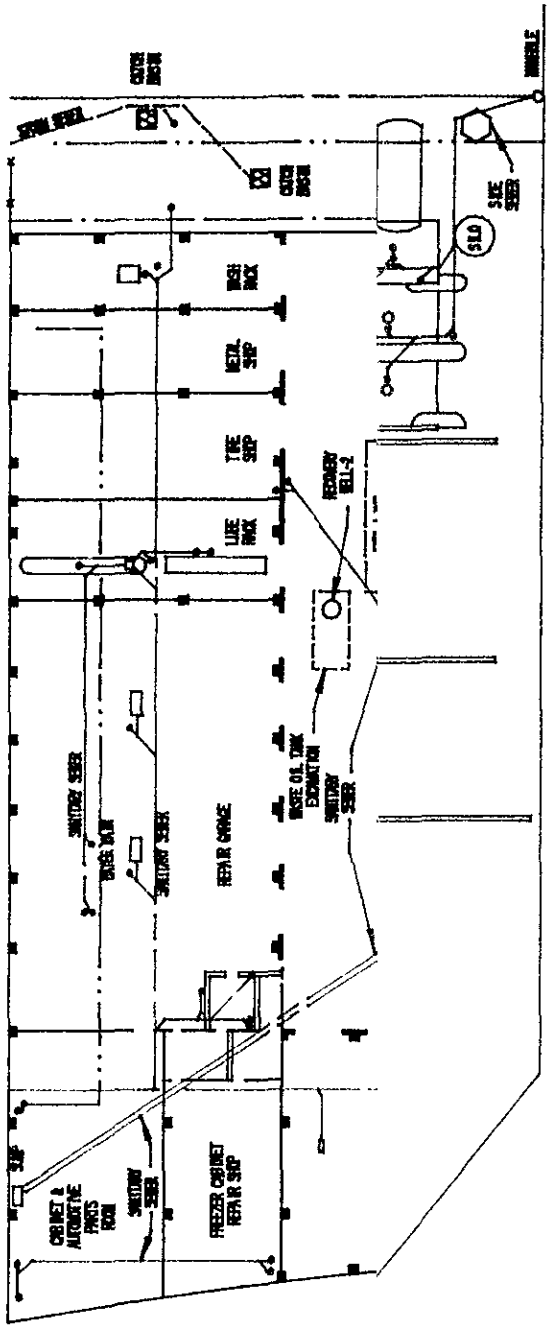
This amendment is an update to the January 17, 1989, Unauthorized Release Report (URR) prepared for the Carnation Dairy Facility located at 1310 14th Street in Oakland. A copy of the Unauthorized Release Report is included in Appendix A. A site map of the western portion of the facility is shown on Figure 1. At the time AGE prepared the original report, an unauthorized release had occurred but the analytical results were not yet available from the analyzing laboratories. This addendum includes the analytical results from soil and ground water sampling in the former tank excavation area, description of emergency remediation measures, product recovery system design, and preliminary conclusions and plans for further remedial action at the site.

The first section expands on the "Type, Quantity, and Concentration of Chemicals" portion of the URR. Analytical results from soil samples collected at the soil-water interface at each end of each fuel tank, under the waste oil tank, and under the product lines are enclosed. Results from a ground water sample collected in the fuel tank excavation pit is also included.

In addition, this update describes emergency remediation measures performed to contain and recover free fuel (gasoline/diesel) floating on the groundwater, treatment of animal fat floating on the groundwater beneath the fuel layer, and treatment of the detergent in the groundwater. Also, included are results of bench testing, field pilot tests, and data such as product thicknesses and groundwater chemistry from the recovery wells. Wow!

FUEL TANK AREA

Eight soil samples were collected at the soil-water interface at each end of the four underground fuel tanks. The samples were collected as grab samples from the backhoe bucket in six-inch brass tubes. One ground water sample was collected from the west side of the tank excavation. The water in the excavation was not purged



N

FIGURE 1

AGE
A GEOLOGIC ENGINEERING
– WESTERN HALF
PROJECT NO: 004-88-059
AT POPLAR OAKLAND, CA.

Y	CHECKED BY	APPROVED BY	SCALE
0			NONE

prior to collecting the sample. The water was brought to the surface in the backhoe bucket. The water sample was collected in 40 ml VOA vials and in a one-liter amber bottle. One composite soil sample was collected from the excavated soil stockpile. All samples were collected following proper protocol and were transported to Chemwest Analytical Laboratory in Sacramento in a cooler with dry ice under chain of custody. Sample locations are shown on Figure 2.

All of the samples were analyzed for total petroleum hydrocarbons (TPH), benzene, ethylbenzene, toluene, xylene and total organic lead. The ground water was sampled again at the time of the waste oil tank removal and analyzed for methyl blue active substances (MBAS). The analytical results are listed in Table 1. Copies of the analytical results and chain of custody forms are included in Appendix B.

WASTE OIL TANK

The soil in the waste oil tank excavation was sampled twice. The initial sampling was performed when the waste oil tank was removed. Four soil samples were collected in brass tubes from soil in the backhoe bucket. The samples were collected following proper protocol and were transported to Chemwest Analytical Laboratories in Sacramento in a cooler with ice under chain of custody. The samples were analyzed for TPH, volatile organics, semivolatile organics and cadmium, chromium, lead and zinc by methods 8015 Modified, 8240, 8270 and ICAP, respectively. The reported results for TPH were 19,000 ppm as gasoline and below reporting limits (1000 ppm) for diesel. Volatile organic results reported 27,000 ppb toluene, 12,000 ppb ethylbenzene, and 92,000 ppb total xylenes. Naphthalene and 2-methylnaphthalene were detected at concentrations of 31,000 ppb and 20,000 ppb, respectively. Chromium and zinc concentrations were reported as 26 ppm and 23 ppm, respectively. The remaining chemical constituents were below reporting limits for the analyses performed. Certified analytical results and the chain of custody form are included in Appendix B.

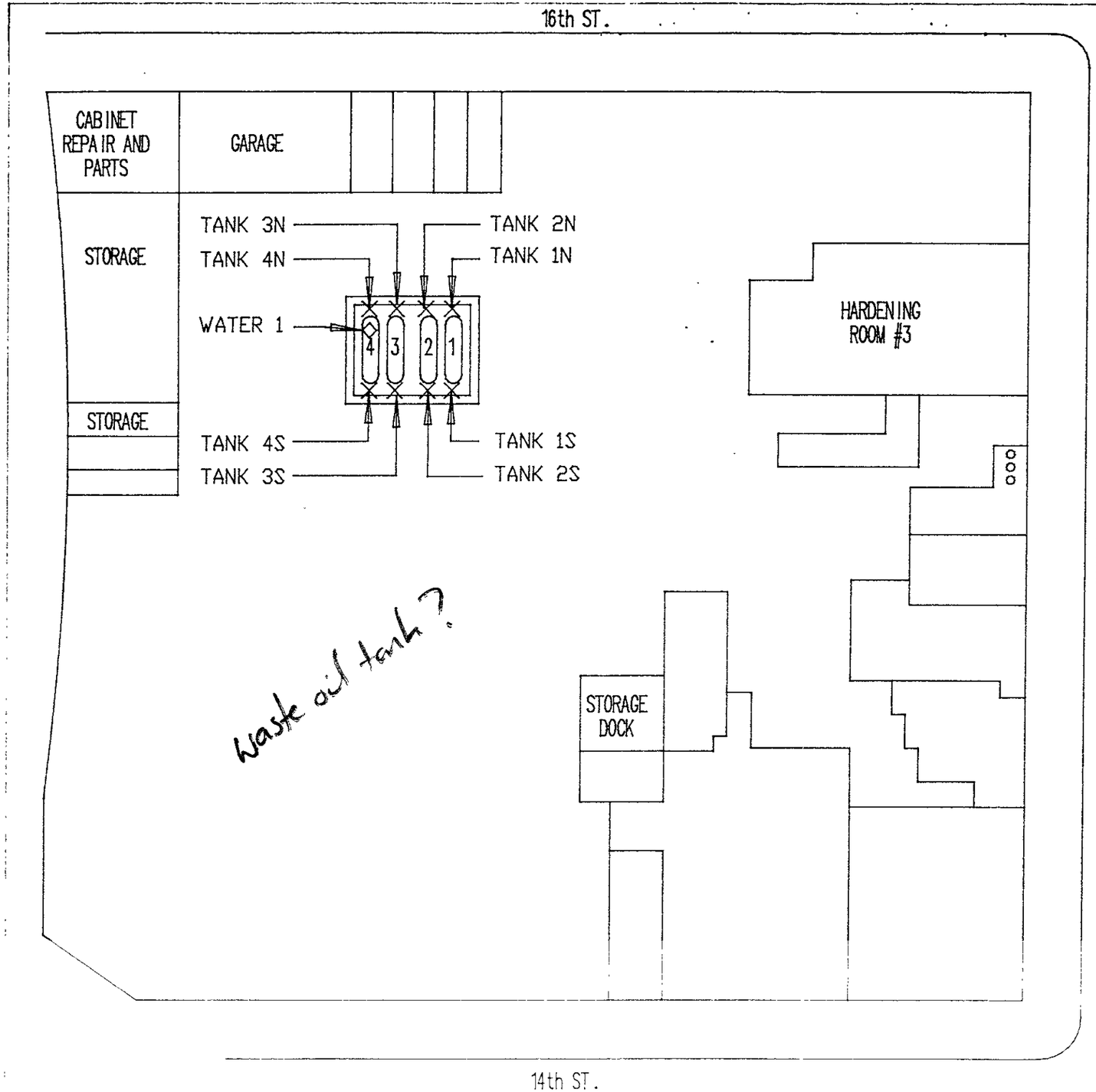
Why not TCC?

An additional soil sample was collected from the waste oil tank on January 15, 1989. The sample was collected in the same manner as described previously and was transported to Precision Analytical Laboratory in Richmond under chain of custody. The sample was analyzed for PCBs. The analytical results show no PCBs detected. Analytical results and a copy of the chain of custody are included in Appendix B.

PRODUCT LINES AND FUEL ISLAND

Four soil samples were collected below the product lines. The sampling locations are shown on Figure 3. The soil in the vicinity

FIGURE 2



N

LEGEND

FORMER UNDERGROUND STORAGE LOCATIONS — 4 3 2 1

SOIL SAMPLE LOCATION — × TANK 1N

WATER SAMPLE LOCATION — ◇ WATER 1

AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: TANK SAMPLE LOCATIONS						
PROJECT NAME: CARNATION OAKLAND					PROJECT NO.	004-88-059
SITE LOC: 13 X 14TH ST. AT POPLAR OAKLAND, CA.						
REV.	DATE	DESCRIPTION	DWG BY	CHK BY	APP BY	SCALE:
0	2-23-89	SAMPLE	C.DIDIO			NONE

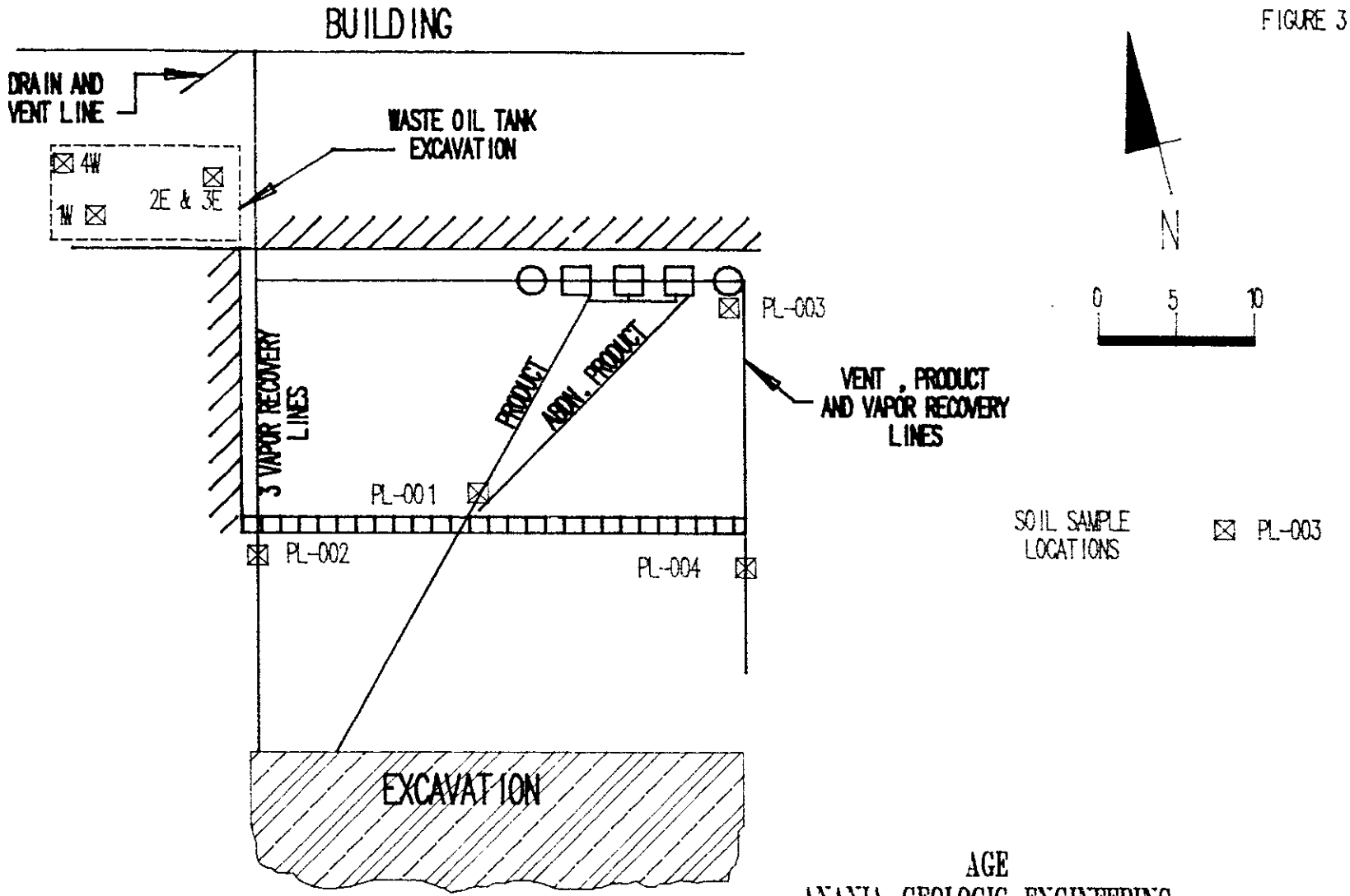
TABLE 1: ANALYTICAL RESULTS FOR SAMPLES FROM FUEL TANK AREA, IN PPM

Sample No.	TPH Gasoline	TPH Diesel	Benzene	Ethyl-benzene	Toluene	Xylene	Total Organic Lead
Tank 1N	17000	280	200	130	660	580	BRL
Tank 1S	570	36	40	54	190	260	BRL
Tank 2N	12000	BRL*	50	44	190	200	BRL
Tank 2S	26000	570	200	BRL**	740	690	BRL
Tank 3N	31000	BRL*	300	BRL**	940	840	BRL
Tank 3S	9700	BRL*	20	36	110	50	BRL
Tank 4N	18000	BRL*	100	BRL	520	520	BRL
Tank 4S	38000	BRL*	200	200	910	850	BRL
Soil Pile 1	BRL***	6500	1.1	0.5	0.4	2.0	BRL
Water 1	1400	0.93	22	1.7	25	--	BRL

BRL = Below reporting limit.
* = Reporting limit 1000 ppm.
** = Reporting limit 200 ppm.
*** = Reporting limit 5000 ppm.
Reporting limit for Total Organic Lead for soil samples is 10 ppm.
Reporting limit for Total Organic Lead for water sample is 1 ppm.

[TABLE1.059, URRV2-14]

FIGURE 3



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PRODUCT LINES & WASTE OIL TANK LOCATIONS					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO: 004-88-059	
SITE LOCATION: 1310 14th ST. AT POPLAR ST. OAKLAND					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
1	2-24-89	CHRIS DIDIO			1" = 10'

of the product lines and the fuel islands was a sandy fill material to depths of greater than four feet below ground surface. The soil samples were collected at depths between 3.5 and 4 feet below ground surface from the fill material and not in native soil. The samples were collected below the sand bed lining the pipe trenches. Two samples were collected on the north side of the trench drain, which lies between the fuel islands and the former fuel tanks, and two samples were collected on the south side of the drain. All four soil samples were collected from the backhoe bucket in six-inch brass tubes following proper protocol. The samples were transported to Precision Analytical Laboratory in Richmond under chain of custody. All samples were analyzed for TPH, BTEX, and TTLC lead by methods 8015 Modified, 8020 and ICAP, respectively. Analytical results are shown in Table 2. Copies of the laboratory reports and chain of custody form are enclosed in Appendix B.

GROUNDWATER

A groundwater sample was collected from Recovery Well No. 1 on January 16, 1989. The sample was bailed from the recovery well. The well had not been purged prior to sampling. The sample was submitted for complete water chemistry analyses to include TPH, volatile hydrocarbons, ammonia analysis, total dissolved solids, pH, and metals. Concentrations of detected constituents are listed in Table 3. Certified analytical results and the chain of custody are in Appendix B.

METHODS OF CLEANUP TO DATE

The four fuel tanks, the waste oil tank, product lines, and fuel dispensers have been removed. Soil was excavated from these areas and stockpiled on site for later treatment, as shown on Figure 1. Two recovery wells and French drain trenches were installed in the fuel tank and waste oil excavations as shown on Figure 4. A cross-section of the fuel tank excavation recovery system and fuel skimming system[1] are shown on Figure 5. The pneumatic pumping system for developing and testing the recovery wells and the product storage tank with carbon polishers on the vent are shown on Figure 6.

As of February 27, 1989, approximately 1000 gallons of free fuel, mostly composed of gasoline, has been recovered and is being stored in an 8000-gallon storage tank on the site. The fuel will be manifested to Gibson Oil for recycling on an as-needed basis. Product recovery points to depths of 15 and 20 feet are currently being installed in the locations shown on Figure 7 in accordance with the design shown on Figure 8. Additional product recovery points that

good!

[1]The Clean Environment Engineers, Inc., Selective Oil Skimmer uses wire-braided hoses to ground the system back to the well.

TABLE 2: ANALYTICAL RESULTS FOR SAMPLES FROM UNDER THE PRODUCT LINES, IN PPM

Sample	PL-001	PL-002	PL-003	PL-004
TPH - Gasoline	651	ND<20	ND<20	ND<20
TPH - Diesel	ND<20	ND<20	7855	ND<20
Benzene	ND<0.5	ND<1	5	ND<0.5
Ethylbenzene	3	ND<1	<0.5	ND<0.5
Toluene	4	ND<1	9	ND<0.5
Xylene	10	ND<1	8	ND<0.5
Total Lead	10	13	180	7.1
Total Organic Lead*	<0.5	<0.5	<0.5	<0.5

ND = Not detected.
* = Values are reported as parts per billion (ug/g)

[TABLE2.059, URRV2-14]

TABLE 3: ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS IN GROUNDWATER SAMPLE FROM RECOVERY WELL NO. 1

Constituent	Concentration
TPH - Gasoline	2170 ppm ✓
TPH - Diesel	420 ppm
Benzene	35 ppm
Toluene	54 ppm
Ethylbenzene	6 ppm
Xylene	30 ppm
Total Dissolved Solids	0.74 mg/l
Ammonia	20 ppm
pH	7.5
Zinc	0.1 ppm
Lead	0.3 ppm — high lead
Nickel	0.03 ppm
Copper	0.02 ppm
Barium	0.03 ppm

Table3.059

will be installed later will be shown on updated versions of Figure 7.

In addition, bench and field tests are being conducted to determine the effectiveness of bioremediating the fuel constituents, detergent, and animal fat. Initial bench and pilot tests have indicated that Solmar Bioculture formulation L-104 will be very effective for biodegrading the detergent in the groundwater and soil and for bioremediating the fuel constituents in the soil and groundwater. Tests have also indicated that Solmar formulation I-107 will be effective at mitigating/biodegrading the animal fat layer.

