ALTON GEOSCIENCE, INC.

PRELIMINARY SITE INVESTIGATION REPORT

Chevron Service Station 3356

19201 Center Street

Castro Valley, California

Prepared for:

Chevron U.S.A., Inc.
2410 Camino Ramon
San Ramon, California 94583-0804

Alton Geoscience, Inc.

Project No. 30-030

October 31, 1989

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CHEVRON SERVICE STATION 3356
19201 CENTER STREET
CASTRO VALLEY CALIFORNIA

ALTON GEOSCIENCE PROJECT NO. 30-030

This Preliminary Site Investigation was prepared in accordance with current procedures and guidelines established by the governing Regulatory Agencies.

The report was prepared by:

Stephan Rosen
Project Manager

10-31-89
Date

The report was reviewed by:

Al Sevilla
Registered Civil Engineer
No. 26392
Operations Manager

10/31/89
Date

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1.0 INTRODUCTION AND BACKGROUND

At the request of Chevron U.S.A., Incorporated, Alton Geoscience performed a preliminary site investigation at Chevron Station Number 3356, located at 19201 Center Street, in Castro Valley, California. The site vicinity map is presented in Figure 1 and the site plan shown in Figure 2.

1.1 Purpose and Scope

The preliminary site investigation was conducted at Chevron Station Number 3356 in response to Chevron's concern regarding suspected subsurface contamination. Chevron had reviewed a report on the results of a soil vapor contaminant assessment prepared by EA Engineering, Science, and Technology, Inc., dated April 11, 1989. The study identified elevated concentrations of total volatile hydrocarbons in vapor phase near the southwestern ends of both the gasoline tank cavity and dispenser island. Based on their review, Chevron contracted Alton Geoscience to perform a preliminary site assessment.

To address Chevron's concerns, Alton Geoscience installed three ground water monitoring wells; collected and analyzed soil and ground water samples; and determined the gradient and direction of ground water flow beneath the site.

1.2 Site Description

The site is located on the southwest corner of the intersection of Center and Heyer Streets in Castro Valley, California, at an elevation of approximately 285 feet above mean sea level (NGVD-1929). Local topography is irregular and dips to the south/southwest. Chevron Station Number 3356 operates four underground storage tanks and two dispenser islands at the site. Figure 2 shows the layout of the station and underground tanks, as well as the tank contents and capacities. Immediately adjacent properties are commercially developed, properties across Heyer and Center Streets are residentially developed, as shown in Figure 3.

1.3 Regional Geology

The site is located in the Castro Valley Basin. This basin is underlain by the Cretaceous Chico Formation, composed of biotitic, arkosic sandstone and clay shale with major amounts of arenaceous shale, siltstone, and conglomerate. This formation measures between 2,000 and 6,000 feet thick.

Overlying the Chico Formation is late Pleistocene and Holocene age alluvium which consists of irregularly interbedded clay, silt, sand, and gravel, attaining a maximum thickness of about 80 feet. Surficial deposits in the Castro Valley Basin (to approximately 45 feet below grade), consist of brown and grey, sandy, silty clay with an irregularly-bedded layer of brown clay, silty sand, and brown, silty, clay-sand deposits.

1.4 Regional Hydrogeology

The project site is within the Castro Valley ground water basin. The younger Quaternary sediments consisting of sand, silt, and clay are the major water bearing units in the area. Ground water in these unconsolidated sediments is primarily unconfined. The eastern and northern slopes of the basin are the principal recharge areas, with low rates of recharge. Regional ground water flow is generally to the southwest, probably toward the Santa Clara Valley. The Chico Formation basement is made up of consolidated rock and considered non water bearing because of poor water yield. Current development of ground water from this basin is limited for irrigation, domestic, and stock use, however, there is potential for limited additional development.

2.0 FIELD METHODS

The procedures and methods used during field activities were based on review of available background information, and in accordance with applicable regulatory requirements and procedures outlined in Appendix A. The initial phase of this investigation entailed the drilling of three soil borings to depths of approximately 45 feet below grade and the collection of soil samples. If, during the drilling activities, ground water was encountered, monitoring wells were to be constructed and ground water samples collected.

2.1 Soil Borings and Sampling

On August 15, 1989, prior to commencement of drilling activities, Ground Water Protection Ordinance Permit Application Number 89473 was completed by Alton Geoscience and approved by the Alameda County Flood Control and Water Conservation District. A copy of the permit is included in Appendix B.

On August 18, 1989, Alton Geoscience supervised the drilling and installation of three, 4-inch-diameter ground water monitoring wells. The borings were drilled to depths of 45, 45, and 40 feet below grade (Borings B-1, B-2, and B-3, respectively). Soil samples were collected continuously in Boring B-1, to 38 feet below grade where the continuous sampler met with refusal. The remainder of the boring was sampled at 5-foot intervals, as were Borings B-2 and B-3. Drilling activities were performed using a CME 75 drill rig with hollow stem augers by West Hazmat Drilling Corporation of Rancho Cordova, California.

Boring locations B-1 and B-2 were selected to correspond to the two locations previously determined to display elevated concentrations of total volatile hydrocarbons (TVH) in vapor phase (EA Engineering, Science, and Technology, April 1989). The April 1989 soil vapor survey report identified two locations with elevated TVH vapors: near the southern end of the westernmost dispenser island, and near the southwestern end of the gasoline tank cavity. Boring B-3 was drilled adjacent to the waste oil tank.

Saturated soils were encountered at different depths in each boring; see the enclosed boring logs for descriptions. Water levels were allowed to equilibrate prior to monitoring well completion. A description of drilling procedures and soil sampling protocol are included as Appendix A. Copies of the boring logs are presented in Appendix C.

2.2 Ground Water Monitoring Well Construction

The three soil borings (B-1, B-2, and B-3) were converted to ground water monitoring wells MW-1, MW-2, and MW-3, respectively. The wells were constructed of clean, 4-inch-diameter, flush threaded, Schedule 40 polyvinyl chloride (PVC) blank casing and 0.020-inch, slotted PVC casing, to depths ranging between 30 and 39 feet below grade. Well installation procedures and construction details are presented in Appendix D.

2.3 Monitoring Well Development and Sampling

Well development was conducted on September 6, 1989, using an above-ground, air-powered, double diaphragm, positive displacement pump. Each well was developed by purging between 4.5 and 5.5 well volumes of water. An odor of sewage was noted by the field technician during the development of Monitoring Wells MW-1 and MW-2. See water sampling survey

forms for field observations (Appendix E). Water samples were collected on September 8, 1989. The well development and sampling procedures were conducted in accordance with Regional Water Quality Control Board (RWQCB) guidelines, and followed the standard protocol described in Appendix E.

Water samples were collected in clean containers and transported in an iced cooler to GTEL Environmental Laboratories for analysis, following proper chain of custody procedures.

2.4 Ground Water Level Monitoring and Surveying

Ground water level monitoring data collected on September 6, and September 12, 1989 are presented in Table 1. A ground water elevation contour map based on interpretation of the September 12, 1989 monitoring data is presented in Figure 4.

The monitoring wells were surveyed on September 12, 1989, in reference to the Alameda County Department of Public Works Benchmark "HEYCEN," with an elevation of 288.909 feet above mean sea level. The purpose of the survey was to determine the top of casing elevations of the three monitoring wells, for use in calculating the water table elevation at each well. The water table elevation data are used to determine the direction of ground water flow in the shallow aquifer beneath the site, as discussed in Section 3.2, Site Hydrogeology. The survey data is also included in Table 1.

TABLE 1

SURVEY AND WATER LEVEL MONITORING DATA

Well Number	Elevation (feet)*	Depth to Water (feet)	Water Level Elevation (feet)*
	September 6, 1989 Data		
MW-1	285.22	18.30	266.92
MW-2	286.16	13.91	272.25
MW-3	284.46	18.73	265.73
	September 12, 1989 Data		
MW-1	285.22	18.39	266.83
MW-2	286.16	13.97	272.19
MW-3	284.46	17.78	266.68

Note: (feet)* = feet above mean sea level (NGVD-1929)

3.0 SITE GEOLOGY AND HYDROGEOLOGY

A brief description of the pertinent information on the site geology and hydrogeology is presented below.

3.1 Site Geology

Sandy clay was encountered in each boring to depths of approximately 10 to 15 feet below grade, and may represent fill material used at the site. At a depth of 9 feet below grade in Boring B-1, and at depths between 15 and 20 feet below grade in Boring B-2, sand was encountered and persisted throughout the borings, with the exception of a thin clay unit at 25 feet (Boring B-1). The sand encountered in Boring B-1 contained varying degrees of fines and gravel, while the sand in Boring B-2 contained some clay at approximately 20, and minor silt from 25 to 45 feet below grade. At depths greater than 15 feet in Boring B-3, clayey silt was encountered and present to 40 feet below grade. In all borings, the soils encountered at depths greater than 25 feet were semi-indurated. Saturated soil was first observed at approximately 32 feet in Boring B-1, 40 feet in Boring B-2,

and 11 feet in Boring B-3. Sieve analysis of a soil sample collected from the saturated zone in Boring B-1 indicates that this soil is a silty, fine-grained sand.

3.2 Site Hydrogeology

The ground water elevations from Monitoring Wells MW-1, MW-2, and MW-3, as measured on September 12, 1989, were used to develop the ground water elevation contour map shown as Figure 4. The data indicate a south/southwesterly flow direction with an average gradient of approximately 0.08 foot per foot; correlative to topography. The average depth to water beneath the site in these wells was 16.71 feet below grade.

4.0 ANALYTICAL METHODS AND RESULTS

All laboratory analyses of soils and ground water samples were performed by a California state-certified analytical laboratory, using standard test methods of the U.S. Environmental Protection Agency (EPA) and the California Department of Health Services (DHS). A listing of the analytical methods used is presented in Appendix F.

4.1 Soil Analysis and Results

Soil samples collected from Boring B-1 were analyzed for total petroleum hydrocarbons (TPH), low boiling point, benzene, toluene, ethylbenzene, xylenes (BTEX), and organic lead (Pb). Soil samples collected from Boring B-2 were analyzed for TPH (low boiling point) and BTEX. Soil samples collected from Boring B-3 were analyzed for total recoverable petroleum hydrocarbons (TRPH), TPH (both low and high boiling points), BTEX, organic lead, and halogenated organic compounds (HOC). The additional analyses performed on the samples from Boring B-3 were necessary because of the proximity of B-3 to the waste oil tank. The results of the laboratory analyses are presented in Table 2. The official Laboratory Reports and Chain of Custody Records are included in Appendix F, as well as the result of the sieve analysis.

