MacKinnon Environmental Consulting

Specializing in Ground Water and Soil Contamination

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PRELIMINARY SUBSURFACE INVESTIGATION FOR A METAL RECYCLING YARD OAKLAND CALIFORNIA

Prepared for:
Custom Alloy Scrap Sales. Inc.
2730 Peralta Street
Oakland, California

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INTRODUCTION

This report describes the work performed by MacKinnon Environmental Consulting for Custom Alloy Scrap Sales, Inc. (CASS) in Oakland, California. A preliminary investigation of the subsurface was performed to determine whether fuel contamination had impacted the ground water. The investigation also gives an initial estimate of the extent and levels of fuel contamination in the soil.

Three monitoring wells were installed and five soil borings were drilled and sampled. This report includes a description of the work performed, field observations, results of analyses, and recommendations for further action based on the findings of this project.

BACKGROUND

CASS is a metal scrapyard which recycles aluminum and iron. It occupies the block located between Peralta and Poplar St. and 28th and 26th Streets in Oakland (Figure 1). The largest portion of the recycling yard is devoted to aluminum products and is covered with concrete. The smaller ("ITP") yard recycles iron and is located in the southwest corner of the property (see Figure 2).

Two underground tanks were removed by R.J. Miller Co. on April 9 and 11, 1990. These included a gasoline tank which was under the sidewalk on 28th near Peralta and a diesel tank located in the south side of the aluminum yard. The tanks passed a tank integrity test in 1989, however the piping associated with the diesel tank did not pass a pressure test.

Analysis of four soil samples from the gasoline pit and piping were well below 100 parts per million (ppm) except for one sample which tested at 340 ppm. Most of the samples from the diesel pit however exceeded 100 ppm; the highest level (7400 ppm) was detected in a composite sample. In addition floating product has been reported in a small utility vault in the sidewalk on 26th Street.

Subsequently CASS requested MacKinnon Environmental Consulting to conduct a subsurface investigation, including the characterization of ground water and soil, as laid out in a workplan compiled by Clayton Environmental Consulting and approved by Alameda County Health Department (ACHD).

SCOPE OF WORK

The objectives of this study were to: 1) to evaluate the hydrogeology of the site, 2) to determine if the ground water and soil are contaminated by diesel fuel, and 3) test the shallow soils in the ITP (steel) yard for possible metal or waste oil contamination.

Three monitoring wells and five soil borings were drilled to satisfy the above objectives. Soil samples were collected from the monitoring well and soil borings and the wells were sampled for ground water analysis.

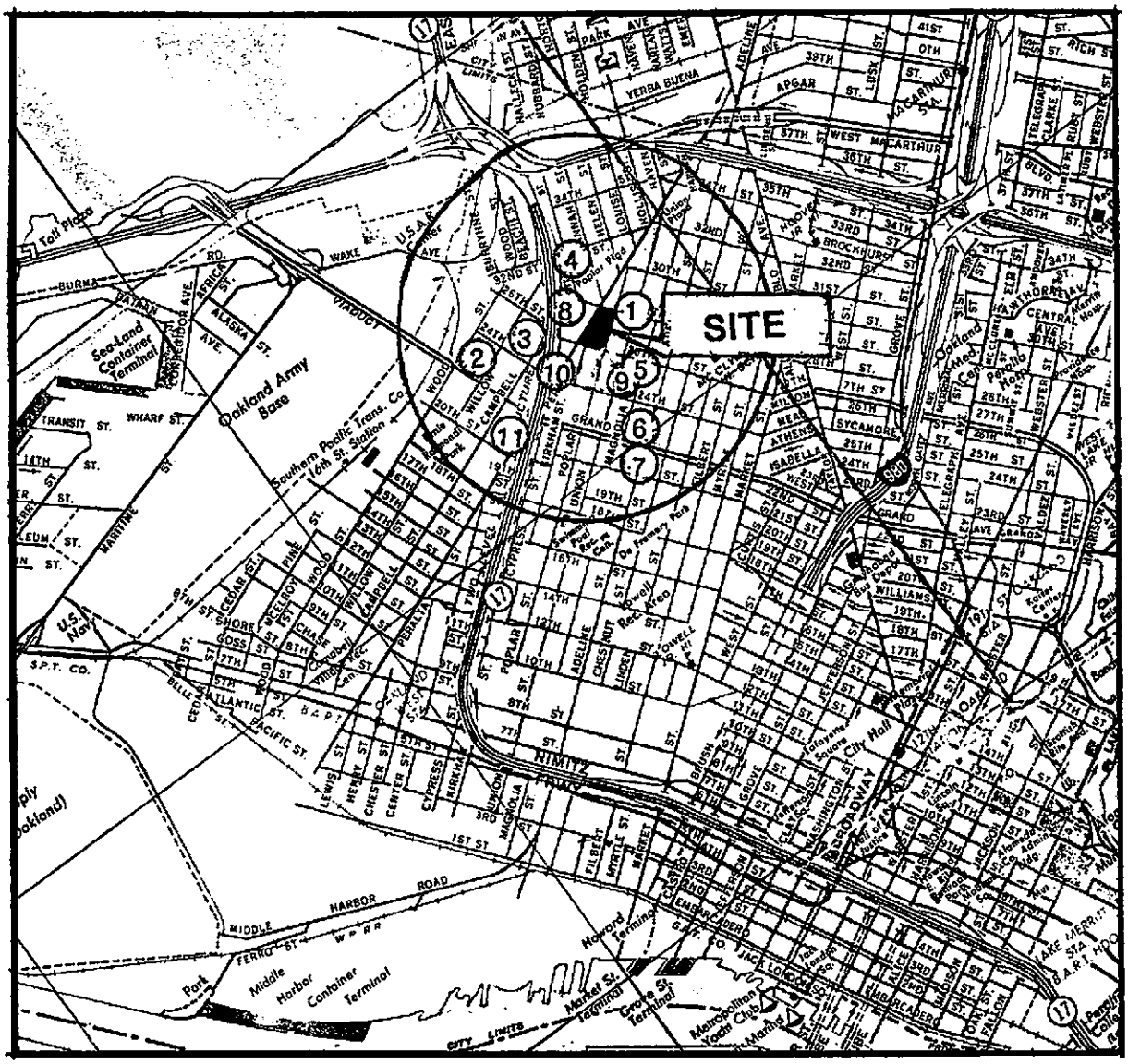


FIGURE 1
SITE LOCATION MAP SHOWING SUBSURFACE CONTAMINATION SITES
WITHIN 1/2-MILE RADIUS OF SITE

N

. arc outlines radius of 1/2-mile
circled numbers denote fuel leak cases, Table 5

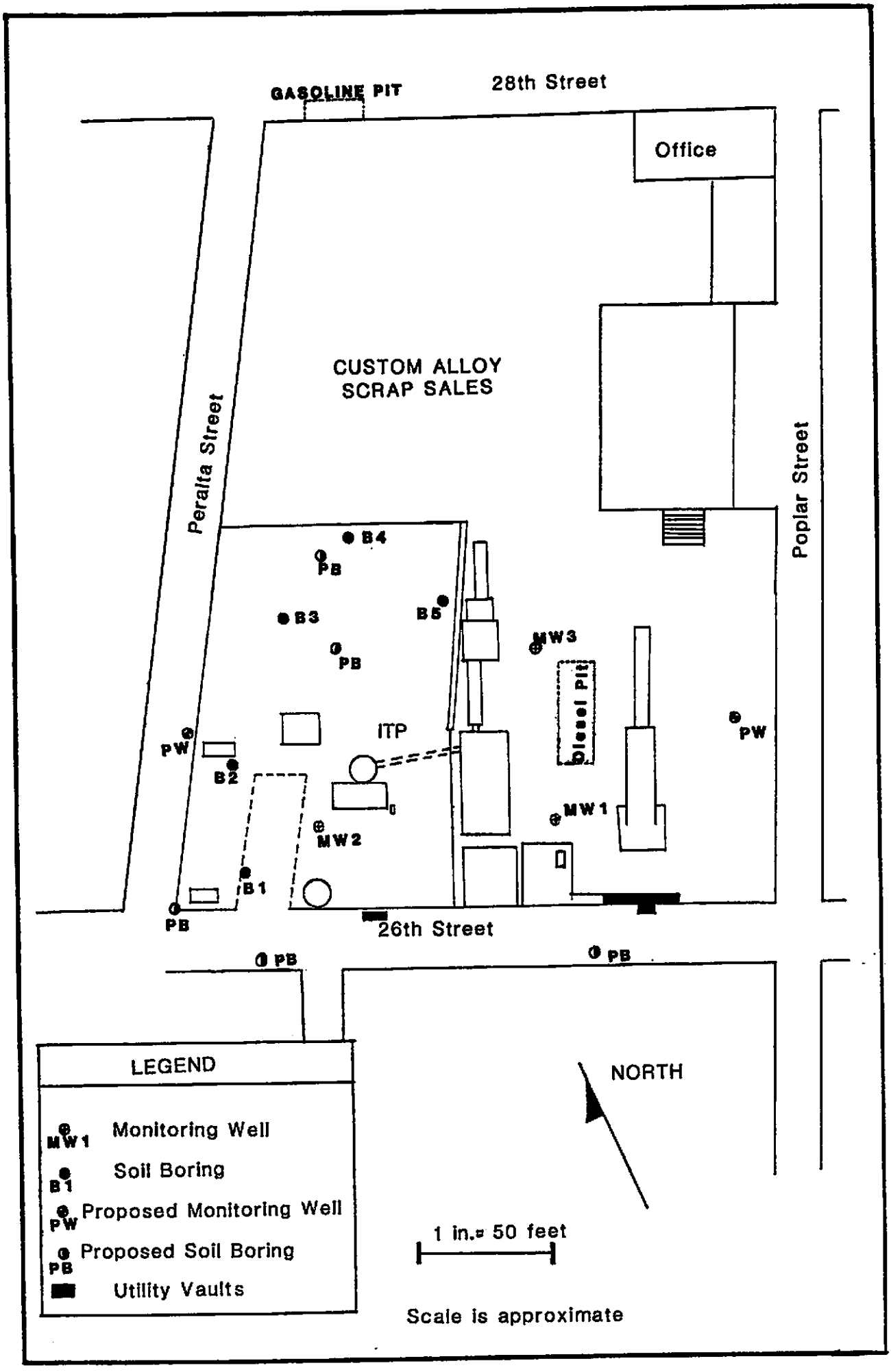


FIGURE: 2 Location of Boreholes and Monitoring Wells

The wells were surveyed by a licensed surveyor in May, 1990. An attempt was made to measure water levels in all three monitoring wells and estimate the flow direction.