Field performance test of the Solmar L-104 culture resulted in rapid degradation of the detergent in the groundwater and a corresponding increase in free fuel thickness. Adding 25 pounds of Solmar L-104 into RW No. 1 resulted in the free fuel layer in RW No. 2 increasing from 1 inch to 29 inches in 15 days. The field test also indicated that the aquifer is anaerobic and oxygen demand will be very high. Additional testing indicated that the oxygen demand can be met by injecting compressed air into the wells.

RW No. 2 was developed by pumping 200 gallons of free product out of the well in two hours. The fuel layer thickness decreased from 14 inches to 2 inches and recovered at a rate of 1.4 inches per day. The recovery data indicates that the transmissivity of fuel in RW No. 2 in the shallow aquifer is 2.8 $ft^3/ft/day$.

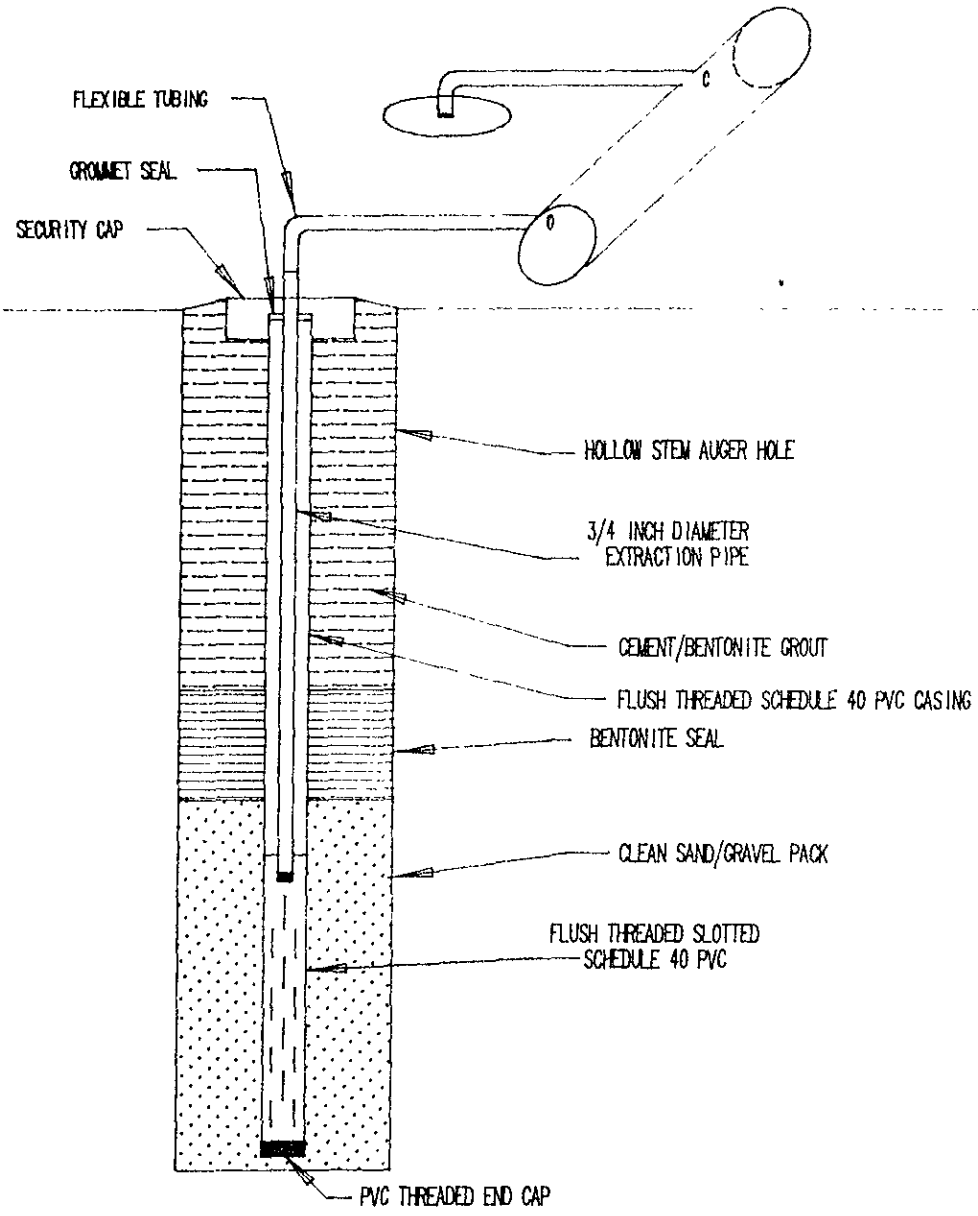
DETERMINATION OF EXTENT OF IMPACT FROM RELEASE

The full extent of the unauthorized release of fuel (gasoline and diesel) is unknown at this time. However, the recovery points installed nearest the building, RP 20 through RP 23 (shown on Figure 7), contained between 2 and 3 feet of free fuel. Recovery points 27 through 29, located 35 feet away from the building, had six inches or less of product.

Approved by:

Karl J. Anania
California Registered
Geologist No. 4306

FIGURE 8



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PROPOSED PRODUCT RECOVERY EXTRACTION POINT

PROJECT NAME: CARNATION/OAKLAND PROJECT NO: 004-88-059

SITE LOCATION: 1310 14th ST. AT POPLAR ST. OAKLAND

REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
	2-13-89	CHRIS DIDIO			NONE

APPENDIX A

UNAUTHORIZED RELEASE REPORT

UNAUTHORIZED RELEASE REPORT FOR THE CARNATION DAIRY FACILITY LOCATED AT 1310 14th STREET OAKLAND, ALAMEDA COUNTY, CALIFORNIA

JANUARY 17, 1989
AGE PROJECT NO. 004-88-059

In order to comply with the "Unauthorized Release Reporting Requirements" of the California Code of Regulations (CCR) Title 23, Article 5, section 2652, Mr. Karl J. Anania gave the required 24-hour notice to the Alameda County Department of Health (County) Regional Water Quality Control Board on January 5, 1989. This written report is prepared as a follow-up confirmation of the unauthorized release.

Floating product was present in the bottom of the pit during the excavation of four steel tanks on January 5, 1989. Two 12,000-gallon tanks contained diesel fuel and two 10,000-gallon tanks stored unleaded gasoline. All four of the tanks were in good condition and did not have any visible holes during the removal operation. Staining in the side walls adjacent to the product lines strongly indicate leaking pipelines as the source of the release.

TYPE, QUANTITY AND CONCENTRATION CHEMICALS

At this time the quantity of the release is not known. Eight soil samples were collected at the liquid interface of the excavation sidewall approximately 9.5 feet below ground surface. One sample was taken at each end of each tank. Sample locations are shown in Figure 1. One groundwater sample was collected from liquid in the bottom of the excavation pit. The pit was not purged prior to collecting the groundwater sample. Analytical results for these samples have not yet been received from the laboratory (Chemwest Analytical Laboratory in Sacramento). Requested analyses and methods for all samples are as follows:

Test	Method
Total Petroleum Hydrocarbons (TPH)	8015 Modified
Benzene	8020
Ethyl Benzene	8020
Toluene	8020
Xylenes	8020
Total Organic Lead (TOL)	DOHS Approved

AGE 1447 35TH STREET SACRAMENTO, CALIFORNIA . 95816 PHONE (916) 451-0921 FAX (916) 737-1844

Final results are expected on or about January 27, 1989. An addendum to this report will be sent after the laboratory reports are received.

URF says on it that a product is floating on ground water in pit.

DETERMINATION OF EXTENT OF IMPACT FROM RELEASE

The extent of the unauthorized release from the diesel and gasoline tanks is not known at this time. It is also not yet known whether groundwater has been impacted. Anania Geologic Engineering (under the direct supervision of Karl J. Anania) is under contract with Carnation to perform a site characterization. Preliminary plans are to drill up to 15 borings which can be converted to monitoring wells around the perimeter of the site to determine lateral and vertical extent of contamination and groundwater flow direction. The wells can also be used to monitor progress of the remediation system. A work plan will be submitted to the lead agency prior to beginning work on the site characterization.

METHODS OF CLEANUP TO DATE

All four tanks have been removed and approximately 500 cubic yards of soil have been stockpiled onsite and covered with plastic. The excavated soil was sampled the same day as the tank pit and groundwater, and has been submitted for the same analyses. Results are expected around January 27.

Absorbant boom and pads were used to recover free product from the excavation pit. The boom and pads were put into seven barrels for solidification and are currently stored onsite. The barrels will be hauled offsite by a licensed hazardous waste hauler at a later date. The approximate cost of cleanup and investigation to date is $125,000.00.

PLANNED CLEANUP ACTIONS

A petroleum skimming system is being installed as part of the immediate measures to contain the "spill." The design and operational characteristics of the system will be submitted within the next week. The excavation pit is being filled with clean 1/2-inch to 3/4-inch aggregate to 5 feet below ground surface. A geotextile fabric will be placed on the gravel. Approximately 4-1/2 feet of sand will be placed in the pit and compacted. The surface will be paved with asphalt on a gravel subbase.

A 12-inch recovery well will be installed in the west side of the excavated area for the recovery of free product. The well will extend to approximately 14 feet and will be constructed with schedule 80 slotted PVC. Vertical slots approximately 1/8-inch wide and 10 to 12 inches in length will be cut into the pipe with a skill saw. Bentonite will not be used to seal or set the recovery well.

AGE 1447 35TH STREET SACRAMENTO, CALIFORNIA . 95816 PHONE (916) 451-0921 FAX (916) 737-1844

A recovery trench system designed as French drains will connect to the recovery well. The recovered product will be stored onsite in a 5,000 or 10,000-gallon above-ground tank equipped with overfill control.

FACILITY OPERATOR'S NAME AND PHONE NUMBER:

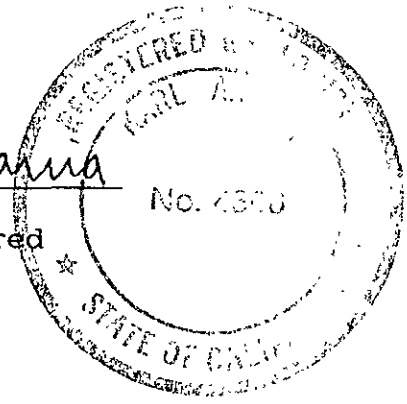
Mr. Howard R. Shmuckler
(213) 932-6464

Prepared by:

Mary L. Scruggs
Project Manager/Geologist

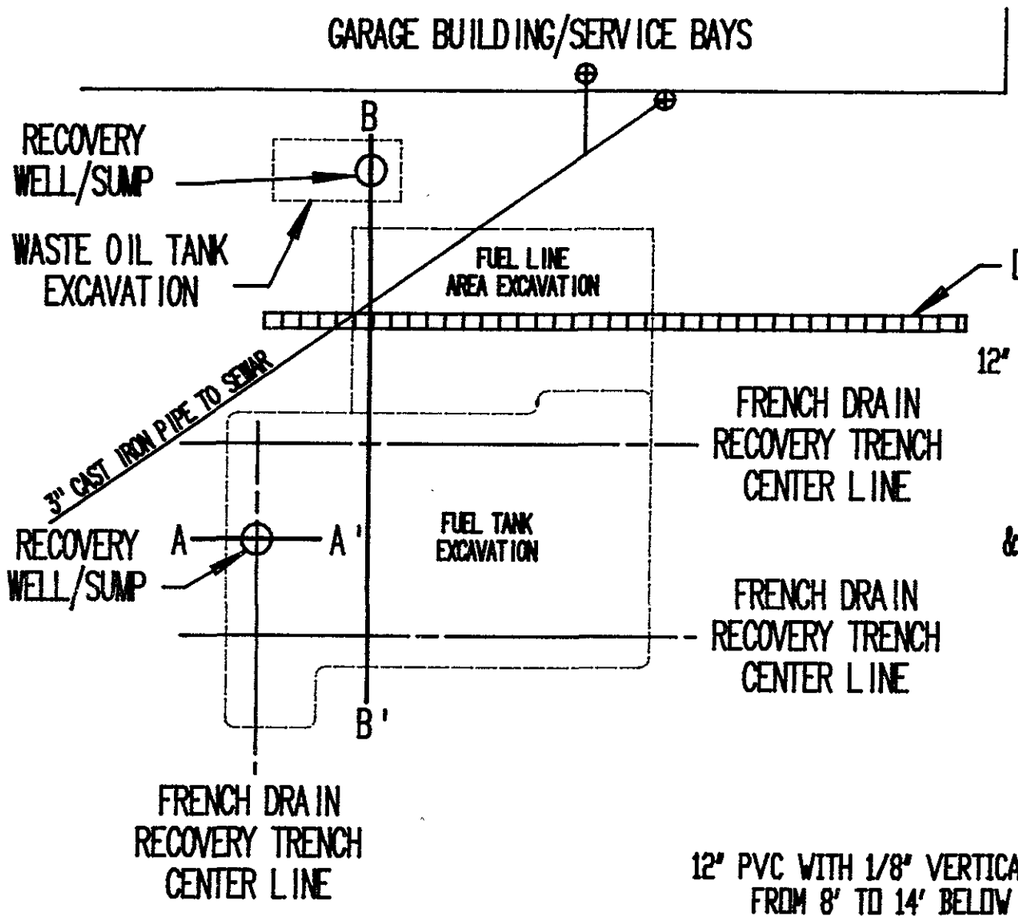
Approved by:

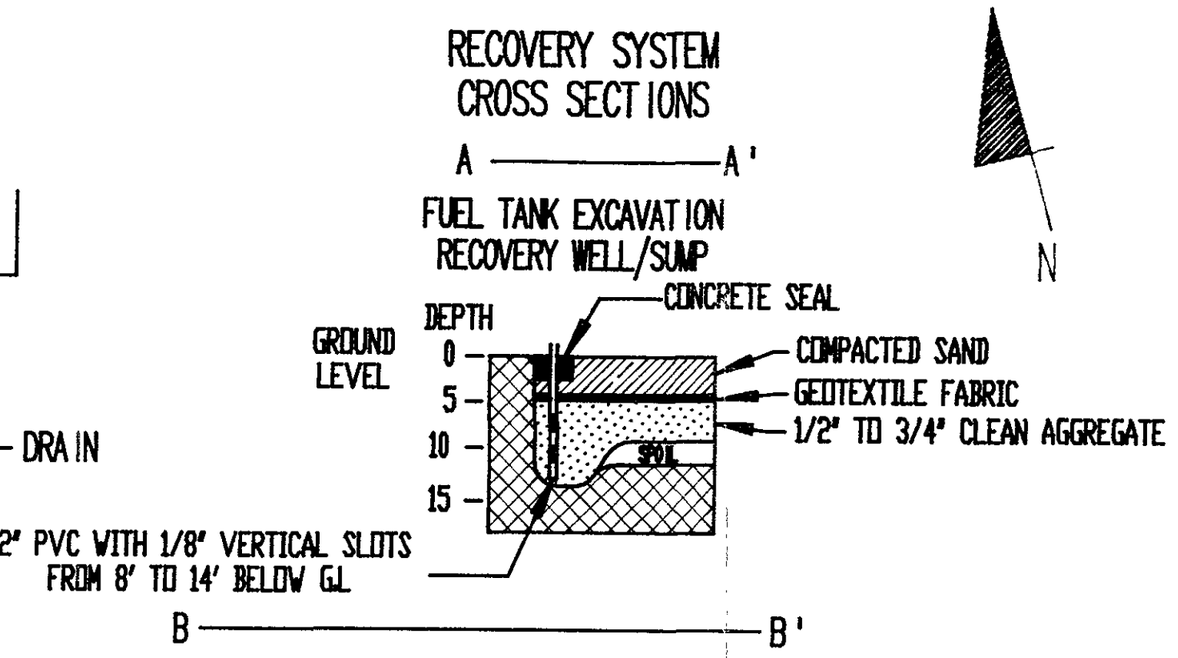
Karl J. Anania
California Registered
Geologist No. 4306



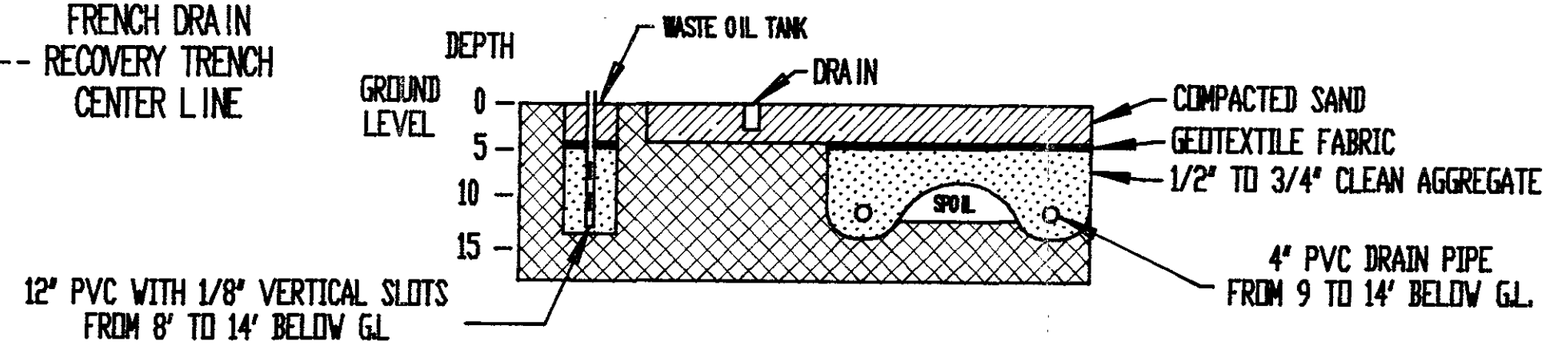
AGE 1447 35TH STREET SACRAMENTO, CALIFORNIA . 95816 PHONE (916) 451-0921 FAX (916) 737-1844

FIGURE 4





RECOVERY WELL/SUMP FOR WASTE OIL TANK EXCAVATION
& RECOVERY TRENCH/FRENCH DRAIN FOR FUEL TANK EXCAVATION



NOTE 1: NO BENTONITE WAS USED TO SEAL THE RECOVERY WELL/SUMPS

NOTE 2: WATER LEVEL CHANGES FROM 9' TO 12' DUE TO TIDAL INFLUENCES

0 10 20
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

AGE
ANANIL GEOLOGIC ENGINEERING

TITLE: TANK EXCAVATION ENGINEERING RECOVERY SYSTEM AS BUILT

PROJECT NAME: CARNATION/OAKLAND PROJECT NO: 004-88-03

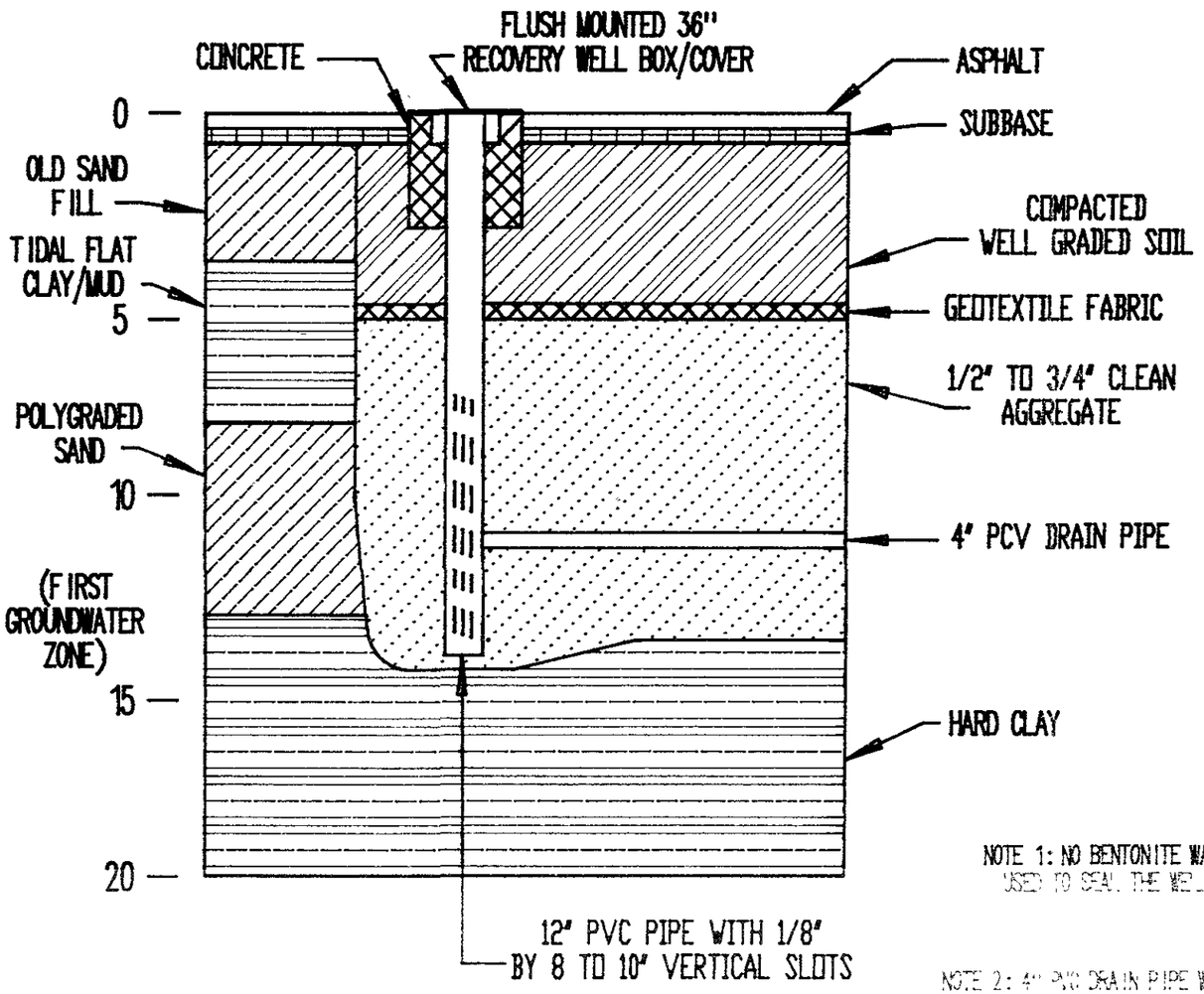
SITE LOCATION: 1310 14th St. OAKLAND, CA.

REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
1	2-8-89	CHRIS DIDIO		K.J.A.	1" = 20'

FIGURE 5

NOT TO SCALE

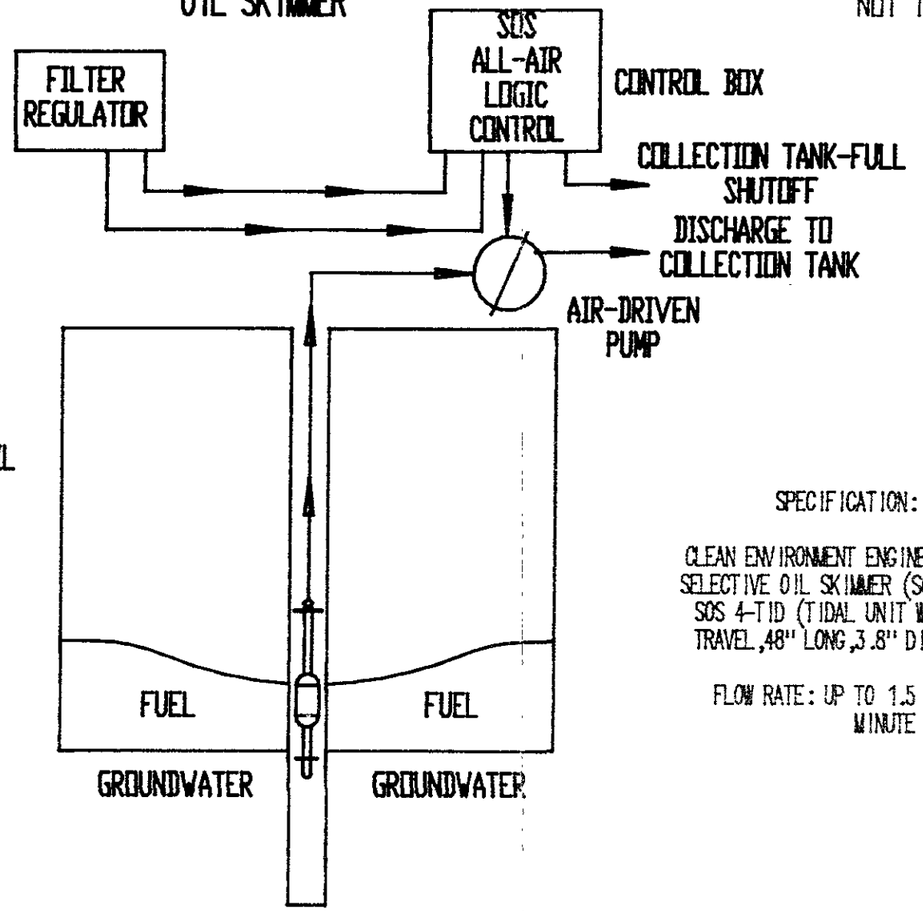
PROFILE
RECOVERY WELL/SUMP AND
FRENCH DRAIN FOR FUEL TANK EXCAVATION



NOTE 1: NO BENTONITE WAS USED TO SEAL THE WELL.

NOTE 2: 4" PVC DRAIN PIPE WITH 3/8" HOLES AT A 1" TO 10" SLOPE TOWARDS RECOVERY WELL/SUMP

SCHEMATIC SHALLOW
WELL SELECTIVE
OIL SKIMMER



SPECIFICATION:

CLEAN ENVIRONMENT ENGINEERS, INC.
SELECTIVE OIL SKIMMER (SOS) MODEL
SOS 4-TID (TIDAL UNIT WITH 24"
TRAVEL, 48" LONG, 3.8" DIAMETER)

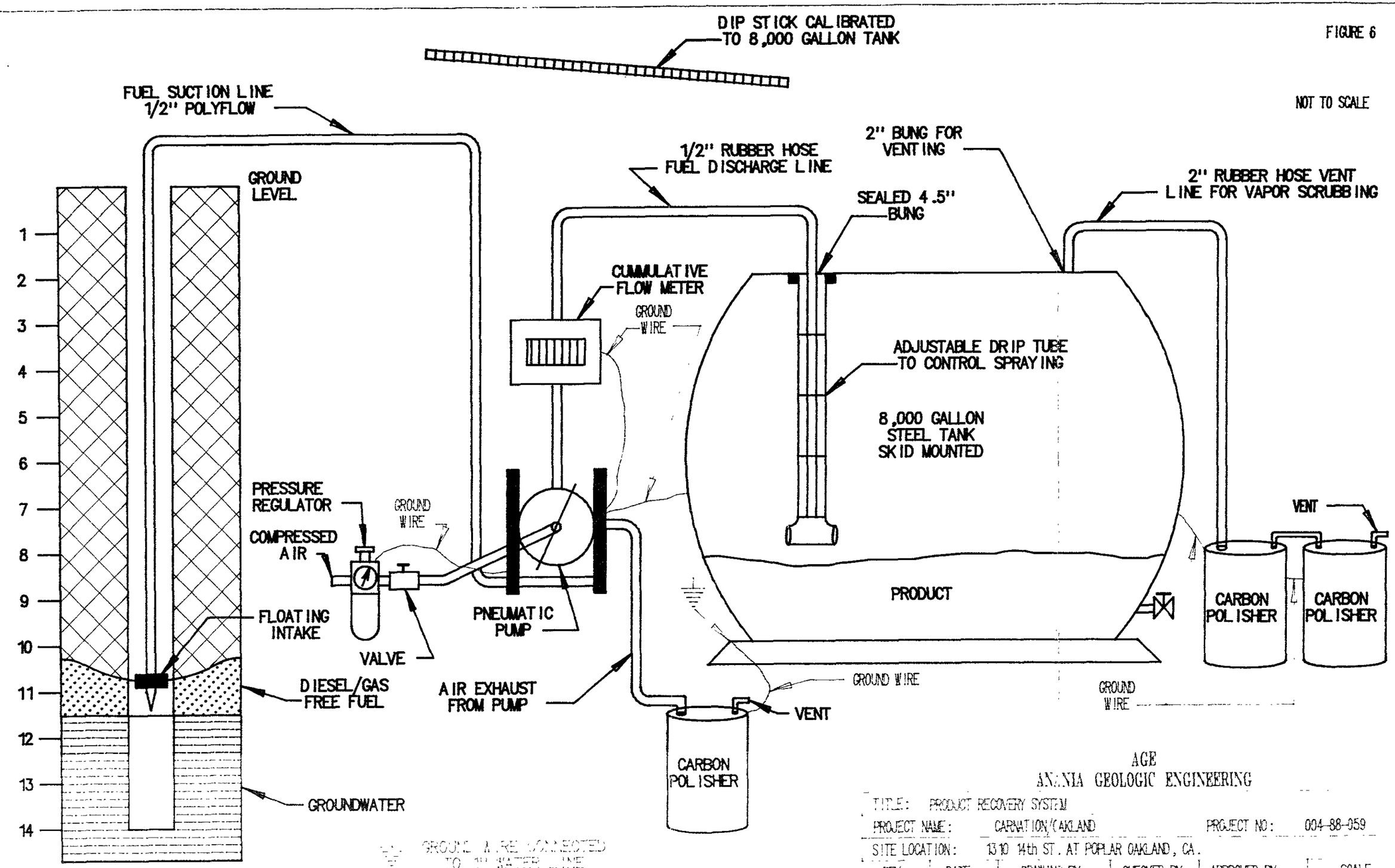
FLOW RATE: UP TO 1.5 GALLONS PER
MINUTE MAXIMUM

AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: FRENCH DRAIN AND RECOVERY WELL/SUMP WITH SKIMMER SCHEMATIC						
PROJECT NAME: CARNATION, OAKLAND					PROJECT NO. 004-88-059	
SITE LOC: 1310 14th ST. AT POPLAR ST., OAKLAND						
REV.	DATE	DESCRIPTION	DWG BY	CHK BY	APP BY	SCALE:
0	1-16-89		C.DIDIO			DWG NO. 2
1	1-31-89		C.DIDIO			FIGURE:
						PAGE:

FIGURE 6

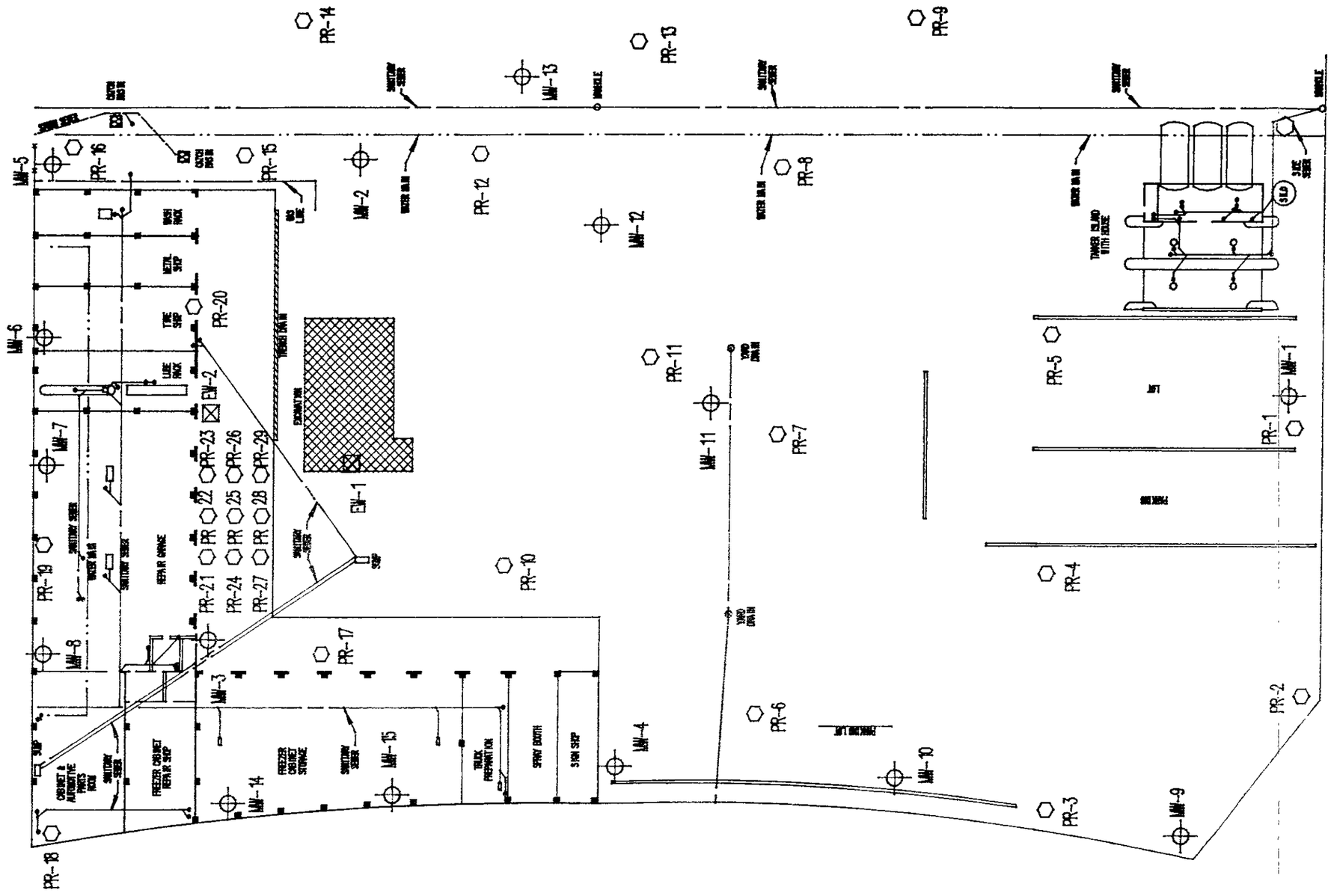
NOT TO SCALE



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PRODUCT RECOVERY SYSTEM					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO:	004-88-059
SITE LOCATION: 1310 14th ST. AT POPLAR OAKLAND, CA.					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
	2-21-89	CHRIS DIDIO			NONE

FIGURE 7



LEGEND

EXTRACTION WELL	⊠ EW-1
PRODUCT RECOVERY POINT	○ PR-1
PROPOSED MONITORING WELL	⊕ MW-1

AGE
ANAMA GEOLOGIC ENGINEERING

TITLE: PROJECT BORING LOCATIONS					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO:	004-88-059
SITE LOCATION: 1310 14TH ST. AT POPLAR OAKLAND, CA.					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
		C.DIDIO			NONE

APPENDIX B

ANALYTICAL RESULTS AND CHAIN OF CUSTODY FORMS

ANANIA GEOLOGIC ENGINEERING

UPDATE No. 1

AMENDMENT TO UNAUTHORIZED RELEASE REPORT FOR CARNATION DAIRY FACILITY LOCATED AT 1310 14TH STREET IN OAKLAND, CALIFORNIA

FEBRUARY 27, 1989

AGE PROJECT No. 004-88-059

February 27, 1989

Ms. Katherine Chesick
Alameda County Department of
Environmental Health
80 Swan Way
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Oakland, CA 94621

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Sincerely,

Mary L. Scruggs
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FEBRUARY 27, 1989

AGE Project No. 004-88-059

This amendment is an update to the January 17, 1989, Unauthorized Release Report (URR) prepared for the Carnation Dairy Facility located at 1310 14th Street in Oakland. A copy of the Unauthorized Release Report is included in Appendix A. A site map of the western portion of the facility is shown on Figure 1. At the time AGE prepared the original report, an unauthorized release had occurred but the analytical results were not yet available from the analyzing laboratories. This addendum includes the analytical results from soil and ground water sampling in the former tank excavation area, description of emergency remediation measures, product recovery system design, and preliminary conclusions and plans for further remedial action at the site.

The first section expands on the "Type, Quantity, and Concentration of Chemicals" portion of the URR. Analytical results from soil samples collected at the soil-water interface at each end of each fuel tank, under the waste oil tank, and under the product lines are enclosed. Results from a ground water sample collected in the fuel tank excavation pit is also included.

In addition, this update describes emergency remediation measures performed to contain and recover free fuel (gasoline/diesel) floating on the groundwater, treatment of animal fat floating on the groundwater beneath the fuel layer, and treatment of the detergent in the groundwater. Also, included are results of bench testing, field pilot tests, and data such as product thicknesses and groundwater chemistry from the recovery wells.

FUEL TANK AREA

Eight soil samples were collected at the soil-water interface at each end of the four underground fuel tanks. The samples were collected as grab samples from the backhoe bucket in six-inch brass tubes. One ground water sample was collected from the west side of the tank excavation. The water in the excavation was not purged

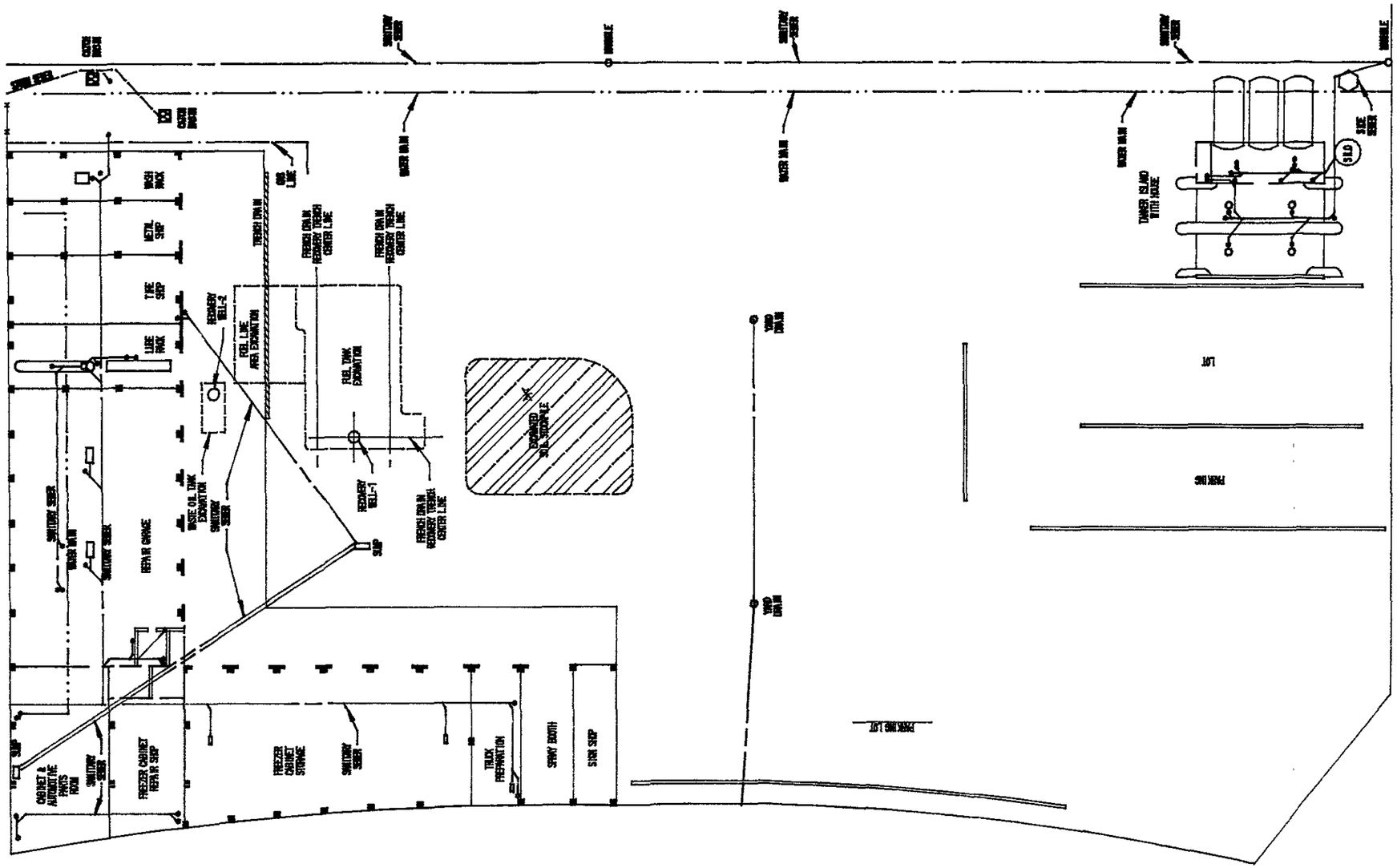


FIGURE 1

* soil from fuel tank & product lines

AGE

prior to collecting the sample. The water was brought to the surface in the backhoe bucket. The water sample was collected in 40 ml VOA vials and in a one-liter amber bottle. One composite soil sample was collected from the excavated soil stockpile. All samples were collected following proper protocol and were transported to Chemwest Analytical Laboratory in Sacramento in a cooler with dry ice under chain of custody. Sample locations are shown on Figure 2.