TABLE 2

RESULTS OF
LABORATORY ANALYSIS OF SOIL SAMPLES

Boring	Depth (Feet)	TRPH	TPH	TPH1	B	T	E	X	Pb	HOC
		(Concentrations in parts per million)								
B-1	5.0	---	---	ND1	ND2	ND3	ND3	ND3	ND2	---
	8.0	---	---	ND1	ND2	ND3	ND3	ND3	---	---
	10.0	---	---	ND1	ND2	ND3	ND3	ND3	ND2	---
	20.0	---	---	ND1	ND2	ND3	ND3	ND3	---	---
	30.0	---	---	ND1	ND2	ND3	ND3	ND3	---	---
	31.5	---	---	ND1	ND2	ND3	ND3	ND3	ND2	---
B-2	6.5	---	---	5.8	ND2	ND3	ND3	ND3	---	---
	11.5	---	---	9.9	0.091	ND3	0.10	0.49	---	---
	16.5	---	---	ND1	ND2	ND3	ND3	ND3	---	---
	40.5	---	---	ND1	ND2	ND3	ND3	ND3	---	---
B-3	6.5	250	2.9	ND1	ND2	ND3	ND3	ND3	0.14	ND4
	11.5	14	5.9	ND1	ND2	ND3	ND3	ND3	ND2	ND4
	26.0	---	---	ND1	ND2	ND3	ND3	ND3	---	---

Notes:
TRPH = total recoverable petroleum hydrocarbons
TPH = total petroleum hydrocarbons (high b.p.)
TPH1 = total petroleum hydrocarbons (low b.p.)
B = benzene
T = toluene
E = ethylbenzene
X = xylenes
Pb = organic lead
HOC = halogenated organic compounds
ND1 = not detected at detection limit 1.0 ppm
ND2 = not detected at detection limit 0.05 ppm
ND3 = not detected at detection limit 0.1 ppm
ND4 = see lab sheets for various detection limits
--- = not analyzed

4.2 Water Analysis and Results

Ground water samples collected from Monitoring Wells MW-1 and MW-2 were analyzed for TPH and BTEX. Ground water from Monitoring Well MW-3 was analyzed for the same constituents and also for halogenated organic compounds (HOC) and total oil and grease (TO&G), because of its proximity to the waste

oil tank. The results of the laboratory analyses are presented in Table 3. The official Laboratory Reports and Chain of Custody Record are included in Appendix F.

TABLE 3

RESULTS OF
LABORATORY ANALYSIS OF GROUND WATER SAMPLES

Monitoring Well	TO&G	HOC	TPH	B	T	E	X	Pb
	(Concentrations in parts per billion)							
MW-1	---	---	ND1	ND2	ND2	ND2	ND2	ND3
MW-2	---	---	23	1	4	1	4	ND3
MW-3	1,000	ND4	ND1	ND2	ND2	ND2	ND2	ND3
California Department of Health Services Action Levels For Drinking Water Standards (Concentrations in parts per billion)								
				0.7	100	680	1,860	50*

Notes:
TO&G = total oil and grease
HOC = halogenated organic compounds
TPH = total petroleum hydrocarbons
B = benzene
T = toluene
E = ethylbenzene
X = xylenes
Pb = lead
ND1 = not detected at 1.0 ppb
ND2 = not detected at detection limit 0.5 ppb
ND3 = not detected at detection limit 50 ppb
ND4 = see lab sheet for various detection limits
ppb = parts per billion
--- = not analyzed
50* = Maximum Contaminant Level (CA Administrative Code, Title 22)

5.0 DISCUSSION OF RESULTS

The results of the laboratory analyses of soil and ground water samples collected during this investigation are presented below.

5.1 Soil

No detectable concentrations of TPH, BTEX, or organic lead were present in the soil samples collected from Boring B-1. Detectable concentrations of TPH were present in the samples from 6.5 and 11.5 feet below grade in Boring B-2 (5.8 and 9.9 parts per million (ppm), respectively). The sample from 6.5 feet below grade had nondetectable concentrations of BTEX, while 0.091 ppm benzene, 0.10 ppm ethylbenzene, and 0.49 ppm xylenes were present in the sample from 11.5 feet. TPH and/or BTEX were not detected in soil samples from Boring B-3. However, 250 ppm of total recoverable petroleum hydrocarbons (TRPH) and 2.9 ppm of TPH (high boiling point) were detected in the sample collected from 6.5 feet below grade. Organic lead was detected at 0.14 ppm in this sample, but halogenated volatile organics (HVO) were not detected. At a depth of 11.5 feet in Boring B-3, TRPH was present at a concentration of 14 ppm and TPH (high boiling point) at 5.9 ppm. No detectable concentrations of organic lead and/or HOC were detected in this sample.

5.2 Ground Water

Laboratory analyses of ground water samples demonstrated that detectable concentrations of TPH and BTEX were not present in Monitoring Wells MW-1 and MW-3. The ground water sampled from MW-2, however, had detectable concentrations of TPH (23 ppm) and BTEX (1, 4, 1, and 4 parts per billion (ppb), respectively). Only benzene in this sample exceeds the California Department of Health Services action level for Drinking Water Standards of 0.7 ppb. The sample from MW-3 was also tested for HOC, and total oil and grease; HOC were not detected, however, total oil and grease was detected at a concentration of 1,000 ppb. No organic lead was detected in the ground water sampled from this site.

6.0 FINDINGS AND CONCLUSIONS

Three soil borings were drilled and ground water monitoring wells installed to depths of approximately 45 feet below

grade through soils consisting of sandy clay, sands with fines, and clayey silt. At approximately 25 feet below grade, the soils became semi-indurated. Saturated soils were encountered at varying depths in the borings, and ground water was observed to equilibrate at approximately 16.71 feet below grade in the wells, for an average elevation of 268.57 feet above mean sea level (NGVD-1929).

The ground water elevation contour map constructed from the water level and survey data collected from the site indicate a relatively steep south/southwesterly ground water flow direction beneath the site. Ground water flow direction is correlative to surface topography.

Field and analytical data do not support the findings of the previous soil gas survey study with regard to potential contamination near the dispenser island. Petroleum hydrocarbon constituents were not detected in the soil samples from Boring B-1 (adjacent to where concentrations of TVH in vapor phase had previously been detected). The presence of gasoline-range hydrocarbons in the soil samples from 6.5 and 11.5 feet below grade in Boring B-2, appear to correlate to the previous study, however, these concentrations are limited to the same stratigraphic horizon as the gasoline tank cavity, and are both less than 10 ppm. Detectable concentrations of TRPH were present in Boring B-3 adjacent to the waste oil tank at 6.5 and 11.5 feet below grade. The concentrations attenuate rapidly with depth (from 250 to 14 ppm) thus suggesting that the hydrocarbon-affected area is limited in extent. High boiling point TPH was also detected in these same samples, but the concentrations (less than 10 ppm) do not suggest that contamination is pervasive near the waste oil tank.

Analysis of ground water samples collected from the monitoring wells indicates that ground water from Monitoring Wells MW-2 and MW-3 has been impacted by petroleum-range hydrocarbons. Ground water from Monitoring Well MW-1 has no detectable concentrations of TPH, BTEX, and organic lead. Ground water samples from MW-2 contained detectable concentrations of TPH and BTEX, however, only the benzene concentration exceeds the California Department of Health Services action level for Drinking Water Standards (by 0.3 ppb). The gasoline-range hydrocarbons detected in Monitoring Well MW-2 are not considered to be pervasive under the site for the following reasons:

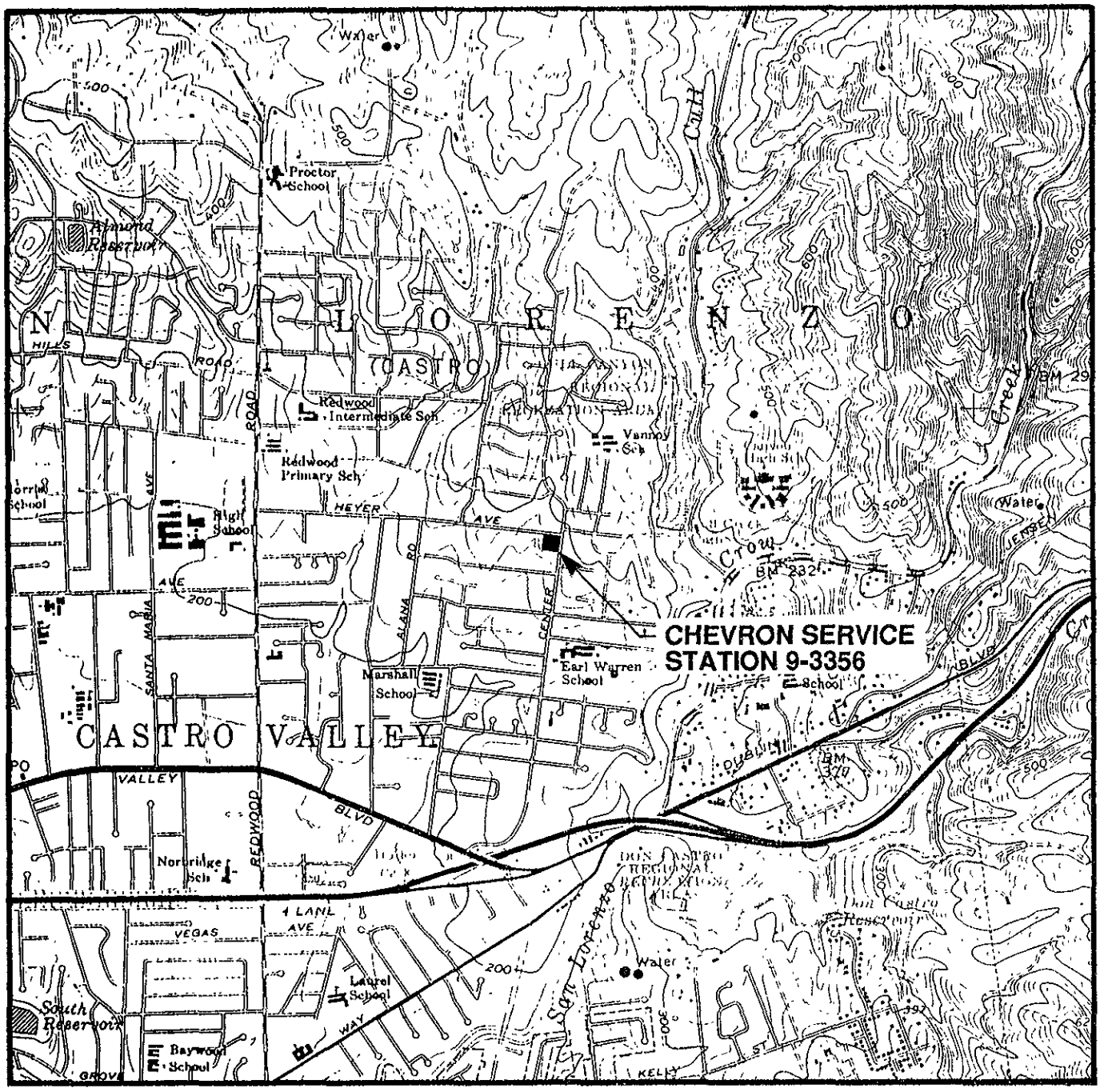
1. The concentrations detected adjacent to the tank cavity were below or close to drinking water standards.

2. Detectable concentrations of gasoline-range petroleum hydrocarbons were not present in the two downgradient wells.

3. The adsorbed-phase hydrocarbon concentrations detected in soil samples from Boring B-2 were less than 10 ppm.

The sample from MW-3 contained nondetectable concentrations of TPH, BTEX, organic lead, and HOC. However, total oil and grease was detected at a concentration of 1,000 ppb, which may be related to a former release of waste oil into the soil.