In addition, fuel leak and toxic cases on record at the Regional Water Quality Control Board (RWB) were reviewed to identify known contamination problems within the vicinity of the site.

DRILLING AND WELL CONSTRUCTION

The three monitoring wells (MW1 - MW3) were drilled with hollow stem augers, logged and sampled by a California registered geologist. Soil cuttings generated during drilling were placed in 55-gallon drums, labeled and stored on site.

Figure 1 shows the location of the wells in relation to the site. MW1 was sited 20-21 feet south of the diesel pit, MW2 was located in the ITP yard near the diesel pump and piping, and MW3 was drilled approximately 10 feet northwest of the diesel pit. Wells were located with regard to anticipated contamination and ground water flow, but are constrained by pre-existing structures.

Four-inch diameter, threaded PVC casing was used in well construction. The casing was capped at both ends and a Christy box was installed at the surface. Locks were attached to preclude tampering. Well construction is described below and details are shown on the boring logs in Appendix A.

The monitoring wells were bored to a depth of 19.5 to 19.9 feet below ground level. The well depth was chosen based on the depth of ground water at the time of drilling. Each well was constructed with ten feet of .01-inch slotted casing and an 8-inch silt trap was added at the bottom. The slotted interval begins approximately 9 feet below grade (over 8.5' below top of casing) and extends to a depth of 19 feet. Blank casing was installed above the screened interval to the surface. The annular space between the borehole and the well casing was packed with #2 Monterey sand from the bottom of the well to two feet above the screened interval. A bentonite plug was set above the sand pack and the remaining annular space was sealed to the surface with cement. The Christy box itself was set in a concrete-cement mix to minimize cracking and add strength at the surface.

SAMPLING

Soil

At least two soil samples were collected for analysis in each of the three monitoring well borings: one at five feet and a second just above the water table (approximate depth of 11 feet). These samples were analyzed for diesel and benzene, toluene, ethylbenzene,and xylene (BTEX). An additional sample was collected at 7 feet in MW1 because the visual appearance of the soil in the sample above, i.e. at the 5-foot depth, suggested the presence of hydrocarbons.

Evidence of diesel contamination near the water table-capillary fringe in all three well borings prompted a field decision to take further samples at this depth. These samples were collected from three borings (B1, B2 and B5) and were analyzed for diesel. The results help delineate the extent of diesel contamination which has migrated along the top of the ground water surface.

Soil samples were also collected from five borings (Figure 2) at depths between 2.5 and 4 feet below grade. This sampling interval represents the bottom of fill material and top of native soil in the ITP yard. These samples were analyzed for waste oil and metals (copper, zinc and lead). The five-foot sample from MW1 was also tested for waste oil.

Soil samples were collected in 2 x 6-inch brass liners using a modified California split-spoon sampler driven by a 140-pound hammer. The sampler was fitted with four clean, brass liners and one of the soil samples (commonly the lowermost brass liner) was selected for analysis. The open sample ends were then covered with aluminum foil, capped and placed on ice for delivery to the laboratory.

Brass liners were scrubbed on site in water with a trisodium phosphatic (TSP) detergent and then double rinsed. The sampler was also cleaned in a TSP solution following each sampling and the augers and sampler were steam cleaned between each hole.

Ground Water

On May 18, 1990 the wells were developed by surging and then bailing. Surging is one of the most effective methods of well development and was accomplished with a surge block (plunger). The up and down movement of the plunger draws water both into the well and then forces water back into the formation. This flow reversal brings fine material into the well and develops the filter pack.

The fine material was removed from the well with a large diameter bailer. Temperature, conductivity and pH parameters were measured for the first well (MW3) and used as a minimal estimate of the development volume for subsequent wells. Between 38 and 52 gallons of water were removed per well, a minimum of 6.5 to 8.5 well volumes each. Development water was stored in separate drums on site and labeled.

Prior to development, a sheen was detected in MW1 indicating a very thin layer of immiscible product. In MW2, over 16 inches of floating product were measured with an interface probe. The thickness was also measured with a clear acrylic bailer, however the first bail contained only 5 inches of product and a later bail showed up to 12 inches.

Samples of the ground water were taken from two of the three wells within 1-2 hours of development. Water from MW2, in the ITP yard, was not sampled because of the floating product. Several ounces of this product were collected in a glass jar and sent to the lab for analyses.

Sampling equipment was carefully decontaminated before initial use and between each well. Ground water samples were withdrawn from the wells

second silty clay which is distinctly blue-green in color and over nine feet thick. The top of a third clay, light brown in color, was found below the blue-green clay at 15-16 feet below grade in all three well logs.

A gravelly sand layer, probably less than three feet thick, occurs within the blue-green clay in MW2 (see boring log) between 11 and approximately 14 feet. An attempt was made to determine if this sand was laterally continuous by collecting lithologic samples at similar depths in the other two well borings. Minor sand and gravel was found in MW1 within the blue-green clay at this depth but no sand body was encountered. The clayey cuttings from both MW1 and MW3 contained sand and gravel below 16 foot depths; the coarse material may be present within a clay matrix (as in the soil sample from 12 feet in MW1) however or could indicate a small sandy lens which mixed with clays as the cuttings came up the hole.

Ground water levels were estimated to be approximately 12 feet below ground surface during drilling. Water levels were measured with an electric sounder or microprobe prior to well development on May 18, 1990. MW1 and MW3 were measured again prior to sampling, but appeared not to have fully recovered. These two wells were re-measured on June 20, 1990 but the free product in MW2 cast doubts on whether the accuracy of calculations for flow and gradient would be valid.

The three wells were surveyed for distances and elevations May, 1990 by a California licensed surveyor. The site survey is included in Appendix A. The measured water levels and conversions to elevations are given in Table 1 below.

Table 1

WATER LEVEL DEPTHS AND ELEVATIONS FOR CASS

			5-18-90		6-20-90	
WELL	GRD	TOC Elev.	Depth	Elev.	Depth	Elev.
MW1	5.82	5.64	10.80	-5.16	10.2	-4.56
MW2	4.66	4.19	9.59	-5.40	-----	
MW3	6.38	5.84	11.08	-5.24	10.3	-4.46

GRD = Ground surface
TOC = top of casing

The ground water flow direction based on the data above appears to be to the west-northwest, however the data is suspect - free product in MW2 renders this well questionable for calculating flow. Nonetheless the ground water gradient in this area is known to be low and can be expected to flow in a westerly direction towards San Francisco Bay. Other studies in the area list flows varying from a northwest to a southwest direction.

by a teflon bailer which had been steam cleaned before arriving at the site. The bailer was scrubbed before each use with a TSP solution and a bottle brush. It was then rinsed with clean tap water, rinsed with reagent grade methanol and finally, double rinsed with distilled water. A new rope was tied to the end of the bailer and every effort was made to keep the rope above the water in the well. As an extra precaution the wells were sampled from "clean to dirty" i.e. as contamination was anticipated to be low or absent in MW3 it was sampled first and MW1 was sampled last.

Ground water was transferred, with minimal agitation, into glass bottles certified clean by the laboratory doing the analysis. The bottles for volatile organic analyses were checked to ensure that air bubbles were not present. Sample containers were immediately sealed, labeled and placed on ice.

All samples were delivered under chain-of custody procedures.

HYDROGEOLOGY

Geologic Setting

San Francisco Bay lies in a low area in the Coast Range province, a region of northwest trending faults, hills and valleys. The site itself is situated on the flatlands, just over one mile east of the eastern edge of the present Bay. The Bay is a drowned valley which is thought to have originally formed by erosion of the ancestral Sacramento River (Jenkins, 1951) and subsequently widened by subsidence and a rise in sea level. Quaternary (Pleistocene to recent) sediments deposited in what is now the Bay, include both shallow marine and continental deposits.