All of the samples were analyzed for total petroleum hydrocarbons (TPH), benzene, ethylbenzene, toluene, xylene and total organic lead. The ground water was sampled again at the time of the waste oil tank removal and analyzed for methyl blue active substances (MBAS). The analytical results are listed in Table 1. Copies of the analytical results and chain of custody forms are included in Appendix B.

WASTE OIL TANK

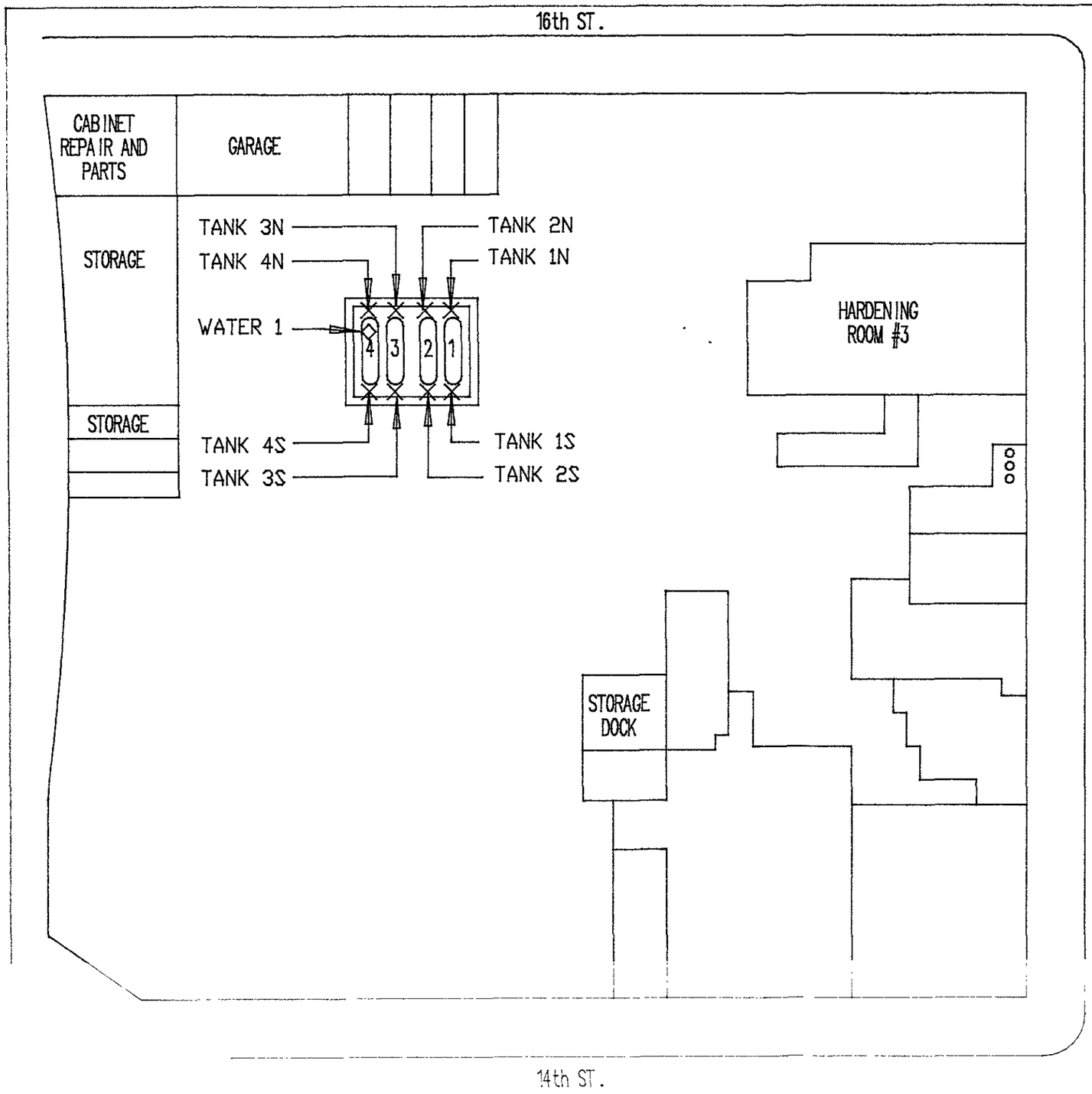
The soil in the waste oil tank excavation was sampled twice. The initial sampling was performed when the waste oil tank was removed. Four soil samples were collected in brass tubes from soil in the backhoe bucket. The samples were collected following proper protocol and were transported to Chemwest Analytical Laboratories in Sacramento in a cooler with ice under chain of custody. The samples were analyzed for TPH, volatile organics, semivolatile organics and cadmium, chromium, lead and zinc by methods 8015 Modified, 8240, 8270 and ICAP, respectively. The reported results for TPH were 19,000 ppm as gasoline and below reporting limits (1000 ppm) for diesel. Volatile organic results reported 27,000 ppb toluene, 12,000 ppb ethylbenzene, and 92,000 ppb total xylenes. Naphthalene and 2-methylnaphthalene were detected at concentrations of 31,000 ppb and 20,000 ppb, respectively. Chromium and zinc concentrations were reported as 26 ppm and 23 ppm, respectively. The remaining chemical constituents were below reporting limits for the analyses performed. Certified analytical results and the chain of custody form are included in Appendix B.

An additional soil sample was collected from the waste oil tank on January 15, 1989. The sample was collected in the same manner as described previously and was transported to Precision Analytical Laboratory in Richmond under chain of custody. The sample was analyzed for PCBs. The analytical results show no PCBs detected. Analytical results and a copy of the chain of custody are included in Appendix B.

PRODUCT LINES AND FUEL ISLAND

Four soil samples were collected below the product lines. The sampling locations are shown on Figure 3. The soil in the vicinity

FIGURE 2



LEGEND

FORMER UNDERGROUND STORAGE LOCATIONS

4 3 2 1

SOIL SAMPLE LOCATION × TANK 1N

WATER SAMPLE LOCATION ◇ WATER 1

AGE
ANANIA GEOLOGIC ENGINEERING

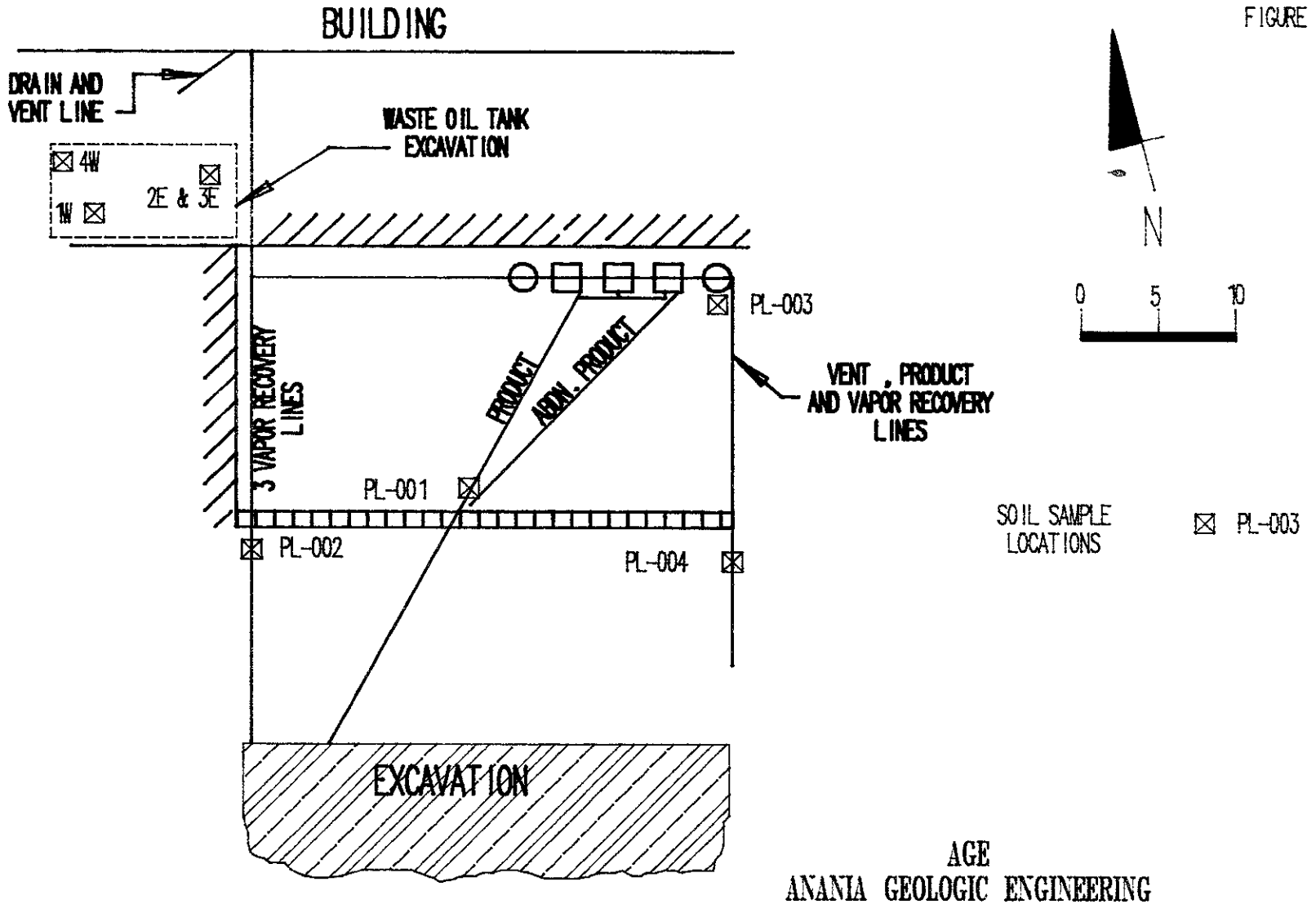
TABLE 1: ANALYTICAL RESULTS FOR SAMPLES FROM FUEL TANK AREA, IN PPM

Sample No.	TPH Gasoline	TPH Diesel	Benzene	Ethyl-benzene	Toluene	Xylene	Total Organic Lead
Tank 1N	17000	280	200	130	660	580	BRL
Tank 1S	570	36	40	54	190	260	BRL
Tank 2N	12000	BRL*	50	44	190	200	BRL
Tank 2S	26000	570	200	BRL**	740	690	BRL
Tank 3N	31000	BRL*	300	BRL**	940	840	BRL
Tank 3S	9700	BRL*	20	36	110	50	BRL
Tank 4N	18000	BRL*	100	BRL	520	520	BRL
Tank 4S	38000	BRL*	200	200	910	850	BRL
Soil Pile 1	BRL***	6500	1.1	0.5	0.4	2.0	BRL
Water 1	1400	0.93	22	1.7	25	--	BRL

BRL = Below reporting limit.
* = Reporting limit 1000 ppm.
** = Reporting limit 200 ppm.
*** = Reporting limit 5000 ppm.
Reporting limit for Total Organic Lead for soil samples is 10 ppm.
Reporting limit for Total Organic Lead for water sample is 1 ppm.

[TABLE1.059, URRV2-14]

FIGURE 3



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PRODUCT LINES & WASTE OIL TANK LOCATIONS					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO: 004-88-059	
SITE LOCATION: 1310 14th ST. AT POPLAR ST. OAKLAND					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
1	2-24-89	CHRIS DIDIO			1" = 10'

of the product lines and the fuel islands was a sandy fill material to depths of greater than four feet below ground surface. The soil samples were collected at depths between 3.5 and 4 feet below ground surface from the fill material and not in native soil. The samples were collected below the sand bed lining the pipe trenches. Two samples were collected on the north side of the trench drain, which lies between the fuel islands and the former fuel tanks, and two samples were collected on the south side of the drain. All four soil samples were collected from the backhoe bucket in six-inch brass tubes following proper protocol. The samples were transported to Precision Analytical Laboratory in Richmond under chain of custody. All samples were analyzed for TPH, BTEX, and TTLC lead by methods 8015 Modified, 8020 and ICAP, respectively. Analytical results are shown in Table 2. Copies of the laboratory reports and chain of custody form are enclosed in Appendix B.

GROUNDWATER

A groundwater sample was collected from Recovery Well No. 1 on January 16, 1989. The sample was bailed from the recovery well. The well had not been purged prior to sampling. The sample was submitted for complete water chemistry analyses to include TPH, volatile hydrocarbons, ammonia analysis, total dissolved solids, pH, and metals. Concentrations of detected constituents are listed in Table 3. Certified analytical results and the chain of custody are in Appendix B.

METHODS OF CLEANUP TO DATE

The four fuel tanks, the waste oil tank, product lines, and fuel dispensers have been removed. Soil was excavated from these areas and stockpiled on site for later treatment, as shown on Figure 1. Two recovery wells and French drain trenches were installed in the fuel tank and waste oil excavations as shown on Figure 4. A cross-section of the fuel tank excavation recovery system and fuel skimming system[1] are shown on Figure 5. The pneumatic pumping system for developing and testing the recovery wells and the product storage tank with carbon polishers on the vent are shown on Figure 6.

As of February 27, 1989, approximately 1000 gallons of free fuel, mostly composed of gasoline, has been recovered and is being stored in an 8000-gallon storage tank on the site. The fuel will be manifested to Gibson Oil for recycling on an as-needed basis. Product recovery points to depths of 15 and 20 feet are currently being installed in the locations shown on Figure 7 in accordance with the design shown on Figure 8. Additional product recovery points that

[1]The Clean Environment Engineers, Inc., Selective Oil Skimmer uses wire-braided hoses to ground the system back to the well.

TABLE 2: ANALYTICAL RESULTS FOR SAMPLES FROM UNDER THE PRODUCT LINES, IN PPM

Sample	PL-001	PL-002	PL-003	PL-004
TPH - Gasoline	651	ND<20	ND<20	ND<20
TPH - Diesel	ND<20	ND<20	7855	ND<20
Benzene	ND<0.5	ND<1	5	ND<0.5
Ethylbenzene	3	ND<1	<0.5	ND<0.5
Toluene	4	ND<1	9	ND<0.5
Xylene	10	ND<1	8	ND<0.5
Total Lead	10	13	180	7.1
Total Organic Lead*	<0.5	<0.5	<0.5	<0.5

ND = Not detected.
* = Values are reported as parts per billion (ug/g)

[TABLE2.059, URRV2-14]

TABLE 3: ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS IN GROUNDWATER SAMPLE FROM RECOVERY WELL NO. 1

Constituent	Concentration
TPH - Gasoline	2170 ppm
TPH - Diesel	420 ppm
Benzene	35 ppm
Toluene	54 ppm
Ethylbenzene	6 ppm
Xylene	30 ppm
Total Dissolved Solids	0.74 mg/l
Ammonia	20 ppm
pH	7.5
Zinc	0.1 ppm
Lead	0.3 ppm
Nickel	0.03 ppm
Copper	0.02 ppm
Barium	0.03 ppm

Table3.059

will be installed later will be shown on updated versions of Figure 7.

In addition, bench and field tests are being conducted to determine the effectiveness of bioremediating the fuel constituents, detergent, and animal fat. Initial bench and pilot tests have indicated that Solmar Bioculture formulation L-104 will be very effective for biodegrading the detergent in the groundwater and soil and for bioremediating the fuel constituents in the soil and groundwater. Tests have also indicated that Solmar formulation I-107 will be effective at mitigating/biodegrading the animal fat layer.

Field performance test of the Solmar L-104 culture resulted in rapid degradation of the detergent in the groundwater and a corresponding increase in free fuel thickness. Adding 25 pounds of Solmar L-104 into RW No. 1 resulted in the free fuel layer in RW No. 2 increasing from 1 inch to 29 inches in 15 days. The field test also indicated that the aquifer is anaerobic and oxygen demand will be very high. Additional testing indicated that the oxygen demand can be met by injecting compressed air into the wells. *

RW No. 2 was developed by pumping 200 gallons of free product out of the well in two hours. The fuel layer thickness decreased from 14 inches to 2 inches and recovered at a rate of 1.4 inches per day. The recovery data indicates that the transmissivity of fuel in RW No. 2 in the shallow aquifer is 2.8 $ft^3/ft/day$.

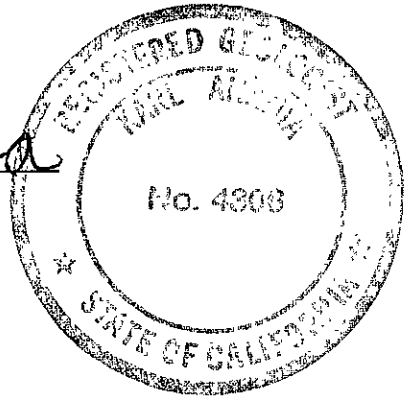
DETERMINATION OF EXTENT OF IMPACT FROM RELEASE

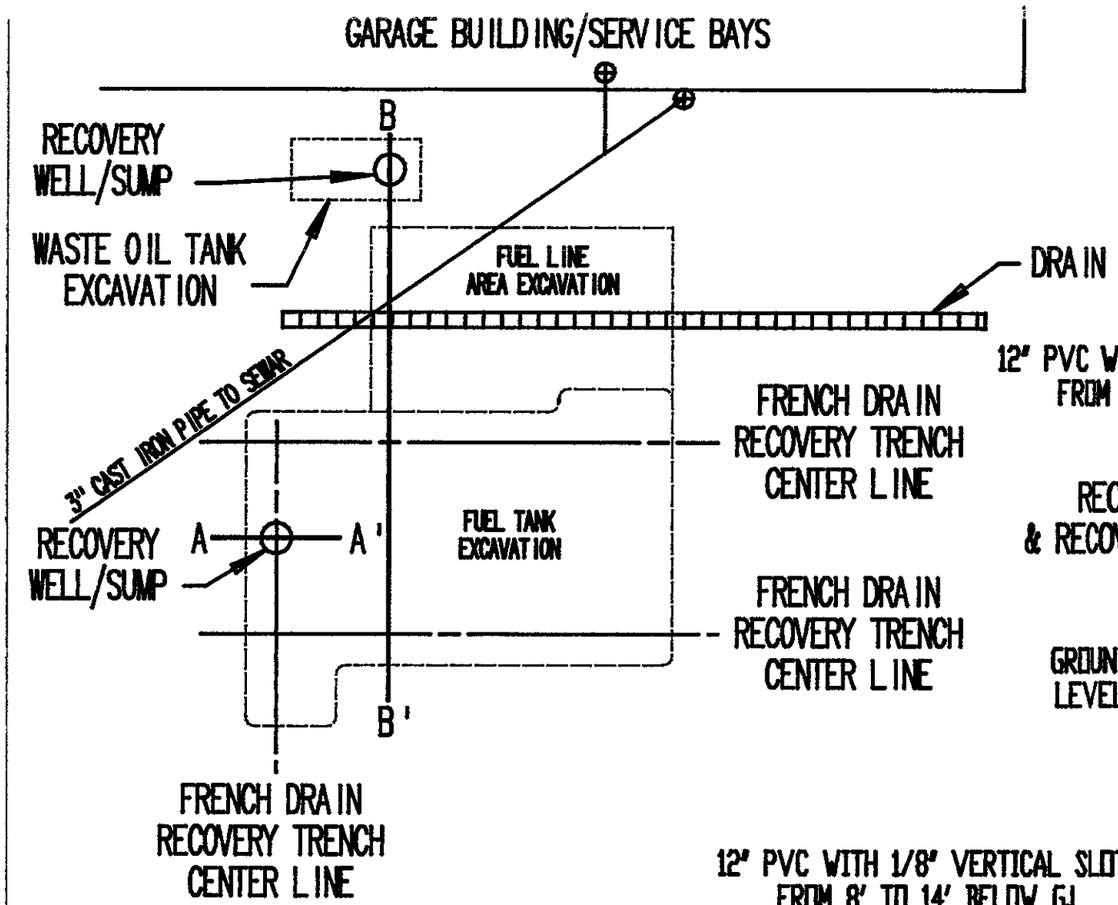
The full extent of the unauthorized release of fuel (gasoline and diesel) is unknown at this time. However, the recovery points installed nearest the building, RP 20 through RP 23 (shown on Figure 7), contained between 2 and 3 feet of free fuel. Recovery points 27 through 29, located 35 feet away from the building, had six inches or less of product.