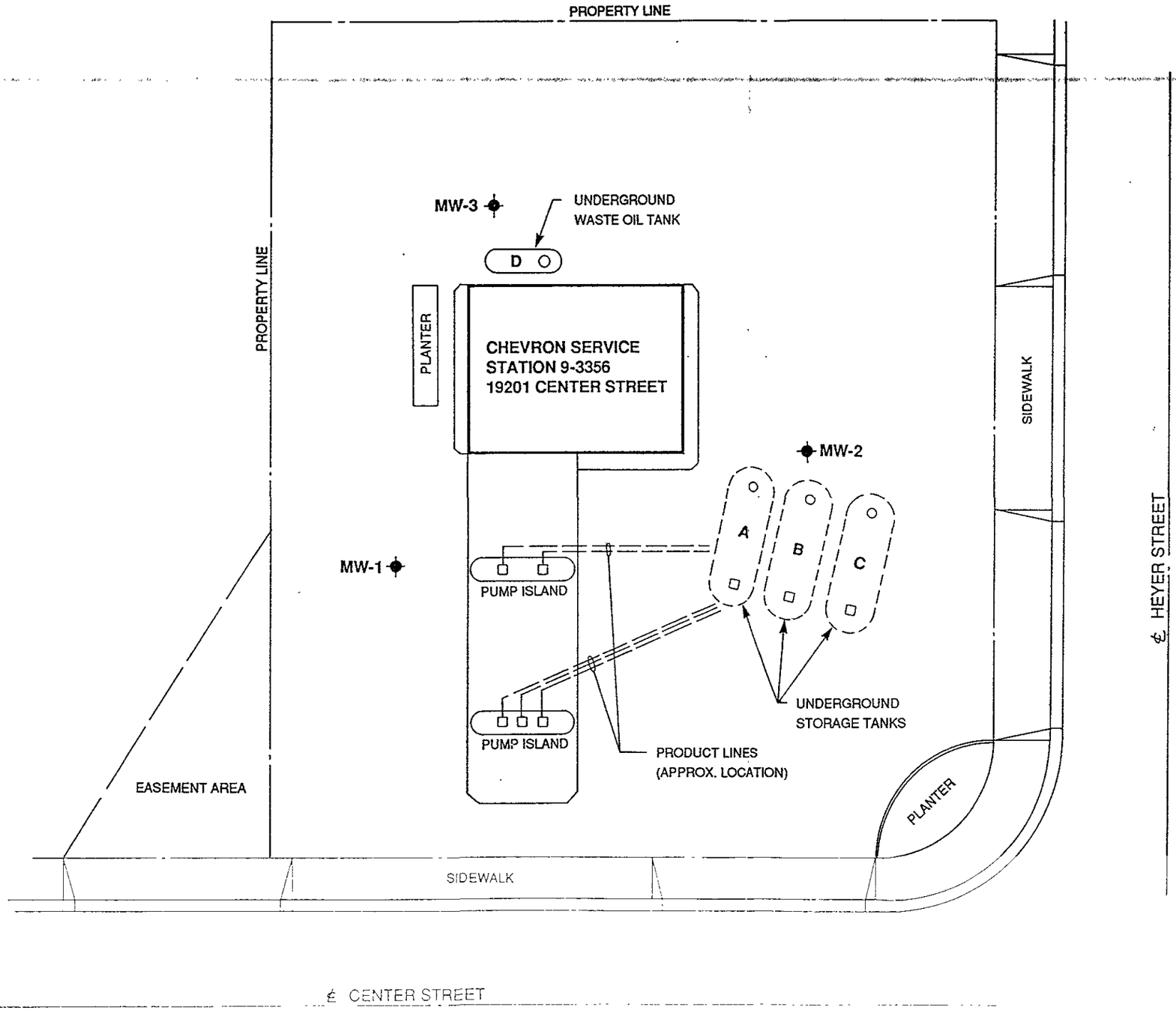
FIGURES



Source:
USGS Map, Hayward Quadrangle, California
7.5-minute series (Topographic) 1959,
Photo Revised 1980

0 1000 2000
SCALE IN FEET

Figure 1. Vicinity Map



N

20 10 0 20

SCALE IN FEET

LEGEND

GROUND WATER MONITORING WELL

UNDERGROUND TANK
SIZE & CONTENT

A: 10,000 gal. Unleaded Regular

B: 10,000 gal. Leaded Regular

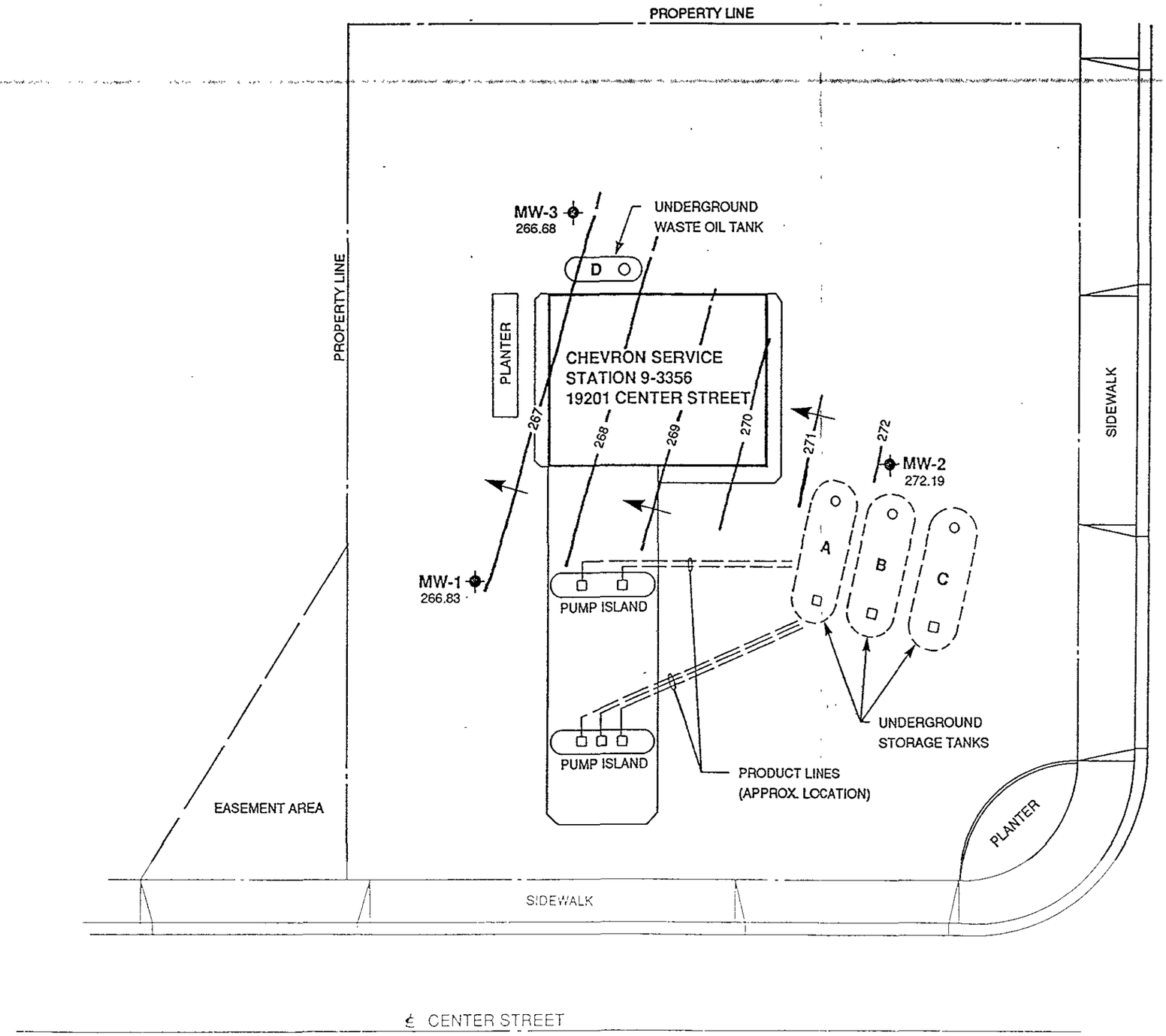
C: 10,000 gal. Supreme Unleaded

D: 500 gal. Waste Oil

Figure 2. Site Plan Showing Ground Water Monitoring Well Locations

Source Chevron U S A

PROJECT NO. 30-030



N

20 10 0 20

SCALE IN FEET

LEGEND

GROUND WATER MONITORING WELL

CONTOUR INTERVAL = 1.0 FEET

271 GROUND WATER ELEVATION CONTOUR

DIRECTION OF GROUND WATER FLOW

UNDERGROUND TANK
SIZE & CONTENT

A: 10,000 gal. Unleaded Regular

B: 10,000 gal. Leaded Regular

C: 10,000 gal. Supreme Unleaded

D: 500 gal. Waste Oil

Figure 4. Ground Water Elevation Contour Map

Source. Chevron U S A.

PROJECT NO. 30-030

APPENDIX A

GENERAL FIELD PROCEDURES

APPENDIX A

GENERAL FIELD PROCEDURES

A description of general field procedures conducted during drilling activities is presented below.

Drilling and Soil Sampling

Soil borings/monitoring wells were drilled utilizing 10-inch-diameter, continuous-flight, hollow-stem augers. Boring B-1 was initially drilled with 8-inch-diameter, hollow-stem augers. It was determined that the installation of monitoring wells was necessary and therefore required re-drilling with 10-inch-diameter, hollow-stem augers. To avoid cross-contamination, the augers were steam-cleaned prior to drilling each boring.

Soil samples were obtained for soil description, field hydrocarbon vapor testing, and laboratory analysis. Samples were collected continuously from Boring B-1 and at 5-foot intervals in Borings B-2 and B-3.

Continuous sampling was performed using a 5-foot-long continuous core sampler fixed inside the lead auger. The core sampler was washed with a sodium tripolyphosphate solution and rinsed before each sampling event. Upon retrieval, the core sampler was split and 1.5-inch-diameter, stainless steel sample tubes were driven into the core.

Soil samples collected at 5-foot intervals were retrieved ahead of the lead auger utilizing an 18-inch-long by 2-inch-diameter, split spoon sampler lined with 1.5-inch-diameter, stainless steel sample tube inserts. The sampler and sample tubes were washed with a sodium tripolyphosphate solution and rinsed before each sampling event. The sampler was driven by a 30-inch free fall of a 140-pound hammer. Blow counts were recorded for three successive 6-inch intervals.

Upon retrieval from both the 5-foot and 18-inch samplers, the sample tubes were removed and securely sealed with Teflon sheeting and polyurethane caps. In the 18-inch sampler, the bottom sample tube was removed and capped. The sample was labeled with sample identification, sample depth, geologist's initials, and date of collection. The soil sample was kept on dry ice prior to and during transport to a state-certified laboratory.

Soil immediately adjacent to that selected for laboratory analysis was tested for elevated hydrocarbon concentrations, with a Gastech Model 1238 combustible gas indicator (CGI). The CGI reading was taken after approximately 15 seconds and recorded on the boring log.

The remaining soil recovered was described in accordance with the Unified Soil Classification System. For each soil type, field estimates of density/consistency, moisture, color, grading, and soil type were recorded on the boring logs.

APPENDIX B

WELL PERMIT

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT Station No. 9-3356
19201 Center Street
Castro Valley, CA 94546

(2) CLIENT
Name Chevron U.S.A.
Address 2410 Camino Ramon Phone 415-842-9625
City San Ramon Zip 94583-0804

(3) APPLICANT
Name Alton Geoscience, Inc.
Address 1170 Burnett Ave, S Phone 415-682-1582
City Concord Zip 94520

(4) DESCRIPTION OF PROJECT
Water Well Construction x Geotechnical Investigation
Cathodic Protection ___ General ___
Well Destruction ___ Contamination ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring x Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger x
Cable ___ Other ___

DRILLER'S LICENSE NO. C57#:554979

WELL PROJECTS
Drill Hole Diameter 40 in. Maximum
Casing Diameter 4 in. Depth 65 ft.
Surface Seal Depth 20 ft. Number 3

GEOTECHNICAL PROJECTS
Number of Borings 3 Maximum
Hole Diameter ___ in. Depth ___ ft.