The youngest, surficial deposit is known as "Bay Mud" and is present in areas adjacent to the Bay. Bay Mud is generally composed of unconsolidated, olive-gray, blue-gray, or black silty clay. It is typically plastic and varies from soft to stiff. Organic remains such as shells and peat are often found. Permeability is generally low except where lenses of sand occur. Bay Mud is mainly derived from the sediment load carried by the Sacramento and San Joaquin Rivers and has been deposited in the Bay for almost 10,000 years (Helley et al.,1979). Bay Mud continues to be deposited today.

In the Oakland area, several other sedimentary units are noted by Radbruch & Case (1967). Sandy artificial fill, of varying composition, is common along the margins of the Bay. Franciscan bedrock has been documented (Woodward-Clyde, 1987) underlying the sediments at Clay and 12th Streets less than 1.5 miles southeast of the site. The Franciscan Formation is a complex assemblage of deformed and altered sediments and volcanic rocks which commonly form bedrock in the San Francisco Bay region.

Site Hydrogeology

The geologic materials found during drilling consist dominantly of fine grained sediments which generally fall into the category of Bay Mud. A black, silty clay is present below the fill beginning at 2 to 4 feet and extends to a depth of 6 to 7 feet. Underlying the black clay is a

RESULTS OF ANALYSES

Soil and water samples were sent to Superior Analytical Laboratory, Martinez, California. This laboratory is certified by the state of California for drinking water and hazardous waste testing and analysis. Chain-of-custody documentation followed all samples to the lab. Samples were analyzed following procedures developed and verified by the Environmental Protection Agency (EPA) or the California Department of Health Services (DHS). Selected soil and ground water samples were analyzed as follows:

EPA 8020/5030 - Benzene, toluene, ethylbenzene,and xylene (BTEX)
DHS Method - Total petroleum hydrocarbons as diesel (soil)
EPA 8015 - Total petroleum hydrocarbons as diesel and gasoline (water)
EPA SM5520F - Total petroleum hydrocarbons as oil
EPA 6010 - metals (lead, zinc and copper)

Soils

Soil samples were analyzed from the three monitoring wells. These samples were collected at depths of five feet and, approximately 11 feet. Additional samples were also collected from the top of the water table or capillary zone (approximately 11 feet) in three borings. The purpose of these samples was to test for soil and ground water contamination that had migrated from the diesel tank area. Results are shown below.

TABLE 2
ANALYTICAL RESULTS FOR SOIL SAMPLES

Boring or Well/ Depth	Diesel	Benzene	Toluene	Ethylbnzn.	Xylenes
W1/5'	ND	NA	NA	NA	NA
W1/7'	ND	NA	NA	NA	NA
W1/11'	399	ND	ND	ND	ND
W2/5'	ND	NA	NA	NA	NA
W2/10'	780	ND	ND	ND	15.3*
W3/5'	ND	NA	NA	NA	NA
W3/11'	811	ND	ND	ND	52.7*
B1/11'	356	NA	NA	NA	NA
B2/11'	ND	NA	NA	NA	NA
B5/11'	814	NA	NA	NA	NA

a) Diesel results are expressed in milligrams per kilograms (mg/kg). Mg/kg is equivalent to parts per million (ppm).
* xylene results are in micrograms per kilograms (ug/kg). Ug/kg is equivalent to parts per billion (ppb).

b) ND = not detected
NA = not analyzed

Shallow soil samples from the ITP yard were tested for metals and waste oil. The five foot sample from MW1 was also analyzed for waste oil, but as this report is being finalized results have not arrived. Preliminary results by telephone however indicate that this sample contains a "high" concentration. Remaining results are as follows:

TABLE 3

Boring/ Depth	W.Oil	Lead	Zinc	Copper
B1/4'	70	ND	27	14
B2/4'	ND	<20	22	13
B3/3.5'	2890	240	560	22
B4/3.5	99	15	31	18
B5/4'	2410	42	52	19

Ground Water

Neither diesel nor gasoline contamination was detected in the ground water from MW1 or MW3. Low levels of benzene and ethylbenzene however were found in both wells and 0.7 ppb xylene was detected in MW1. The analytical results are shown in the table 3 below. Results are in micrograms per liter (ug/L) which is equivalent to ppb.

TABLE 4
RESULTS FOR GROUND WATER SAMPLES

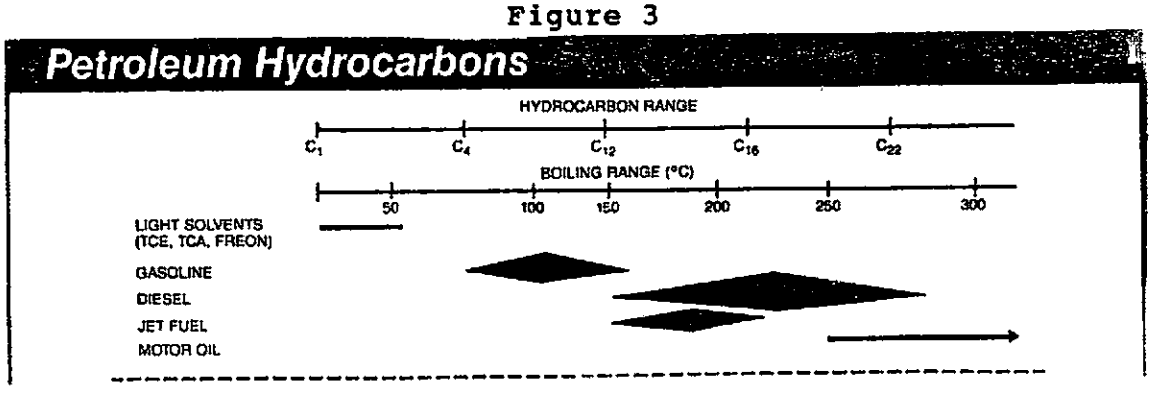
Well	Gasoline	Diesel	Benzn	Toluene	Ethylbnzn	Xylenes
MW1	ND	ND	0.4	ND	1.0	0.7
MW3	ND	ND	1.8	ND	0.5	ND
Duplicate(MW3)	NA	NA	1.8	ND	0.5	ND

Free Product

The free product found in MW2 was tested for diesel and polychlorinated biphenyls (PCBs). The sample was further tested by Fourier transform infared (FTIR) to determine if other compounds might be present. (This analysis had not been completed as this report was being finalized. Results will be reported by letter or in a subsequent report.)

No PCB's were detected in the sample. The lab noted the product is a petroleum product with a carbon chain number of approximately 18 and fell well within the boiling range for diesel. The diagram (Figure 3) below illustrates petroleum hydrocarbon "chain numbers" and their respective boiling ranges.

Figure 3



Complete laboratory reports for the above samples are attached in Appendix B. Chromatograms for the free product and a diesel standard are also attached for comparison.

DISCUSSION

Benzene and toluene are generally very low or absent as components of diesel and are more commonly associated with gasoline. Xylene however, and sometimes ethylbenzene, are associated with diesel. Thus soils contaminated with diesel tested as expected: BTE was missing but low levels of xylene were detected in two samples. The ground water results are perplexing in that diesel was absent as was toluene, but low levels of benzene and ethylbenzene were present. Xylene occurred in only one sample at 0.7 ppb. Ground water samples were also tested for gasoline and none was detected. Subsequent sampling of these two wells will possibly shed light on this discrepancy.

REGULATORY FRAMEWORK

Regulations regarding hazardous waste are found in Title 22 of the California Code of Regulations. The DHS is the enforcing agency for Title 22 with regard to human health while the Regional Water Quality Control Board (RWB) is responsible for the protection of water resources. In Alameda County, the Department of Environmental Health (ACHD) is authorized by the RWB as the lead agency to manage fuel leak cases and implement state regulations.

There are two types of regulatory levels for classifying hazardous wastes in soil: total threshold limit concentrations (TTLC's) and soluble threshold limit concentrations (STLC's). These limits have been established only for certain compounds and do not include gasoline, diesel or waste oil - hydrocarbons of prime concern at CASS. TTLC's and STLC's for metals analyzed at CASS are as follows:

	Copper	Lead	Zinc
TTLC	2500	1000	5000
STLC	25	5	250

DHS has also established action levels for select chemicals in both water and soils and the RWB determines levels of fuel hydrocarbons allowable in soil. Both of these levels serve as guides to clean-up levels and are determined on a site specific basis. Factors to be considered include the depth to ground water, subsurface fractures, precipitation, ground water use and permeability of soil.

When fuels exceed 100 ppm in soils this is generally regarded as a guideline as to whether further action is required. (This action level is usually increased in the case of aliphatics such as diesel.) The RWB estimates that when this level is exceeded a large discharge may have occurred. The level of clean-up however is "determined by assessing the potential impact of residual soil contamination on the ground water" (Tri-Regional Recommendations, RWB 1988).

Action levels are superceded by maximum contaminant levels (MCLs) which are state drinking water standards found in Title 22. MCLs have not been established for fuel hydrocarbons although MCL's do apply to BTEX compounds (volatile fraction of fuels).

REVIEW OF UNDERGROUND FUEL LEAK CASES

MacKinnon Environmental Consulting generally attempts to review nearby subsurface investigations on file at the Oakland office of the Regional Water Quality Control Board (RWQCB). A number of soil and ground water contamination problems were found to exist in the nearby area. Within a 1/2 mile radius of the Peralta Street site are 15 reported releases. The locations of these releases are shown by number on Figure 1; the sites corresponding to these numbers are listed in Table 5.