Approved by:

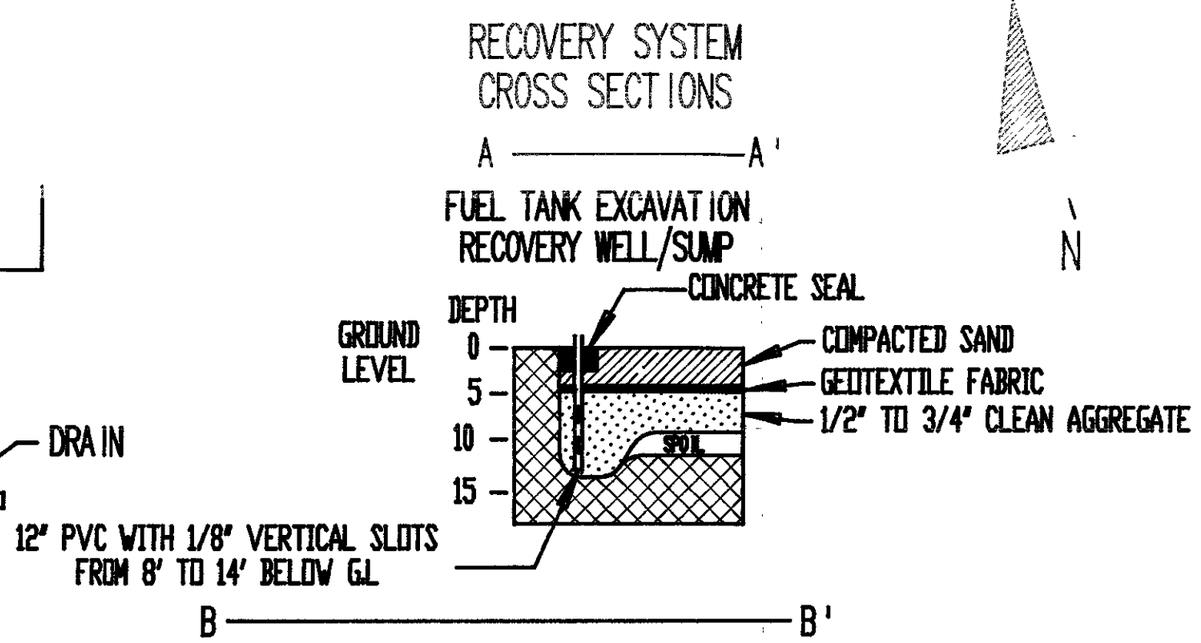
Karl J. Anania

Karl J. Anania
California Registered
Geologist No. 4306

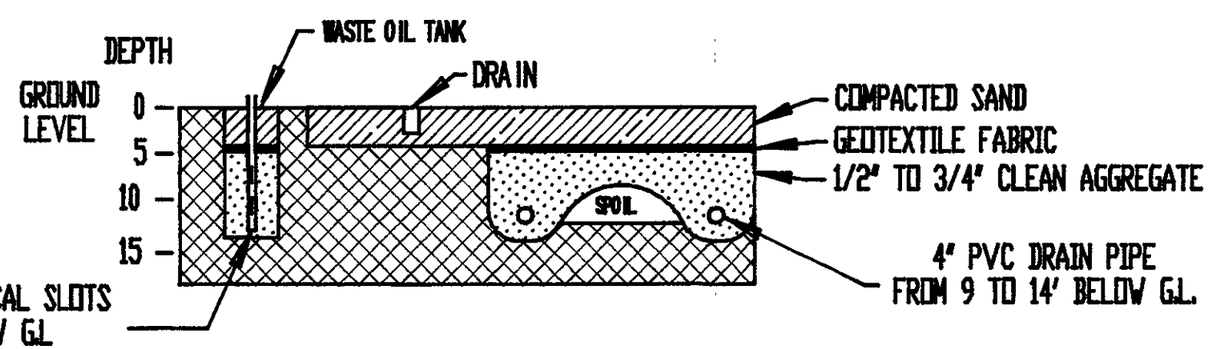




RECOVERY SYSTEM
CROSS SECTIONS



RECOVERY WELL/SUMP FOR WASTE OIL TANK EXCAVATION
& RECOVERY TRENCH/FRENCH DRAIN FOR FUEL TANK EXCAVATION



NOTE 1: NO BENTONITE WAS USED TO SEAL THE RECOVERY WELL/SUMPS

NOTE 2: WATER LEVEL CHANGES FROM 9' TO 12' DUE TO TIDAL INFLUENCES

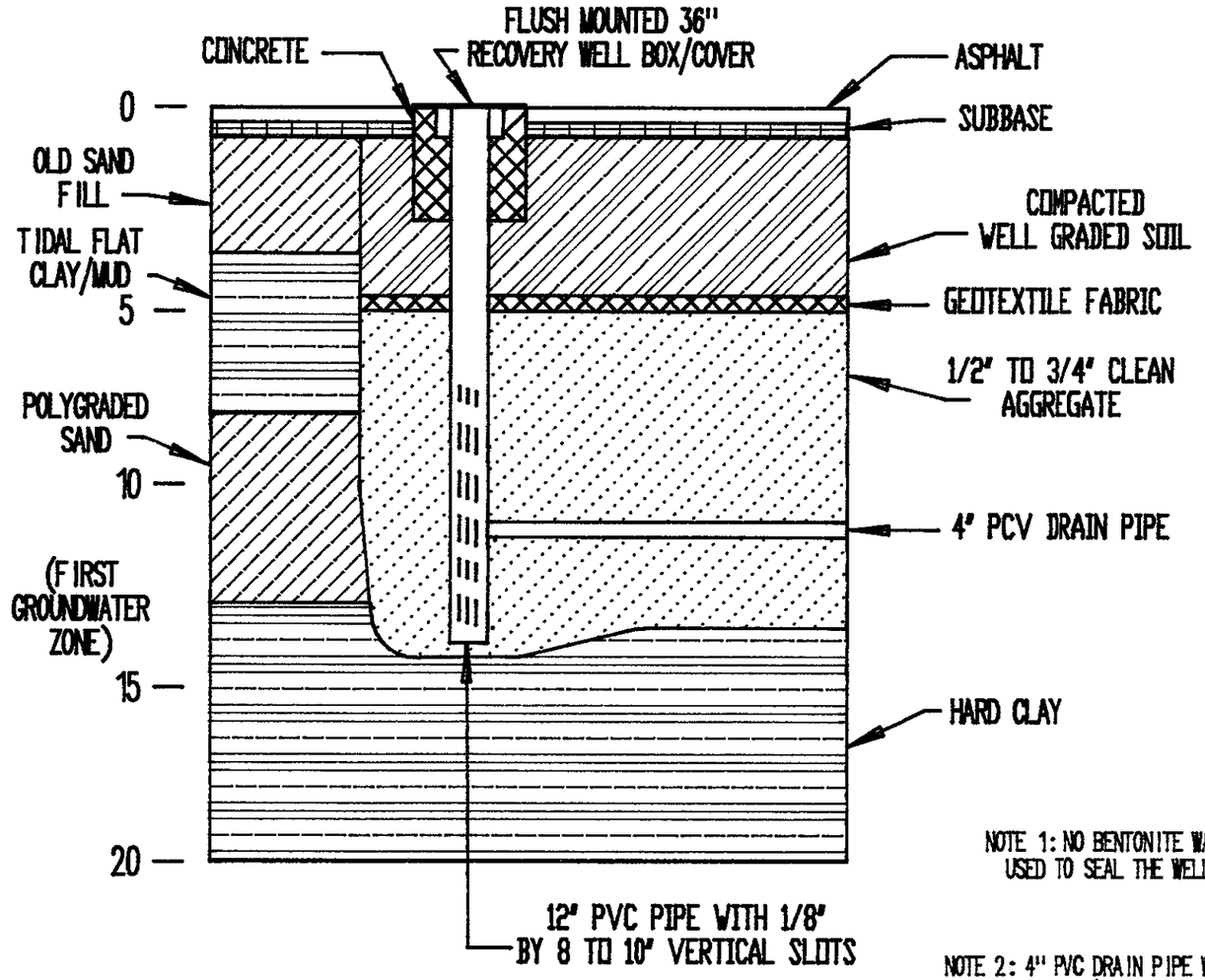
0 10 20
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: TANK EXCAVATION FRENCH DRAIN RECOVERY SYSTEM AS BUILT					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO: 004-88-059	
SITE LOCATION: 1310 14st. OAKLAND, CA.					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
1	2-8-89	CHRIS DIDIO		K.J.A.	1" = 20'

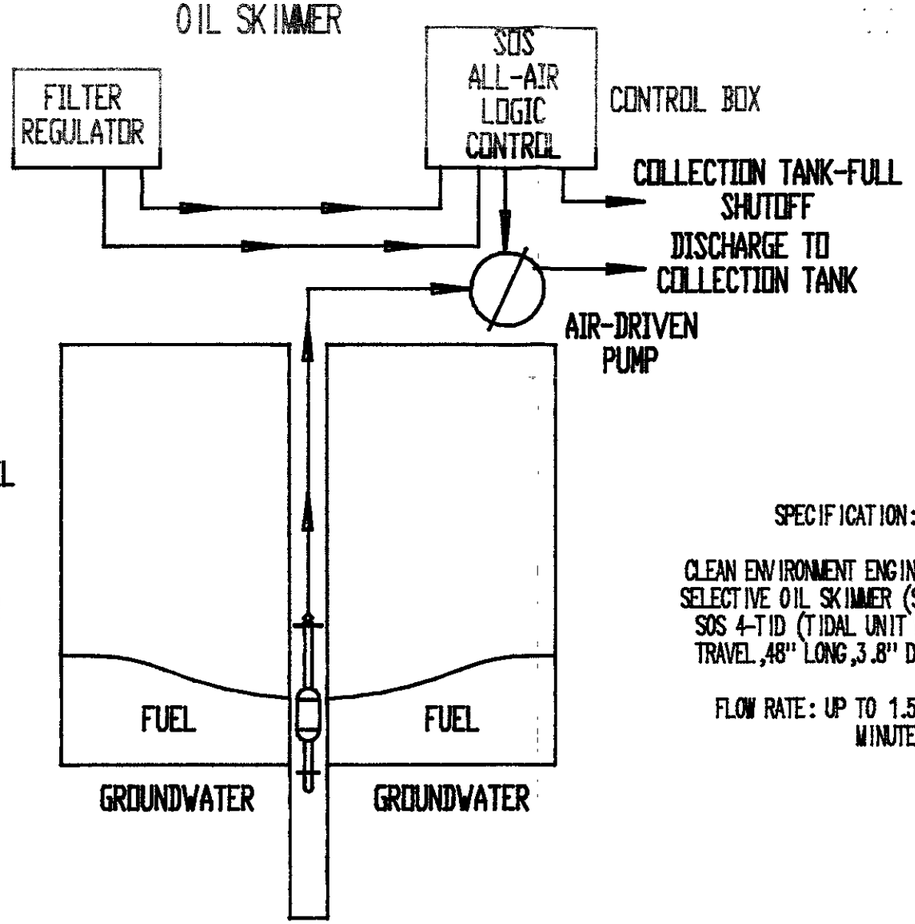
PROFILE
RECOVERY WELL/SUMP AND
FRENCH DRAIN FOR FUEL TANK EXCAVATION



NOTE 1: NO BENTONITE WAS USED TO SEAL THE WELL

NOTE 2: 4" PVC DRAIN PIPE WITH 3/8" HOLES AT A 1'/100' SLOPE TOWARDS RECOVERY WELL/SUMP

SCHEMATIC SHALLOW
WELL SELECTIVE
OIL SKIMMER



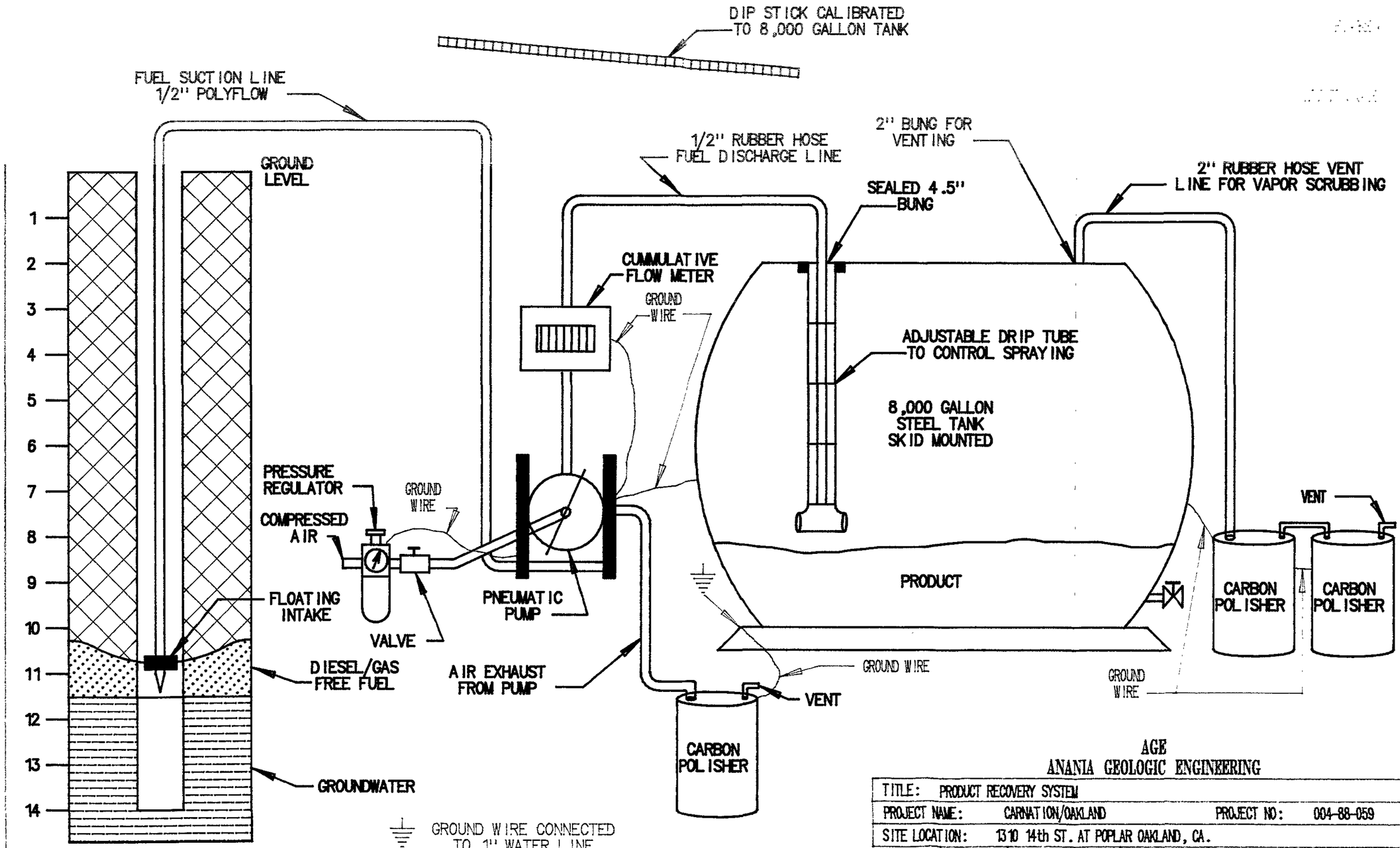
SPECIFICATION:

CLEAN ENVIRONMENT ENGINEERS, INC.
SELECTIVE OIL SKIMMER (SOS) MODEL
SOS 4-TID (TIDAL UNIT WITH 24"
TRAVEL, 48" LONG, 3.8" DIAMETER)

FLOW RATE: UP TO 1.5 GALLONS PER
MINUTE MAXIMUM

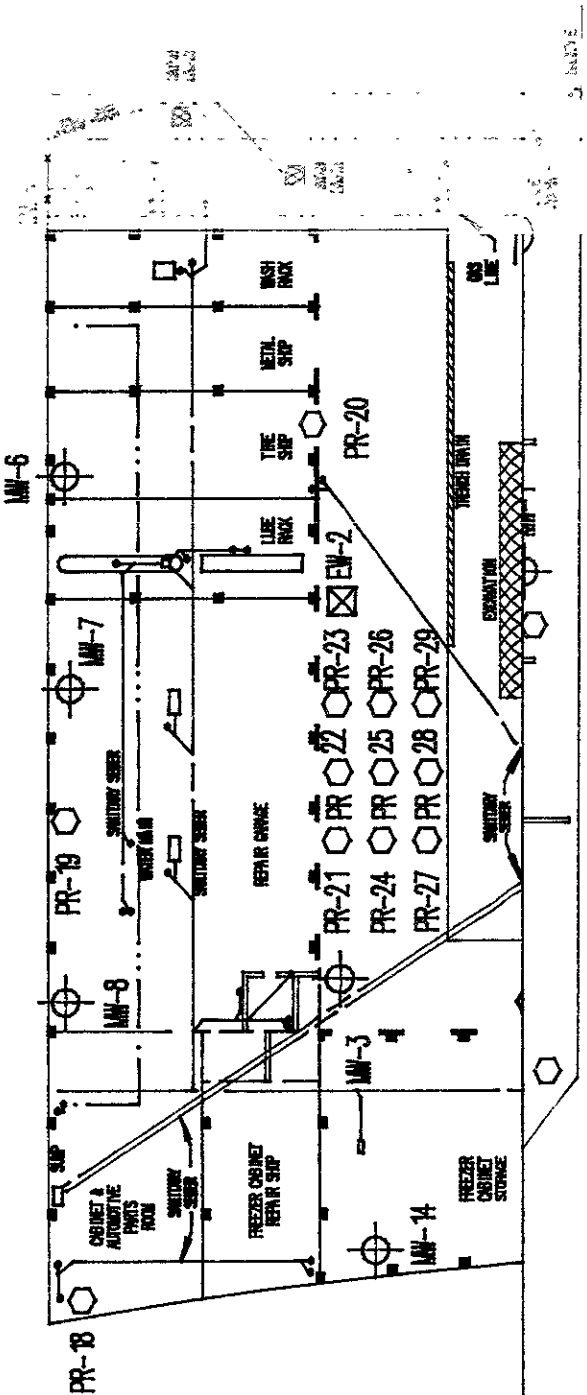
AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: FRENCH DRAIN AND RECOVERY WELL/SUMP WITH SKIMMER SCHEMATIC						
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO. 004-88-059		
SITE LOC: 1310 14th ST. AT POPLAR ST. OAKLAND						
REV.	DATE	DESCRIPTION	DWG BY	CHK BY	APP BY	SCALE:
0	1-16-89		C.DIDIO			DWG NO. 2
1	1-31-89		C.DIDIO			FIGURE:
						PAGE:



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PRODUCT RECOVERY SYSTEM					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO:	004-88-059
SITE LOCATION: 1310 14th ST. AT POPLAR OAKLAND, CA.					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
	2-21-89	CHRIS DIDIO			NONE



LEGEND

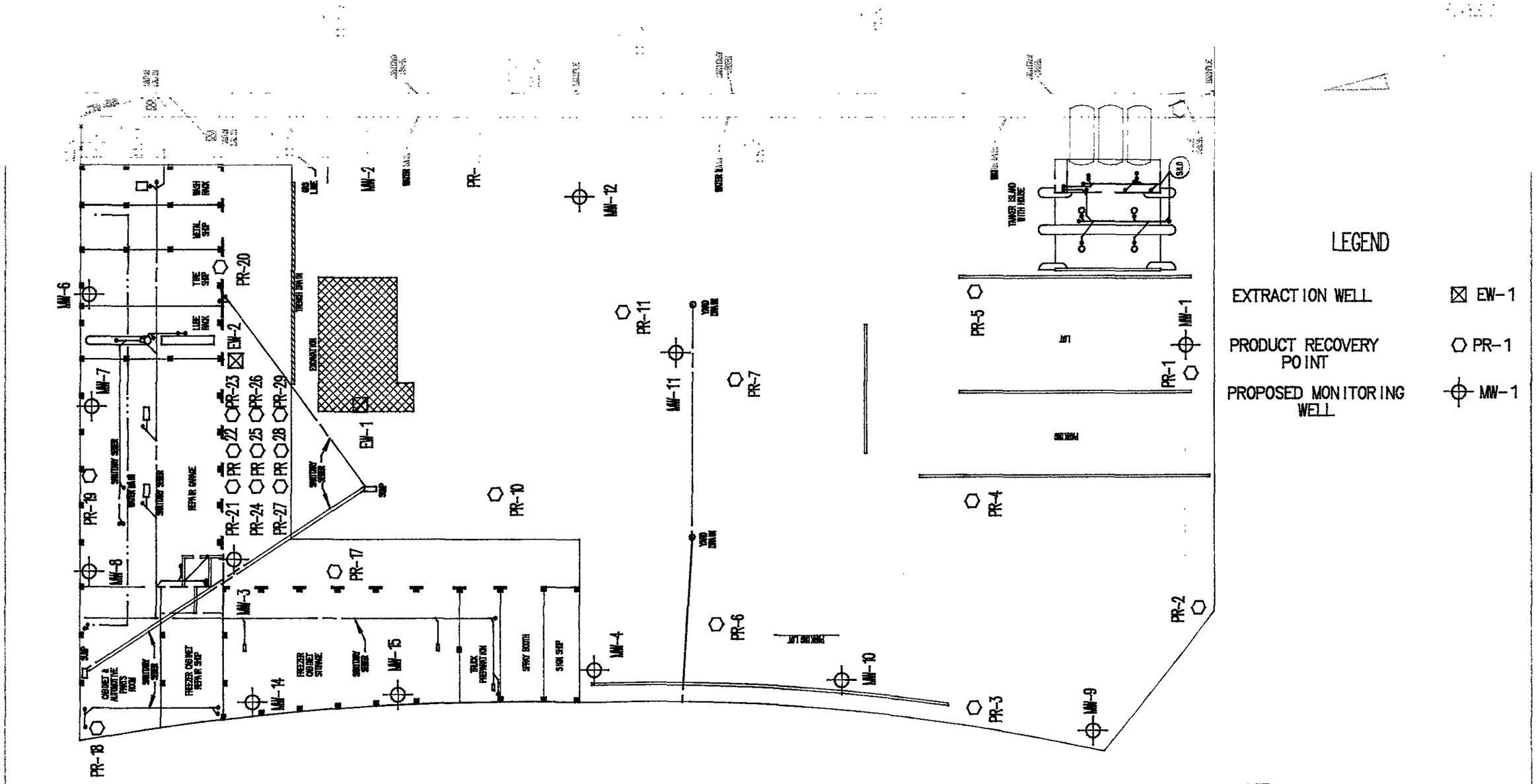
EXTRACTION WELL	⊠ EW-1
PRODUCT RECOVERY POINT	⬡ PR-1
PROPOSED MONITORING WELL	⊕ MW-1

AGE
A GEOLOGIC ENGINEERING

PROJECT NO: 004-88-059

T POPLAR OAKLAND, CA.