(7) ESTIMATED STARTING DATE 8-18-89
ESTIMATED COMPLETION DATE 8-21-89

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 8-15-89

FOR OFFICE USE

PERMIT NUMBER 89473
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved [signature] Date 15 Aug 89
Todd N. Wendler

21989

APPENDIX C

BORING LOGS

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-030 BORING DATE: 8-18-89

LOCATION: CASTRO VALLEY GEOLOGIST: S. ROSEN

TYPE: 8" HSA CONTINUOUS BORING NO.: 1

DRILLING COMPANY: WEST HAZMAT

DEPTH (FEET)	I	MATERIAL ENCOUNTERED	USCS
		Hand excavated first 4 feet.	
5	++	Soft to medium stiff, damp, olive gray, sandy CLAY (fill material). CGI <25 ppm. TPH = ND, B = ND, T = ND, E = ND, X = ND.	CL
	++	Soft, damp, grayish olive, sandy CLAY (fill material). CGI < 50 ppm. TPH = ND, B = ND, T = ND, E = ND, X = ND.	CL
10	++	Soft, wet, light olive gray, clayey, very fine-grained SAND; some gravel; well graded. TPH = ND, B = ND, T = ND, E = ND, X = ND.	SC
		Stiff, damp, moderate yellowish brown, clayey, very fine-grained SAND; trace gravel. CGI <50 ppm.	SC
15			
▽		Medium stiff, damp to moist, dusky yellow, clayey, fine- to medium-grained SAND; poorly graded. CGI <50 ppm.	SC
20	++	TPH = ND, B = ND, T = ND, E = ND, X = ND.	
		Dense, damp, grayish orange to moderate brown (iron staining), clayey, gravelly SAND. CGI = 25 ppm.	SC
25		Stiff, damp, yellowish gray, silty CLAY. CGI = 25 ppm.	CL
		Dense, damp, grayish orange to moderate brown (abundant iron staining), semi-indurated, clayey, gravelly SAND. CGI <50 ppm. TPH = ND, B = ND, T = ND, E = ND, X = ND.	SC
30	++	Same as above (wet to saturated). TPH = ND, B = ND, T = ND,	SC
	++	E = ND, X = ND.	
		Dense, saturated, medium bluish gray, semi-indurated, silty, fine- to medium-grained SAND; poorly graded.	SM
35		Hard, saturated, medium bluish gray, semi-indurated, silty, fine- to medium-grained SAND; poorly graded.	SM
40			

TPH =Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator
++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 45 Feet

BORING LOG

PROJECT: 30-030 BORING DATE: 8-18-89

LOCATION: CASTRO VALLEY GEOLOGIST: S. ROSEN

TYPE: 8" HSA BORING NO.: 1

DRILLING COMPANY: WEST HAZMAT

DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
45		50 for 4"	Hard, saturated, medium bluish gray, semi-indurated, silty, fine- to medium-grained SAND; poorly graded.	SM

TPH =Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator

++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 45 Feet

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-030 BORING DATE: 8-18-89

LOCATION: CASTRO VALLEY GEOLOGIST: S. ROSEN

TYPE: 10" HSA BORING NO.: 2

DRILLING COMPANY: WEST HAZMAT

DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
			Hand excavated first 4 feet.	
5 ++		3,3,4	Soft, damp, dark gray, sandy CLAY. CGI <100 ppm. TPH = 5.8 ppm, B = ND, T = ND, E = ND, X = ND.	CL
10 ++		7,12,14	Medium stiff to stiff, damp, moderate yellowish brown, sandy CLAY. CGI = 125 ppm. TPH = 9.9 ppm, B = 0.091 ppm, T = ND, E = 0.10 ppm, X = 0.49 ppm.	CL
∇ 15 ++		8,13,15	Medium stiff to stiff, damp, moderate yellowish brown, sandy CLAY. CGI = 75 ppm. TPH = ND, B = ND, T = ND, E = ND, X = ND.	CL
20		4,24,51	Stiff to very stiff, dry to damp, moderate yellowish brown, clayey SAND. CGI >50 ppm.	SC
25		35,50 for 4"	Very stiff, dry to damp, dark gray, semi-indurated, silty SAND. CGI <75 ppm.	SM
30		50 for 5"	Hard, damp, medium bluish gray, semi-indurated, silty, fine- to medium-grained SAND, poorly graded. CGI = 75 ppm.	SM
35		50 for 3"	Hard, dry to damp, medium bluish gray, semi-indurated, silty, fine- to medium-grained SAND, poorly graded. CGI = 50 ppm.	SM
40 ++		50 for 3"	Hard, saturated, medium bluish gray, semi-indurated, silty, fine- to medium grained SAND, poorly graded. TPH = ND, B = ND, T = ND, E = ND, X = ND.	SM

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
∇ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator
++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 45 Feet

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-030 BORING DATE: 8-18-89

LOCATION: CASTRO VALLEY GEOLOGIST: S. ROSEN

TYPE: 10" HSA BORING NO.: 2

DRILLING COMPANY: WEST HAZMAT

DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
45		50 for 2"	Hard, dry, medium bluish gray, semi-indurated, silty, very fine-grained SAND.	SM

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
∇ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator

++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 45 Feet

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-030 BORING DATE: 8-18-89

LOCATION: CASTRO VALLEY GEOLOGIST: S. ROSEN

TYPE: 10" HSA BORING NO.: 3

DRILLING COMPANY: WEST HAZMAT

DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
			Hand excavated first 4 feet.	
5 ++		8,13,7	Soft, damp, dark brown, silty, sandy CLAY (fill material). CGI <50 ppm. TRPH = 250 ppm, TPH = ND, B = ND, T = ND, E = ND, X = ND.	CL
10 ++		6,6,8	Soft, wet to saturated, dusky brown, sandy CLAY. CGI 50 ppm. TRPH = 14 ppm, TPH = ND, B = ND, T = ND, E = ND, X = ND.	CL
15		8,12,18	Soft to medium stiff, damp, moderate brown, sandy CLAY. CGI 50 ppm.	CL
▽				
20		9,15,16	Medium stiff, dry to damp, moderate yellowish brown, clayey SILT. CGI = 75 ppm.	ML
25 ++		34,50 for 5"	Hard, dry, moderate yellowish brown, semi-indurated, clayey SILT. CGI 50 ppm. TPH = ND, B = ND, T = ND, E = ND, X = ND.	ML
30		70 for 3"	Hard, dry, dusky yellowish brown, semi-indurated, clayey SILT. CGI <75 ppm.	ML
35		50 for 3"	Hard, dry, medium light gray, semi-indurated SILT. CGI = 50 ppm.	ML
40		50 for 0"	No sample retrieved.	

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator
++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 40 Feet

APPENDIX D

MONITORING WELL INSTALLATION PROCEDURES AND CONSTRUCTION DETAILS

APPENDIX D

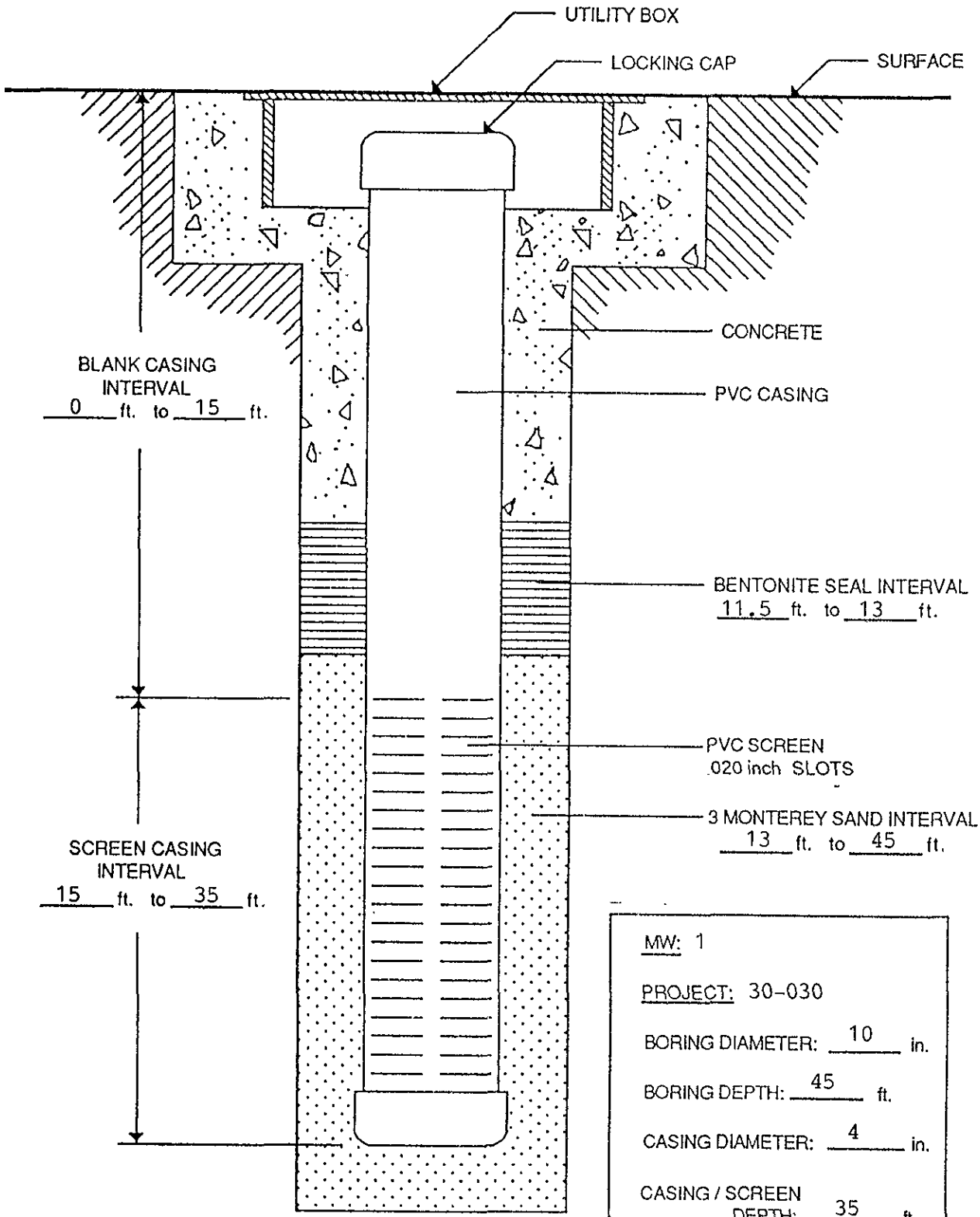
MONITORING WELL INSTALLATION AND CONSTRUCTION DETAILS

Included in this appendix are monitoring well installation and construction details for monitoring wells installed as part of this study.

Monitoring Well Installation

Monitoring wells were constructed of 4-inch-diameter, flush-threaded, Schedule 40 PVC blank, and screened (0.020-inch slot size) casing. The annular space surrounding the screened portion was backfilled with No. 3 Monterey sand (filter pack) to approximately 1.5 feet above the top of the screened section. A 1.5-foot-thick bentonite annular seal was placed above the filter pack and the remaining annulus was grouted with neat cement to the surface. Utility boxes were installed slightly above grade to minimize infiltration of surface waters. Locking, water-tight well caps were installed to ensure the integrity of the well.

MONITORING WELL CONSTRUCTION DETAIL



MW: 1

PROJECT: 30-030

BORING DIAMETER: 10 in.

BORING DEPTH: 45 ft.

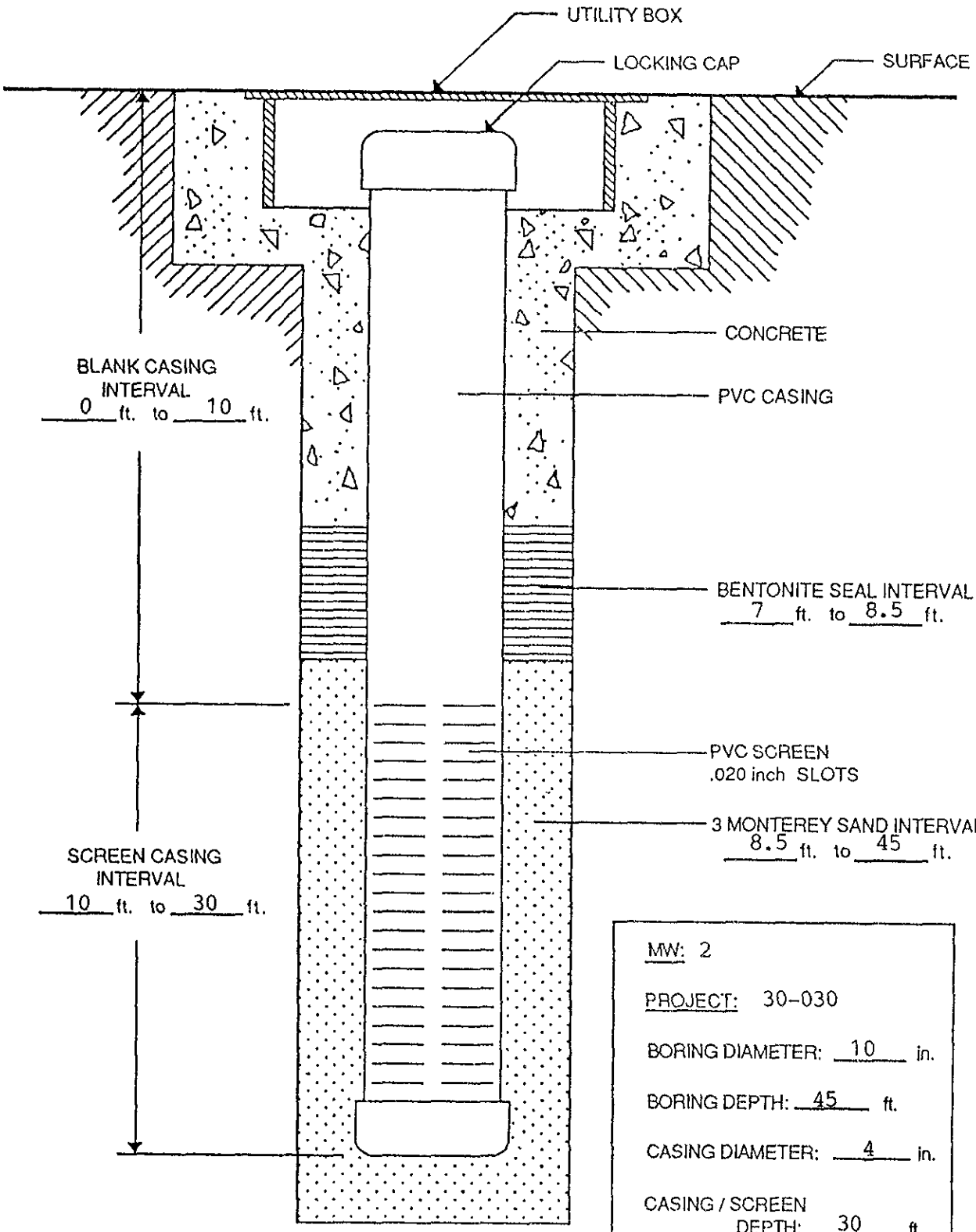
CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 35 ft.

NOTE: DRAWING IS NOT TO SCALE

ALTON GEOSCIENCE
1170 BURNETT AVE., STE S
CONCORD, CA 94520

MONITORING WELL CONSTRUCTION DETAIL



MW: 2

PROJECT: 30-030

BORING DIAMETER: 10 in.

BORING DEPTH: 45 ft.

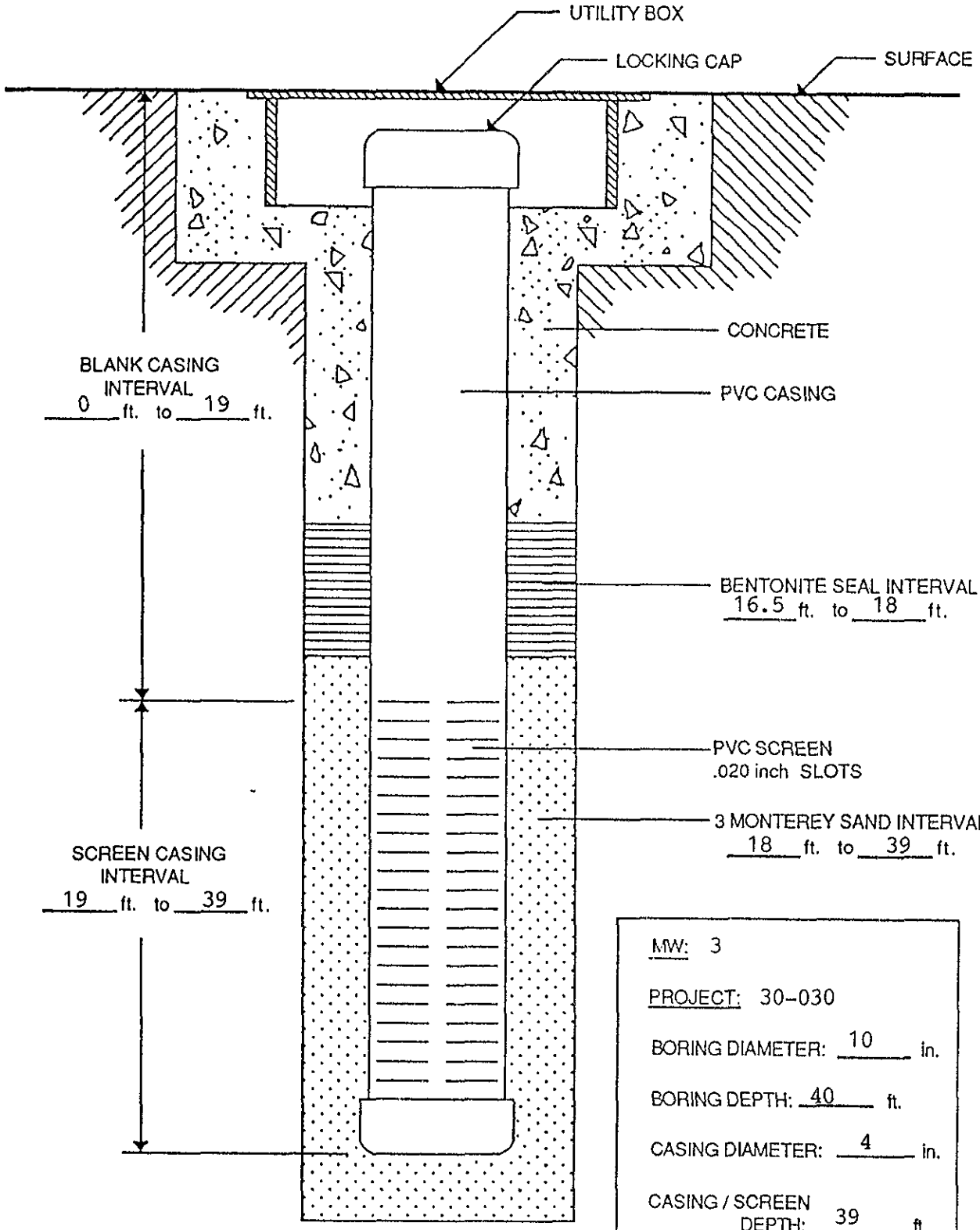
CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 30 ft.

NOTE: DRAWING IS NOT TO SCALE

ALTON GEOSCIENCE
1170 BURNETT AVE., STE S
CONCORD, CA 94520

MONITORING WELL CONSTRUCTION DETAIL



MW: 3

PROJECT: 30-030

BORING DIAMETER: 10 in.

BORING DEPTH: 40 ft.

CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 39 ft.

NOTE: DRAWING IS NOT TO SCALE

ALTON GEOSCIENCE
1170 BURNETT AVE., STE S
CONCORD, CA 94520

APPENDIX E

WELL DEVELOPMENT AND WATER SAMPLING PROCEDURES AND FIELD SURVEY FORMS

APPENDIX E

WELL DEVELOPMENT, WATER SAMPLING PROCEDURES, AND FIELD SURVEY FORMS

All purging and ground water sampling equipment was cleaned prior to use to minimize cross-contamination between wells. All equipment in contact with ground water was triple-rinsed prior to each sampling event in successive baths consisting of tripolyphosphate solution, tap water, and deionized water. Prior to sampling, the well was developed and purged in accordance with EPA protocol. The purged water was pumped into barrels prior to disposal or recycling at an appropriate waste disposal facility.

Ground water samples were collected by lowering a 2-inch-diameter, bottom-fill, Teflon bailer just below the water level in the well. The samples were carefully transferred from the check-valve-equipped Teflon bailer to zero-headspace 1-liter and 40-milliliter glass containers fitted with Teflon-sealed caps. All samples were inverted to ensure that entrapped air was not present. Each sample was labeled with sample number, well number, sample date, and geologist's initials. The samples remained on ice prior to laboratory analysis.

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms

Job # 30-030 Site: Chevron Date: 9/6/89

Well # MW-1 Sampling Team: Will Shipp/Butch, Armour Petroleum

Sampling Method: N/A

Well Development Method: 0.5" Double Diaphragm Suction Pump

Describe Equipment D-Con Before Sampling This Well: Lynox; Deionized Water

Total Depth of Well: 35.1 feet Time: 2:30 Depth to Water Water Before Pumping: 18.25 feet

Height of Water Column:		Diameter 2-inch	Diameter 4-inch		Volume		Purge Factor		Volume to Purge
16.85	feet *	.16	.65	=	10.95	gal *	4	=	43.8

Depth Purging From. _____ feet. Time Purging Begins: 2:35

Notes on Initial Discharge: Turbid, light brown.

Time	Volume Purged	pH	Conductivity	T	Notes
3:20	22	7.05	4.16	70.6	Cloudy, very light brown
3:55	35	7.17	3.83	68.9	Cloudy
5:15	52	7.51	3.99	72.3	Slighty silty, light gray

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms
(CONTINUED)

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
T°C				

Pre-Sample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: 1. Problems with pump.

2. 4:50 p.m.: resumed purging after recharging since 3:55 p.m.

3. Faint sewage odor.

52 total gallons purged.

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms

Job # 30-030 Site: Chevron Date: 9/6/89

Well # MW-2 Sampling Team: Will Shipp/ Butch, Armour Petroleum

Sampling Method: N/A

Well Development Method: 0.5" Double Diaphragm Suction Pump

Describe Equipment D-Con Before Sampling This Well: Lynox; Deionized Water

Total Depth of Well: 29.90 feet Time: 12:05 Depth to Water Water Before Pumping: 13.72 feet

Height of Water Column:		Diameter 2-inch	Diameter 4-inch		Volume		Purge Factor		Volume to Purge
16.18	feet *	.16	.65	=	10.52 gal	*	4	=	45 gal.

Depth Purging From. 13 - 30 feet. Time Purging Begins: 12:10

Notes on Initial Discharge: Turbid, pebbles, light gray.

Time	Volume Purged	pH	Conductivity	T	Notes
2:00	22	8.06	3.92	74.4	Cloudy, yellow tinge
4:15	38	7.46	3.48	71.1	Cloudy, light brown
4:20	50	7.78	3.39	69.4	Silty, gray

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms
(CONTINUED)

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
T°C				

Pre-Sample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: 50

Comments: Stopped at 2:20 p.m. to allow MW-2 to recharge; started purging MW-1 during recharge: water level dropped to bottom of well in 30 minutes. Water level at 15.1' before second purging, 55 total gallons. No odors in first and second samples; third sample had distinct sewage odor; also had a graphite-gray color and was silty.

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms

Job # 30-030 Site: Chevron Date: 9/6/89

Well # MW-3 Sampling Team: Stephan Rosen/Will Shipp/Butch, Armour Petroleum

Sampling Method: N/A

Well Development Method: 0.5" Double Diaphragm Suction Pump

Describe Equipment D-Con Before Sampling This Well: Lynox; Deionized Water

Total Depth of Well: 39.3 feet Time: 9:00 Depth to Water Water Before Pumping: 18.725 feet

Height of Water Column:		Diameter 2-inch	Diameter 4-inch		Volume		Purge Factor		Volume to Purge
20.575	feet *	.16	.65	=	13.37	gal *	4	=	53.50

Depth Purging From: 18 - 40 feet. Time Purging Begins: 9:30

Notes on Initial Discharge: Light brown, turbid.

Time	Volume Purged	pH	Conductivity	T	Notes
9:55	33	7.76	1.92	65.9	Turbid, light gray
10:30	46	7.26	2.53	66.7	Turbid, light brown
10:40	54	7.25	2.61	67.2	Turbid, light brown
11:00	63	7.51	2.63	67.7	Turbid, light brown
11:30	74	7.57	2.67	69.7	Clear, trace sand grains

ALTON GEOSCIENCE, INC.
Water Sampling Field Survey Forms
(CONTINUED)

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
T°C				

Pre-Sample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: _____

Comments: 80 gallons total on 9/6/89; recharge rate .5"/13 sec; 28' to water at 11:35.

APPENDIX F

ANALYTICAL METHODS, OFFICIAL LABORATORY REPORTS, AND CHAIN OF CUSTODY RECORDS

APPENDIX F

ANALYTICAL METHODS, OFFICIAL
LABORATORY REPORTS, AND CHAIN OF CUSTODY RECORDS

This appendix includes copies of the official Laboratory Reports and Chain of Custody Records for soil and ground water samples selected for laboratory analysis. A description of laboratory methods and chain of custody procedures is presented below.

Laboratory Procedures

All laboratory analyses were performed by a state-certified laboratory in accordance with the following methods:

Sample Analysis	Soil	Water
Total Petroleum Hydrocarbons -Low to Med Boiling Point	EPA Methods 5030/8015	
Total Petroleum Hydrocarbons -High Boiling Point	EPA Method 3350/8015	---
Benzene, Toluene, Ethylbenzene, and xylenes	EPA Methods 5030/8020	
Organic Lead	California LUFT 12/87	
Total Recoverable Petroleum Hydrocarbons	EPA Method 418.1	---
Halogenated Volatile Organics	EPA Method 8240	---
Purgeable Halocarbons	---	EPA Method 601
Total Oil and Grease	---	EPA Method 503A&E

Chain Of Custody Procedure

Chain of custody protocol was followed for all samples. The Chain of Custody form(s) accompanies the samples from the sampling locality to the laboratory, providing a continuous record of possession prior to actual analysis.

SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

AUG 29 1989

Alton Geoscience	Client Project ID:	#30-030, Chevron	Sampled:	Aug 18, 1989
1170 Burnett Ave., Suite S	Matrix Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 92714	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Aug 23, 1989
Attention: Stephen Rosen	First Sample #:	908-3100	Reported:	Aug 26, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
908-3100	B1 @ 5'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3101	B1 @ 8'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3102	B1 @ 10'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3103	B1 @ 20'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3104	B1 @ 30'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3105	B1 @ 31.5'	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

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(415) 364-9600 • FAX (415) 364-9233

Alton Geoscience	Client Project ID:	#30-030, Chevron	Sampled:	Aug 18, 1989
16510 Aston Street	Matrix Descript:	Soil	Received:	Aug 22, 1989
Irvine, CA 92714	Analysis Method:	EPA 5030/8015/8020		
Attention: Stephen Rosen	First Sample #:	908-3091	Reported:	Aug 28, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
908-3091	B2 @ 6.5'	5.8	N.D.	N.D.	N.D.	N.D.
908-3092	B2 @ 11.5'	9.9	0.091	N.D.	0.10	0.49
908-3093	B2 @ 16.5'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3098	B2 @ 40.5'	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

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Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Matrix Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Aug 25, 1989
Attention: Stephen Rosen	First Sample #:	908-3084	Reported:	Aug 29, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
908-3084	B3 @ 6.5'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3085	B3 @ 11.5'	N.D.	N.D.	N.D.	N.D.	N.D.
908-3086	B3 @ 26'	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

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Arthur G. Burton
Laboratory Director

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Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Matrix Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	EPA 3550/8015		
Attention: Stephen Rosen	First Sample #:	908-3084	Analyzed:	Aug 25, 1989
			Reported:	Aug 29, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
908-3084	B3 @ 6.5'	2.9
908-3085	B3 @ 11.5'	5.9

Detection Limits:	**1.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

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Arthur G. Burton
Laboratory Director

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Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Matrix Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	EPA 418.1 (I.R. with clean-up)		
Attention: Stephen Rosen	First Sample #:	908-3084	Analyzed:	Aug 25, 1989
			Reported:	Aug 29, 1989

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample Number	Sample Description	Petroleum Oil mg/kg (ppm)
908-3084	B3 @ 6.5'	250
908-3085	B3 @ 11.5'	14

Detection Limits:	**1.0**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

9083084.ALG <3>

SEQUOIA ANALYTICAL

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Alton Geoscience	Client Project ID:	#30-030, Chevron	Sampled:	Aug 18, 1989
1170 Burnett Ave., Suite S	Sample Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 92714	Analysis Method:	California LUFT Manual, 12/87	Analyzed:	Aug 23, 1989
Attention: Stephen Rosen	First Sample #:	908-3100	Reported:	Aug 25, 1989

ORGANIC LEAD

Sample Number	Sample Description	Sample Results mg/kg (ppm)
908-3100	B1 @ 5'	N.D.
908-3102	B1 @ 10'	N.D.
908-3107	B1 @ 31.5'	N.D.

Detection Limits:	**0.05**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

9083100.ALG <2>

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
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Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Sample Descript:	Soil	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	California LUFT Manual, 12/87	Analyzed:	Aug 25, 1989
Attention: Stephen Rosen	First Sample #:	908-3084	Reported:	Aug 29, 1989

ORGANIC LEAD

Sample Number	Sample Description	Sample Results mg/kg (ppm)
908-3084	B3 @ 6.5'	0.14
908-3085	B3 @ 11.5'	N.D.

Detection Limits:	**0.05**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Sample Descript:	Soil, B3 @ 6.5'	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	EPA 5030/8010	Analyzed:	Aug 28, 1989
Attention: Stephen Rosen	Lab Number:	908-3084	Reported:	Aug 29, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Bromodichloromethane	5.0	N.D.
Bromoform	5.0	N.D.
Bromomethane	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	5.0	N.D.
Chloroethane	25.0	N.D.
2-Chloroethylvinyl ether	5.0	N.D.
Chloroform	5.0	N.D.
Chloromethane	5.0	N.D.
Dibromochloromethane	5.0	N.D.
1,2-Dichlorobenzene	10.0	N.D.
1,3-Dichlorobenzene	10.0	N.D.
1,4-Dichlorobenzene	10.0	N.D.
1,1-Dichloroethane	5.0	N.D.
1,2-Dichloroethane	5.0	N.D.
1,1-Dichloroethene	5.0	N.D.
Total 1,2-Dichloroethene	5.0	N.D.
1,2-Dichloropropane	5.0	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	10.0	N.D.
1,1,2,2-Tetrachloroethane	5.0	N.D.
Tetrachloroethene	5.0	N.D.
1,1,1-Trichloroethane	5.0	N.D.
1,1,2-Trichloroethane	5.0	N.D.
Trichloroethene	5.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	10.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Alton Geoscience	Client Project ID:	Chevron, #30-030	Sampled:	Aug 18, 1989
1170 Burnett Ave., Ste S	Sample Descript:	Soil, B3 @ 11.5'	Received:	Aug 22, 1989
Concord, CA 94520	Analysis Method:	EPA 5030/8010	Analyzed:	Aug 28, 1989
Attention: Stephen Rosen	Lab Number:	908-3085	Reported:	Aug 29, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Bromodichloromethane	5.0	N.D.
Bromoform	5.0	N.D.
Bromomethane	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	5.0	N.D.
Chloroethane	25.0	N.D.
2-Chloroethylvinyl ether	5.0	N.D.
Chloroform	5.0	N.D.
Chloromethane	5.0	N.D.
Dibromochloromethane	5.0	N.D.
1,2-Dichlorobenzene	10.0	N.D.
1,3-Dichlorobenzene	10.0	N.D.
1,4-Dichlorobenzene	10.0	N.D.
1,1-Dichloroethane	5.0	N.D.
1,2-Dichloroethane	5.0	N.D.
1,1-Dichloroethene	5.0	N.D.
Total 1,2-Dichloroethene	5.0	N.D.
1,2-Dichloropropane	5.0	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	10.0	N.D.
1,1,2,2-Tetrachloroethane	5.0	N.D.
Tetrachloroethene	5.0	N.D.
1,1,1-Trichloroethane	5.0	N.D.
1,1,2-Trichloroethane	5.0	N.D.
Trichloroethene	5.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	10.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

ALTON GEOSCIENCE
~~16510 ASTON ST. IRVINE, CA (714) 261-0674~~ 1170 Burnett Ave, Ste. S CONCORD, CA

CHAIN of CUSTODY RECORD

682-1582 PAGE 1 of 3

DATE: 8-21-89

RESULTS DUE BY: ASAP

PROJECT NUMBER: 30-030

PROJECT NAME AND ADDRESS: CHEVRON — CASTRO VALLEY

ANALYSES BY 9-1

PROJECT MANAGER: S. ROSEN

SAMPLER'S SIGNATURE: Stephan Rosen

LABORATORY:

REMARKS OR SPECIAL INSTRUCTIONS:

NOTE: IF SAMPLE # 03 HAS DETECTABLE CONCENTRATIONS OF TPH or BTEX, ANALYZE #04 FOR TPH & BTEX — SAME INSTRUCTIONS FOR SAMPLES # 05 AND # 06.

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS	SAMPLE PREP. 3510: SOLV. EXTR.	SAMPLE PREP. 3810: HEAD SPACE	SAMPLE PREP. 5030: PURGE & TRAP	SOIL ANALYSIS 418.1: TPHC (IR)	SOIL ANALYSIS 8010: HALOCARBONS	SOIL ANALYSIS 8020: BTXE w/MTBE	SOIL ANALYSIS DHS METHOD: TPHC (GC)	SOIL ANALYSIS ~~7420: TOTAL Pb~~ (TEL) DHS	SOIL ANALYSIS TPH (D) - 3550 prep	WATER ANALYSIS 418.1: TPHC (IR)	WATER ANALYSIS 601: HALOCARBONS	WATER ANALYSIS 602: BTXE	WATER ANALYSIS DHS METHOD: TPHC (GC)	WATER ANALYSIS 7421: TOTAL Pb
01	8-18 am	B-1, 5'	Soil	X		1						X	X	X						
02	"	B-1, 8'	"	X		1						X	X							
03	"	B-1, 10'	"	X		1						X	X	X						
04	"	B-1, 15'	"	X		1														
05	"	B-1, 20'	"	X		1						X	X							
06	"	B-1, 24'	"	X		1														
07	"	B-1, 30'	"	X		1						X	X							
08	"	B-1, 31.5'	"	X		1						X	X	X						
~~09~~	"		"	X		X														
					TOTAL NO. OF CONTAINERS:	8														

24 HR $210 5147

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
Stephan Rosen	8-22 0900	[illegible]	8/22/89 0903	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	COURIER:

ALTON GEOSCIENCE
~~10510 ASTON ST.~~ 1170 Burnett Ave, Ste S
~~IRVINE, CA. (714) 261-0674~~ CONCORD, CA

CHAIN of CUSTODY RECORD

682-1582 PAGE 2 of 3

DATE: 8-21-89

RESULTS DUE BY: ASAP

PROJECT NUMBER: 30-030

PROJECT NAME AND ADDRESS: CHEVRON - CASTRO VALLEY

PROJECT MANAGER: S. Rosen

SAMPLER'S SIGNATURE: Stephanie Rosen

LABORATORY: 5030 LUFT ANALYSES BY 9-1

REMARKS OR SPECIAL INSTRUCTIONS:
NOTE: IF SAMPLE # 11 HAS DETECTABLE CONCENTRATIONS OF TPH OR BTEX, ANALYZE SAMPLE #12 FOR TPH & BTEX — SAME INSTRUCTIONS FOR SAMPLES # 13, #14, and #15.

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS	SAMPLE PREP. 3510: SOLV. EXTR.	SAMPLE PREP. 3810: HEAD SPACE	SAMPLE PREP. 5030: PURGE & TRAP	SAMPLE PREP.	SOIL ANALYSIS 418.1: TPHC (IR)	SOIL ANALYSIS 8010: HALOCARBONS	SOIL ANALYSIS 8020: BTXE with 3	SOIL ANALYSIS DHS METHOD: TPHC (GC)	SOIL ANALYSIS ~~7420: TOTAL~~ Pb (TEL) DHS	TPH (D) - 3550 Prep	WATER ANALYSIS 418.1: TPHC (IR)	WATER ANALYSIS 601: HALOCARBONS	WATER ANALYSIS 602: BTXE	WATER ANALYSIS DHS METHOD: TPHC (GC)	WATER ANALYSIS 7421: TOTAL Pb	
09	8-18 pm	B-2, 6.5'	Soil	X		1							X	X								
10		B-2, 11.5'		X		1							X	X								
11		B-2, 16.5'		X		1							X	X								
12		B-2, 21.5'		X		1																
13		B-2, 26.5'		X		1																
14		B-2, 30.5'		X		1																
15		B-2 35.5'		X		1																
16		B-2, 40.5'		X		1							X	X								
17	"	B-2, 46.5'	"	X		1							X	X	X							
					TOTAL NO. OF CONTAINERS:	17																

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
Stephanie Rosen	8-22 0900		8/24/89 0900	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	COURIER:

ALTON GEOSCIENCE
~~16510 ASTON ST.~~ 1170 BURNETT AVE, STE. S
~~IRVINE, CA (714) 261-0674~~ CONCORD, CA

CHAIN of CUSTODY RECORD

682-1582 PAGE 3 of 3

DATE: 8-21-89

RESULTS DUE BY: ASAP

PROJECT NUMBER: 30-030

PROJECT NAME AND ADDRESS: CHEVRON - CASTRO VALLEY

PROJECT MANAGER: J. ROSEN

SAMPLER'S SIGNATURE: Stephan Rosen

LABORATORY:

5030 WATER ANALYSES BY 9-1

REMARKS OR SPECIAL INSTRUCTIONS:
NOTE: IF SAMPLE # 19 HAS DETECTABLE CONCENTRATIONS OF TPH OR BTEX ANALYZE SAMPLE #20 FOR TPH & BTEX - SAME INSTRUCTIONS FOR SAMPLES # 21, # 23, AND # 24.
IF SAMPLE #20 HAS HIT, SAME INSTRUCTIONS APPLY

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS	SAMPLE PREP. 3510: SOLV. EXTR.	SAMPLE PREP. 3810: HEAD SPACE	SAMPLE PREP. 5030: PURGE & TRAP	SOIL ANALYSIS 418.1: TPHC (IR)	SOIL ANALYSIS 8010: HALOCARBONS	SOIL ANALYSIS 8020: BTXE w/ MTBE	SOIL ANALYSIS DHS METHOD: TPHC (GC)	SOIL ANALYSIS ~~7420: TOTAL~~ Pb (TEL) DHS	SOIL ANALYSIS TPH(D)-3550 Prep	WATER ANALYSIS 418.1: TPHC (IR)	WATER ANALYSIS 601: HALOCARBONS	WATER ANALYSIS 602: BTXE	WATER ANALYSIS DHS METHOD: TPHC (GC)	WATER ANALYSIS 7421: TOTAL Pb	WATER ANALYSIS
18	8-18 pm	B-3, 6.5'	Soil	X		1				X	X	X	X	X	X						
19	"	B-3, 11.5'	"	X		1				X	X	X	X	X	X						
20		B-3, 16.5'		X		1															
21		B-3, 21.5'		X		1															
22		B-3, 26'		X		1						X	X								
23		B-3, 30'		X		1															
24	"	B-3, 35'	"	X		1															
						TOTAL NO. OF CONTAINERS:	24														

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
Stephan Rosen	8-22 0900		22 Aug 89 0900	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	COURIER:

Source: Assessor's Map 84C
Code Area Nos. 54-003

Figure 3. Map Showing Adjacent Properties

PROJECT NO. 30-030

GTEL
ENVIRONMENTAL
LABORATORIES, INC

Northwest Region
4080 Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423 7143 *from outside California*

09/15/89 JP Page 1 of 1

WORK ORD#: C909211
CLIENT: STEPHAN ROSEN
ALTON GEOSCIENCE
16510 ASTON STREET
IRVINE, CA 92714
PROJECT#: SFB-001-0198.72-4
LOCATION: CASTRO VALLEY, CA

SAMPLED: 09/08/89 BY: W. SHIPP
RECEIVED: 09/11/89
ANALYZED: 09/13/89 BY: M. LY

MATRIX: Water
UNITS: ug/L (ppb)

PARAMETER	MDL	SAMPLE # I.D.	01 01	02 02	03 03		
Benzene	0.5		<0.5	1	<0.5		
Toluene	0.5		<0.5	4	<0.5		
Ethylbenzene	0.5		<0.5	1	<0.5		
Xylenes	0.5		<0.5	4	<0.5		
Total BTEX	0.5		<0.5	10	<0.5		
Misc. Hydrocarbons (C4-C12)	1		<1	13	<1		
Total Petroleum Hydrocarbons as Gasoline	1		<1	23	<1		

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD: Modified EPA 5030/8020/8015

Emma P. Popek

EMMA P. POPEK, Laboratory Director

GTEL
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LABORATORIES, INC

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Concord, CA 94520
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(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

WORK ORD#: C909210
CLIENT: STEPHAN ROSEN
ALTON GEOSCIENCE
16510 ASTON STREET
IRVINE, CA 92714
PROJECT#: SFB-001.0198.72-3
LOCATION: CASTRO VALLEY, CA

SAMPLED: 09/08/89 BY: W. SHIPP
RECEIVED: 09/11/89
ANALYZED: 09/14/89 BY: R. CONDIT

MATRIX: Water
UNITS: ug/L (ppb)

PARAMETER	MDL	SAMPLE # I.D. 01 03				
Chloromethane	0.5	<0.5				
Bromomethane	0.5	<0.5				
Dichlorodifluoromethane	0.5	<0.5				
Vinyl chloride	1	<1				
Chloroethane	0.5	<0.5				
Methylene chloride	0.5	<0.5				
Trichlorofluoromethane	0.5	<0.5				
1,1-Dichloroethene	0.2	<0.2				
1,1-Dichloroethane	0.5	<0.5				
trans-1,2-Dichloroethene	0.5	<0.5				
Chloroform	0.5	<0.5				
1,2-Dichloroethane	0.5	<0.5				
1,1,1-Trichloroethane	0.5	<0.5				
Carbon tetrachloride	0.5	<0.5				
Bromodichloromethane	0.5	<0.5				
1,2-Dichloropropane	0.5	<0.5				
trans-1,3-Dichloropropene	0.5	<0.5				
Trichloroethene	0.5	<0.5				
Dibromochloromethane	0.5	<0.5				
1,1,2-Trichloroethane	0.5	<0.5				
cis-1,3-Dichloropropene	0.5	<0.5				
2-Chloroethylvinyl ether	1	<1				
Bromoform	0.5	<0.5				
1,1,2,2-Tetrachloroethane	0.5	<0.5				
Tetrachloroethene	0.5	<0.5				
Chlorobenzene	0.5	<0.5				

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD: EPA 601

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Concord, CA 94520
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(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

WORK ORD#:C909210

CLIENT: STEPHAN ROSEN
PROJECT#: SFB-001.0198.72-3
LOCATION: CASTRO VALLEY, CA

MATRIX: Water
UNITS: ug/L (ppb)

PARAMETER	MDL	SAMPLE # I.D. 01 03				
1,3-Dichlorobenzene	0.5	<0.5				
1,2-Dichlorobenzene	0.5	<0.5				
1,4-Dichlorobenzene	0.5	<0.5				

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD: EPA 601

Emma P. Popek

EMMA P. POPEK, Laboratory Director

GTEL
ENVIRONMENTAL
LABORATORIES, INC

Northwest Region
4080 Pike Lane
Concord CA 94520
(415) 685-7852
(800) 544 3422 *from inside California*
(800) 423 7143 *from outside California*

09/15/89 jp Page 1 of 1

WORK ORD#: C909212
CLIENT: STEPHAN ROSEN
ALTON GEOSCIENCE
16510 ASTON STREET
IRVINE, CA 92714
PROJECT#: SFB-001.0198.72-5
LOCATION: CASTRO VALLEY, CA

SAMPLED: 09/08/89 BY: W. SHIPP
RECEIVED: 09/11/89
ANALYZED: 09/13/89 BY: M. ISKANDER

MATRIX: Water
UNITS: mg/L (ppm)

PARAMETER	MDL	SAMPLE # I.D.	01 01	02 02	03 03		
Lead (organic)	0.05		<0.05	<0.05	<0.05		

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD: per California DHS

Emma P. Popek

EMMA P. POPEK, Laboratory Director

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

09/19/89 LS PAGE 1 OF 1

WORK ORD#: C909213
CLIENT: STEPHAN ROSEN
ALTON GEOSCIENCE
16510 ASTON STREET
IRVINE, CA
PROJECT#: SFB-001.0198.72-6
LOCATION: CASTRO VALLEY, CA

SAMPLED: 09/08/89 BY: W. SHIPP
RECEIVED: 09/11/89 BY: K. FILLINGER
ANALYZED: 09/16/89 BY: R. LAPURGA
MATRIX: WATER J. FLORO
UNITS: mg/L (ppm)

TEST RESULTS

PARAMETER	MDL	SAMPLE # I.D.	01 03
Total Oil and Grease	1		1

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD:
EPA 503 A&E

Emma P. Popek

EMMA P. POPEK, Director

ALTON GEOSCIENCE
16510 ASTON ST.
IRVINE, CA. ~~(714) 261-0674~~ 415-632-1582

CHAIN of CUSTODY RECORD

DATE: 9-11-89

RESULTS DUE BY: A:A1

PROJECT NUMBER: 30-030

PROJECT NAME AND ADDRESS: CHEVRON, CASTRO VALLEY

PROJECT MANAGER: Stephan Rosen

SAMPLER'S SIGNATURE: [illegible]

LABORATORY: STEL. DHS-LUFT

REMARKS OR SPECIAL INSTRUCTIONS:

NOTE. FOR TPH ANALYSIS – PLEASE RUN TPH AS GASOLINE AND TPH AS DIESEL (3510 & 3550 [illegible])

* [illegible] all [illegible]

* Please [illegible]

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS	SAMPLE PREP. 3510: SOLV. EXTR.	3810: HEAD SPACE	5030: PURGE & TRAP		SOIL ANALYSIS 418.1: TPHC (IR)	8010: HALOCARBONS	8020: BTXE	DHS METHOD: TPHC (GC)	7420: TOTAL Pb		WATER ANALYSIS 418.1: TPHC (IR)	601: HALOCARBONS	602: BTXE	DHS METHOD: TPHC (GC)	7421: TOTAL Pb	[illegible]
01	9-8 [illegible]	MW-1	WATER	✓		9							X	X					X	X	X	
02	" "	MW-2	"	✓		9							X	X					X	X	X	
03	" "	MW-3	"	✓		9							X	X				X	X	X	X	X

TOTAL NO. OF CONTAINERS: 27

RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
[signature]	9/11/89 [illegible]			
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	COURIER:
	[illegible]	[signature]	[illegible]	

SIEVE ANALYSIS

PROJECT NAME Chevron Eastern Valley PROJECT NO. 30-031

SAMPLE NO. _____ DATE 9/21/89

DESCRIPTION _____

TESTED BY FHC REDUCED BY _____ CHECKED BY PKM

COARSE SIEVE ANALYSIS

WT. AIR DRY SOIL RETD. #10 _____ GMS. WT. AIR DRY SOIL PASSING #10 568.2 - 83.6 = 484.6 GMS.

WT. OVEN DRY SOIL RETD. #10 _____ GMS. HYGROSCOPIC WATER CONTENT 1.3 %

WT. OVEN DRY SOIL RETD. ON #10 AFTER WASHING _____ GMS. WT. OVEN DRY SOIL PASSING #10 _____ GMS.

TOTAL WT. DRY SOIL PASSING #10 478.4 GMS.

TOTAL WEIGHT OF DRY SOIL USED IN TEST _____ GMS. (W_s)

SIEVE SIZE	CUMULATIVE WT. RETAINED ON SIEVE	% PASSING	
2"			
1½"			
1"			
3/4"			
1/2"			
3/8"			

FINE SIEVE ANALYSIS

WT. OF AIR DRY SAMPLE USED IN TEST _____ GMS. WT. OF OVEN DRY SAMPLE _____ GMS. (W_s)

NO. 4				HYDROMETER MATERIAL-MULTIPLY BY % PASSING #10 SIEVE
NO. 10				
NO. ~~16~~ 20	4.0	0.8%	99.3 %	
NO. ~~30~~ 40	32.9	6.9%	92.4 %	
NO. ~~50~~ 60	89.5	18.7%	73.7 %	
NO. ~~100~~ 140	175.4	36.7%	37 %	
NO. 200	39.5	8.3%	28.7%	
PAN	11.2 + 125.9 = 137.1	28.7%	BREAKDOWN	

352.5 430 Washed moist weight

MOIST WEIGHT + TARE 108.8 GMS. WASHED DRY WEIGHT + TARE 442.5 GMS.

OVEN DRY WEIGHT + TARE 107.8 GMS. TARE 91.3 GMS.

TARE 37.1 GMS. WASHED DRY WEIGHT 351.2 GMS.

MOISTURE CONTENT 1.3 % OVEN DRY WEIGHT (W_s) _____ GMS.

COMMENTS: _____

HYDROMETER ANALYSIS

PROJECT NAME Cherry Creek Valley PROJECT NO. [illegible] DATE 9/21/89

SAMPLE NO. _____ TESTED BY _____

REDUCED BY _____ CHECKED BY PLM

WT. OF AIR DRY SOIL (A') _____ gms. HYDROMETER SER. NO. _____ ASSET NO. ____

WT. OF OVEN DRY SOIL (B') _____ gms. SPECIFIC GRAVITY, G_s (A) _____

WT. OF OVEN DRY SOIL RET. ON #10 SIEVE (C') _____ gms.

WT. OF MOIST SAMPLE PASSING #10 SIEVE USED FOR TEST 313.6 - 257.9 = 55.7 gms.

WT. OF OVEN DRY SOIL RET. ON #10 SIEVE AFTER WASHING (D') _____ gms.

WT. OF DRY SOIL PASSING #10 SIEVE USED FOR TEST, W_s (B) 55 gms.

WT. MOIST SOIL PASSING #10 SIEVE (E') _____ gms.

	(C)	(D)	(E)			
	TEMP °F	R_t Observed Reading	TIME Min.	TIME CLOCK	Water Content, %	
					Wt. Oven Dry Soil — No. 10	
					Total Wt. Dry Soil — No. 10	
					Total Wt. Soil Used	
					% Passing No. 10	
9/21/89	73	1.018	13:23 2	13:23	Grain Diameter, D mm	
					% Finer Than D For Test	
					% Finer Than D For Soil	
0.0005	73	1.016	5	13:26	D	
					Test	
					Soil	
0.0006	73.5	1.0145	15	13:36	D	
					Test	
					Soil	
	73.5	1.013	30	13:51	D	
					Test	
					Soil	
0.0008	75.0	1.0125	60	14:21	D	
					Test	
					Soil	
0.0011	77.0	1.011	250	17:31	D	
					Test	
					Soil	
9/[illegible]/89	76.0	1.0095	1448	13:21	D	
0.0007					Test	
					Soil	
					D	
					Test	
					Soil	
					D	
					Test	
					Soil	
					D	
					Test	
					Soil	
					D	
					Test	
					Soil	

• 200 SIEVE •

WEIGHT RETAINED ON SIEVE 25.3 gms. % PASSING TOTAL SAMPLE 46 %

2920.1.1

GRAIN SIZE ANALYSIS-HYDROMETER METHOD

Data Sheet 7

Project Chevron Cantua Valley Job No. 30-50

Location of Project _____ Boring No. _____ Sample No. _____

Description of Soil _____ Depth of Sample _____

Tested By FHC Date of Testing 9/21/89 – 9/22/89

Hydrometer analysis

Hydrometer no. 151H G_s of solids = 2.65 a = 1.0

Dispersing agent Hexametaphosphate Amount 4 % Wt. of soil, W_s _____

Zero correction 0.007 Meniscus correction 0.001

Date	Time of reading	Elapsed time, min	Temp., °C	Actual Hyd. reading R_a	Corr. Hyd. reading R_c	% Finer	Hyd. Corr. only for meniscus, R	L from Table 6-5	$\frac{L}{t}$	K from Table 6-4	D, mm	% finer
9/21/89	13:23	2	22.8	1.018	1.0115	33.6	1.019	13.25	6.625	0.0132	0.033398	21.0
	13:26	5	22.8	1.016	1.0095	27.7	1.017	13.80	2.760	0.0132	0.021193	17.3
	13:36	15	23.1	1.0145	1.0081	23.7	1.0155	14.17	0.9447	0.01315	0.012778	14.8
	13:51	30	23.1	1.013	1.0066	19.3	1.014	14.52	0.4840	0.01315	0.009153	12.0
	14:21	60	23.9	1.0125	1.0063	18.4	1.0135	14.61	0.2435	0.01303	0.006643	11.5
	17:31	250	25.0	1.011	1.005	14.6	1.012	15.00	0.0600	0.01286	0.003155	9.1
9/22/89	13:21	1440	24.4	1.0095	1.0032	9.3	1.0105	15.44	0.0107	0.01294	0.001344	5.8

$\frac{28.7}{46} = 0.624$

$R_c = R_{actual}$ – zero correction + C_T % finer = $R_c(a)/W_s$ $D = K\sqrt{L/t}$

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PROJECT NO.

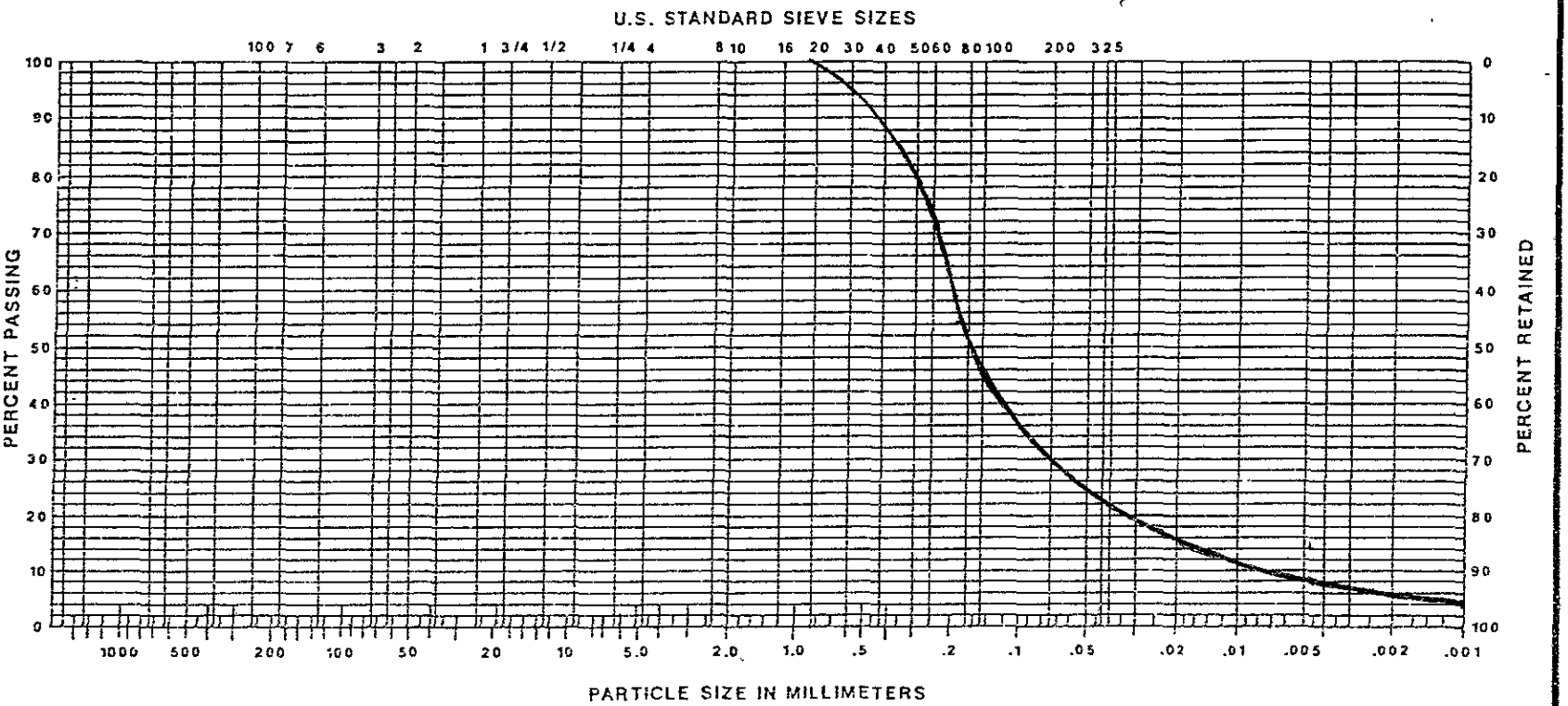
DATE

Figure

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D 422-72)

Curve	Sample	Depth	N.M.	L.L.	P.I.	% Grav	% Sand	% Silt & % Clay	Key	Soil Classification



COBBLES	GRAVEL		SAND			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	