Fuel leak cases are classified A to C by the Regional Water Quality Control Board (RWQCB) according to soil and/or ground water impact. In addition they are priority ranked from 1 to 3 depending on the severity of the problem. (See key below).

Site specific ground water flow gradients are reported for two of these sites. These include flow to the south at Ned Clyde Construction and flow to the northwest at Zellerbach Oakland; Kalmar also estimated a northwest flow but with reservations as to the accuracy.

TABLE 5

Site	Location	Classification
1. Albert Plute	1229 28th St.	A3
2. Zellerbach	2230 Willow	A3
3. Pacific Supply	1735 24th St.	B3
4. E&R Auto Wreckers	3230 Ettie St.	B3
5. Collins Property	2452? Magnolia St.	B3
6. Ned Clyde Construction	2311 Adeline St.	B3
7. EBMUD	2130 Adeline	B3
8. Kalmar AC	2792 Cypress St.	B3
9. NW Venetian Blinds	1218 24th St.	Toxic
10.Kantor's Furniture	2525 Cypress St.	C
11.PG&E	2121 Peralta St.	C
12.Hang Lung	1960 Adeline	*
13.Aralex	958 28th St	*
14.Toland & Sons	2635 Peralta	*
15.E-Z Est	2528 Adeline	Toxic*

A = ground water contamination
B = soil contamination C = no further action required
Toxic = chemicals other than fuels are involved
* = RWB staff could not locate file; no information available.

In most of the cases above it can be assumed ground water is flowing away from the CASS site, the case is closed or is limited at present

to soil contamination. The releases of possible concern are #1, 5 and 9 on the list above because they are less than two blocks away and might be upgradient of CASS. Diesel contamination in soil and ground water is reported at Plute (#1) and NW Venetian Blinds (#9) has a problem involving chlorinated solvents, polynuclear aromatics and lead. Collins (#5) had a gasoline spill, however their address needs to be verified. The RWB files will be checked in three months for further development on these two cases and the four files where information was not available.

CONCLUSIONS

The underground tanks at the CASS site have been removed. The two former tanks appear to have been the main sources of contamination at the property. Records indicate that the small tank on 28th Street contained gasoline and the large tank on the south side of the property contained diesel.

The ground water gradient in this area is known to be low and can be expected to flow in a westerly direction towards San Francisco Bay. The direction of ground water flow at the site is inconclusive however due to the free product in MW2. Other studies in the area suggest that flow may vary from northwest to southwest.

Diesel

The major problem appears to be the free product present in MW2. This is a priority for clean-up. Tests confirm the product falls within the diesel range of hydrocarbons. Fortunately the explosion hazard of diesel is quite low compared to gasoline. The contamination is probably derived either from the diesel tank itself or piping leakage. Diesel was not detected in the water from wells closest to the pit however so that it seems likely that the piping is the main culprit.

Soil contaminated at concentrations of 300 to 800 ppm diesel was found at depths of approximately 11 feet in five separate borings (MW1, MW2, MW3, B1 and B5). This is the approximate depth to ground water and suggests diesel is migrating along the surface of the water table. Diesel was not found above this depth in the four samples from the monitoring wells. BTEX were not detected in soil samples except for samples from MW2 and MW3, at approximately 11 feet, which contained 15.3 and 52.7 ug/kg xylene respectively.

Neither diesel nor gasoline were detected in the ground water from MW1 or MW3. Low levels of BTEX were found but are below maximum contaminant levels (MCLs) with the exception of benzene (1.8 ppb) in MW3. Benzene is a contaminant of concern because it is a carcinogen and has a very low MCL (1ppb). MCLs however commonly apply to drinking water aquifers and the water table in this area can essentially be considered non-potable. The water table lies within Bay Mud, a low permeability unit which cannot properly, by definition of yield, be regarded an aquifer.

Metals and Waste Oil

Low levels of copper, zinc and/or lead were found in the five shallow soil samples in the ITP yard. However in all cases the metals are well

below total threshold limit concentrations (TTLC's). Considering the samples were taken from soil in a steel recycling yard, these results are better than could be expected. Soluble threshold limit concentrations (STLC's) were not tested and are probably not warranted in an industrial area such as this one.

Six shallow soil samples were tested for waste oil: five from the ITP yard and one from MW1. Two of these had less than 100 ppm, one was not detected and two (B3 and B5) exceeded 2000 ppm. The latter results, while high are not unexpected for a steel yard. B5 was inadvertently drilled next to a buried engine which was probably the source of the oil (and possibly diesel) in this boring. Waste oil is fairly immobile so that it tends to stay in place rather than migrate into the water table. Precautions need to be taken to prevent further spills in this area and it is recommended that any obviously stained areas be dug up and stored on site. (A telephone conversation with the lab indicates the sample from MW1 has "high" levels of waste oil, but results have not been reported as this report is being finalized. The results will be issued in a separate letter or subsequent report.)

Gasoline

Analysis of four soil samples from the gasoline pit and piping were well below the 100 ppm guideline except for one sample in which results were 340 ppm. Further action is required due to the sample which exceeds action limits.

RECOMMENDATIONS

Due to the contamination found at the site additional work is recommended in both gasoline and diesel pit areas. The soil that was left in the tank pits (for safety reasons) will be removed by R.J. Miller Co. This is being scheduled at present.

Gasoline Contamination

Following removal of soil from the gasoline pit further excavation is being recommended in the area of contamination. The native soil will then be tested in this area; two additional samples from the sidewalls will also be collected and composited. The goal is to meet all of the conditions required for "no further action" (Tri-Regional Recommendations, RWB 1988) as outlined below:

A. Total petroleum hydrocarbons (TPH) less than 100 ppm.
B. No TPH below the high ground water level.
C. The soil has low permeabilty.
D. Ground water has not been impacted.

If condition A and B can be met by sampling soil in the "high ground water level" then D should also be satisfied. Condition C is met by the predominance of clay at the site.

Consideration should be given to the location of this site in an industrial area with numerous contamination cases nearby. More importantly the water table in this area is essentially non-potable and lies within Bay Mud.

Diesel Contamination

Further work is also needed on the south side of the property in the vicinity of the diesel pit. Additional borings and monitoring wells (see Figure 2 for proposed locations) are recommended to help define the extent of the diesel plume. Two wells, one in the inferred upgradient and one in the inferred downgradient direction, are proposed. Ground water from MW1 and MW3 will be sampled at the same time the two new monitoring wells are sampled.

Two soil borings will be drilled in 26th Street, two in the ITP yard and one at the corner of 26th and Peralta. Soil samples will be collected from the borings just above the present water level as an indication of contamination which may have migrated along the water table.

Drilling in the street is contingent on permit approval by the City of Oakland; their office estimates permit processing to require at least one month. Thus field work is only tentatively planned for early August. A quarterly progress report should be submitted to Alameda County Department of Health (ACDH) however by October 1 ,199Ø.

Remedial action is required in the vicinity of the diesel contamination. Removal of free product is a priority item and will hopefully be initiated in the next few months. Proposals are being submitted to CASS at present and options are being evaluated as to efficiency and economic viability. MacKinnon Environmental Consulting (MEC) will oversee these efforts at least initially.

Other Work

A hazardous materials inventory is being compiled for CASS by a certified industrial hygienist. Upon completion, an employee training program will be prepared. These two items are being initiated to comply with the business plan requirements of the California Health and Safety Code.

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A copy of this report should be submitted to Lester Feldman of the RWB and Gil Wistar of ACDH for their review. MEC will mail copies to these agencies and other parties at your request.

WARRANTY

MacKinnon Environmental Consulting warrants all services to be of high professional quality. No other warranty, either expressed or implied, as to quality or result to be achieved as a consequence of this work, is made.

This report provides an assessment of the potential problems noted and represents a professional opinion. All reports and recommendations are based upon conditions and information made available to MacKinnon Environmental to date. Liability is not assumed in cases where the client or other parties involved have failed to disclose known environmental information. No responsibility is assumed for the control or correction of conditions or practices existing at the premises of the client. Data available from future subsurface exploration may modify the conclusions and recommendations of this report.