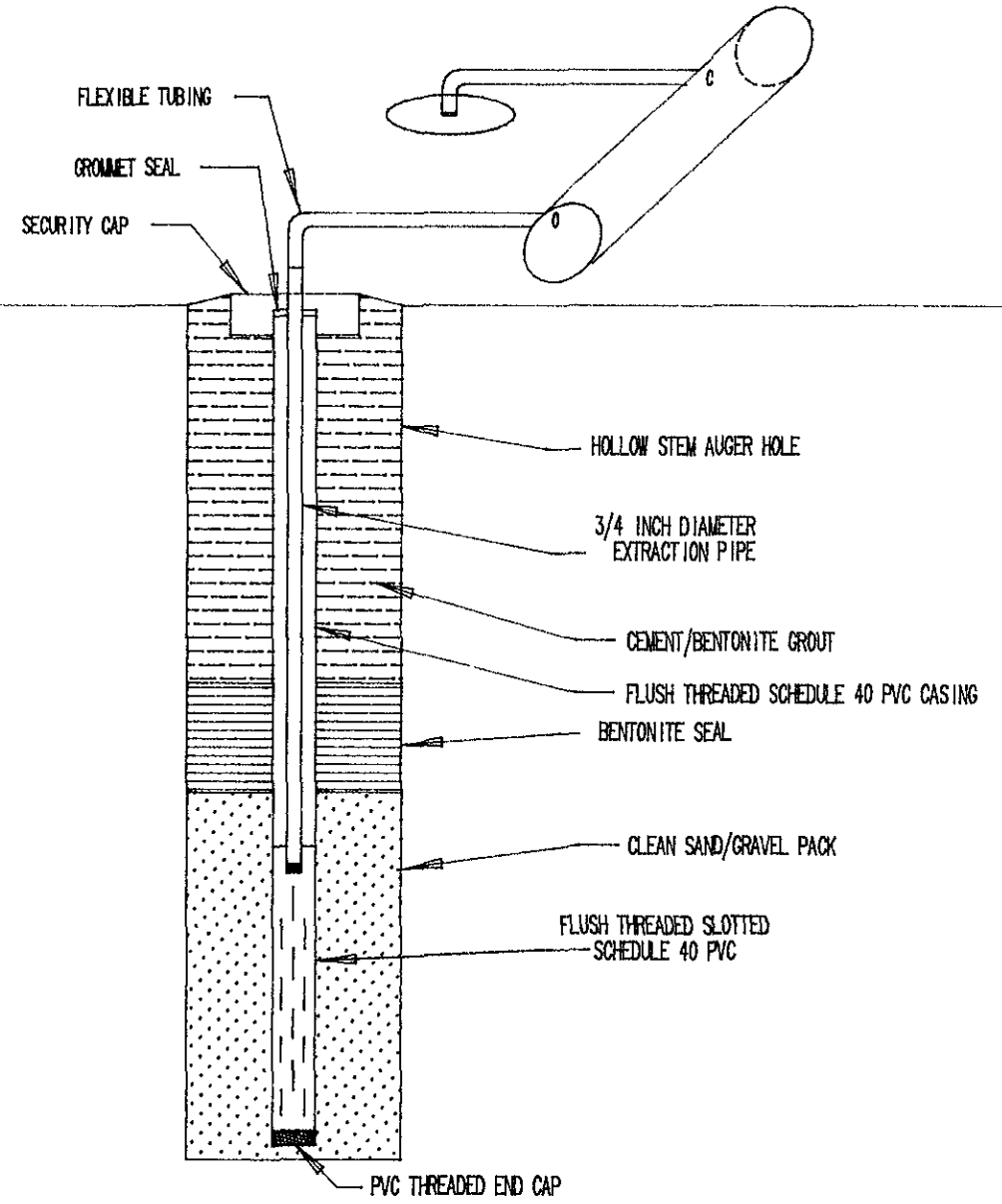
	CHECKED BY	APPROVED BY	SCALE
			NONE



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PROJECT BORING LOCATIONS					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO:	004-88-059
SITE LOCATION: 1310 14TH ST. AT POPLAR OAKLAND, CA.					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
		C.DIDIO			NONE

FIGURE 8



AGE
ANANIA GEOLOGIC ENGINEERING

TITLE: PROPOSED PRODUCT RECOVERY EXTRACTION POINT					
PROJECT NAME: CARNATION/OAKLAND				PROJECT NO: 004-88-059	
SITE LOCATION: 1310 14th ST. AT POPLAR ST. OAKLAND					
REV.	DATE	DRAWING BY	CHECKED BY	APPROVED BY	SCALE
	2-13-89	CHRIS DIDIO			NONE

APPENDIX A

UNAUTHORIZED RELEASE REPORT

**UNAUTHORIZED RELEASE REPORT
FOR THE CARNATION DAIRY FACILITY
LOCATED AT 1310 14th STREET
OAKLAND, ALAMEDA COUNTY, CALIFORNIA**

**JANUARY 17, 1989
AGE PROJECT NO. 004-88-059**

In order to comply with the "Unauthorized Release Reporting Requirements" of the California Code of Regulations (CCR) Title 23, Article 5, section 2652, Mr. Karl J. Anania gave the required 24-hour notice to the Alameda County Department of Health (County) Regional Water Quality Control Board on January 5, 1989. This written report is prepared as a follow-up confirmation of the unauthorized release.

Floating product was present in the bottom of the pit during the excavation of four steel tanks on January 5, 1989. Two 12,000-gallon tanks contained diesel fuel and two 10,000-gallon tanks stored unleaded gasoline. All four of the tanks were in good condition and did not have any visible holes during the removal operation. Staining in the side walls adjacent to the product lines strongly indicate leaking pipelines as the source of the release.

TYPE, QUANTITY AND CONCENTRATION CHEMICALS

At this time the quantity of the release is not known. Eight soil samples were collected at the liquid interface of the excavation sidewall approximately 9.5 feet below ground surface. One sample was taken at each end of each tank. Sample locations are shown in Figure 1. One groundwater sample was collected from liquid in the bottom of the excavation pit. The pit was not purged prior to collecting the groundwater sample. Analytical results for these samples have not yet been received from the laboratory (Chemwest Analytical Laboratory in Sacramento). Requested analyses and methods for all samples are as follows:

Test	Method
Total Petroleum Hydrocarbons (TPH)	8015 Modified
Benzene	8020
Ethyl Benzene	8020
Toluene	8020
Xylenes	8020
Total Organic Lead (TOL)	DOHS Approved

AGE 1447 35TH STREET SACRAMENTO, CALIFORNIA . 95816 PHONE (916) 451-0921 FAX (916) 737-1844

Final results are expected on or about January 27, 1989. An addendum to this report will be sent after the laboratory reports are received.

DETERMINATION OF EXTENT OF IMPACT FROM RELEASE

The extent of the unauthorized release from the diesel and gasoline tanks is not known at this time. It is also not yet known whether groundwater has been impacted. Anania Geologic Engineering (under the direct supervision of Karl J. Anania) is under contract with Carnation to perform a site characterization. Preliminary plans are to drill up to 15 borings which can be converted to monitoring wells around the perimeter of the site to determine lateral and vertical extent of contamination and groundwater flow direction. The wells can also be used to monitor progress of the remediation system. A work plan will be submitted to the lead agency prior to beginning work on the site characterization.

METHODS OF CLEANUP TO DATE

All four tanks have been removed and approximately 500 cubic yards of soil have been stockpiled onsite and covered with plastic. The excavated soil was sampled the same day as the tank pit and groundwater, and has been submitted for the same analyses. Results are expected around January 27.

Absorbant boom and pads were used to recover free product from the excavation pit. The boom and pads were put into seven barrels for solidification and are currently stored onsite. The barrels will be hauled offsite by a licensed hazardous waste hauler at a later date. The approximate cost of cleanup and investigation to date is $125,000.00.

PLANNED CLEANUP ACTIONS

A petroleum skimming system is being installed as part of the immediate measures to contain the "spill." The design and operational characteristics of the system will be submitted within the next week. The excavation pit is being filled with clean 1/2-inch to 3/4-inch aggregate to 5 feet below ground surface. A geotextile fabric will be placed on the gravel. Approximately 4-1/2 feet of sand will be placed in the pit and compacted. The surface will be paved with asphalt on a gravel subbase.

A 12-inch recovery well will be installed in the west side of the excavated area for the recovery of free product. The well will extend to approximately 14 feet and will be constructed with schedule 80 slotted PVC. Vertical slots approximately 1/8-inch wide and 10 to 12 inches in length will be cut into the pipe with a skill saw. Bentonite will not be used to seal or set the recovery well.

AGE 1447 35TH STREET SACRAMENTO, CALIFORNIA . 95816 PHONE (916) 451-0921 FAX (916) 737-1844

APPENDIX B

ANALYTICAL RESULTS AND CHAIN OF CUSTODY FORMS

CHEMWEST
ANALYTICAL LABORATORIES, INC.

January 23, 1989

RECEIVED JAN 2 6 1989

A.G.E.
1447 35th Street
Sacramento, CA 95816

Attention: Ms. Mary Scruggs

Subject: Report of Data - Case Number 3040

Dear Ms. Scruggs:

The technical staff at CHEMWEST is pleased to provide our report for the analyses you requested: Aromatic Volatile Organics - EPA Method 8020/602; TPH EXTN/GC-FID; and Total Organic Lead - DHS Method.

Ten samples (9 soils & 1 water) for Project Carnation Oakland, Project Number 004-88-059 were received January 6, 1989 in good condition. Results of the analyses along with the analytical methodology and appropriate reporting limits are presented on the following page(s).

Thank you for choosing CHEMWEST Laboratories. Should you have questions concerning this data report or the analytical methods employed, please do not hesitate to contact Toni Weeks, our Technical Service Representative or your project manager. We hope that you will consider CHEMWEST Laboratories for your future analytical support and service requirements.

Sincerely,

Jill B Hehes

Jill B. Hehes, Ph.D.
Vice President of Technical Services

and

Margie Namba

Margie Namba
Project Manager

MN:ds

cc: Joel Bird, President
File

600W North Market Boulevard • Sacramento, CA 95834 • Phone (916) 923-0840 • FAX (916) 923-1938

A Subsidiary of CompuChem Corporation

ANALYTICAL METHODOLOGY

Aromatic Volatile Organics by Purge & Trap and GC-PID

WATER - Method 602 or 8020

A 5 ml sample volume, or 5 ml of a suitable dilution, is purged on a suitable purge and trap system with helium. The purged sample is analyzed on a Gas Chromatograph equipped with a Photoionization Detector (PID). A packed column is used to separate the compounds.

SOIL - Method 8020

A 10 gram, or other appropriate aliquot of soil, is weighed into a clean VOA vial. Soils received in brass core tubes are sampled by discarding 2-5 centimeters of soil from each end of the tubes (this is done to reduce the possibility of analyzing a portion of soil that has been exposed to sampling technique contamination). Equal aliquots of soil are then removed from each end of the tube and combined in the VOA vial. Soil in jars or bags is aliquoted using a similar technique, which discards exposed sample surfaces. A 10 ml, or other appropriate volume of methanol, is added to the soil and the soil is shaken with the solvent. 100 ul of the extract, or a reduced aliquot or volume of a suitable dilution, is injected into 5 ml of laboratory blank water and analyzed by the same technique used for water samples.

ANALYTICAL METHODOLOGY

Total Petroleum Hydrocarbons (TPH) Extractables by GC-FID

Extraction Procedure:

WATER -

A 1 liter sample is poured into a 2 liter separatory funnel. 3x100 ml extractions with methylene chloride (2 minute shake outs) are completed. The methylene chloride is decanted off and concentrated to a 5 ml final volume.

SOIL -

A 30 gram, or other appropriate aliquot of soil, is mixed with 10 grams of washed sodium sulfate. 100 mls of methylene chloride is added to the soil and placed on a mechanical shaker for 1 hour. The liquid is decanted off and the process is repeated with an additional 50 ml of methylene chloride. The combined solvent extracts are filtered through sodium sulfate and the extract is concentrated to a 5 ml final volume.

GC ANALYSIS -

An appropriate volume of the sample extract is injected into a Gas Chromatograph equipped with a Flame Ionization Detector (FID), a split/splitless capillary injector (operated in the splitless mode), and a fused silica capillary column. The TPH fraction is quantitated as gasoline and/or #2 diesel fuel (and/or different petroleum hydrocarbon fuel types if requested, such as JP-4 jet fuel) based on relative retention times and examination of the elution profile. The TPH fraction quantitation is based on chromatographic peak areas against a multipoint standard curve.

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 1N
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-1
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	200	25
Toluene	660	50
Ethylbenzene	130	100
Chlorobenzene	BRL	50
Total Xylenes (1)	580	50
1,4-Dichlorobenzene	BRL	300*
1,3-Dichlorobenzene	BRL	200*
1,2-Dichlorobenzene	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	89%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 1S
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-2
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	40	5
Toluene	190	10
Ethylbenzene	54	20
Chlorobenzene	BRL	100*
Total Xylenes (1)	260	10
1,4-Dichlorobenzene	BRL	150*
1,3-Dichlorobenzene	BRL	100*
1,2-Dichlorobenzene	BRL	10

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	102%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 2N
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-3
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	50	10
Toluene	190	20
Ethylbenzene	44	40
Chlorobenzene	BRL	75*
Total Xylenes (1)	200	20
1,4-Dichlorobenzene	BRL	100*
1,3-Dichlorobenzene	BRL	100*
1,2-Dichlorobenzene	BRL	20

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	105%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 2S
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-4
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	200	50
Toluene	740	100
Ethylbenzene	BRL	200
Chlorobenzene	BRL	300*
Total Xylenes (1)	690	100
1,4-Dichlorobenzene	BRL	400*
1,3-Dichlorobenzene	BRL	300*
1,2-Dichlorobenzene	BRL	100

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	105%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: KC

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 3N
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-5
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	300	50
Toluene	940	100
Ethylbenzene	BRL	200
Chlorobenzene	BRL	300*
Total Xylenes (1)	840	100
1,4-Dichlorobenzene	BRL	400*
1,3-Dichlorobenzene	BRL	400*
1,2-Dichlorobenzene	BRL	100

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	100%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 3S
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-6
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	20	5
Toluene	110	10
Ethylbenzene	36	20
Chlorobenzene	BRL	100*
Total Xylenes (1)	150	10
1,4-Dichlorobenzene	BRL	150*
1,3-Dichlorobenzene	BRL	100*
1,2-Dichlorobenzene	BRL	10

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	87%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 4N
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-7
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	100	50
Toluene	520	100
Ethylbenzene	BRL	200
Chlorobenzene	BRL	200*
Total Xylenes (1)	520	100
1,4-Dichlorobenzene	BRL	300*
1,3-Dichlorobenzene	BRL	300*
1,2-Dichlorobenzene	BRL	100

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	93%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Tank 4S
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-8
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	200	25
Toluene	910	50
Ethylbenzene	200	100
Chlorobenzene	BRL	400*
Total Xylenes (1)	850	50
1,4-Dichlorobenzene	BRL	500*
1,3-Dichlorobenzene	BRL	400*
1,2-Dichlorobenzene	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	87%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Water 1
Date Analyzed: 01/13/89

CHEMWEST I.D.: 3040-9
Matrix : Water

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	22000	250
Toluene	25000	500
Ethylbenzene	1700	1000
Chlorobenzene	BRL	3000*
1,4-Dichlorobenzene	BRL	3200*
1,3-Dichlorobenzene	BRL	1500*
1,2-Dichlorobenzene	BRL	500

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	81%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

*: Matrix Interference.

Approved by: YP

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Soil Pile 1
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-10
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	1.1	0.05
Toluene	0.4	0.1
Ethylbenzene	0.5	0.2
Chlorobenzene	BRL	0.5*
Total Xylenes (1)	2.0	0.1
1,4-Dichlorobenzene	BRL	10*
1,3-Dichlorobenzene	BRL	5*
1,2-Dichlorobenzene	BRL	0.1

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	132%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.
*: Matrix Interference.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
AROMATIC VOLATILE ORGANICS

Client I.D.: Method Blank
Date(s) Analyzed: 01/13/89

CHEMWEST I.D.: 3040-MB
Matrix : Soil

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	BRL	0.05
Toluene	BRL	0.1
Ethylbenzene	BRL	0.2
Chlorobenzene	BRL	0.1
Total Xylenes (1)	BRL	0.1
1,4-Dichlorobenzene	BRL	0.1
1,3-Dichlorobenzene	BRL	0.1
1,2-Dichlorobenzene	BRL	0.1

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	105%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of O-, M-, and P-Xylenes.