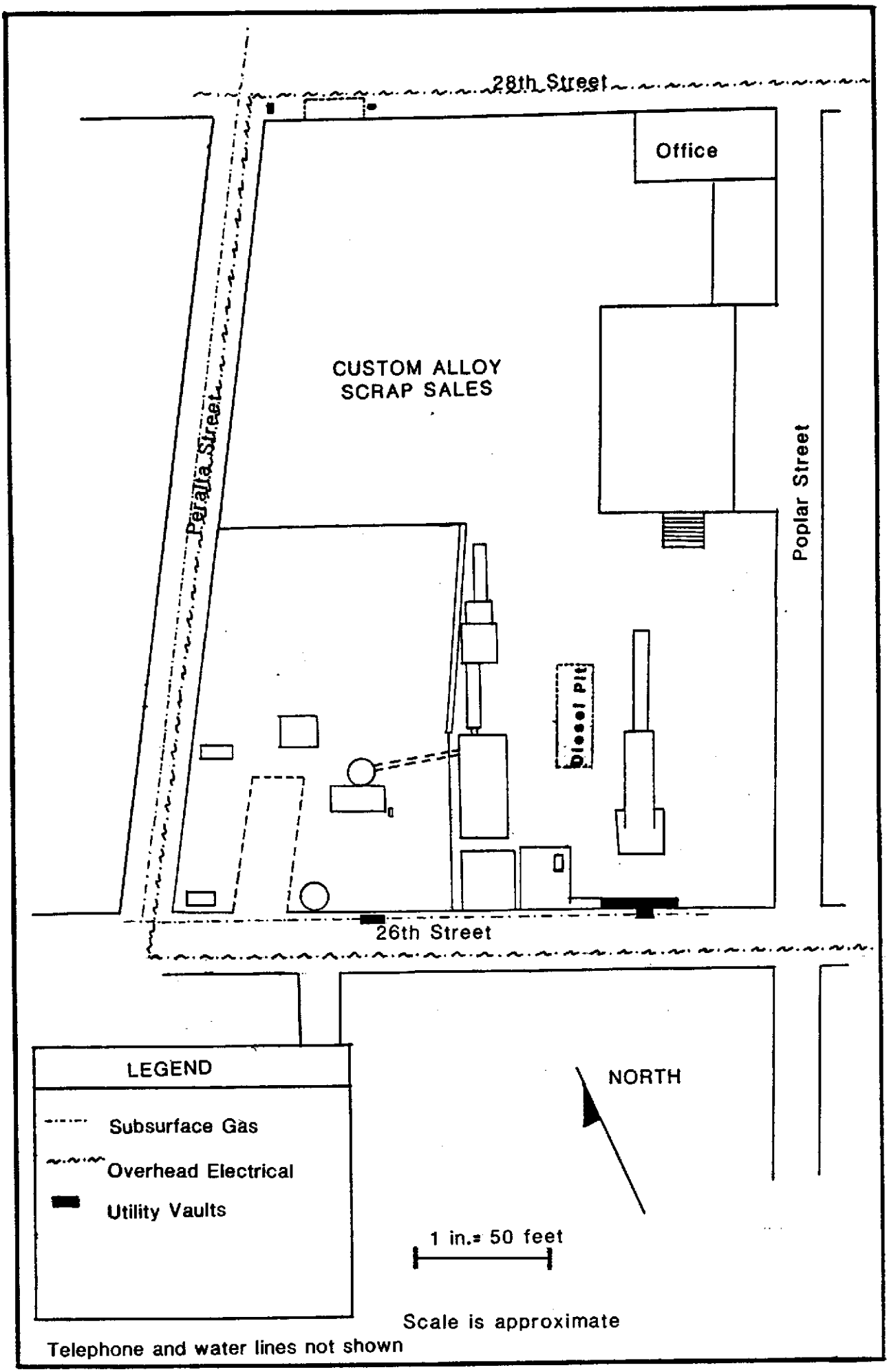

FIGURE: 4 LOCATION OF UTILITIES

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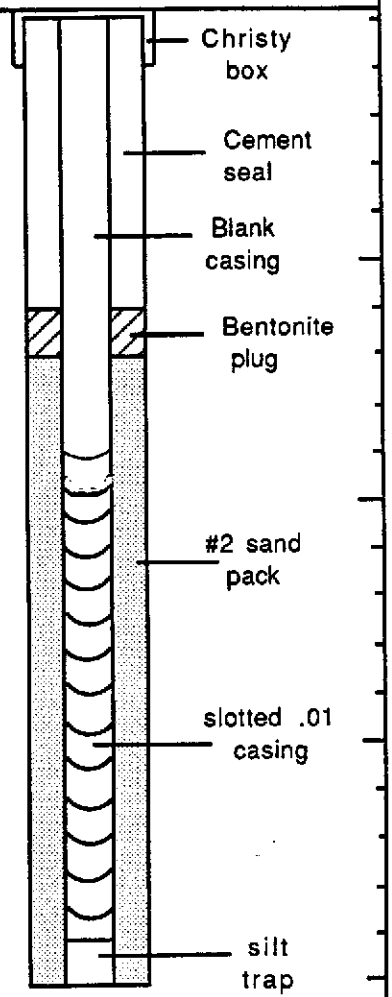
APPENDIX A
BORING LOGS AND SITE SURVEY

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: MW1
LOCATION: ~20' S of diesel pit		DATE: 5-16-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: >10'		DRILLER: Kvilhaug
DRILLING METHOD: Hollow stem auger, 11"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	UCSC/Lithology	Graphic Symbol
0				7" concrete/1' silt and gravel 5" asphalt and brick rubble	FILL	
				black SILTY CLAY (Bay Mud); moist; no odor but soil oily at 5-5.5'	OL	
5	⊠		4-6-12	blue-green SILTY CLAY; stiff; moist; no odor - appears "clean"		
			8-12-22	becomes lighter in color and slightly mottled at 8"		
10	⊠		5-12-30-50	light brown mottling increases at 10'; also contains minor sand and small gravel	CL	
15				light brown SILTY CLAY - cuttings contain coarse sand and small gravel; wet		
20				T.D. 20'		



REMARKS

⊠ = sample analyzed

2' sampler at 10'-12'

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: MW2
LOCATION: ITP yard near Diesel pump		DATE: 5-15-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: ~11'-12'		DRILLER: Kvilhaug
DRILLING METHOD: Hollow stem auger, 11"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	UCSC/Lithology	Graphic Symbol	WELL CONSTRUCTION
0				Gravel base 6"			Christy box
				black CLAY and SILT with rubble; slightly moist below 2'	FILL		
			3-6-10	black SILTY CLAY (Bay Mud); moist; no odor			Cement seal; Blank casing
5	⊠				O L/ C L		Bentonite plug 8.7'
			12-18-25	blue-green very SILTY CLAY; plastic; moist; medium stiff to soft; mottled; slight odor; discoloration below 10'; wet			
10	⊠		10-15-25	very coarse SAND with small Gravel, Silt and minor Clay; saturated; odor	S M		#2 sand pack
				blue-green Gravelly-Sandy CLAY; wet			slotted .01 casing
15					C L		
			5-6-8	light red-brown SILTY CLAY with fine Sand; mottled light grey; stiff; wet; no odor			silt trap
20				T.D. 19.5'			

REMARKS

⊠ = sample analyzed

oily product came up outside of last 10' of auger after setting sand and bentonite

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: MW3
LOCATION: ~10' NW of diesel pit		DATE: 5-16-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: undetermined during drilling		DRILLER: Kvilhaug
DRILLING METHOD: Hollow stem auger, 11"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	UCSC/Lithology	Graphic Symbol	WELL CONSTRUCTION
0				8" concrete/12"gravel 4" silt, sand and gravel	FILL		Christy box
			6- 8- 15	black SILTY CLAY with minor peat; soft; moist; no odor	OL		Cement seal Blank casing
5	⊠						Bentonite plug
			6- 11- 28- 40	blue-green SILTY CLAY; mottled light brown with very fine sand; moist; medium stiff	CL		#2 sand pack
10	⊠	8"		color change between 12'-13' to olive			slotted .01 casing
15				light brown SILTY CLAY - cuttings mixed with coarse sand and gravel; wet			
				T.D. 19.7'			silt trap
20							

REMARKS

⊠ = sample analyzed

Sand and gravel in cuttings below 16' may represent a permeable lense in clay or may be present within clay itself.

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: SB-1
LOCATION: ~14' from gate and ~33' SE of MW2		DATE: 5-15-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: ~11'		DRILLER: Kvilhaug
DRILLING METHODS : Hollow stem auger, 8"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	USCS	Graphic Symbol	WELL CONSTRUCTION
0				~8" gravel base			
				brown SAND and SILT with rubble; damp at 2'	Fill		
5	⊠		6-8-15	black SILTY CLAY (Bay Mud) with minor peaty threads; stiff; slightly moist; no odor	OL		
					CL		
				olive-blue SILTY CLAY with fine-grained sand; mottled yellow brown; medium stiff; no odor; saturated at 11'			
10	⊠		7-12-20				
15							
20							

REMARKS

⊠ = boring sample to be analyzed

Boring was backfilled with compacted clay balls and bentonite chips

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: SB2
LOCATION: ~38' N-NW of MW2, ~65' from entrance		DATE: 5-15-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: ~11'		DRILLER: Kvilhaug
DRILLING METHODS : Hollow stem auger, 8"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	USCS	Graphic Symbol	WELL CONSTRUCTION
0				dry soil with wood chips and rubble (mostly metal)			
				dark brown SANDY SILT with clay and rubble; slightly moist	Fill		
5	⊠		4-7-12	black SILTY CLAY (Bay Mud); slightly moist; stiff; no odor	OL		
				bluish-olive very SILTY CLAY; moist; medium stiff to soft; no odor; wet at 11'	CL		
10	⊠		8-12-20				
15							
20							

REMARKS

⊠ = boring sample to be analyzed

Boring was backfilled with compacted clay balls and bentonite chips

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: SB3
LOCATION: middle ITP yard		DATE: 5-15-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH		DRILLER: Kvilhaug
DRILLING METHODS : Hollow stem auger, 8"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	USCS	Graphic Symbol	WELL CONSTRUCTION
0				SILT, GRAVEL, and rubble; dry	Fill		
			7-12-15	black SILTY CLAY; damp; no odor	OL		
5							
10							
15							
20							

REMARKS

⊠ = boring sample to be analyzed

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: SB4
LOCATION: N end of steel yard		DATE: 5-15-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH		DRILLER: Kvilhaug
DRILLING METHODS : Hollow stem auger, 8"		

DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	USCS	Graphic Symbol	WELL CONSTRUCTION
0				gravel base ~6"; dark brown SANDY SILT; dry	Fill		
	⊠	12"	8-12-20	black SILTY CLAY (Bay Mud) with minor peat; damp; no odor	OL		
5							
10							
15							
20							

REMARKS

⊠ = boring sample to be analyzed

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA

BORING LOG

PROJECT NO: CAS-590	PROJECT NAME: CASS	BORING NO: SB5
LOCATION: middle ITP yard near E wall		DATE: 5-16-90
GEOLOGIST: Cinda C. MacKinnon, R.G. (#4316)		Page 1 of 1
GROUND WATER DEPTH: ~11' (based on nearby well)		DRILLER: Kvilhaug
DRILLING METHODS : Hollow stem auger, 8"		

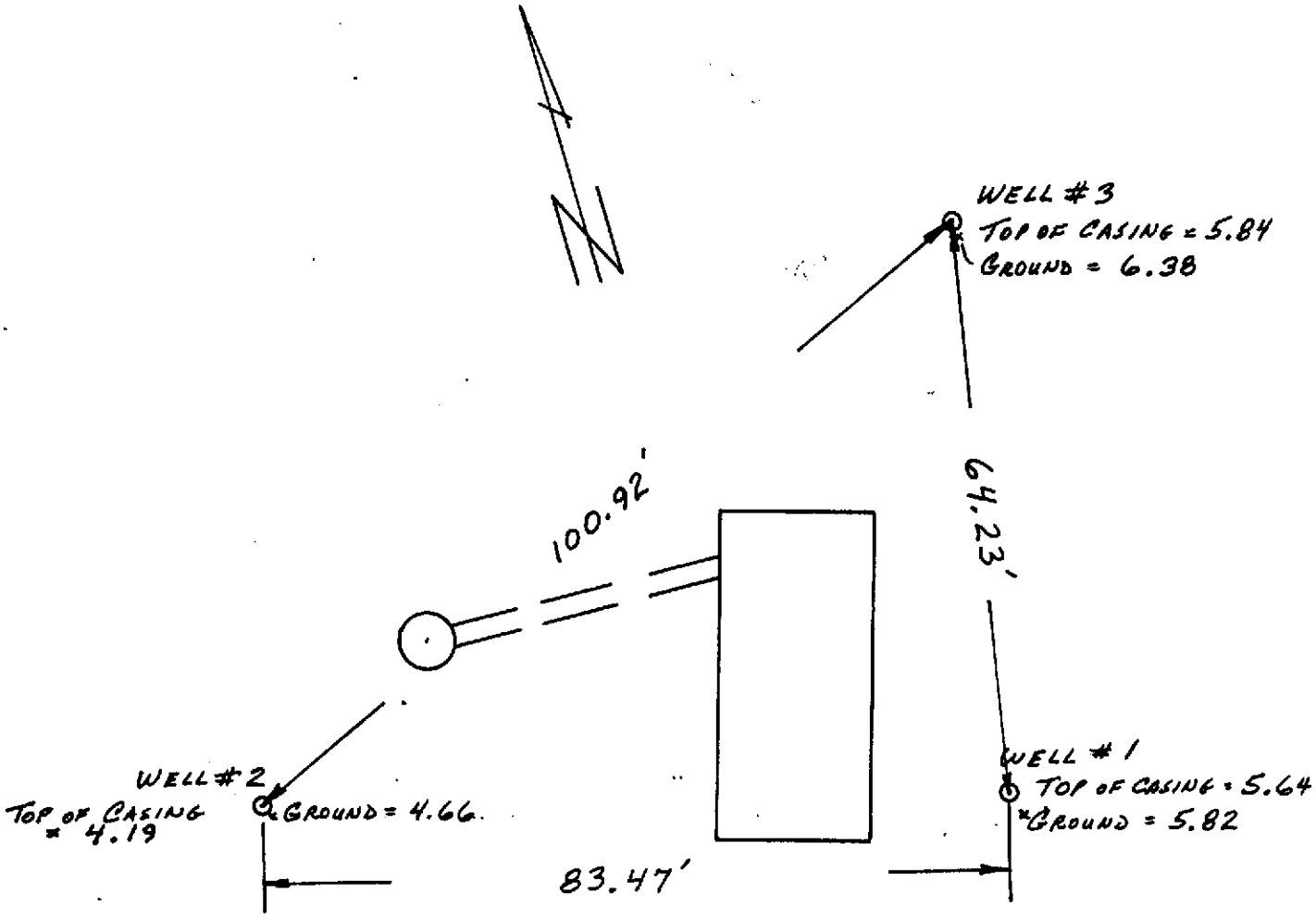
DEPTH	SAMPLE	RECOVERY	BLOWS	DESCRIPTION	USCS	Graphic Symbol	WELL CONSTRUCTION
0				loose, dry, dark brown soil, wood chips, metallic pieces and other rubble	Fill		
5	⊠		38-9-12	black SILTY CLAY (Bay Mud); moist; medium stiff to soft; no odor	OL		
10				blue-grey SILTY CLAY; plastic; moist	CL		
	⊠		7-7-14-25	blue-green SANDY CLAY with silt and small gravel; olive-brown mottling (slight); moist			
15							
20							

REMARKS

⊠ = boring sample to be analyzed

Boring was backfilled with compacted clay balls and bentonite chips

MACKINNON ENVIRONMENTAL CONSULTING
WALNUT CREEK, CA



NOTE:
ELEVATION SHOWN ARE IN FEET ON CITY OF OAKLAND DATUM.

LICENSED LAND SURVEYOR
L Dean Bailey
No. [illegible]
STATE OF CALIFORNIA

SURVEY OF
MONITOR WELL LOCATION AND ELEVATION AT CUSTOM ALLOY SCRAP SALES

FOR
CUSTOM ALLOY SCRAP SALES, INC.

BATES AND BAILEY
LAND SURVEYORS
15 SHATTUCK SQ., BERKELEY, CA 94704 • PHONE 415-843-2007

SCALE: 1" = 20'	APPROVED: L. Dean Bailey	DRAWN BY C.B.
DATE MAY, 1990		JOB No. 13557

APPENDIX B
LABORATORY REPORTS

NARRATIVE

Client: Cinda MacKinnon
Client ID: 2047
Client Set: 2

Receipt Date: 5/15/90
Date Analyzed: 5/18-23/90
Report Date: 5/23/90

Documentation and shipping: No shipping or documentation problems were noted.

Samples: Four soil samples were analyzed for total petroleum hydrocarbons as diesel . A single soil sample was analyzed for BTXE by EPA Method 8020.

Analysis: The free product submitted for analysis was diluted in methylene chloride and anlyzed under the same protocol as the samples. Comparision of the chromatogram of the free product and a representative diesel chromatogram indicates that the free product is a petroleum product in the same boiling point range as diesel. Sample 2047-2-9 and 2047-2-3 contained detectable quantities of hydrocarbons and sample 2047-2-9 contained a trace amount of xylene.

QA/QC: No target analytes were detected above method detection limits in the blank. The matrix spike results are included in this report.

WESTERN ENVIRONMENTAL LABORATORY
ANALYTICAL RESULTS REPORT

Client: CC MacKinnon

Matrix: soil
% Moisture: n/a
Extraction: Sonication
GPC Cleanup: n/a

Date Received: 5-15-90
Date Extracted: 5-23-90
Date Analyzed: 5-23-90
Dilution Factor: 1
Initial Calibration Date: 5-21-90
Laboratory Blank Date: 5-23-90

WEL ID	CLIENT ID	TOTAL PETROLEUM HYDROCARBONS AS DIESEL mg/kg
2047-3-1	W1-5	<10
2047-3-2	W1-11	399
2047-3-3	W3-5	<10
2047-3-4	W3-11	811
2047-3-6	B5-10	814
2047-3-7	W1-7	<10
BLANK	---	<10
	Method Detection Limit	10

QA/QC RESULTS: Spike Recovery

THP-D Percent Spike Recovery	88%
TPH-D Percent Spike Duplicate Recovery	94%
Percent Difference	12%

Release Approved By

John McHone for Victoria Taylo
Release Approved By

WESTERN ENVIRONMENTAL LABORATORY
ANALYTICAL RESULTS REPORT

Client: CC MacKinnon

Matrix: soil
% Moisture: n/a
Extraction: Sonication
GPC Cleanup: n/a

Date Received: 5-15-90
Date Extracted: 5-23-90
Date Analyzed: 5-23-90
Dilution Factor: 1
Initial Calibration Date: 5-21-90
Laboratory Blank Date: 5-23-90

WEL ID	CLIENT ID	TOTAL PETROLEUM HYDROCARBONS AS DIESEL mg/kg
2047-2-1	W2-5	<10
2047-2-3	B1-10	356
2047-2-5	B2-10	<10
2047-2-9	W2-10	780
BLANK	---	<10
	Method Detection Limit	10

QA/QC RESULTS: Spike Recovery

THP-D Percent Spike Recovery	88%
TPH-D Percent Spike Duplicate Recovery	94%
Percent Difference	12%

Release Approved By

Release Approved By

EPA METHOD 8020 ANALYSIS DATA SHEET
SAMPLE: 2047-3-2

Client: CC Mackinnon
Client ID: W1-11
Matrix: soil
% Moisture: n/a
Extraction: Purge and Trap
GPC Cleanup: n/a

Date Received: 5-16-90
Date Extracted: n/a
Date Analyzed: 5-18-90
Dilution Factor: 1
Initial Calibration Date: 5-16-90
Laboratory Blank Date: 5-18-90

CAS Number	Compound	Concentration (ug/kg)	MDL (ug/kg)
71-43-2	Benzene	<5.0	5.0
108-88-3	Toluene	<5.0	5.0
100-41-4	Ethlybenzene	<5.0	5.0
1330-20-7	Xylenes	<15.0	15.0

Release Approved By

Release Approved By

WESTERN ENVIRONMENTAL LABORATORY

EPA METHOD 8020 ANALYSIS DATA SHEET
SAMPLE: 2047-2-9

Client: CC Mackinnon
Client ID: MW2-10
Matrix: soil
% Moisture: n/a
Extraction: Purge and Trap
GPC Cleanup: n/a

Date Received: 5-15-90
Date Extracted: n/a
Date Analyzed: 5-18-90
Dilution Factor: 1
Initial Calibration Date: 5-16-90
Laboratory Blank Date: 5-18-90

CAS Number	Compound	Concentration (ug/kg)	MDL (ug/kg)
71-43-2	Benzene	<5.0	5.0
108-88-3	Toluene	<5.0	5.0
100-41-4	Ethlybenzene	<5.0	5.0
1330-20-7	Xylenes	15.3	15.0

Release Approved By

Release Approved By

EPA METHOD 8020 ANALYSIS DATA SHEET
SAMPLE: 2047-3-4

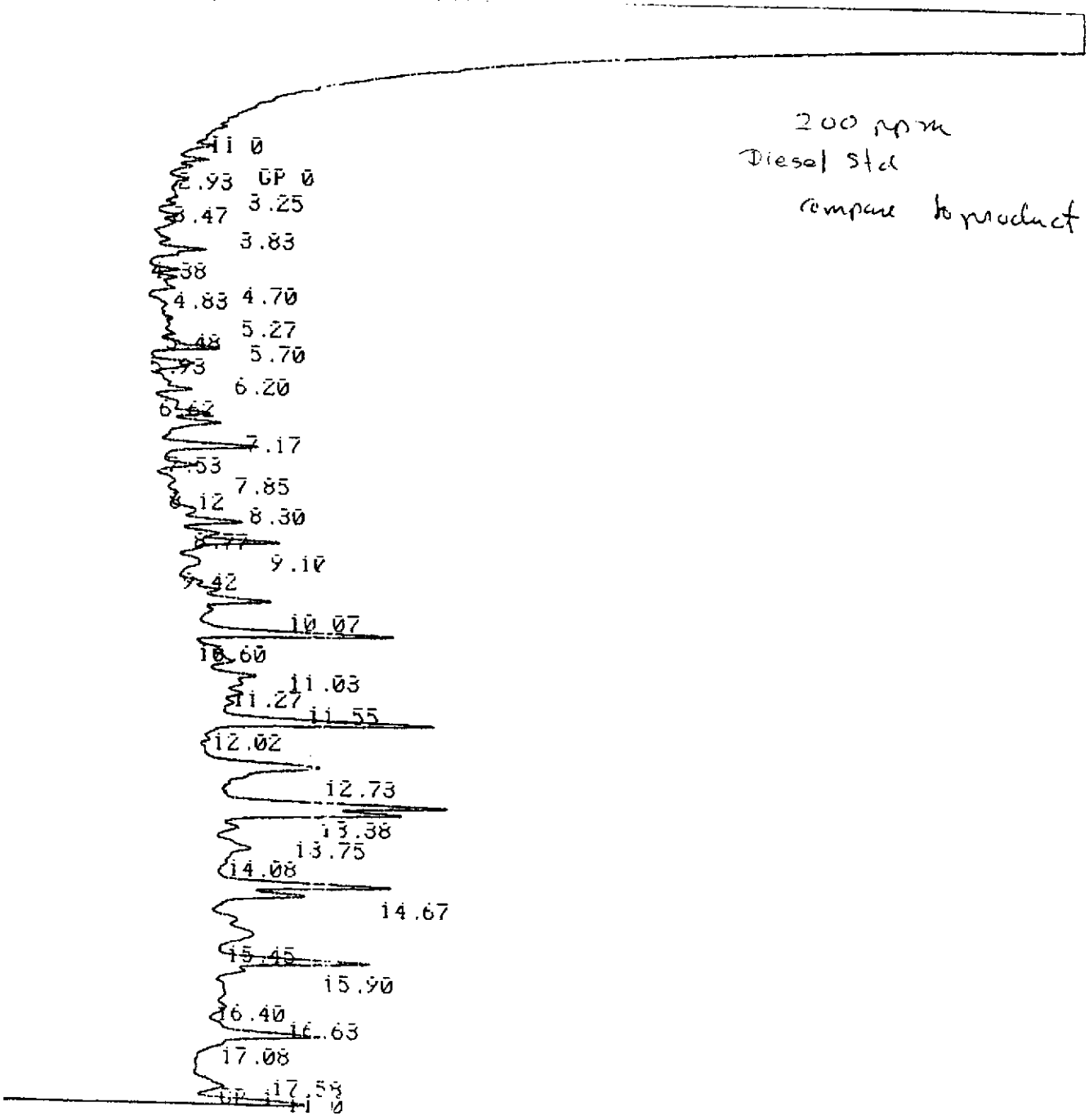
Client: CC Mackinnon
Client ID: W3-11
Matrix: soil
% Moisture: n/a
Extraction: Purge and Trap
GPC Cleanup: n/a

Date Received: 5-16-90
Date Extracted: n/a
Date Analyzed: 5-18-90
Dilution Factor: 1
Initial Calibration Date: 5-16-90
Laboratory Blank Date: 5-18-90

CAS Number	Compound	Concentration (ug/kg)	MDL (ug/kg)
71-43-2	Benzene	<5.0	5.0
108-88-3	Toluene	<5.0	5.0
100-41-4	Ethlybenzene	<5.0	5.0
1330-20-7	Xylenes	52.7	15.0

Release Approved By

Release Approved By for Victoria Taylor



8010 05/23/90 10:44:52 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 657 INDEX 408 BIN 68

PEAK#	AREA%	RT	AREA BC
1	0.478	2.93	10179 02
2	0.381	3.25	8111 02
3	0.455	3.47	9700 02
4	0.568	3.83	12100 02
5	1.248	4.38	26603 02
6	0.438	4.7	9329 02
7	0.756	4.83	16103 02
8	0.437	5.27	9323 02
9	0.684	5.48	14574 02
10	0.442	5.7	9414 02
11	1.354	5.93	28849 02
12	0.93	6.2	19812 02
13	0.9	6.62	19183 02
14	2.942	7.17	62685 02

BIN (72) = FILE (1.) =
DS1.A FAULT 100: AT 15125

011

FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
ENABLE BASELINE DRAWING? [Y/N] (N)
STORAGE MENU? [Y,N] (N)

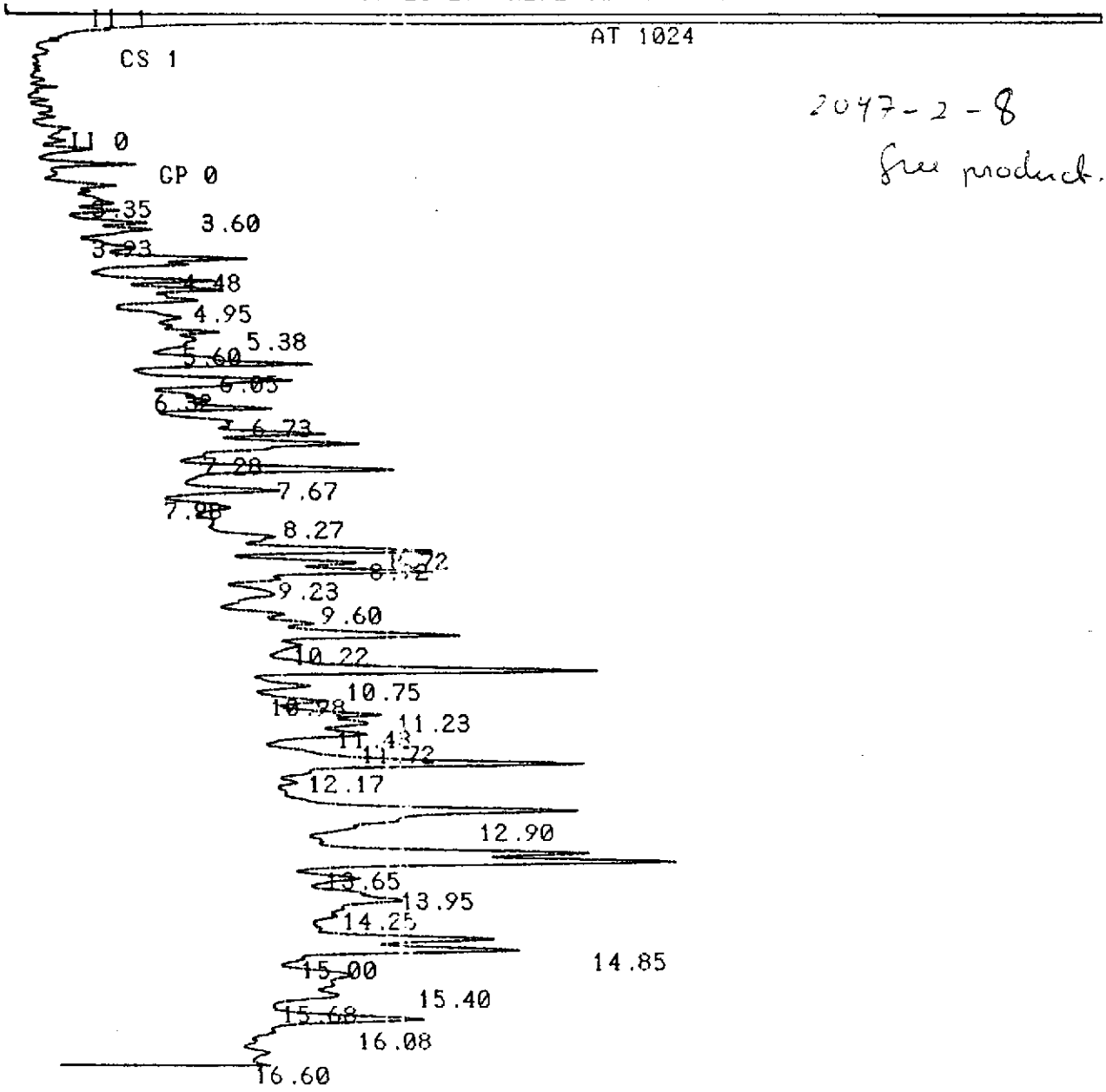
FUNCTION NUMBER [0-10] (0) 1

1. CHROMATOGRAM REPROCESSING

BIN (72) = 73 FILE (1.) =

PRESS 'INJECT' TO BEGIN.

CHANNEL A INJECT 05/23/90 15:26:27 REPLAYED FROM BIN # 73



010 05/23/90 15:26:27 CH= "A" PS= 1.

TOTAL PETROLEUM HYDROCARBONS
GRAVIMETRIC METHOD SM5520F

Lab Name: TMA/Norcal
Client: WESTERN ENVIRONMENTAL
Matrix: Soil

Date Received: 5/16/90
Date Analyzed: 5/24/90

TMA/Norcal ID	Client ID	Results (mg/kg)	Detection Limit (mg/kg)
N005317-1A	2047022 B1	70	50
N005317-2A	2047024 B2	<50	50
N005317-3A	2047026 B3	2890	50
N005317-4A	2047027 B4	99	50

Renée Doherty
Analyst

Data Release Authorized By

TOTAL PETROLEUM HYDROCARBONS
GRAVIMETRIC METHOD SM5520F

Lab Name: TMA/Norcal
Client: WESTERN ENVIRONMENTAL
Matrix: Soil

Date Received: 5/17/90
Date Analyzed: 5/23/90

TMA/Norcal ID	Client ID	Results (mg/kg)	Detection Limit (mg/kg)
N005345-1A	204735 B5	2410	50

Analyst

Data Release Authorized By

Western Environmental
Page 2
June 5, 1990

TABLE I

TMA/Norcal I.D.:	NO-05-317-1A	NO-05-317-2A	Detection	EPA
Client I.D.:	2047022 B1-4	2047024 B2-4	Limit	Method
UNITS: mg/Kg				
Copper	14	13	3	6010
Lead	<7	<20 *	7	6010
Zinc	27	22	4	6010

* Higher detection limit due to spectral interference.

TABLE II

TMA/Norcal I.D.:	NO-05-317-3A	NO-05-317-4A	Detection	EPA
Client I.D.:	2047026 B3-3	2047027 B4-3	Limit	Method
UNITS: mg/Kg				
Copper	22	18	3	6010
Lead	240	15	7	6010
Zinc	560	31	4	6010

TABLE III

Assay: Polychlorinated Biphenyls
EPA Method: 600/4-81-045 September 1982

TMA/Norcal I.D.	Client I.D.	Result (mg/Kg)	Detection Limit (mg/Kg)
NO-05-317-05A	2047028 WX-2	<1	1

TABLE I

TMA/Norcal I.D.:	NO-05-345-01A	Detection	EPA
Client I.D.:	204735 B5-3	Limit	Method
UNITS: mg/Kg			
Copper	19	3	6010
Lead	42	7	6010
Zinc	52	4	6010

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 80882
CLIENT: Mackinnon Environmental
CLIENT JOB NO.: CASS/CAS590

DATE RECEIVED: 05/18/90
DATE REPORTED: 05/25/90

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	W-1	0.4	ND<0.3	1.0	0.7
2	W-3	1.8	ND<0.3	0.5	ND<0.3
3	W-3 Duplicate	1.8	ND<0.3	0.5	ND<0.3

ug/L - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg
Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 104%: Duplicate RPD = <8%

Richard Srna, Ph.D.
Laboratory Manager

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 80882
CLIENT: Mackinnon Environmental
CLIENT JOB NO.: CASS/CAS590

DATE RECEIVED: 05/18/90
DATE REPORTED: 05/25/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/L) Gasoline Range	Diesel Range
1	W-1	ND<1	ND<1
2	W-3	ND<1	ND<1

mg/L - parts per million (ppm)

Method Detection Limit for Gasoline and Diesel in Soil: 10 mg/Kg
Method Detection Limit for Gasoline and Diesel in Water: 1 mg/L
Method Detection Limit for Diesel in Water: 0.05 mg/L

QAQC Summary:

Daily Standard run at 200mg/L: RPD Gasoline = 5%
RPD Diesel = 10%
MS/MSD Average Recovery = 99%: Duplicate RPD = 0%

Richard Srna, Ph.D.
Laboratory Manager

2711 Alcatraz Ave
Berkeley CA 94705
415-547-2332

WESTERN
ENVIRONMENTAL
LABORATORY

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME: Mackinnon	NO. OF CONTAINERS	Waste Oil	Metals	5520 E&F	Cu Pb Zn	PCBs in oil	REMARKS
SAMPLERS: (Signature)								

STA. No.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	Waste Oil	Metals	5520 E&F	Cu Pb Zn	PCBs in oil	REMARKS
	5-16				2047022		✓	✓				two week turnaround on waste oil + PCBs
					2047024		✓	✓				
					2047026		✓	✓				three week turnaround on metals
					2047027		✓	✓				
					2047028				✓			

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Victoria Taylor	5/15 120				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	
		Robert Fox	5/16/90 1:20		

CHAIN-OF-CUSTODY RECORD

R/A Control No. _____

C/C Control No. 50864

PROJECT NAME/NUMBER CASS OAK / CAS-590

LAB DESTINATION W. Environ.

SAMPLE TEAM MEMBERS C.C. MacKinnon

CARRIER/WAYBILL NO. _____

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
W1-5'	S of D. Pit	5-16-90	Soil	brass	Diesel / WASTE OIL / BTEX tested only	—
W1-10'	" " " "				D/BTEX	—
W3-5'	NW of D " "				diesel only	—
W3-10'	NW " " "				D/BTEX	—
B5-3	ITP				— ✓	✓
B5-10'	ITP				diesel HOLD	—
W1-7'	S of D. Pit				diesel only	—

COPY

Special Instructions: Verify if unknown product in W1-5 and W3-5' is not diesel prior to test

Possible Sample Hazards: W1-5 unknown product

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: C. MacKinnon, MEC 5-16-90 1812

   Received By: D. Taylor WEL 5-16-90 1812

2. Relinquished By: _____

   Received By: _____

3. Relinquished By: _____

   Received by: _____

4. Relinquished By: _____

   Received By: _____

WHITE - To accompany samples
YELLOW - Field copy

Lab No. 83043

CHAIN OF CUSTODY AND ANALYSIS REQUEST

CONSULTANT'S NAME MacKinnon Environmental ~~SAMPLER'S NAME~~ 930-9272

PROJECT MANAGER Cinda MacKinnon LABORATORY DESTINATION Superior

PROJECT NO. CASS-591 WATER

Sample ID	Matrix*	TPH Diesel	~~TPH Low~~ Level D	TPH G+BTXE	Oil & ~~Grease~~	8010 ~~Halogen-~~ated	Metals ~~(Zn, Cr, Cd, Pb)~~	Others	Date Collected	Containers
W7	Water		diesel 50 ppb	BTEX (only)					5-2-91	2 glass (1 VOA, 1 amber)
~~XXX~~										
W3				BTEX						
W4				BTEX						
W5				BTEX						
W6				BTEX and TPH gasoline						

Please initial: ICP

Samples Stored in ice. ~~no~~ yes

Appropriate containers. yes

Samples preserved. NO

VOA's without headspace. yes

Comments: OK

*Matrix: S = Soil, A = Air, W = Water

Relinquished by Cinda MacK	Date/Time 5-3-91 12:10	Received by	
Organization MEC		Organization Express St	
Relinquished by	Date/Time 5/3/91 1:45	Received by	
Organization Express St		Organization	
Relinquished by	Date/Time	Received by 5/3/91	
Organization		Organization Dedeman	

NOTES 5 well samples All to be analyzed for diesel LL and BTEX. W6 to be analyzed for gasoline as well as BTEX & diesel.

5 day turn around important!

Lab.Analysis/Custody