Approved by: _____

REV3.1.89

CHEMWEST ANALYTICAL LABORATORIES
TOTAL PETROLEUM HYDROCARBONS - EXTRACTABLE

Date Extracted : 01/10/89
Date(s) Analyzed: 01/13/89

Case : 3040
Matrix: Soil

Reporting Units: mg/Kg

Client ID	CHEMWEST ID	Gasoline Result	Gasoline RL	Diesel Result	Diesel RL	Other Hydrocarbon Mixture Result	Other Hydrocarbon Mixture RL
Method Blank	3040-MB	BRL	10	BRL	10	BRL	10
Tank 1N	3040-1	17000	1000	280	200	BRL	1000
Tank 1S	3040-2	570	10	36	10	BRL	10
Tank 2N	3040-3	12000	1000	BRL	1000	BRL	1000
Tank 2S	3040-4	26000	1000	570	500	BRL	1000
Tank 3N	3040-5	31000	1000	BRL	1000	BRL	1000
Tank 3S	3040-6	9700	1000	BRL	1000	BRL	1000
Tank 4N	3040-7	18000	1000	BRL	1000	BRL	1000
Tank 4S	3040-8	38000	1000	BRL	1000	BRL	1000
Soil Pile 1	3040-10	BRL	5000	6500	5000	BRL	5000

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: _____

REV3:1.89

CHEMWEST ANALYTICAL LABORATORIES
TOTAL PETROLEUM HYDROCARBONS - EXTRACTABLE

Date Extracted : 01/10/89
Date(s) Analyzed: 01/10/89

Case : 3040
Matrix: Water

Reporting Units: mg/L

Client ID	CHEMWEST ID	Gasoline Result	Gasoline RL	Diesel Result	Diesel RL	Other Hydrocarbon Mixture Result	Other Hydrocarbon Mixture RL
Method Blank	3040-MB	BRL	10	BRL	10	BRL	10
Water 1	3040-9	1400	10	0.93	10	BRL	10

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: _____

REV2:9.88

CHEMWEST ANALYTICAL LABORATORIES
TOTAL ORGANIC LEAD

Date(s) Analyzed: 01/13/89
thru: 01/13/89

Case : 3040
Matrix: Soil

Client ID	CHEMWEST ID	Amount Detected (mg/Kg)
Tank 1N	3040-1	BRL
Tank 1S	3040-2	BRL
Tank 2N	3040-3	BRL
Tank 2S	3040-4	BRL
Tank 3N	3040-5	BRL
Tank 3S	3040-6	BRL
Tank 4N	3040-7	BRL
Tank 4S	3040-8	BRL
Soil Pile 1	3040-10	BRL

The reporting limit for Total Organic Lead is 10 mg/Kg.

BRL: Below Reporting Limit.

Approved by: _____

REV3:1.89

CHEMWEST ANALYTICAL LABORATORIES
TOTAL ORGANIC LEAD

Date(s) Analyzed: 01/13/89
thru: 01/13/89

Case : 3040
Matrix: Water

Client ID	CHEMWEST ID	Amount Detected (mg/L)
Water 1	3040-9	BRL

The reporting limit for Total Organic Lead is 1.0 mg/L.

BRL: Below Reporting Limit.

Approved by: JBH

REV3:1.89

CHEM WEST ANALYTICAL LABORATORIES,INC.
600 West North Market Blvd.
Sacramento, California 95834
(916) 923-0840 FAX (916) 923-1938

CLIENT

Order No. 3040
Date Rec'd. 1/6/89 @ 0940
Compl. Date
Section Margie Namba

CLIENT: A. G. E.
~~1447th Street~~ 35th Street
Sacramento, CA 95816

Project Name: Carnation Oakland
Project No. 004-88-059
P.O. NO. ~~Mary Scruggs~~
Contact Karl J. Anaria
Phone (916) 451-0921

ANALYSIS: Ten samples rec'd 1/6/89 (9 soils & 1 water) to be analyzed for TPH EXTN/GC-FID, aromatic volatile organics ~~602~~/8020, ~~Extractable lead~~ and total organic lead.

* Report due on 1/20/89

	sample Id	Date	Time	analyses	Matrix	containers
3040-1	Tank 1N	1/5/89	1450	TPH, 8020, Total Organic Lead	soil	1-6" core tube
-2	Tank 1S		1525			
-3	Tank 2N		1459			
-4	Tank 2S		1520			
-5	Tank 3N		1504			
-6	Tank 3S		1518			
-7	Tank 4N		1607			
-8	Tank 4S		1514			
-9	Water 1		1537		water	1-1qt bottle 3-40ml voa
-10	Soil Pile 1		1600		soil	1-6" core tube

RI, GC 1/6
M/I MICHELLE TOLIVER

D.T.C.

SAMPLE WILL BE HELD 30 DAYS UNLESS LONGER TIME IS ARRANGED.

CW I.D. 3040

ENVIRONMENTAL NT — **AGE** — ENERGY MINERALS

3 | 2 | 1

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation Oakland. PROJECT No. 004-88-059.

REPORT RESULTS TO: Karl J. Anania / Mary L. Scruggs.

SURVEY: Tank Excavation

SAMPLERS: Karl Anania / Mary Scruggs

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE: SOIL COMP	SAMPLE TYPE: SOIL GRAB	SAMPLE TYPE: WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	TANK 1 N	1/5/89	1455		X		1	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 1 S	1/5/89	1525		X		8	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 2 N	1/5/89	[illegible]		X		2	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 2 S	1/5/89	1520		X		7	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 3 N	1/5/89	1504		X		3	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 3 S	1/5/89	1518		X		6	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 4 N	1/5/89	1507		X		4	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 4 S	1/5/89	1514		X		5	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	WATER 1	1/6/89	1537			X	9	3 VOAs 1 Amber bottle (1L)	~~602~~ 8015M (TPH) 8020 Total organic lead
	~~VOA Field Blank~~	~~1/5/89~~	~~1537~~					VOAs preserved w/ Ascorbic Acid; 1 VOA	sample broken
Note: Log in	tetraethyl lead as w/ mary Scruggs	total 1/6/89	organic 1630 hrs.	lead	per	conversation			

per conversation w/ mary Scruggs [illegible]

RELINQUISHED BY: Mary L. Scruggs	RECEIVED BY:	DATE / TIME 1/6/89 / 9:40
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Bill McBenge "BILL McBENCE"		DATE / TIME 1/6/89 / 09:40

METHOD OF SHIPMENT: 1 cooler w/ dry ice by vehicle O.T.C.

GW I.D. 3040

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation / Oakland. PROJECT No. 004-88-059.

REPORT RESULTS TO: Karl J. Anania / Mary L Scruggs.

SURVEY: Soil Pile Composite

SAMPLERS: Karl J. Anania

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE: SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Soil Pile 1	1/5/89	16⁰⁰	X				1 BRASS TUBE	8015 Mod. TPH 8020 TOTAL LEAD organic (TAT) (per conversation w/ mary Scruggs 1/6/89 1445 hrs.)

RELINQUISHED BY: Karl J Anania	RECEIVED BY: Mary L Scruggs	DATE / TIME 1/5/89 1620
RELINQUISHED BY: Mary L Scruggs	RECEIVED BY:	DATE / TIME 1/6/89 0940
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Bill McBenge "BILL McBENGE"		DATE / TIME 1/6/89 09:40
METHOD OF SHIPMENT: in cooler w/ dry ice by vehicle O.T.C		

(J I.D. 3040

ENVIRONMENTAL N↑ **AGE** ENERGY MINERALS

4 3 2 1

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation Oakland. PROJECT No. 004-88-059.

REPORT RESULTS TO: Karl J. Anania / Mary L. Scruggs.

SURVEY: Tank Excavation

SAMPLERS: Karl Anania / Mary Scruggs

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SAMPLE TYPE SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	TANK 1 N	1/5/89	1455		X		1	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 1 S	1/5/89	1525		X		8	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 2 N	1/5/89	1459		X		2	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 2 S	1/5/89	1520		X		7	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 3 N	1/5/89	1504		X		3	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 3 S	1/5/89	1518		X		6	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 4N	1/5/89	1507		X		4	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	TANK 4S	1/5/89	1514		X		5	1 Brass Tube	8015 Modified (TPH) 8020 Tetraethyl lead
	WATER 1	1/5/89	1533			X	9	3 VOAs 1 Amber bottle (1l)	602 8020 Total organic lead
	VOA Field Blank	1/5/89	1537					1 VOA	VOAs preserved w/ Ascorbic Acid

RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
Mary L. Scruggs		1/6/89 / 0940
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME

RECEIVED FOR LABORATORY BY: Bill McBenge "BILL McBENGE" DATE / TIME 1/6/89 09:40

METHOD OF SHIPMENT: 1 cooler w/ dry ice by vehicle O.T.C.

...STREET SACRAMENTO, CALIFORNIA 95816 PHONE (916) 4..-0921

C U I.D. 3040

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation / Oakland. PROJECT No. 004-88-059.

REPORT RESULTS TO: Karl J. Anania / Mary L Scruggs.

SURVEY: Soil Pile Composite

SAMPLERS: Karl J. Anania

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE: SOIL COMP	SAMPLE TYPE: SOIL GRAB	SAMPLE TYPE: WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Soil Pile 1	1/5/89	16:00	X				1 BRASS TUBE	8015 Mod. TPH 8020 TOTAL LEAD

RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
Karl J Anania	Mary L Scruggs	1/5/89 / 16:20
Mary L Scruggs		1/6/89 / 9:40

RECEIVED FOR LABORATORY BY: Bill McBenge "BILL McRENCE" DATE / TIME 1/6/89 / 09:40

METHOD OF SHIPMENT: in cooler w/ dry ice by vehicle O.T.C

CHEMWEST
ANALYTICAL LABORATORIES, INC.

January 28, 1989

Anania Geologic Engineering
1447 35th Street
Sacramento, CA 95816

Attention: Ms. Mary Scruggs

Subject: Report of Data - Case Number 3096

Dear Ms. Scruggs:

The technical staff at CHEMWEST is pleased to provide our report for the analyses you requested: Volatile Organics - EPA Method 8240; Semivolatile Organics - EPA Method 8270; TPH EXTN/GC-FID; ICP Metals (Cd, Cr, Pb, and Zn); and MBAS - EPA Method 425.1.

Five samples (4 soil and 1 water) for Project Carnation/Oakland, Project Number 004-88-059 were received January 13, 1989 in good condition. Results of the analyses along with the analytical methodology and appropriate reporting limits are presented on the following page(s).

Thank you for choosing CHEMWEST Laboratories. Should you have questions concerning this data report or the analytical methods employed, please do not hesitate to contact Toni Weeks, our Technical Service Representative or your project manager. We hope that you will consider CHEMWEST Laboratories for your future analytical support and service requirements.

Sincerely,

Jill B. Henes, Ph.D.
Vice President of Technical Services

and

Margie M. Namba
Project Manager

MMN:ds

cc: Joel Bird, President
File

ANALYTICAL METHODOLOGY

Volatile Organics

The analytical techniques used for water and soil analysis are based on EPA Methods 624 and 8240 (Purgeables) and follow EPA Contract Laboratory Program (CLP) recommendations. Water and soil samples are analyzed by a purge and trap, packed column GC/MS technique. The samples are analyzed under full scan GC/MS which monitors a mass range of 35-260.

Water -

A 5 ml sample volume to which 3 internal standards and 3 surrogates are added and purged with helium at ambient temperature. The sample is collected on a Tenax silica gel trap and then desorbed onto a packed column.

Soil/Sludge: Low -

A 5 gram sample weight is added to 5 mls of reagent water containing 3 internal standards and 3 surrogates and purged with helium at 40°C.

Soil/Sludge: Medium -

A 5 gram sample is weighed into a QA/QC prepped VOA vial and then shaken with 10 ml methanol. A 100 ul portion of the methanolic extract is combined with 5 ml of water. Surrogates and internal standards are added, and the sample analysis then follows the water protocol.

The 5 gram samples used for analysis are a mix taken from the top, middle and bottom of the sample container. This mix was used to ensure that the analysis represented an accurate analysis of a non-homogenous soil/sludge sample.

Tuning and Blanks

The samples are run after meeting GC/MS hardware tuning ion abundance criteria, using p-Bromofluorobenzene (BFB) for volatiles. Laboratory blanks are run each day and a trip blank is also analyzed.

Surrogates:

Surrogates were included in all samples. Surrogates are used to monitor extractions recovery efficiency.

	% EPA Allowable Recovery	
Compounds	Water	Soil
1,2-Dichloroethane-d4	76 - 114	70 - 121
Toluene-d8	88 - 110	81 - 117
4-Bromofluorobenzene	86 - 115	74 - 121

Matrix Spikes:

Matrix spikes are additional quality assurance controls. Known amounts of selected compounds are added to samples and analytical accuracy is determined by sample analysis.

	% EPA Allowable Recovery	
Matrix Spike Compounds	Water	Soil
1,1-Dichloroethane	61 - 145	59 - 172
Trichloroethene	71 - 120	62 - 137
Chlorobenzene	75 - 130	60 - 133
Toluene	76 - 125	59 - 139
Benzene	76 - 127	66 - 142

ANALYTICAL METHODOLOGY

Semivolatile Organics

Waters -

The sample techniques used for both water and soil samples are based on EPA Methods 625 and 8270, and follow EPA Contract Laboratory Program (CLP) recommendations. Waters are extracted in a separatory funnel utilizing methylene chloride as the extraction solvent. Six surrogate compounds are added prior to extraction to monitor extraction efficiency. After extraction, the solvent is concentrated to 1 ml, internal standards are added and the sample is ready for analysis.

Soils -

Six surrogates are added to a weighed portion of soil. Three times methylene chloride/acetone is added and the soil is shaken vigorously. The solvent is concentrated, internal standards are added and the sample is ready for analysis.

GC/MS -

Samples are analyzed on a GC/MS equipped with a DB-5 capillary column. Helium is the carrier gas and 1 ul of the sample extract is injected. The samples are analyzed under full scan GC/MS which monitors a mass range of 35-550.

Tuning and Blanks

The samples are run after meeting GC/MS hardware tuning ion abundance criteria, Decafluorotriphenylphosphine (DFTPP) for semi-volatiles. Laboratory blanks are extracted with each batch of water samples and soil samples.

Surrogates:

Surrogates were included in all samples. Surrogates are used to monitor extractions recovery efficiency.

Surrogate Compounds	% EPA Allowable Recovery Water	Soil
Nitrobenzene-d5	35 - 114	23 - 120
2-Fluorobiphenyl	43 - 116	30 - 115
p-Terphenyl-d14	33 - 141	18 - 147
Phenol-d5	10 - 94	24 - 113
2-Fluorophenol	21 - 100	25 - 121
2,4,6-Tribromophenol	10 - 123	19 - 122

Matrix Spikes:

Matrix spikes are additional quality assurance controls. Known amounts of selected compounds are added to samples and analytical accuracy is determined by sample analysis.

Matrix Spike Compounds	% EPA Allowable Recovery Water	Soil
1,2,4-Trichlorobenzene	39 - 98	38 - 107
Acenaphthene	46 - 118	31 - 137
2,4-Dinitrotoluene	24 - 96	28 - 89
Pyrene	26 - 127	35 - 142
N-Nitroso-di-n-dipropylamine	41 - 116	41 - 126
1,4-Dichlorobenzene	36 - 97	28 - 104
Pentachlorophenol	9 - 103	17 - 109
Phenol	12 - 89	26 - 90
2-Chlorophenol	27 - 123	25 - 102
4-Chloro-3-methylphenol	23 - 97	26 - 103
4-Nitrophenol	10 - 80	11 - 114

ANALYTICAL METHODOLOGY

Total Petroleum Hydrocarbons (TPH) Extractables by GC-FID

Extraction Procedure:

WATER -

A 1 liter sample is poured into a 2 liter separatory funnel. 3x100 ml extractions with methylene chloride (2 minute shake outs) are completed. The methylene chloride is decanted off and concentrated to a 5 ml final volume.

SOIL -

A 30 gram, or other appropriate aliquot of soil, is mixed with 10 grams of washed sodium sulfate. 100 mls of methylene chloride is added to the soil and placed on a mechanical shaker for 1 hour. The liquid is decanted off and the process is repeated with an additional 50 ml of methylene chloride. The combined solvent extracts are filtered through sodium sulfate and the extract is concentrated to a 5 ml final volume.

GC ANALYSIS -

An appropriate volume of the sample extract is injected into a Gas Chromatograph equipped with a Flame Ionization Detector (FID), a split/splitless capillary injector (operated in the splitless mode), and a fused silica capillary column. The TPH fraction is quantitated as gasoline and/or #2 diesel fuel (and/or different petroleum hydrocarbon fuel types if requested, such as JP-4 jet fuel) based on relative retention times and examination of the elution profile. The TPH fraction quantitation is based on chromatographic peak areas against a multipoint standard curve.

CHEMWEST ANALYTICAL LABORATORIES
VOLATILE ORGANICS

Client I.D.: Method Blank
Date(s) Analyzed: 01/25/89

CHEMWEST I.D.: 3096 -MB
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
Chloromethane	BRL	10
Bromomethane	BRL	10
Vinyl Chloride	BRL	10
Chloroethane	BRL	10
Methylene Chloride	BRL	10
Acetone	BRL	20
Carbon Disulfide	BRL	5
1,1-Dichloroethene	BRL	5
1,1-Dichloroethane	BRL	5
1,2-Dichloroethene (total)	BRL	5
Chloroform	BRL	5
1,2-Dichloroethane	BRL	5
2-Butanone	BRL	20
1,1,1-Trichloroethane	BRL	5
Carbon Tetrachloride	BRL	5
Vinyl Acetate	BRL	10
Bromodichloromethane	BRL	5
1,2-Dichloropropane	BRL	5
cis-1,3-Dichloropropene	BRL	5
Trichloroethene	BRL	5
Benzene	BRL	5
Dibromochloromethane	BRL	5
1,1,2-Trichloroethane	BRL	5
trans-1,3-Dichloropropene	BRL	5
Bromoform	BRL	5
4-Methyl-2-pentanone	BRL	10
2-Hexanone	BRL	10
Tetrachloroethene	BRL	5
1,1,2,2-Tetrachloroethane	BRL	5
Toluene	BRL	5
Chlorobenzene	BRL	5
Ethylbenzene	BRL	5
Styrene	BRL	5
Xylenes (total)	BRL	5

Surrogates	% Recovery	Acceptance Window
1,2-Dichloroethane-d4	104%	70-121%
Toluene-d8	90%	81-117%
4-Bromofluorobenzene	95%	74-121%

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: [signature]

REV4:1.89

CHEMWEST ANALYTICAL LABORATORIES
VOLATILE ORGANICS

Client I.D.: 2E
Date(s) Analyzed: 01/25/89

CHEMWEST I.D.: 3096-2
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
Chloromethane	BRL	20000
Bromomethane	BRL	20000
Vinyl Chloride	BRL	20000
Chloroethane	BRL	20000
Methylene Chloride	BRL	20000
Acetone	BRL	40000
Carbon Disulfide	BRL	10000
1,1-Dichloroethene	BRL	10000
1,1-Dichloroethane	BRL	10000
1,2-Dichloroethene (total)	BRL	10000
Chloroform	BRL	10000
1,2-Dichloroethane	BRL	10000
2-Butanone	BRL	40000
1,1,1-Trichloroethane	BRL	10000
Carbon Tetrachloride	BRL	10000
Vinyl Acetate	BRL	20000
Bromodichloromethane	BRL	10000
1,2-Dichloropropane	BRL	10000
cis-1,3-Dichloropropene	BRL	10000
Trichloroethene	BRL	10000
Benzene	BRL	10000
Dibromochloromethane	BRL	10000
1,1,2-Trichloroethane	BRL	10000
trans-1,3-Dichloropropene	BRL	10000
Bromoform	BRL	10000
4-Methyl-2-pentanone	BRL	20000
2-Hexanone	BRL	20000
Tetrachloroethene	BRL	10000
1,1,2,2-Tetrachloroethane	BRL	10000
Toluene	27000	10000
Chlorobenzene	BRL	10000
Ethylbenzene	12000	10000
Styrene	BRL	10000
Xylenes (total)	92000	10000

Surrogates	% Recovery	Acceptance Window
1,2-Dichloroethane-d4	105%	70-121%
Toluene-d8	103%	81-117%
4-Bromofluorobenzene	106%	74-121%

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: ew

REV4:1.89

CHEMWEST ANALYTICAL LABORATORIES
SEMIVOLATILE ORGANICS

Client I.D.: Method Blank
Date Extracted : 01/09/89
Date(s) Analyzed: 01/24/89

CHEMWEST I.D.: 3096-MB
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
Phenol	BRL	200
2-Chlorophenol	BRL	200
bis(2-Chloroethyl) ether	BRL	200
1,3-Dichlorobenzene	BRL	200
1,4-Dichlorobenzene	BRL	200
1,2-Dichlorobenzene	BRL	200
Benzyl alcohol	BRL	200
2-Methylphenol	BRL	200
bis(2-Chloroisopropyl) ether	BRL	200
Hexachloroethane	BRL	200
N-Nitroso-di-n-propylamine	BRL	200
4-Methylphenol	BRL	200
Nitrobenzene	BRL	200
Isophorone	BRL	200
2-Nitrophenol	BRL	200
2,4-Dimethylphenol	BRL	200
bis(2-Chloroethoxy) methane	BRL	200
2,4-Dichlorophenol	BRL	200
1,2,4-Trichlorobenzene	BRL	200
Benzoic acid	BRL	400
Naphthalene	BRL	200
4-Chloroaniline	BRL	200
Hexachlorobutadiene	BRL	200
4-Chloro-3-methylphenol	BRL	200
2-Methylnaphthalene	BRL	200
Hexachlorocyclopentadiene	BRL	200
2,4,6-Trichlorophenol	BRL	200
2,4,5-Trichlorophenol	BRL	400
2-Chloronaphthalene	BRL	200
2-Nitroaniline	BRL	400
Acenaphthylene	BRL	200
Dimethylphthalate	BRL	200
2,6-Dinitrotoluene	BRL	200
3-Nitroaniline	BRL	400
Acenaphthene	BRL	200
2,4-Dinitrophenol	BRL	400
Dibenzofuran	BRL	200
4-Nitrophenol	BRL	400
2,4-Dinitrotoluene	BRL	200
Fluorene	BRL	200
4-Chlorophenyl-phenylether	BRL	200
Diethylphthalate	BRL	200
4-Nitroaniline	BRL	400
4,6-Dinitro-2-methylphenol	BRL	400

CHEMWEST ANALYTICAL LABORATORIES
SEMIVOLATILE ORGANICS

Client I.D.: Method Blank

CHEMWEST I.D.: 3096-MB
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
N-Nitrosodiphenylamine	BRL	200
4-Bromophenyl-phenylether	BRL	200
Hexachlorobenzene	BRL	200
Pentachlorophenol	BRL	400
Phenanthrene	BRL	200
Anthracene	BRL	200
Di-n-butylphthalate	BRL	200
Fluoranthene	BRL	200
Pyrene	BRL	200
Butylbenzylphthalate	BRL	200
Benzo(a)anthracene	BRL	200
3,3'-Dichlorobenzidine	BRL	400
Chrysene	BRL	200
bis(2-Ethylhexyl)phthalate	BRL	200
Di-n-octylphthalate	BRL	200
Benzo(b)fluoranthene	BRL	200
Benzo(k)fluoranthene	BRL	200
Benzo(a)pyrene	BRL	200
Indeno(1,2,3-cd)pyrene	BRL	200
Dibenz(a,h)anthracene	BRL	200
Benzo(g,h,i)perylene	BRL	200

Surrogates	% Recovery	Acceptance Window
2-Fluorophenol	83%	25-121%
Phenol-d5	82%	24-113%
Nitrobenzene-d5	83%	23-120%
2-Fluorobiphenyl	76%	30-115%
2,4,6-Tribromophenol	61%	19-122%
Terphenyl-d14	58%	18-137%

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: _____

REV4:1.89

CHEMWEST ANALYTICAL LABORATORIES
SEMIVOLATILE ORGANICS

Client I.D.: 4W
Date Extracted : 01/09/89
Date(s) Analyzed: 01/24/89

CHEMWEST I.D.: 3096-4
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
Phenol	BRL	2000
2-Chlorophenol	BRL	2000
bis(2-Chloroethyl) ether	BRL	2000
1,3-Dichlorobenzene	BRL	2000
1,4-Dichlorobenzene	BRL	2000
1,2-Dichlorobenzene	BRL	2000
Benzyl alcohol	BRL	2000
2-Methylphenol	BRL	2000
bis(2-Chloroisopropyl) ether	BRL	2000
Hexachloroethane	BRL	2000
N-Nitroso-di-n-propylamine	BRL	2000
4-Methylphenol	BRL	2000
Nitrobenzene	BRL	2000
Isophorone	BRL	2000
2-Nitrophenol	BRL	2000
2,4-Dimethylphenol	BRL	2000
bis(2-Chloroethoxy) methane	BRL	2000
2,4-Dichlorophenol	BRL	2000
1,2,4-Trichlorobenzene	BRL	2000
Benzoic acid	BRL	4000
Naphthalene	31000	2000
4-Chloroaniline	BRL	2000
Hexachlorobutadiene	BRL	2000
4-Chloro-3-methylphenol	BRL	2000
2-Methylnaphthalene	20000	2000
Hexachlorocyclopentadiene	BRL	2000
2,4,6-Trichlorophenol	BRL	2000
2,4,5-Trichlorophenol	BRL	4000
2-Chloronaphthalene	BRL	2000
2-Nitroaniline	BRL	4000
Acenaphthylene	BRL	2000
Dimethylphthalate	BRL	2000
2,6-Dinitrotoluene	BRL	2000
3-Nitroaniline	BRL	4000
Acenaphthene	BRL	2000
2,4-Dinitrophenol	BRL	4000
Dibenzofuran	BRL	2000
4-Nitrophenol	BRL	4000
2,4-Dinitrotoluene	BRL	2000
Fluorene	BRL	2000
4-Chlorophenyl-phenylether	BRL	2000
Diethylphthalate	BRL	2000
4-Nitroaniline	BRL	4000
4,6-Dinitro-2-methylphenol	BRL	4000

CHEMWEST ANALYTICAL LABORATORIES
SEMIVOLATILE ORGANICS

Client I.D.: 4W

CHEMWEST I.D.: 3096-4
Matrix : Soil

Compound	Amount Detected (ug/Kg)	RL (ug/Kg)
N-Nitrosodiphenylamine	BRL	2000
4-Bromophenyl-phenylether	BRL	2000
Hexachlorobenzene	BRL	2000
Pentachlorophenol	BRL	4000
Phenanthrene	BRL	2000
Anthracene	BRL	2000
Di-n-butylphthalate	BRL	2000
Fluoranthene	BRL	2000
Pyrene	BRL	2000
Butylbenzylphthalate	BRL	2000
Benzo(a)anthracene	BRL	2000
3,3'-Dichlorobenzidine	BRL	4000
Chrysene	BRL	2000
bis(2-Ethylhexyl)phthalate	BRL	2000
Di-n-octylphthalate	BRL	2000
Benzo(b)fluoranthene	BRL	2000
Benzo(k)fluoranthene	BRL	2000
Benzo(a)pyrene	BRL	2000
Indeno(1,2,3-cd)pyrene	BRL	2000
Dibenz(a,h)anthracene	BRL	2000
Benzo(g,h,i)perylene	BRL	2000

Surrogates	% Recovery	Acceptance Window
2-Fluorophenol	90%	25-121%
Phenol-d5	91%	24-113%
Nitrobenzene-d5	108%	23-120%
2-Fluorobiphenyl	72%	30-115%
2,4,6-Tribromophenol	49%	19-122%
Terphenyl-d14	48%	18-137%

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: lw

REV4:1.89

CHEMWEST ANALYTICAL LABORATORIES
TOTAL PETROLEUM HYDROCARBONS - EXTRACTABLE

Date Extracted : 01/19/89
Date(s) Analyzed: 01/25/89

Case : 3096
Matrix: Soil

Reporting Units: mg/Kg

Client ID	CHEMWEST ID	Gasoline Result	Gasoline RL	Diesel Result	Diesel RL	Other Hydrocarbon Mixture Result	Other Hydrocarbon Mixture RL
Method Blank	3096-MB	BRL	10	BRL	10	BRL	10
1W	3096-1	19000	1000	BRL	1000	BRL	1000

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: KP

REV3:1.89

CHEMWEST ANALYTICAL LABORATORIES
METALS ANALYSIS
ICAP SCAN

Client I.D.: 3E
Date(s) Analyzed: 01/26/89
thru: 01/26/89

CHEMWEST I.D.: 3096-3
Matrix : Soil

Element	Amount Detected (mg/Kg)	RL (mg/Kg)
Cadmium	BRL	1
Chromium	26	2
Lead	BRL	10
Zinc	23	5

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by:

REV3:1.89

CHEMWEST ANALYTICAL LABORATORIES
MBAS

Date(s) Analyzed: 01/23/89
thru: 01/23/89

Case : 3096
Matrix: Water

Client ID	CHEMWEST ID	Amount Detected (mg/L)
1A	3096-5	0.34

The reporting limit for MBAS is 0.025 mg/L.

BRL: Below Reporting Limit.

Approved by:

REV2:1.88

CHEM WEST ANALYTICAL LABORATORIES,INC.
600 West North Market Blvd.
Sacramento, California 95834
(916) 923-0840 FAX (916) 923-1938

CLIENT

Order No. 3096
Date Rec'd. 1/13/89 @ 1234
Compl. Date
Section M. Namba

CLIENT: A. G. E. (Anania Geologic Engineering)
1447 35th Street
Sacramento, CA 95816

Project Name: Carnation Oakland
Project No. 004-88-059
P.O. NO. ~~Mary Suggs~~
Contact Tom E. Edwards
Phone (916) 451-0921

ANALYSIS: Five samples recd under chain of custody in 6" brass core tube (4) and 1qt amber glass jar (1) to be analyzed for TPH EXTN/GC-FID, 8240, ICAP, Cd, Cr, Pd, Zinc, 8240 and MBAS.

(Soils and 1-Water)

	Sampled	Date	Time	analysis	matrix	container
3096-1	1W	1/12	1345	TPH EXTN	Soil	1-6" core tube
-2	2E		1300	8240		
-3	3E		1305	ICAP Cd, Cr, ~~Pd~~ Pb Zn		
-4	4W		1400	8270		
-5	1A		1630	MBAS	water	1-1qt jar

AMENDED

Per conversation between Karl Anania and Margie Namba on 1/16/89 at 1500 hrs, change Pd on 3096-3 to Pb.
3096-3 will be analyzed for Cd, Cr, Zn, and Pb by ICAP.

TCW 1/16/89

RI,
M.T. MICHELLE TOLIVER

O.I.C.

C.W. 2096

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation Oakland PROJECT NO. 004-88-059.

REPORT RESULTS TO: Tom E. Edwards / Karl J. Anania.

SURVEY: Waste Oil Tank Pull

SAMPLERS: Karl J Anania, Joe Sandholtzer

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Waste Oil 1W	1/12/89	1345		X			Brass Tube	TPH (GCFID) MOD 8015
	2E	1/12/89	1350		X			"	8240
	3E	1/12/89	1355		X			"	ICAP Cd, Cr Pb, & ZN
	4W	1/12/89	1400		X			"	8270
									2 week verbal

SAMPLES REC'D IN GOOD CONDITION

RELINQUISHED BY: Joe Sandholtzer	RECEIVED BY:	DATE / TIME 1/13/89 / 12:35
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Michelle Tolier		DATE / TIME 1/13 / 12:35

METHOD OF SHIPMENT: Ice chest in car

C.O 3096

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation/Oakland . PROJECT No. 004-88-059 .

REPORT RESULTS TO: Tom E. Edwards / Karl J. Anania .

SURVEY Groundwater from tank excavation for Soaps/Sufractants SAMPLERS Karl Anania Joe Sandbothe

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Sample 1A	1/12/89	16:30			X		Brown liter	Soap/Sufractants & degreasers
	~~Sample 1B~~	~~1/12/89~~	~~16:30~~			X		"	Soap/Sufractants & degreasers

SAMPLES REC'D IN GOOD CONDITION

Hold at AGE

1/14/89

RELINQUISHED BY: Joe Sandbothe	RECEIVED BY:	DATE / TIME 1/13/89 12:34
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Michelle Jolin		DATE / TIME 1/13/89 12:34

METHOD OF SHIPMENT: Ice chest in car

C.O. 3096

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation Oakland PROJECT No. 004-88-059.

REPORT RESULTS TO: Tom E. Edwards / Karl J. Anania.

SURVEY: Waste Oil Tank Pull

SAMPLERS: Karl J Anania / Joe Sandhofer

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SAMPLE TYPE SOIL GRAB	SAMPLE TYPE WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Waste Oil 1W	1/12/89	1345		X			Brass tube	TPH (GCFID) MOD 8015
	2E	1/12/89	1350		X			11	8240
	3E	1/12/89	1355		X			11	ICAP Cd, Cr Pb, & Zn
	4W	1/12/89	1400		X			11	8270
									2 week Verbal
									SAMPLES RECEIVED IN GOOD CONDITION

RELINQUISHED BY: Joe Sandhofer	RECEIVED BY:	DATE / TIME 1/13/89 / 12:35
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Michelle Tolen		DATE / TIME 1/13 / 12:35

METHOD OF SHIPMENT: Ice chest in car

C.O 30916

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

trnt due 1:??

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation/Oakland . PROJECT No. 004-88-059 .

REPORT RESULTS TO: Tom E. Edwards / Karl J. Anania .

SURVEY Groundwater from tank excavation for Soaps/Sufractants SAMPLERS Karl Anania Joe Sandhoffer

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	Sample 1A	1/12/89	1630			X		Brown liter	Soap/Sufractan & degreesers
	~~Sample 1B~~	~~1/12/89~~	~~1630~~			X		"	Soap/Sufractants & degreasers

SAMPLES REC'D IN GOOD CONDITION

Hold at AGE

1/14/89

RELINQUISHED BY: Joe Sandhoffer	RECEIVED BY:	DATE / TIME 1/13/89 12:34
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY: Michelle Jolin		DATE / TIME 1/13/89 12:34

METHOD OF SHIPMENT: Ice chest in car

Precision Analytical Laboratory, Inc.
4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-0300 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/26/89
Reported: 02/10/89
Job No. #: 70645

Attn: Karl Anania / Tom Edwards
Anania Geological Engineering
1447 35th Street
Sacramento, CA. 95816

Project: CARNATION

Total Petroleum Hydrocarbon Analysis; By Modified Method 8015
Nitrogen (Ammonia) Analysis; By Standard Method 417D
Total Dissolved Solids; By Standard Method 209B
mg/l

Lab ID	Client ID	Diesel	Gasoline	TDS	Ammonia	pH
70645-1	Groundwater	420	2,170	0.74	20	7.5

QA/QC: Spike Recovery for Diesel: 80%
Spike Recovery for Gasoline: 112%

Detection Limit for TPH: 20
Detection Limit for Ammonia: 10

Jaime Chow
Laboratory Director

Precision Analytical Laboratory, Inc.
4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-0300 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

State License No. 211

Received: 01/26/89
Reported: 02/10/89
Job No #: 70645

Attn: Karl Anania / Tom Edwards
Anania Geological Engineering
1447 35th Street
Sacramento, CA. 95816

Project: Carnation

Aromatic Volatile Hydrocarbon Analysis:
EPA Method 8020
mg/l

Lab ID	Client ID	Benzene	Toluene	MDL
70645-1	Groundwater	35	54	5

Lab ID	Client ID	Ethylbenzene	Xylene	MDL
70645-1	Groundwater	6	30	5

QA/QC: Spike Recovery for Benzene: 119%
Spike Recovery for Xylenes: 117%

Jaime Chow
Laboratory Director

Precision Analytical Laboratory, Inc.
4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-0300 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/26/89
Reported: 02/10/89
Job #: 70645

Attn: Tom Edwards
Anania Geological Engineering
1447 35th Street
Sacramento, CA. 95816

Project: Carnation - Oakland, CA. #004-88-059

Analysis Method EPA 6010
Prep Method EPA 3010
mg/l

Lab ID #: 70645
Client ID: Groundwater sample

METAL		MDL	% SPIKE RECOVERY
Tl	<1.0	1.0	100
As	<1.0	1.0	108
Hg	<1.0	1.0	96
Se	<1.0	1.0	98
Mo	<0.04	0.04	102
Sb	<0.04	0.04	90
Zn	0.1	0.006	100
Cd	<0.01	0.01	100
Pb	0.3	0.044	102
Co	<0.02	0.02	98
Ni	0.03	0.026	98
Cr	<0.05	0.05	100
V	<0.05	0.05	102
Be	<0.05	0.05	102
Cu	0.02	0.004	98
Ag	<0.05	0.05	N/A
Ba	0.3	0.004	106

MDL: Method detection Limit: Compound below this level would not be detected.

Jaime Chow
Laboratory Director

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation/Oakland . PROJECT No. 004-88-059 .

REPORT RESULTS TO: Karl J Ananía / Tom Edwards .

SURVEY: Recovery Well Baseline

SAMPLERS: Karl Ananía / Joe Southerland

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE: SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	GROUNDWATER 1	1/26	1:30			✓	1	8oz AMBER	Cam metals pH, TDS, (available) Nitrogen, Phosphorus, chlorides and physical chemistry. TPH & BTX & EB. Total Oil & Greese. USE sample from appropriat bottles
	GROUNDWATER (2)	1/26	1:35			✓	2	8oz AMBER	
	GROUNDWATER 3	1/26	1:40			✓	3	1 LITER AMBER	
	GROUND WATER 4	1/26	1:45			✓	4	1 LITER AMBER	
	GROUND WATER 5	1/26	1:50			✓	5	VOA	
	GROUNDWATER 6	1/26	1:55			✓	6	VOA	
	GROUND WATER 7	1/26	2:00			✓	7	VOA	
	GROUNDWATER 8	1/26	2:05			✓	8	VOA	
	GROUND WATER 9	1/26	2:10			✓	9	VOA	
	GROUNDWATER 10	1/26	2:15			✓	10	VOA	
	GROUNDWATER 11	1/26	2:20			✓	11	VOA	
	GROUNDWATER 12	1/26	2:25			✓	12	VOA	

RELINQUISHED BY:	RECEIVED BY:	DATE / TIME 1/26 16:08
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RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY:		DATE / TIME

METHOD OF SHIPMENT:

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

Pg 2 of 3

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation / Oakland . PROJECT No. 004-88-059 .

REPORT RESULTS TO: Karl J. Anania / Tom Edwards .

SURVEY: Recovery Well Baseline

SAMPLERS: Karl J Anania / Tom Edwards

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	GROUND WATER 13	1/26	2:30			✓	13	VOA	
	GROUND WATER 111	1/26	2:35			✓	14	VOA	
	GROUNDWATER 15	1/26	2:40			✓	15	VOA	
	GROUNDWATER 16	1/26	2:45			✓	16	VOA	
	GROUNDWATER 17	1/26	2:50			✓	17	VOA	
	GROUNDWATER 18	1/26	3:00			✓	18	VOA	
	GROUNDWATER 19	1/26	3:06			✓	19	PLASTIC BOTTLE	
	GROUNDWATER 20	1/26	3:10			✓	20	PLASTIC BOTTLE	
	GROUNDWATER 21	1/26	3:24			✓	21	PLASTIC BOTTLE	
	GROUNDWATER 22	1/26	3:34			✓	22	PLASTIC BOTTLE	
	GROUND WATER 23	1/26	3:40			✓	23	PLASTIC BOTTLE	
	GROUND WATER 24	1/26	3:47			✓	24	PLASTIC BOTTLE	

See page 1

RELINQUISHED BY:	RECEIVED BY:	DATE / TIME 1-26-89 16:00
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RELINQUISHED BY:	RECEIVED BY:	DATE / TIME
RECEIVED FOR LABORATORY BY:		DATE / TIME

METHOD OF SHIPMENT:

ENVIRONMENTAL **AGE** ENERGY MINERALS

ANANIA GEOLOGIC ENGINEERING

Pg 3 of 3

CHAIN OF CUSTODY RECORD

PROJECT NAME: Carnation / Oakland. PROJECT No. 004-88-059.

REPORT RESULTS TO: Karl J. Anania / Tom Edwards.

SURVEY: Recovery Well Baseline

SAMPLERS: Karl J Anania / Tom Sandbothe

LABORATORY LOG NUMBER	STATION NUMBER	DATE	TIME	SAMPLE TYPE: SOIL COMP	SOIL GRAB	WATER	SEQ. No.	No. OF CONTAINERS	ANALYSIS REQUIRED
	GROUND WATER 25	1/26	3.54			✓	25	PLASTIC BOTTLE	see page 1 KJA
	GROUNDWATER 26	1/26	4:00			✓	26	PLASTIC BOTTLE	see page 1 KJA

RELINQUISHED BY: Tom Sandbothe — RECEIVED BY: [signature] — DATE / TIME: 1/26/88 16:09

RELINQUISHED BY: [signature] — RECEIVED BY: [signature] — DATE / TIME: 1/27/88 [illegible]

RELINQUISHED BY: — RECEIVED BY: — DATE / TIME:

RECEIVED FOR LABORATORY BY: — DATE / TIME:

METHOD OF SHIPMENT: