A Report Prepared for

Gerber Products Company
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Freemont, Michigan 49412

PHASE III SITE INVESTIGATION ADDENDUM
FORMER GERBER PRODUCTS FACILITY
OAKLAND, CALIFORNIA

HLA Job No. 19459,001.02

by

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February 21, 1990

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1.0 INTRODUCTION

This report presents the results of Harding Lawson Associates (HLA) Phase III site investigation of soil and ground-water conditions at the former Gerber Products Company (Gerber) facility in Oakland, California.

The purpose of this investigation has been to: 1) further evaluate the areal and vertical extent of total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylenes (BTEX) previously detected in the unsaturated soils in the vicinity of the former Chevron service station area of the property; and 2) characterize the areal extent of dissolved TPH and BTEX in ground water of the uppermost aquifer downgradient of the former Chevron service station area.

2.0 BACKGROUND

The project site is in the southeastern portion of Oakland, California, approximately 1-mile east of the Nimitz Freeway, U.S. Interstate 880. San Francisco Bay is approximately 2 miles southwest of the site and the Oakland hills are about 2 miles east of the site. The surrounding topography is generally flat with the surface elevation of the site approximately 20 feet above mean sea level.

2.1 Site Description

The former Gerber food processing facility is located at the northwest corner of San Leandro Street and 98th Avenue in Oakland, California (Plate 1). Land use in the area is primarily industrial with retail businesses and multi-family housing. The former Gerber facility consisted of offices, warehouses, and buildings where food was processed. The remaining 20 acres of the site were reported to consist of concrete and asphalt-covered parking or storage areas.

Prior to Gerber's acquisition of the property, the northeastern corner of the site (Plate 1) was occupied by Chevron and Shell Oil Company retail service stations. The site is presently occupied by several light industrial operations that include Environmental Sampling Supply Company, a construction contractor group, and a plastics recycling center. During HLA's site visit on August 3, 1989, a truck and car were being overhauled underneath the canopy area (Plate 1), and automotive fluids and/or degreasing agents were observed leaking onto the pavement beneath them. The remaining areas of the site continue to exist as office space, vacant buildings, and concrete- and asphalt-covered pavement.

A former gasoline service station located in the immediate vicinity of the site at 9801 San Leandro Street has been identified as having soil and ground-water impacts

resulting from gasoline contamination. The 9801 San Leandro Street site is at the corner of 98th Avenue and San Leandro Street, across 98th Avenue from Monitoring Well MW-5 at the northeast corner of the Gerber facility (Plate 1). Review of California Regional Water Quality Control Board - San Francisco Bay Area (RWQCB) documentation indicates the 9801 San Leandro Street property was a former Thrifty gasoline service station and that the property was purchased by the City of Oakland as part of the City's 98th Avenue street widening project. The City of Oakland is reportedly in the process of addressing soil and ground-water remediation activities at the subject property.

2.2 Previous Investigations

Previous site investigations at the former Gerber facility by Beta Associates (*1987*) and Groundwater Technology, Inc. (*1988*), as described in the reports provided for our review dated May 29, 1987, and November 17, 1988, respectively, were performed to evaluate the presence (or absence) of potential contamination in areas identified as suspect during an initial property inspection. As shown on Plate 1, a total of 15 soil borings (DH-1 through DH-11, MW-5, MW-6, MW-7 and MW-8) were previously drilled at the site to characterize soil conditions, and 7 of those borings (DH-1, DH-2, DH-4 and MW-5 through MW-8) were converted into monitoring wells (MW-1, MW-2, and MW-4 through MW-8, respectively) for characterization of ground-water conditions in the uppermost aquifer.

Analytical laboratory results for soil and ground-water samples collected from the previous borings and monitoring wells (Tables 1 and 2, respectively), indicate the presence of aromatic volatile organic compounds and TPH in soil samples collected from DH-8, MW-5, MW-6, and MW-8, and in ground-water samples collected from

Wells MW-2, MW-5, MW-6, and MW-8. In addition, chlorinated volatile organic compounds were detected in ground-water samples collected from Monitoring Wells MW-1 and MW-7.

The aromatic volatile organic compounds detected at the site include BTEX, which are common dissolved components of gasoline. The BTEX and TPH constituents detected in ground-water samples collected from Wells MW-2, MW-5, MW-6, and MW-8 appear to be related to operations of the former Chevron service station that occupied the northeastern corner of the site prior to Gerber's acquisition of the property, and/or the migration of these constituents onto the Gerber facility from the former Thrifty gasoline service station. Additionally, elevated concentrations of TPH and benzene, toluene, and xylenes were detected in the soil sample collected from Boring DH-8 and appear to indicate an on-site source of contamination in the area occupied by the former Chevron service station. Results of a ground-penetrating radar survey conducted by Groundwater Technology, Inc. (*1988*), did not indicate the presence of underground fuel storage tanks in the area occupied by the former Chevron and Shell Oil service stations, suggesting that the tanks had previously been removed.

The chlorinated volatile organic compounds detected at the site, 1,1-dichloroethane (DCA); 1,1-dichloroethene (DCE); and 1,1,1-trichloroethane (TCA), were reported in ground-water samples collected from Monitoring Wells MW-1 and MW-7.

2.3 Regional Geology and Hydrogeology

The former Gerber facility is located on the San Leandro alluvial fan which is situated between San Francisco Bay and the Oakland foothills. The fan soils consist of Quaternary Age unconsolidated channel and floodplain sediments deposited by San

Leandro Creek, which is currently located 1-mile south of the site. These sediments were derived primarily from erosion of older marine rocks in the foothills and consist of coarse sand and gravel along former stream channels and of silt and clay on the associated floodplain.

The San Leandro alluvial fan consists of interlayered deposits of low-permeability clay (aquitards) and permeable sand and gravel (aquifers). The low-permeability clay materials function as confining layers for the deeper confined aquifer systems in the area, and also comprise shallow-aquifer zones. An industrial well located at the former Gerber Products facility is completed in a deeper confined aquifer zone of the area (in contrast to the shallow uppermost aquifer zone that is the subject of this investigation); the well is reported to extend to a depth of 602 feet below ground surface and is screened between 160 to 225 feet. Ground-water use from the deeper confined aquifers in the area is reported to be limited to industrial purposes (*Groundwater Technology, Inc., 1988*).

3.0 FIELD INVESTIGATION

HLA's field investigation of site conditions at the former Gerber facility was conducted between August 3 and November 4, 1989. The scope of our services included drilling eight borings (two of which were completed as monitoring wells) and collecting soil samples from them for chemical analysis; installing and developing two ground-water monitoring wells; measuring water levels and collecting ground-water samples from each monitoring well at the site (9 wells); conducting a series of aquifer slug tests; and arranging a survey to provide reference elevations at each monitoring well location.

3.1 Soil Sampling Program

To further evaluate the areal and vertical distribution of TPH and BTEX concentrations in soil of the vadose zone in the vicinity of DH-8, six soil borings, designated SB-1 through SB-6, were drilled at the locations shown on Plate 2 and soil samples were collected from them and submitted for chemical analysis. The soil borings were drilled using truck-mounted hollow-stem auger drilling equipment. An HLA geologist was present during drilling operations to coordinate activities, perform health and safety monitoring, collect soil samples, and record subsurface conditions. The soils in each boring were classified according to the Unified Soil Classification System (USCS). The lithologic logs of the soil borings and a key to the USCS are presented in Appendix A.

Undisturbed soil samples were collected from each boring at depths of approximately 5, 10, and 15 feet below ground surface (bgs). An organic vapor analyzer was used to screen soil samples for the presence of volatile organic compounds. Samples were also checked for other evidence of contamination, such as soil discoloration, petroleum and chemical odors, and the presence of liquid phase chemicals. Following

collection and field screening, all soil sample tubes were sealed with foil-lined and taped plastic end caps. On the basis of field screening, 17 soil samples from the 6 soil borings were selected for chemical analysis. The soil samples selected for chemical analysis were stored on blue ice until delivery to Curtis & Tompkins, Ltd., a California state-certified laboratory in Berkeley, California. Chain of custody records were initiated in the field and maintained until samples were relinquished to the analytical laboratory.

To prevent potential cross contamination between borings, all downhole equipment was steam cleaned prior to use for drilling each boring. All soil sampling equipment was also cleaned with an Alconox wash and deionized water rinse prior to the collection of each soil sample. All soil sampling procedures were conducted in accordance with HLA QA/QC procedures, which meet or exceed all state and local requirements.

3.2 Monitoring Well Installation and Development

To further evaluate the areal extent of TPH and BTEX concentrations in the uppermost aquifer beneath the site, two additional monitoring wells, designated MW-9 and MW-10, were installed at locations shown on Plate 1. Drilling was performed on August 4, 1989, by Spectrum Drilling, Inc., of Stockton, California using a Mobile B-53 hollow-stem auger drill rig. An HLA geologist was present to coordinate drilling activities and monitoring well installation. Drilling operations, lithologic logging, and the collection and screening of soil samples from the borings drilled for well installation were performed in accordance with the procedures described in Section 3.1.

Monitoring wells were constructed with flush-threaded 4-inch-diameter, Schedule 40 PVC well casing and screen. Prior to removal of the auger sections, factory-slotted 0.010-inch well screen with a bottom cap was placed at the bottom of

3.3 Ground-Water Sampling Program

On August 8, 1989, water-level measurements were obtained and ground-water samples were collected from the nine monitoring wells at the site (MW-1, MW-2, and MW-4 through MW-10). Ground-water samples were collected using a stainless steel bailer and decanted into 40-milliliter (ml) vials. The wells were purged of a minimum of three well volumes by hand bailing or with a centrifugal pump prior to sampling. The purged water was contained in 55 gallon drums and stored at the site. Water quality parameters (pH, electrical conductivity, temperature, and clarity) were also monitored during purging of the wells.

All water-level and sampling equipment was steam cleaned before use in each well to minimize cross contamination. Following collection, ground-water samples were stored on blue ice until delivery to Curtis & Tompkins, Ltd., for chemical analysis. A field blank consisting of deionized water was poured though a stainless steel bailer into a 40 ml vial and was stored with the samples. Chain of custody records were initiated in the field and maintained until samples were relinquished to the laboratory.

3.4 Analytical Program

Soil samples submitted for chemical analysis were analyzed for TPH calibrated as gasoline by EPA Test Method 8015 (modified) and for BTEX by EPA Test Method 8020 using purge and trap extraction by EPA Test Method 5030. Ground-water samples submitted for chemical analysis were analyzed for volatile organics using EPA Test Method 624 and for TPH calibrated as gasoline by EPA Test Method 8015 (Modified) using purge and trap extraction method EPA 5030. All samples were analyzed by Curtis & Tompkins, Ltd.

3.5 Slug Testing Program

On September 25, 1989, a series of slug tests was performed in Monitoring Wells MW-2, MW-5, MW-6 and MW-8 to estimate the transmissivity and hydraulic conductivity of the uppermost aquifer that underlies the site. The slug tests were performed in accordance with a method presented by Bouwer and Rice *(1976)* and Bouwer (*1989*) for determining the hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells.

The hydraulic conductivity of the uppermost aquifer in the vicinity of each well tested was calculated from the rate of rise of the water level in the well after a certain volume of water was suddenly removed. Simulation of water removal during the subject tests was achieved by completely submerging a weighted 6-foot-long PVC slug (with a displacement volume of 0.036 cubic foot), allowing the water level in the well to reach equilibrium, and then quickly removing the slug. The resulting rate of rise of the water level in the well (recovery) was measured until the water level returned to static conditions. Water-level changes were measured using an In-Situ Inc. pressure transducer and Hermit model SE1000B data logger. Prior to the beginning and end of each slug test performed, calibration of the pressure transducer was checked using a steel measuring tape. The slug testing procedure was duplicated in each well to assess confirmation of the test data.

4.0 RESULTS OF FIELD INVESTIGATION

4.1 Soil and Ground-Water Conditions

Lithologic data obtained during drilling at the site revealed a general sequence of silty to sandy clay underlain by clayey sand underlain by sandy clay. The sand unit and the clay above the sand comprise the uppermost aquifer at the site. Boring logs are presented in Appendix A.

The uppermost soil at the site consists of predominantly stiff silty to sandy clay with occasional lenses of sand. These soils extend to approximately 16 feet bgs and are wet to saturated below approximately 11 feet bgs. From approximately 16 to 21 feet bgs, the soil consists of dense, saturated, clayey fine-grained sand. At Monitoring Well MW-10, the sand grades into a poorly graded sand with some fine gravel from 20 to 21 feet bgs. These sands and the saturated portion of the clay overlying these sands comprise the uppermost aquifer. The soil underlying this water-bearing sand unit is comprised of soft to stiff sandy clay. This clay unit is present at approximately 20 feet bgs at Monitoring Well MW-9. The clay unit functions as the lower confining layer (aquitard) for the uppermost aquifer.

The uppermost aquifer at the site occurs primarily from 11 to 21 feet bgs and is generally under semiconfined conditions. Water-level data and chemical data suggest that the water-bearing sand and saturated portion of the upper clay act as an unconfined unit. Hydraulically, however, the upper clay behaves as a confining layer for the semiconfined sand aquifer.

Water-level measurements from monitoring wells at the site have been obtained on four dates from April 1987 to August 1989 and are presented in Table 3. The depth to water measurements were used to calculate ground-water elevations in feet above mean sea level. Ground-water elevations from August 8, 1989, have been used to

construct the potentiometric contour map presented on Plate 3. As shown, the localized direction of ground-water flow is toward the west. The hydraulic gradient across the site ranges from approximately 0.001 to 0.002 foot/foot.

4.2 Slug Test Results

Water-level data from the slug tests performed in Monitoring Wells MW-2, MW-5, MW-6, and MW-8 are illustrated as semilog plots of the change in water level versus time on Plates B1 through B6 presented in Appendix B, and were analyzed to derive values of transmissivity and hydraulic conductivity for the uppermost aquifer at the site according to Bouwer and Rice (*1976*), and Bouwer (*1989*). Analysis of the slug test data was based upon the thickness of the clayey sand zone identified in the uppermost aquifer (approximately 16 to 21 feet bgs) to derive hydraulic parameters. Calculation Sheets of the analyses are presented in Appendix B. The effect of the rate of rise of the water level in each well attributed to drainage of the gravel pack was also eliminated by ignoring the early data points of the semilog plots and using the second straight line portion in the data plot for the calculation of aquifer parameters.

A summary of the slug test results are presented in Table 4. Analysis of the semilog plots resulted in transmissivity and hydraulic conductivity values that ranged from 53 to 288 square feet per day (ft^2/day), and 15 to 72 feet per day (ft/day), respectively.

In conclusion, consistent values of transmissivity and hydraulic conductivity have been derived from the slug tests performed at the site. The geometric mean transmissivity and hydraulic conductivity values of 136 ft^2/day and 32 ft/day, respectively, are considered representative of the uppermost aquifer at the site. On the basis of the hydraulic gradients (0.001 to 0.002), the geometric mean hydraulic

conductivity value obtained from the slug tests, and an estimated porosity of 30 percent for the clayey sand materials that comprise the uppermost aquifer, the horizontal velocity of ground-water flow in the uppermost aquifer ranges from about 0.1 to 0.2 ft/day.

4.3 Soil Sampling Results

The laboratory analytical reports of soil samples submitted for chemical analysis from each boring are presented in Appendix C, and Table 5 presents a summary of the analytical results. In general, analytical results for the soil samples suggest that the distribution of chemicals detected in the soils from the vicinity of the former Chevron service station area can be characterized into three horizontal layers.

Soil samples collected from depths ranging between 5 to 6.5 feet bgs did not contain detectable concentrations of TPH calibrated as gasoline or of BTEX, with exception of TPH detected at 2 milligrams per kilogram (mg/kg) in the 5-foot sample from MW-8, toluene detected at 30 micrograms per kilogram (μg/kg) in the 6- to 6.5-foot sample from Boring SB-1, and benzene detected at 47 μg/kg in the 5- to 5.5-foot sample from Boring SB-5. The zone from the approximate depth of 9 to 10.5 feet bgs contains TPH concentrations ranging from 34 to 470 mg/kg from Borings SB-1 to SB-6. TPH was also detected at 5 mg/kg in the 10-foot sample from MW-8. Maximum BTEX concentrations in these samples were 3,300 μg/kg for benzene, 1,400 μg/kg for toluene, 8,200 μg/kg for ethylbenzene and 22,000 μg/kg for total xylenes. Soil samples collected between the depths of 15 to 16 feet bgs did not contain detectable concentrations of TPH or BTEX except in the vicinity of Borings SB-2 and SB-6. The 15.5- to 16-foot sample from Boring SB-2 had concentrations of TPH at 140 mg/kg, and BTEX at 670, 790, 1,300, and 4,900 μg/kg, respectively. The 15- to

15.5-foot sample from Boring SB-6 had BTEX concentrations of 33, 34, 5.5, and 26 μg/kg, respectively.

TPH and BTEX were not detected in the 6- to 6.5-foot and 12- to 12.5-foot soil samples from Borings MW-9 and MW-10. These borings (completed as monitoring wells) were drilled southwest of the former Chevron service station area.

4.4 Ground-Water Sampling Results

The laboratory analytical reports for ground-water samples collected during the current investigation and submitted for chemical analysis are presented in Appendix D. Table 2 presents a summary of the chemical parameters and concentrations detected in ground-water samples from each monitoring well sampled during the present investigation, and also includes the chemical data reported from the two previous investigations conducted at the site (*Beta. 1987; Groundwater Technology. 1988*).

Chemical results of the August 8, 1989, ground-water sampling event conducted by HLA indicate that chlorinated volatile organic compounds, TPH calibrated to gasoline, and the parameters BTEX were detected in samples collected from monitoring wells at the site. One or more chlorinated volatile organic compounds were detected in Wells MW-1, MW-7, and MW-9. The compounds DCE, DCA, and TCA were detected in Well MW-1 at 47, 9, and 21 μg/l, respectively. Concentrations detected in MW-7 were 39, 8, and 13 μg/l for DCE, DCA, and TCA, respectively. DCE was also detected at a concentration of 3 μg/l in Well MW-9.

TPH and BTEX compounds were detected in monitoring Wells MW-2, MW-5, MW-6, and MW-8 at the northeast corner of the site. TPH concentrations in Wells MW-2, MW-6, and MW-8 were 1.1, 1.0, and 77 milligrams per liter (mg/l), respectively. Benzene concentrations ranged from 48 to 1,900 μg/l, and toluene,

ethylbenzene, and total xylene concentrations ranged from 8 to 820 μg/l, 15 to 1,000 μg/l, and 55 to 3,600 μg/l, respectively.

5.0 DISCUSSION OF CHEMICAL RESULTS

5.1 Soil Conditions

Chemical results for soil samples collected from the former Chevron service station area in the northeast corner of the subject property indicate that elevated concentrations of TPH and BTEX have been detected in a zone ranging from approximately 9 to 10.5 feet bgs. The distribution of TPH concentrations detected in all soil samples collected during the present and former investigations are shown on Plate 4. The concentrations of TPH detected in all samples collected between the depths of 9 and 10.5 feet bgs ranged from 5 to 4017 mg/kg.

Similarly, concentrations of BTEX constituents detected in soil samples from the depths of 9 to 10.5 feet bgs have ranged from: 140 to 3,300 µg/kg; 200 to 2,000 µg/kg; 270 to 8,200 µg/kg; and 430 to 108,092 µg/kg, respectively. Additionally, elevated levels of TPH and BTEX have been detected in a soil sample collected from the depth of 15.5 to 16 feet bgs from boring SB-2 at concentrations of 140 mg/kg and 670, 790, 1,300, and 4,900 µg/kg, respectively. The distribution of chemical concentrations detected in soil samples from the former Chevron service station area correlate closely with the former locations of underground gasoline storage tanks, fuel conveyance lines, and service station pump islands identified on facility layout plans of the former Chevron service station. Because the predominant depth of soil contamination present in the borings sampled ranged from 9 to 10.5 feet bgs, it appears likely that former underground gasoline storage tanks in the subject area of the site were responsible for the TPH and BTEX soil concentrations detected.

5.2 Ground-Water Conditions

Analytical results for ground-water samples collected from monitoring wells at the site indicate that: 1) the areal extent of TPH and BTEX contamination appears to be limited to an area in the vicinity and downgradient of the former Chevron service station, and 2) the distribution and concentrations of the parameters DCE, DCA, and TCA detected in Wells MW-1 and MW-7 appear to indicate the presence of an impact associated with the former Shell Oil Company service station area and/or the potential migration of these parameters to the subject locations from an off-site source.

Chemical results of the TPH and BTEX analyses of ground-water samples collected at the site indicate that these parameters were detected in Wells MW-2, MW-5, MW-6, and MW-8 only. On the basis of the distribution of TPH and BTEX concentrations detected at the site, it appears that the areal extent of TPH and BTEX ground-water contamination is represented by the distribution of benzene concentrations in ground water, and is limited to the area shown on Plate 5. The source(s) responsible for the TPH and BTEX ground-water contamination identified at the site appears to be the TPH contaminated soils in the vicinity of the former Chevron service station.

Chemical results of ground-water samples collected from Wells MW-1 and MW-7 indicate that the parameters DCE, DCA, and TCA were detected in these two wells. DCE, DCA, and TCA belong to a group of compounds classified as chlorinated volatile organics and appear to represent a separate type of ground-water contamination at the site with respect to the TPH and BTEX contamination previously described. On the basis of site history information that has identified a former Shell Oil Company service station that previously occupied the subject area, it seems probable that the chlorinated volatile organic compounds detected at the site are the result of operations of

the former Shell Oil Company service station and/or the migration of these compounds from an off-site (upgradient) source.

6.0 REFERENCES

Beta Associates, 1987. *Subsurface Soil and Ground-Water Contamination Investigation, Gerber Products Facility, 9401 San Leandro Street, Oakland, California*, May 29.

Bouwer, H. 1989. *The Bouwer and Rice Slug Test - An Update*. Ground Water, Vol. 27, No. 3, May-June.

Bouwer, H. and Rice, R.C., 1976. *A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells*. Water Resources Research, Vol. 12, No. 3, June.

Groundwater Technology, Inc., 1988. *Subsurface Hydrocarbon Investigation, Gerber Products Company, 9401 San Leandro Street, Oakland, California*, November 17.

Table 1. Summary of Previous Chemical Results from Soil Samples

WELL NUMBER	SAMPLING DATE	DEPTH (FEET)	TPH (GASOLINE) mg/kg	BENZENE ug/kg	TOLUENE ug/kg	ETHYL BENZENE ug/kg	XYLENES, TOTAL ug/kg	DIESEL mg/kg	MOTOR OIL mg/kg
Source: Groundwater Technology, Inc., 1988									
MW-5	18-May-88	5	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NT	NT
	18-May-88	10	160	ND(0.5)	ND(0.5)	3000	7000	NT	NT
	18-May-88	15	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NT	NT
MW-6	18-May-88	5	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	18-May-88	10	310	ND(0.5)	2000	4000	18000	NT	NT
MW-7	18-May-88	5	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	18-May-88	10	ND(1)	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
MW-8	19-May-88	5	2	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
	19-May-88	10	5	ND(0.5)	ND(5)	ND(5)	ND(5)	NT	NT
Source: Beta Associates, 1987									
MW-1	18-Apr-87	3	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
MW-2	18-Apr-87	3	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-3	18-Apr-87	2.5	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
MW-4	18-Apr-87	10.5	NT	ND(10)	ND(10)	NT	ND(10)	ND	ND
DH-5	18-Apr-87	5	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-6	18-Apr-87	10.5	NT	ND(10)	ND(10)	NT	ND(10)	ND	ND
DH-7	18-Apr-87	3.5	ND(1)	ND(10)	ND(10)	NT	ND(10)	NT	NT
DH-8	18-Apr-87	10	1017	1063	9997	NT	108092	ND(1)	240
DH-9	18-Apr-87	1	NT	ND(10)	ND(10)	ND(10)	ND(20)	NT	NT
DH-10	18-Apr-87	1	NT	NT	NT	NT	NT	NT	NT
DH-11	18-Apr-87	1	NT	ND(10)	ND(10)	NT	ND(10)	NT	380

NOTES:

mg/kg: milligrams per kilogram (equivalent to parts per million)
ug/kg: micrograms per kilogram (equivalent to parts per billion)
ND: Not detected; Limit of detection indicated in parenthesis
NT: Not Tested

Total Petroleum Hydrocarbons (TPH) by EPA Method 8015
Benzene, Toluene, Ethyl Benzene, Total Xylenes by EPA Method 8020
Extraction by EPA Method 5030, Purge and Trap

Table 2. Summary of Chemical Results from Ground-water Samples

WELL NUMBER	SAMPLING DATE	TPH (GASOLINE) mg/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES, TOTAL ug/l	OTHER DETECTABLE VOLATILE COMPOUNDS 1,1-DCE ug/l	1,1-DCA ug/l	1,1,1-TCA ug/l	1,2-DCA ug/l
MW-1	18-Apr-87	NT	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	61	9.5	93.1	0.5
	03-Jun-88	NT	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	8	40	ND(5)
	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	47	9	21	ND(1)
MW-2	18-Apr-87	NT	76.9	121	93.4	477	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.5)
	03-Jun-88	NT	64	18	48	60	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	1.1	48	9	33	55	ND(1)	ND(1)	ND(1)	ND(1)
MW-4	18-Apr-87	NT	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.2)	ND(0.5)	ND(0.5)	ND(0.5)
	03-Jun-88	NT	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
MW-5	03-Jun-88	NT	93	ND(5)	100	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	ND(0.05)	49	8	15	63	ND(1)	ND(1)	ND(1)	ND(1)
MW-6	03-Jun-88	NT	110	140	35	210	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	1.0	45	8	15	74	ND(1)	ND(1)	ND(1)	ND(1)
MW-7	03-Jun-88	NT	ND(5)	ND(5)	ND(5)	ND(5)	25	5	18	ND(5)
	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	39	8	13	ND(1)
MW-8	03-Jun-88	NT	2300	2000	950	4100	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	77	1900	820	1000	3600	ND(1)	ND(1)	ND(1)	ND(1)
MW-9	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	3	ND(1)	ND(1)	ND(1)
MW-10	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Field Blank	03-Jun-88	NT	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
	08-Aug-89	ND(0.05)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)

NOTES:

mg/l: milligrams per liter (equivalent to parts per million)
ug/l: micrograms per liter (equivalent to parts per billion)
NT: Not Tested
ND: Not detected; Limit of detection indicated in parenthesis
1,1-DCE: 1,1-Dichloroethene
1,1-DCA: 1,1-Dichloroethane
1,1,1-TCA: 1,1,1-Trichloroethane
1,2-DCA: 1,2-Dichloroethane

Volatile Organics in Water by EPA Method 624
Total Petroleum Hydrocarbons (TPH) as Gasoline
in Aqueous Solutions by EPA Method 8015 (Modified)
Extraction by EPA Method 5030, Purge and Trap

April 18, 1987 Results from Beta Associates (1987)
June 3, 1988 Results from Groundwater Technology (1988)
August 8, 1989 Results from Curtis & Tompkins, Ltd.

Table 3. Water-Level Elevations

WELL NUMBER	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Top of Casing Elevation	18.05	18.42	18.74	18.96	18.71	18.05	18.97	17.66	18.36
DATE	DEPTH TO WATER (FEET) FROM TOP OF CASING								
20-Apr-87	10.28	10.38	NA	10.84	NA	NA	NA	NA	NA
22-Jul-88	10.48	10.71	11.43	10.86	11.00	10.39	11.04	NM	NM
04-Aug-89	10.41	NM	NM	10.63	10.91	NM	10.95	NM	NM
08-Aug-89	10.40	10.56	11.19	10.77	10.89	10.27	10.98	10.11	10.53
DATE	GROUND-WATER ELEVATION (FEET) ABOVE MEAN SEA LEVEL								
20-Apr-87	7.77	8.04	NA	8.12	NA	NA	NA	NA	NA
22-Jul-88	7.57	7.71	7.31	8.10	7.71	7.66	7.93	NM	NM
04-Aug-89	7.64	NM	NM	8.33	7.80	NM	8.02	NM	NM
08-Aug-89	7.65	7.86	7.55	8.19	7.82	7.78	7.99	7.55	7.83

NOTES:

NA: Not Applicable, Monitoring Well Not Yet Installed

NM: Not Measured

Table 4. Results of Slug Tests

Well Number	Test Number	Aquifer Thickness (feet)	Hydraulic Conductivity (ft/day)	Transmissivity (ft^2/day)
MW-2	1	4.0	64.4	258
	2	4.0	72.0	288
MW-5	1	5.0	27.4	137
	2	5.0	22.5	113
MW-6	1	4.0	48.5	194
	2	4.0	41.5	166
MW-8	1	4.0	15.1	60
	2	4.0	13.2	53
Geometric Mean			32.2	136

Note: Analysis of slug test performed using method of Bouwer and Rice (*1976*) and Bouwer (*1989*).

Table 5. Summary of Chemical Results from Soil Samples

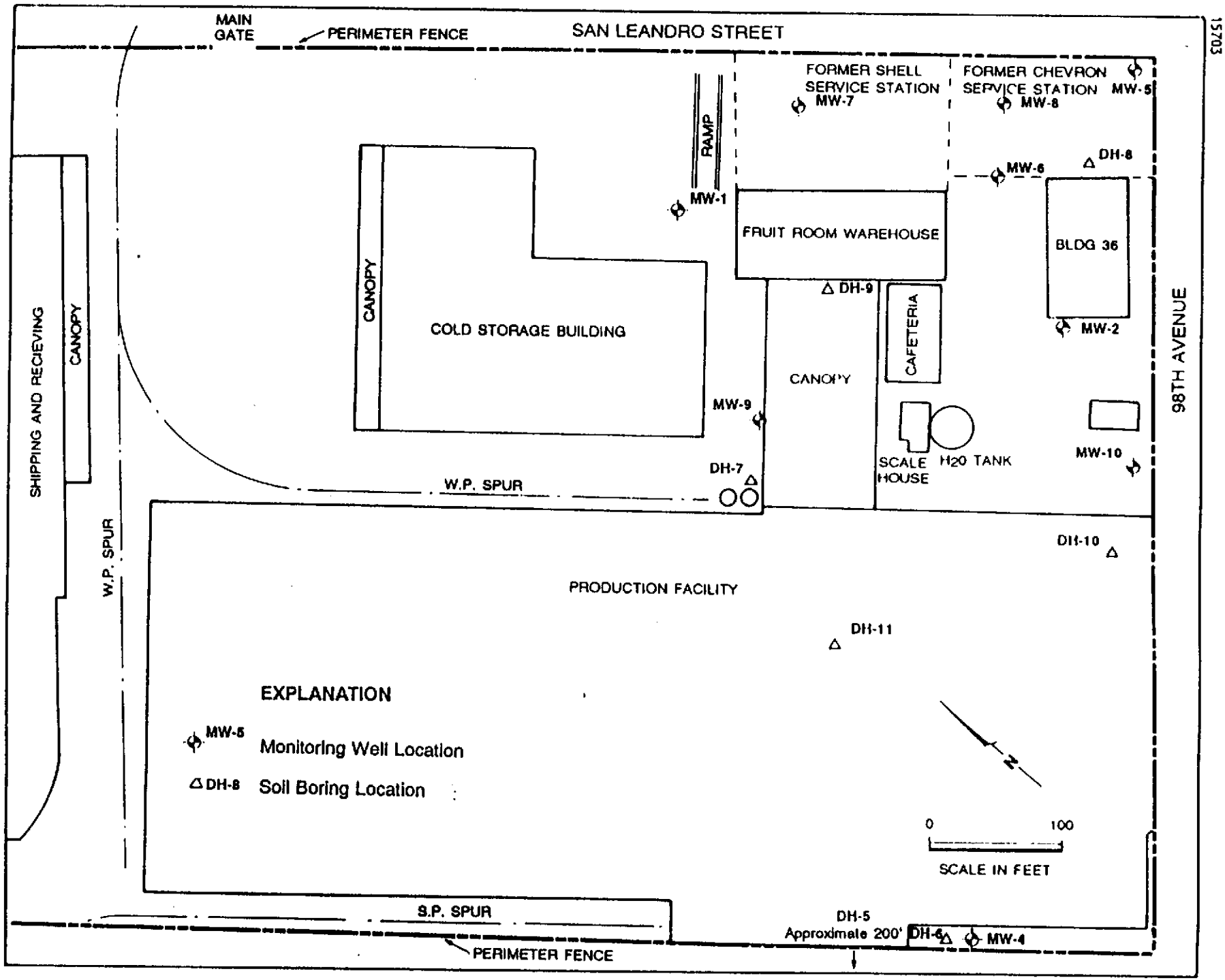
WELL NUMBER	SAMPLING DATE	DEPTH (FEET)	TPH (GASOLINE) mg/kg	BENZENE ug/kg	TOLUENE ug/kg	BENZENE ug/kg	TOTAL ug/kg
SB-1	03-Aug-89	6-6.5	ND(10)	ND(5)	30	ND(5)	ND(5)
	03-Aug-89	10-10.5	400	1900	1400	4100	11000
SB-2	03-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	9-9.5	34	140	200	270	430
	03-Aug-89	15.5-16	140	670	790	1300	4900
SB-3	03-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	9-9.5	130	900	ND(100)	1500	3400
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-4	03-Aug-89	5-5.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	03-Aug-89	10-10.5	300	3300	420	8200	12000
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-5	03-Aug-89	5-5.5	ND(10)	47	ND(5)	ND(5)	ND(5)
	03-Aug-89	10-10.5	470	1900	580	7200	22000
	03-Aug-89	15-15.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
SB-6	05-Oct-89	5-5.5	ND(10)	18	23	8.0	27
	05-Oct-89	10-10.5	270	2000	900	1600	3800
	05-Oct-89	15-15.5	ND(10)	33	34	5.5	26
MW-9	04-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	04-Aug-89	12-12.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
MW-10	04-Aug-89	6-6.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
	04-Aug-89	12-12.5	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)

NOTES:

mg/kg: milligrams per kilogram (equivalent to parts per million)
ug/kg: micrograms per kilogram (equivalent to parts per billion)
ND: Not detected; Limit of detection indicated in parenthesis

Total Petroleum Hydrocarbons (TPH) by EPA Method 8015
Benzene, Toluene, Ethyl Benzene, Total Xylenes by EPA Method 8020
Extraction by EPA Method 5030, Purge and Trap

Analyses performed by Curtis & Tompkins, Ltd.



15703

Harding Lawson Associates
Engineering and Environmental Services

DRAWN

JOB NUMBER 19459,001.02

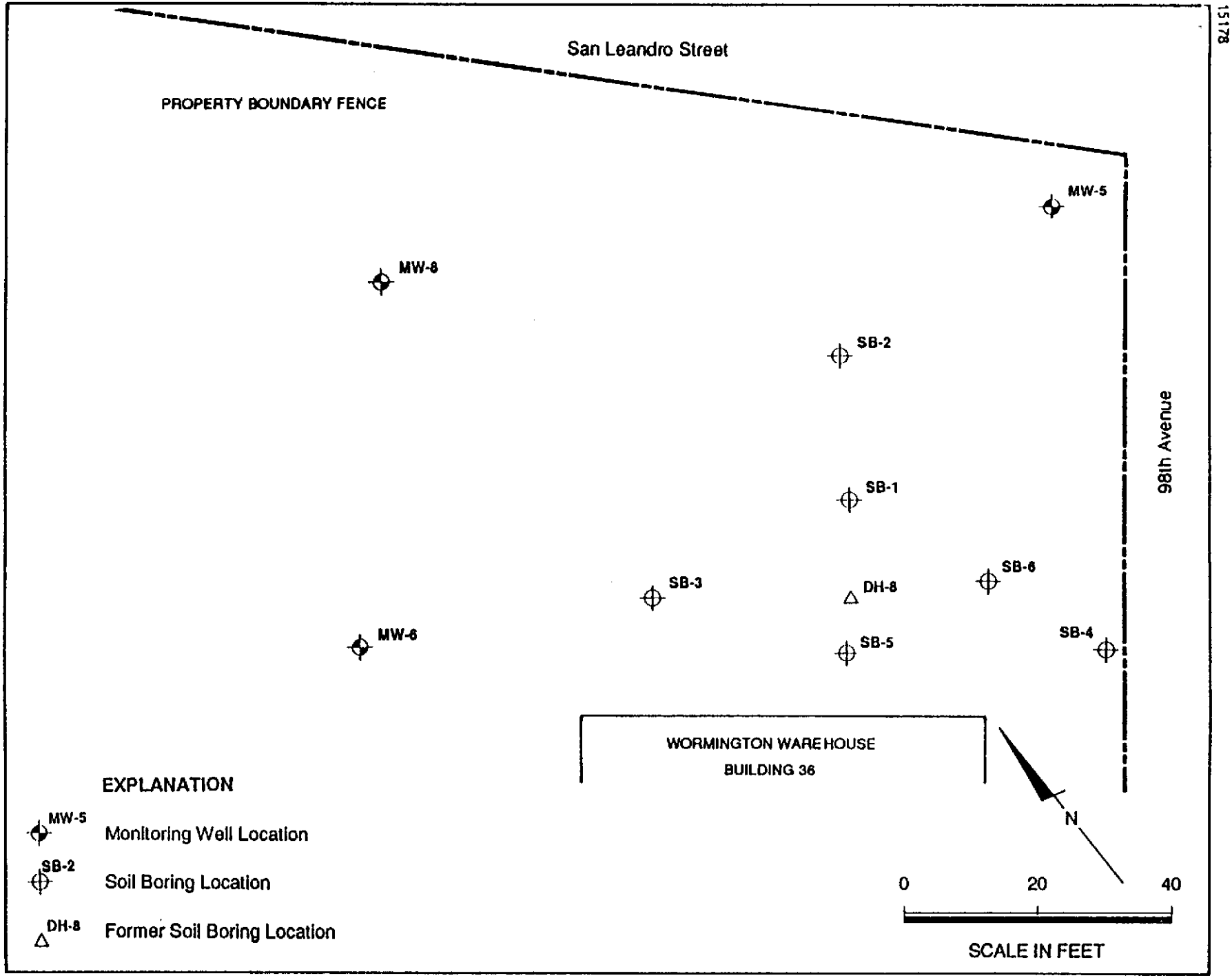
APPROVED

DATE 11/89

REVISED DATE

PLATE 1

Site Plan
Gerber Products Company
Oakland, California



15178

Harding Lawson Associates
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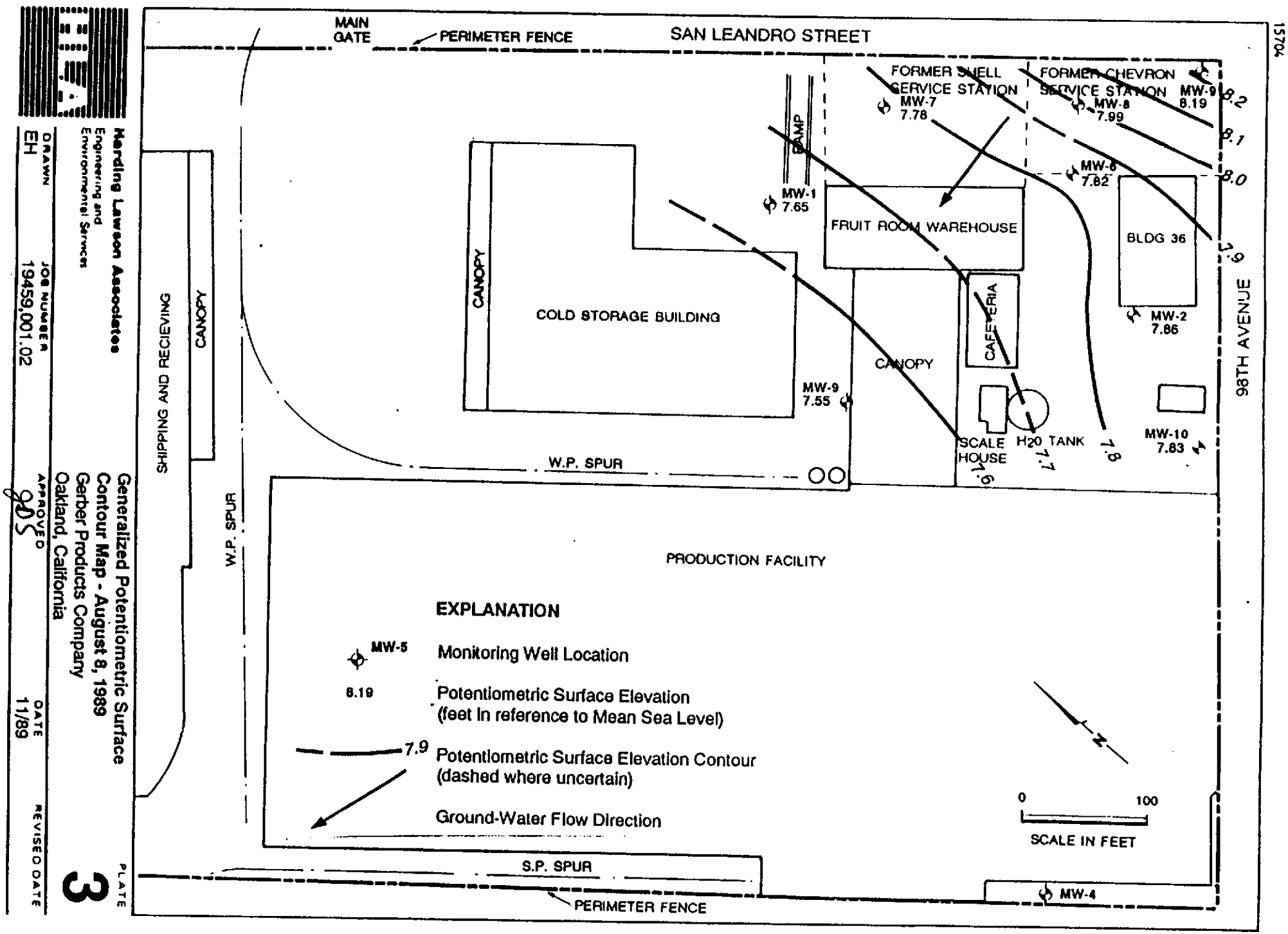
Soil Boring Locations
Gerber Products Company
Oakland, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459,001.02	GDS	11/89	

PLATE 2



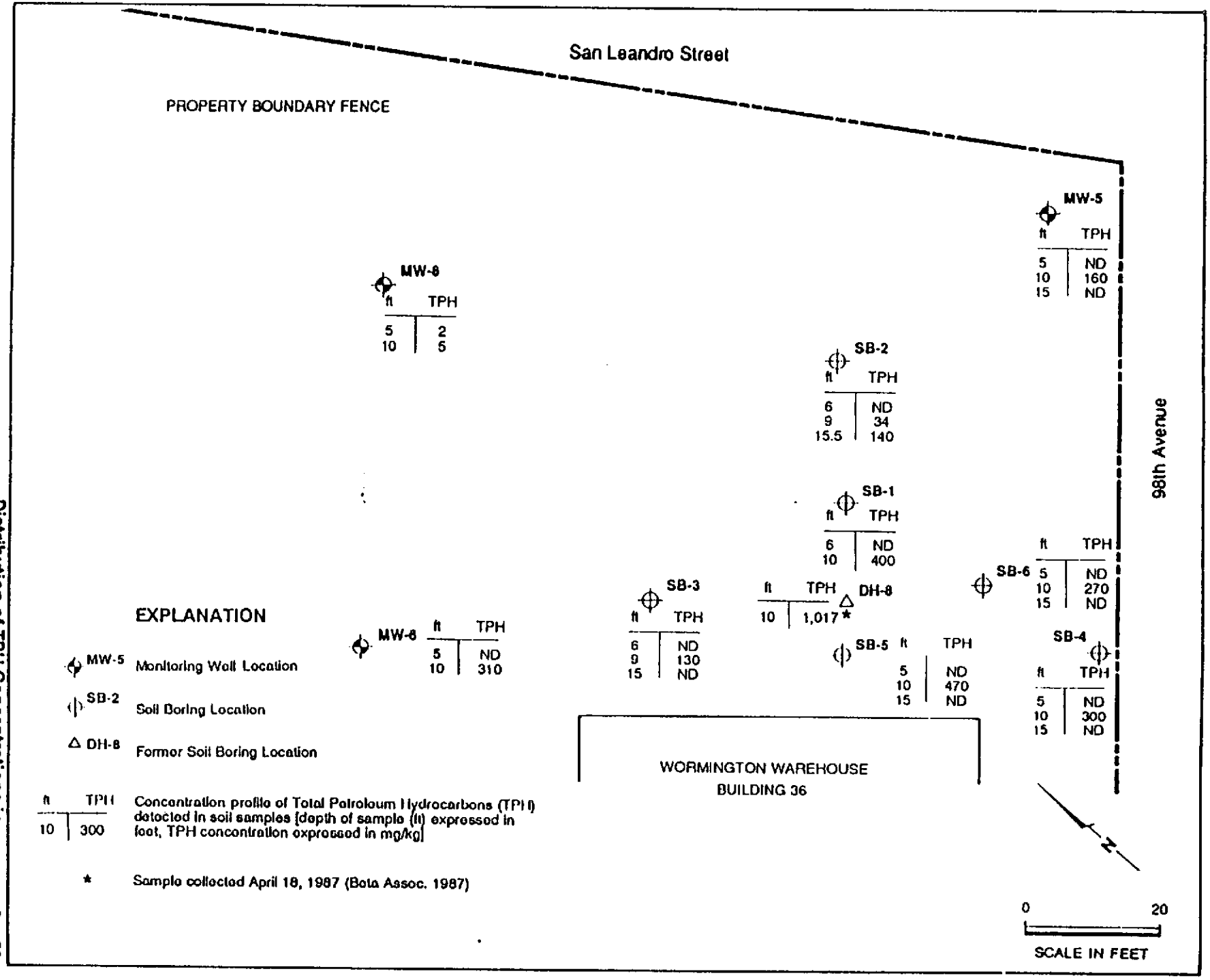
Harding Lawson Associates
Engineering and Environmental Services

DRAWN EH
JOB NUMBER 19459,001.02
APPROVED
DATE 11/89
REVISED DATE

Generalized Potentiometric Surface Contour Map - August 8, 1989
Gerber Products Company
Oakland, California

PLATE 3

15704



15875

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Engineering and Environmental Services

DRAWN

JOB NUMBER
19459.001.02

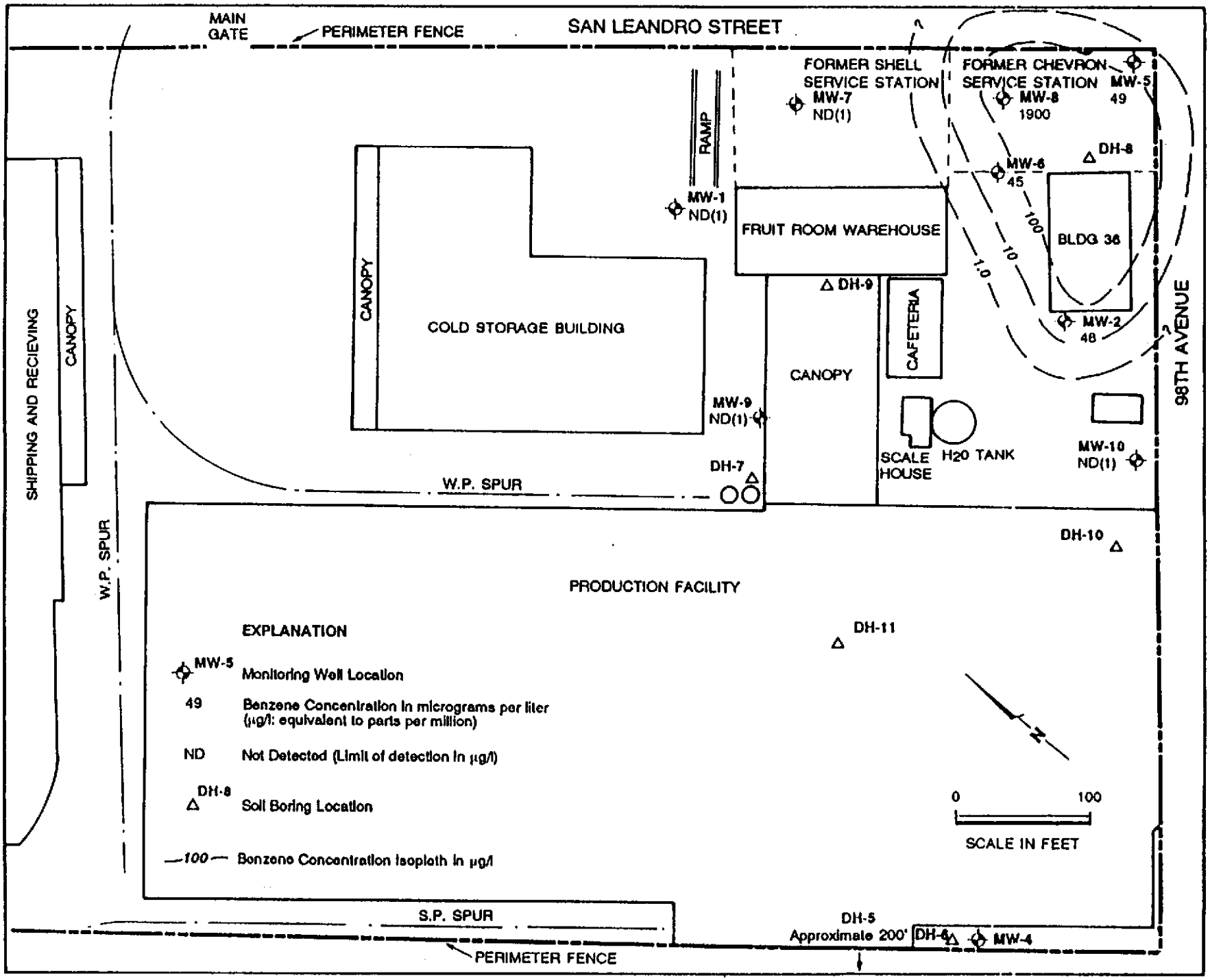
APPROVED
2DS

DATE
11/89

REVISED DATE

PLATE
4

Distribution of TPH Concentrations in Soil Samples
Gerber Products Company
Oakland, California



15876

Harding Lawson Associates
Engineering and Environmental Services

DRAWN EH
JOB NUMBER 1945,001.02
APPROVED
DATE 11/89
REVISED DATE

Distribution of Benzene Concentrations in Groundwater - August 8, 1989
Gerber Products Company
Oakland, California

PLATE 5

Appendix A

BORING LOGS AND WELL COMPLETION DETAILS

Appendix A

BORING LOGS AND WELL COMPLETION DETAILS

LIST OF ILLUSTRATIONS

15920

Equipment 6" Hollow Stem Auger

Elevation 19.2 ft Date 8/3/89

Blows/Ft	OVA (ppm)	Depth (ft)	Sample	
		0		4" asphalt
				BROWN AND BLACK MOTTLED SANDY CLAY (CL) soft, moist
21	20			becoming black, stiff, moist
		5		
32	30			DARK GRAY SAND (SP) medium dense, moist, medium-grained, slight hydrocarbon odor
				DARK GRAY CLAY (CL) stiff, moist, slight white staining, strong hydrocarbon odor
32		10		bottom of boring at 10.0 ft
	700			
		15		

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Log of Boring
Gerber Products Company
Oakland, California

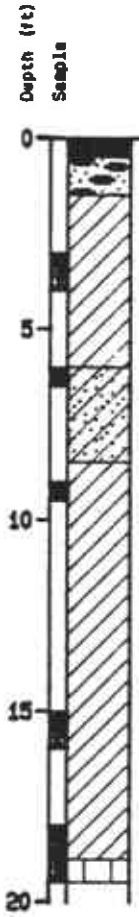
PLATE
A-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459.001.02	SDS	11/89	

15921

Equipment 6" Hollow Stem Auger

Elevation 19.2 ft Date 8/3/89



Blows/Ft	OVA (ppm)	
		4" asphalt SANDY GRAVEL SUB-BASE (Fill) loose, dry BLACK SILTY CLAY (CL) medium stiff, moist
20		color change to dark gray and brown mottled, stiff, moist
30	1	GRAY CLAYEY SAND (SC) stiff, moist, fine- to medium-grained sand
25	200	GRAY AND BROWN MOTTLED SILTY CLAY (CL) very stiff, moist, strong hydrocarbon odor
		becoming wet
22	650	strong hydrocarbon odor
12		BROWN AND GRAY MOTTLED CLAYEY SILT (ML) soft, wet
		bottom of boring at 19.5 ft

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Log of Boring [redacted]
Gerber Products Company
Oakland, California

PLATE
A-2

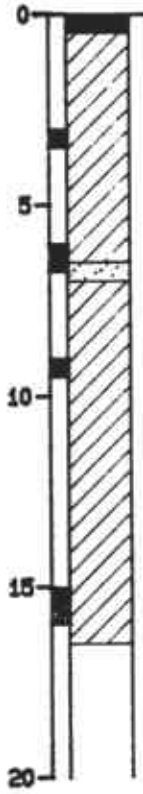
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459.001.02	JDS	11/89	

15922

Equipment 6" Hollow Stem Auger

Elevation 19.2 ft Date 8/3/89

Blows/Ft	OVA (ppm)	Depth (ft)	Sample
		0	
19	400		
		5	
35	20		
26	650	10	
		15	
36	1		
		20	



4" asphalt

BROWN AND GRAY GRAVELLY SANDY CLAY (CL)

becoming black silty clay, stiff, moist, minor 1/4" diameter gravel

GRAY SAND (SP) loose, moist, predominantly fine-grained

GRAY SANDY CLAY (CL) stiff, moist, predominantly fine-grained sand

becoming gray and brown mottled silty clay

bottom of boring at 16.5 ft

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Engineering and Environmental Services

Log of Boring [redacted]
Gerber Products Company
Oakland, California

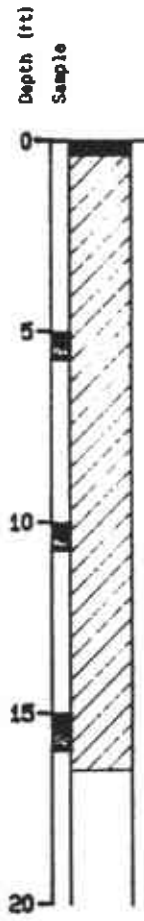
PLATE
A-3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459.001.02	JDS	11/89	

15923

Equipment 6" Hollow Stem Auger

Elevation 19.2 ft Date 8/3/89



Blows/Ft	OVA (ppm)	
		4" asphalt BLACK SANDY CLAY (CL) loose, moist
		becoming black silty clay
35	400	color change to dark gray, very stiff, moist increasing fine-grained sand
22	1000	becoming brown and gray mottled sandy clay, stiff, moist. [redacted] odor strong hydrocarbon odor
		wet, no hydrocarbon odor
14	0	
		bottom of boring at 16.5 ft

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Engineering and Environmental Services

Log of Boring [redacted]
Gerber Products Company
Oakland, California

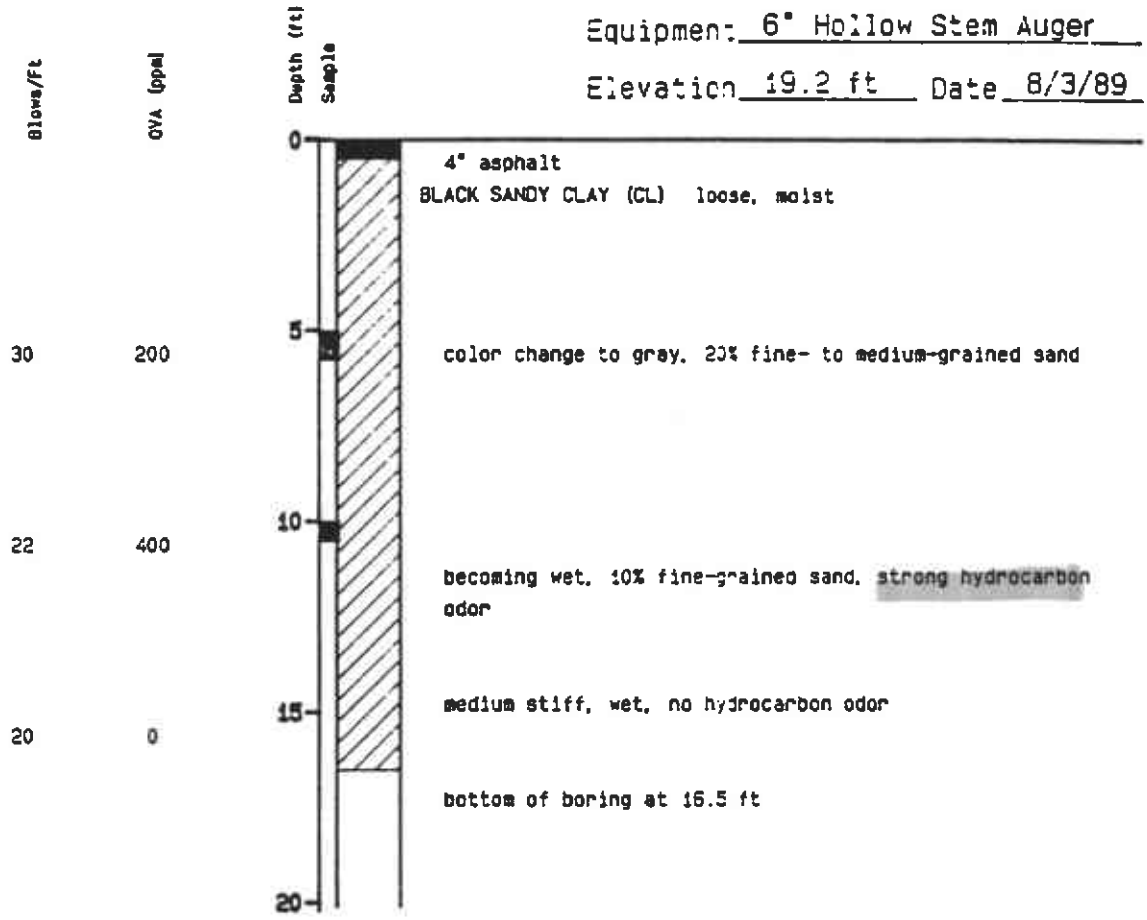
PLATE
A-4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459, 001.02	JPS	11/89	

15924

Equipment: 6" Hollow Stem Auger

Elevation 19.2 ft Date 8/3/89



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Engineering and Environmental Services

Log of Boring
Gerber Products Company
Oakland, California

PLATE
A-5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459.001.02	GDS	11/89	

15925

Equipment 6" Hollow Stem Auger

Elevation 19.2 ft Date 10/5/89

Blows/ft	OVA (ppm)	Depth (ft)	Sample	
		0		4" asphalt
				BROWN SANDY CLAY (CL) loose to firm, moist, fine- to medium-grained sand
		5		decrease in sand
30	2			color change to dark brown, medium stiff to stiff, moist, trace silt
		10		becoming wet
	110			
16	300			color change to gray green and brown mottled, medium stiff, wet to saturated, strong hydrocarbon odor
		15		
12	15			
13	0			BROWN CLAYEY SILT (ML) stiff, wet, no hydrocarbon odor
	0			
		20		bottom of boring at 18.5 ft

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Log of Boring [redacted]
Gerber Products Company
Oakland, California

PLATE
A-6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459, 001.02	JDS	11/89	

15926

Top of PVC Casing
Elevation 17.60 ft

Equipment 11" Hollow Stem Auger
Elevation 40.0 ft Date 8/4/89

GROUND SURFACE

12 IN. DIAMETER STEEL WELL HOUSING WITH LOCKING COVER
2 in. above ground surface

BENTONITE PELLET SEAL
2 to 4 ft

11 IN. DIAMETER BORING
0 to 21 ft

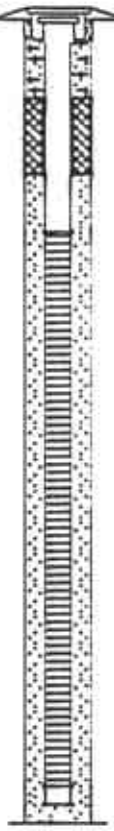
4 IN. DIAMETER SCHEDULE 40 PVC WELL CASING
0 to 20.5 ft

SAND PACK (Monterey #2/16)
4 to 21 ft

4 IN. DIAMETER SCHEDULE 40 PVC WELL [redacted] 0.010" slot size)
5.5 to 20 ft

SILT TRAP 20 to 20.5 ft

BOTTOM WELL CAP at 20.5 ft



Blows/foot	OVA (ppm)	Depth (ft)	Sample	
		0		6" concrete BROWN CLAYEY GRAVEL sub-base (Fill) BLACK CLAY (CL) 2.5Y N 2/0 medium stiff, dry, low plasticity, trace sand
				no hydrocarbon odor
35		5		increasing sand, fine- to medium-grained no hydrocarbon odors
				color change to very dark grayish brown (2.5Y 3/2)
		10		color change to dark brown tan mottled (7.5YR 4/2), stiff, moist, low plasticity, some silt, trace sand, no hydrocarbon odors
36				
45		15		DARK BROWN CLAYEY SAND (SC) 7.5YR 4/4 medium dense, moist to wet, predominantly fine-grained sand, trace medium-grained sand, trace silt no hydrocarbon odors
		20		BROWN SANDY CLAY (CL) 7.5YR 2/2 stiff, saturated, low plasticity, 10% fine- to medium-grained sand, trace coarse-grained sand, no hydrocarbon odors bottom of boring at 21.0 ft
25		25		

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Log of Boring and Well Completion Detail [redacted]
Gerber Products Company
Oakland, California

PLATE A-7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459.001.02	JDS	11/89	

15927

Top of PVC Casing
Elevation 18.36 ft

Equipment 11" Hollow Stem Aug.
Elevation 40.0 ft Date 8/4/89

Blows/foot	OVA (ppm)	Depth (ft)	Sample	
		0		GROUND SURFACE
				12 IN. DIAMETER STEEL WELL HOUSING WITH LOCKING COVER 2 in. above ground surface
				BENTONITE PELLET SEAL 2 to 4 ft
	40	5		9" concrete GRAVEL sub-base (Fill) VERY DARK GRAY CLAY (CL) 7.5YR 3/0 medium stiff, moist, low plasticity no hydrocarbon odor no hydrocarbon odor
				11 IN. DIAMETER BORING 0 to 21 ft
	37	10		color change to very dark grayish brown (10YR 3/2) 4 IN. DIAMETER SCHEDULE 40 PVC WELL CASING 0 to 20.5 ft
				color change to olive gray (5Y 4/2). stiff, moist, no hydrocarbon odor
	31	15		SAND PACK (Monterey #2/16) 4 to 21 ft 4 IN. DIAMETER SCHEDULE 40
				BROWN CLAYEY SAND (SC) 7.5YR 5/4 stiff, moist, very fine- to fine-grained sand, trace coarse sand, some silt no hydrocarbon odor PVC WELL SCREEN (0.010" slot size) 5.5 to 20 ft
		20		SILT TRAP 20 to 20.5 ft
	53			BOTTOM WELL CAP at 20.5 ft increasing silt, saturated BROWN SAND (SP) poorly graded, saturated, medium-grained, minor silt, some fine gravel, no hydrocarbon odors bottom of boring at 21.0 ft
		25		

Harding Lawson Associates
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Log of Boring and Well Completion Detail MW-10
Gerber Products Company
Oakland, California

PLATE **A-8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459, 001.02	JPS	11/89	

15928

MAJOR DIVISIONS					TYPICAL NAMES
COARSE–GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE–GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION – ASTM D2487-85

■ "Undisturbed" Sample

⊠ Bulk or Classification Sample

Blows/foot: Number of blows from a 140 pound hammer dropped 30 inches required to advance the sampler one foot

OVA (ppm): Headspace concentration of volatile organic compounds from 4 ounces of soil paced in an 8 ounce glass jar for 10 minutes

KEY TO TEST DATA

HLA **Harding Lawson Associates**
Engineers and Geoscientists

Unified Soil Classification Chart
Gerber Products Company
Oakland, California

PLATE **A-9**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
EH	19459,001.02	JDS	11/89		

Appendix C

LABORATORY ANALYTICAL REPORTS FOR SOIL SAMPLES
SOIL SAMPLE IDENTIFICATION KEY

Sample Number (Client ID)	Boring/Well Number	Depth (feet)
89080301	SB-1	6-6.5
89080302	SB-1	10-10.5
89080303	SB-2	6-6.5
89080304	SB-2	9-9.5
89080305	SB-2	15.5-16
89080306	SB-3	6-6.5
89080307	SB-3	9-9.5
89080308	SB-3	15-15.5
89080309	SB-4	5-5.5
89080310	SB-4	10-10.5
89080311	SB-4	15-15.5
89080312	SB-5	5-5.5
89080313	SB-5	10-10.5
89080314	SB-5	15-15.5
89100502	SB-6	5-5.5
89100503	SB-6	10-10.5
89100504	SB-6	15-15.5
89084001	MW-10	6-6.5
89084002	MW-10	12-12.5
89084003	MW-9	6-6.5
89084004	MW-9	12-12.5

Appendix C

LABORATORY ANALYTICAL REPORTS FOR SOIL SAMPLES

Calculation Sheet 2. Slug Test of Well MW-8
(continued)

Test 1

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.31 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.15 feet

t = 50 seconds

$$K = \frac{(0.193^2)(2.21)}{2(4)} \frac{1}{50} \ln \frac{0.31}{0.15}$$

K = 1.5×10^{-4} feet/second

K = 9.0×10^{-3} feet/minute

K = 12.9 feet/day

K = 4.5×10^{-3} centimeters/second

Calculation Sheet 1 . Slug Test of Well MW-8

Tests 1 and 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

Method of Analysis: Bouwer and Rice (1976)

H	Hydraulic head above bottom of well screen (equals saturated thickness of aquifer)	7	feet
L	Length of well screen through which water enters/exits well	4	feet
r	Radius of well casing	0.086	feet
r_w	Radius of wellbore	0.313	feet
ϕ	Porosity of gravel pack (assumed)	0.33	unitless
r_c	Effective radius of well casing (including porosity of gravel pack)	0.193	feet

$r_c = [r^2 + \phi(r_w^2 - r^2)]^{1/2}$

L/r_w 12.8 unitless

Calculation of $\ln R_e/r_w$:

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(H/r_w)} + \frac{C}{L/r_w}}$$

where: R_e = Effective radial distance in which the head change is dissipated

C = dimensionless parameter which is a function of L/r_w, determined from analog model studies conducted by Bouwer and Rice (1976)

C = 1.25 (unitless)

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(7/0.313)} + \frac{1.25}{4/0.313}}$$

$\ln R_e/r_w$ = 2.21

Calculation Sheet 2 Slug Test of Well MW-6
(continued) Test 1

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \quad \frac{1}{t} \quad \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.34 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.042 feet

t = 40 seconds

$$K = \frac{0.202^2 (2.35)}{2(4)} \quad \frac{1}{40} \quad \ln \frac{0.34}{0.042}$$

K = 6.3×10^{-4} feet/second

K = 3.8×10^{-2} feet/minute

K = 54.1 feet/day

K = 1.9×10^{-2} centimeters/second

Calculation Sheet 3. Slug Test of Well MW-6
(continued)
Test 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \quad \frac{1}{t} \quad \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.27 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.067 feet

t = 40 seconds

$$K = \frac{0.202^2 (2.35)}{2(4)} \quad \frac{1}{40} \quad \ln \frac{0.27}{0.047}$$

$K = 5.2 \times 10^{-4}$ feet/second

$K = 3.1 \times 10^{-2}$ feet/minute

$K = 45.3$ feet/day

$K = 1.6 \times 10^{-2}$ centimeters/second

Calculation Sheet 1. Slug Test of Well MW-6

Tests 1 and 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

Method of Analysis: Bouwer and Rice (1976)

H	Hydraulic head above bottom of well screen (equals saturated thickness of aquifer)	9	feet
L	Length of well screen through which water enters/exits well	4	feet
r	Radius of well casing	0.086	feet
r_w	Radius of wellbore	0.313	feet
ϕ	Porosity of gravel pack (assumed)	0.37	unitless
r_c	Effective radius of well casing (including porosity of gravel pack)	0.202	feet

$r_c = [r^2 + \phi(r_w^2 - r^2)]^{1/2}$

L/r_w 12.8 unitless

Calculation of ln R_e/r_w:

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(H/r_w)} + \frac{C}{L/r_w}}$$

where: R_e = Effective radial distance in which the head change is dissipated

C = dimensionless parameter which is a function of L/r_w, determined from analog model studies conducted by Bouwer and Rice (1976)

C = 1.25 (unitless)

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(9/0.313)} + \frac{1.25}{4/0.313}}$$

ln R_e/r_w = 2.35

Calculation Sheet 3. Slug Test of Well MW-5
(continued)

Test 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.47 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.17 feet

t = 40 seconds

$$K = \frac{(0.163^2)(2.43)}{2(5)} \frac{1}{40} \ln \frac{0.47}{0.17}$$

K = 1.6×10^{-4} feet/second

K = 9.8×10^{-2} feet/minute

K = 13.8 feet/day

K = 5.0×10^{-3} centimeters/second

Calculation Sheet 2 (continued). Slug Test of Well MW-5

Test 1

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.48 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.13 feet

t = 40 seconds

$$K = \frac{(0.163)^2 (2.43)}{2(5)} \frac{1}{40} \ln \frac{0.48}{0.13}$$

K = 2.1×10^{-4} feet/second

K = 1.3×10^{-2} feet/minute

K = 18.2 feet/day

K = 6.4×10^{-3} centimeters/second

Calculation Sheet 1. Slug Test of Well MW-5
Tests 1 and 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

Method of Analysis: Bouwer and Rice (1976)

H	Hydraulic head above bottom of well screen (equals saturated thickness of aquifer)	10	feet
L	Length of well screen through which water enters/exits well	5	feet
r	Radius of well casing	0.086	feet
r_w	Radius of wellbore	0.313	feet
ϕ	Porosity of gravel pack (assumed)	0.21	unitless
r_c	Effective radius of well casing (including porosity of gravel pack)	0.163	feet

$r_c = [r^2 + \phi(r_w^2 - r^2)]^{1/2}$

L/r_w 16 unitless

Calculation of ln R_e/r_w:

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(H/r_w)} + \frac{C}{L/r_w}}$$

where: R_e = Effective radial distance in which the head change is dissipated

C = dimensionless parameter which is a function of L/r_w, determined from analog model studies conducted by Bouwer and Rice (1976)

C = 1.5 (unitless)

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(10/0.313)} + \frac{1.5}{5/0.313}}$$

ln R_e/r_w = 2.43

Calculation Sheet 3. Slug Test of Well MW-2
(continued)

Test 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \quad \frac{1}{t} \quad \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.50 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.050 feet

t = 40 seconds

$$K = \frac{(0.161)^2 (2.35)}{2(4.0)} \quad \frac{1}{40} \quad \ln \frac{0.50}{0.050}$$

$K = 4.4 \times 10^{-4}$ feet/second

$K = 2.6 \times 10^{-2}$ feet/minute

K = 37.9 feet/day

$K = 1.3 \times 10^{-2}$ centimeters/second

Calculation Sheet 2 (continued). Slug Test of Well MW-2 Test 1

Rising Head Test (Slug removed from well)
Fully Penetrating Well

HYDRAULIC CONDUCTIVITY (K)

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t}$$

where: y_o = zero time y-axis intercept of linear portion of recovery data

y_o = 0.41 feet

y_t = y-axis intercept at time (t) of linear portion of recovery data

y_t = 0.051 feet

t = 40 seconds

$$K = \frac{(0.16)^2 (2.35)}{2(4.0)} \frac{1}{40} \ln \frac{0.41}{0.051}$$

$K = 4.0 \times 10^{-4}$ feet/second

$K = 2.4 \times 10^{-2}$ feet/minute

K = 34.3 feet/day

$K = 1.2 \times 10^{-2}$ centimeters/second

Calculation Sheet 1. Slug Test of Well MW-2
Tests 1 and 2

Rising Head Test (Slug removed from well)
Fully Penetrating Well

Method of Analysis: Bouwer and Rice (1976)

H	Hydraulic head above bottom of well screen (equals saturated thickness of aquifer)	9.0	feet
L	Length of well screen through which water enters/exits well	4.0	feet
r	Radius of well casing	0.086	feet
r_w	Radius of wellbore	0.333	feet
ϕ	Porosity of gravel pack (assumed)	0.18	unitless
r_c	Effective radius of well casing (including porosity of gravel pack)	0.161	feet

$r_c = [r^2 + \phi(r_w^2 - r^2)]^{1/2}$

L/r_w 12.8 unitless

Calculation of ln R_e/r_w:

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(H/r_w)} + \frac{C}{L/r_w}}$$

where: R_e = Effective radial distance in which the head change is dissipated

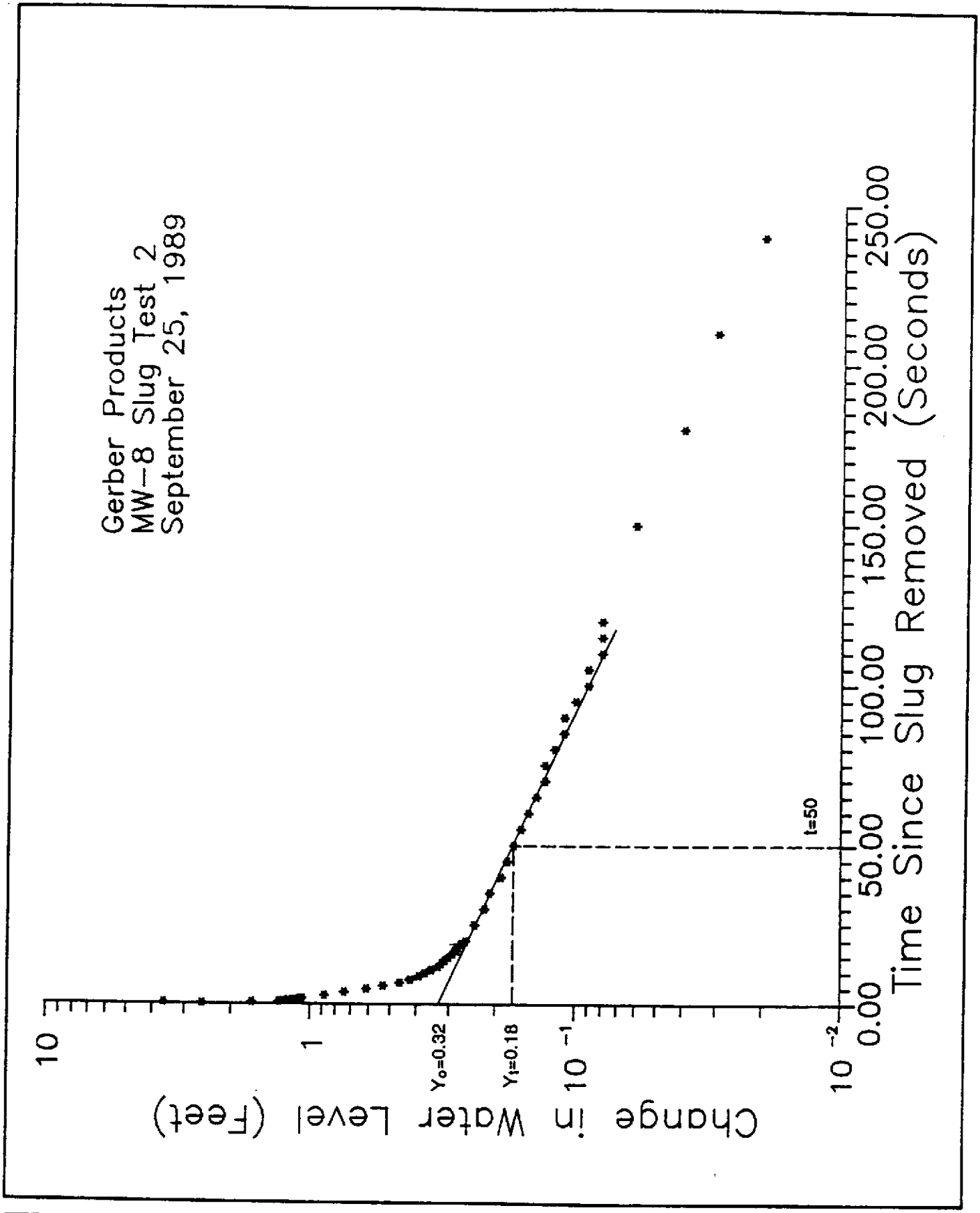
C = dimensionless parameter which is a function of L/r_w, determined from analog model studies conducted by Bouwer and Rice (1976)

C = 1.9 (unitless)

$$\ln R_e/r_w = \frac{1}{\frac{1.1}{\ln(9/0.333)} + \frac{1.9}{4/0.333}}$$

ln R_e/r_w = 2.35

15936



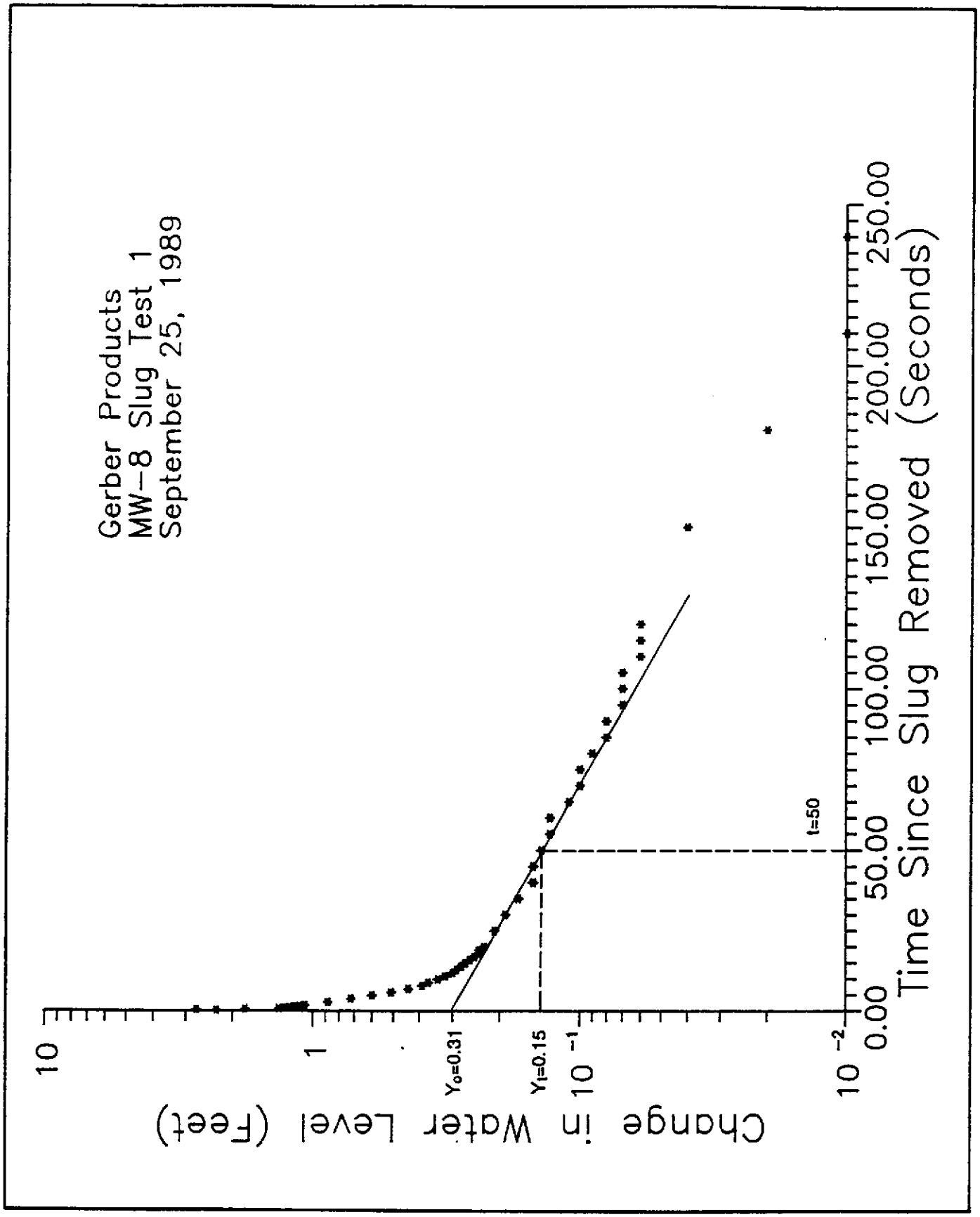
Harding Lawson Associates
Engineering and Environmental Services

MW-8 Slug Test 2
Gerber Products Company
Oakland, California

PLATE **B-8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE

15935



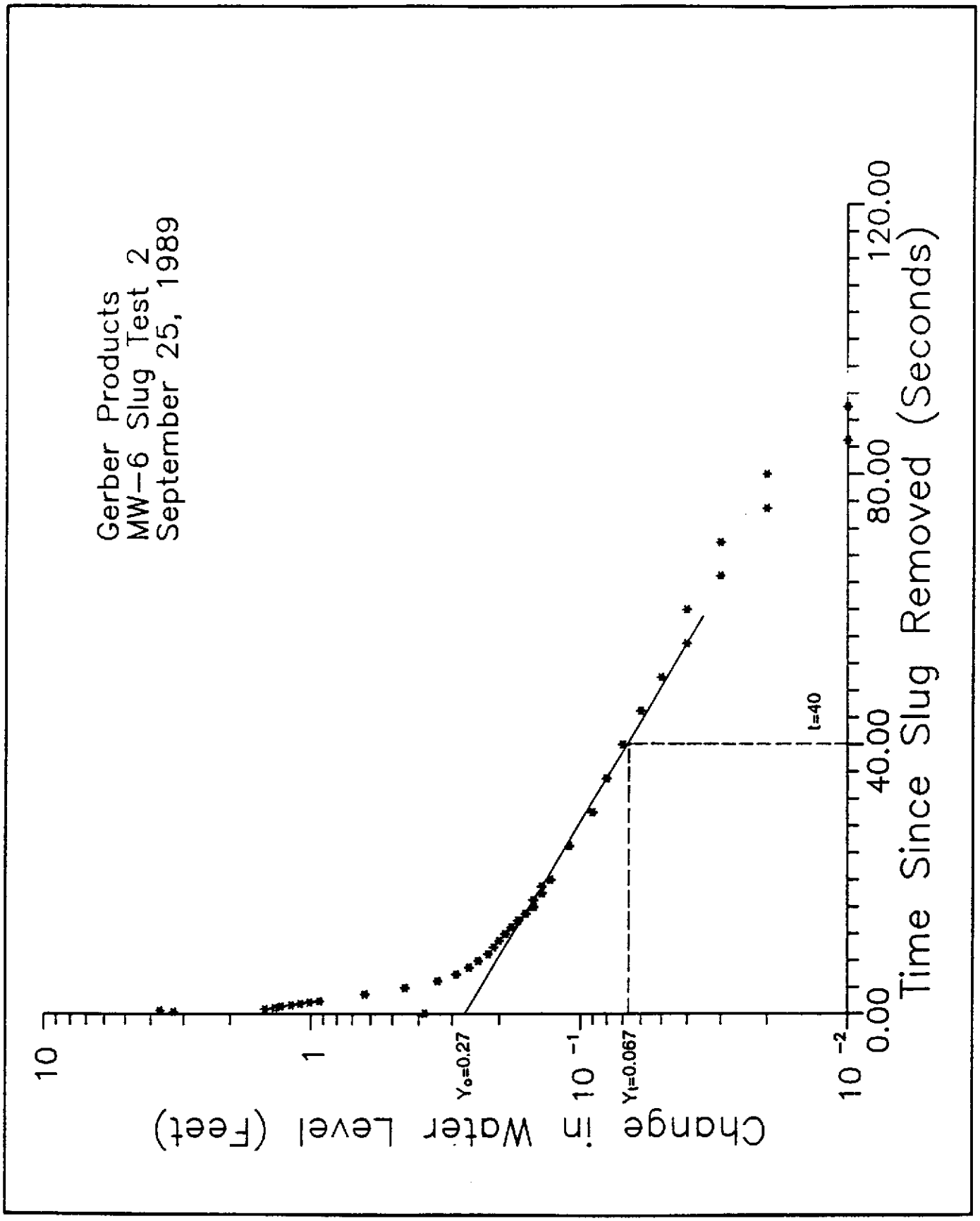
Harding Lawson Associates
Engineering and Environmental Services

MW-8 Slug Test 1
Gerber Products Company
Oakland, California

PLATE **B-7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459,001.02	JDS	12/89	

15934



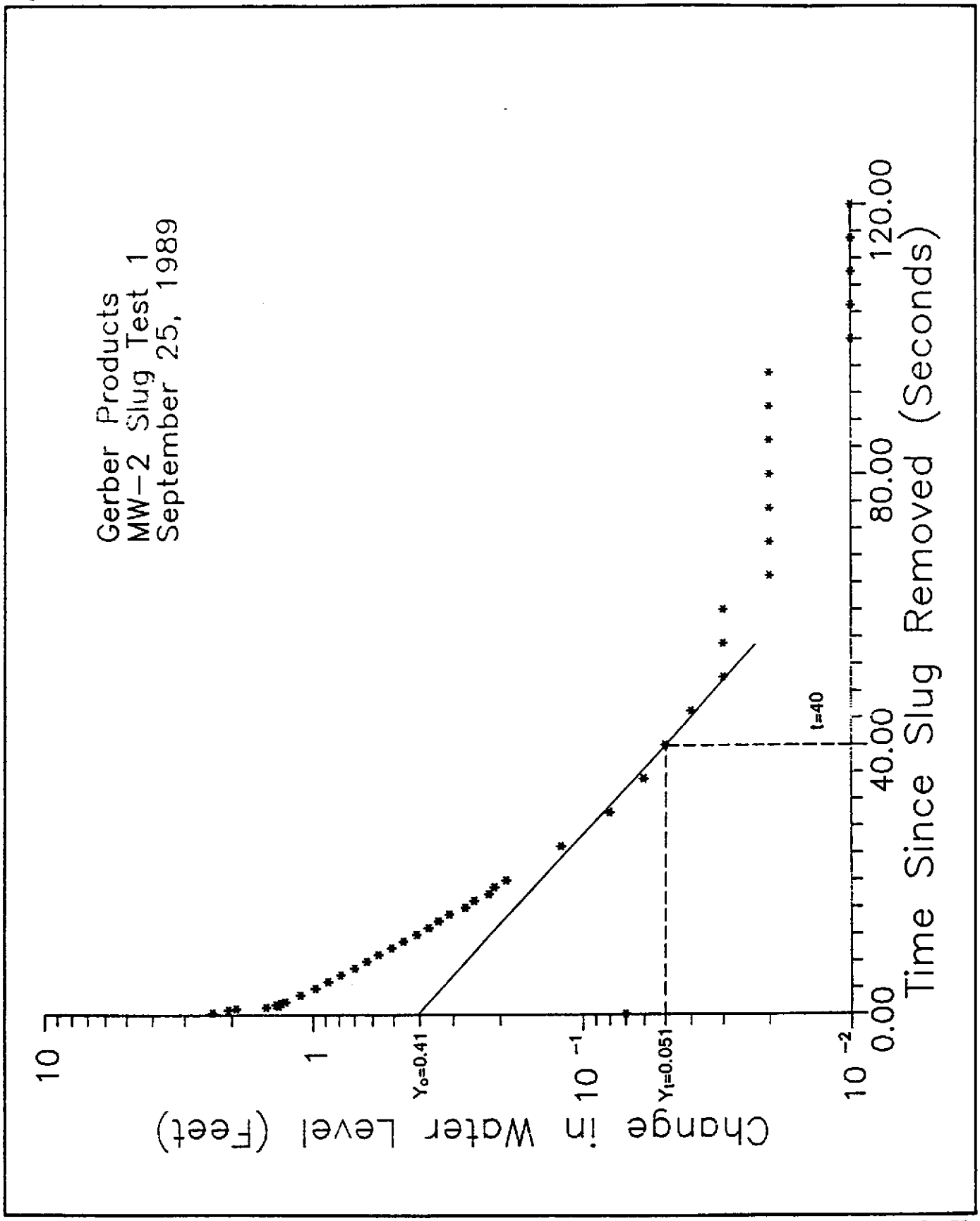
Harding Lawson Associates
Engineering and Environmental Services

MW-6 Slug Test 2
Gerber Products Company
Oakland, California

PLATE **B-6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459,001.02	9/05	12/89	

15929



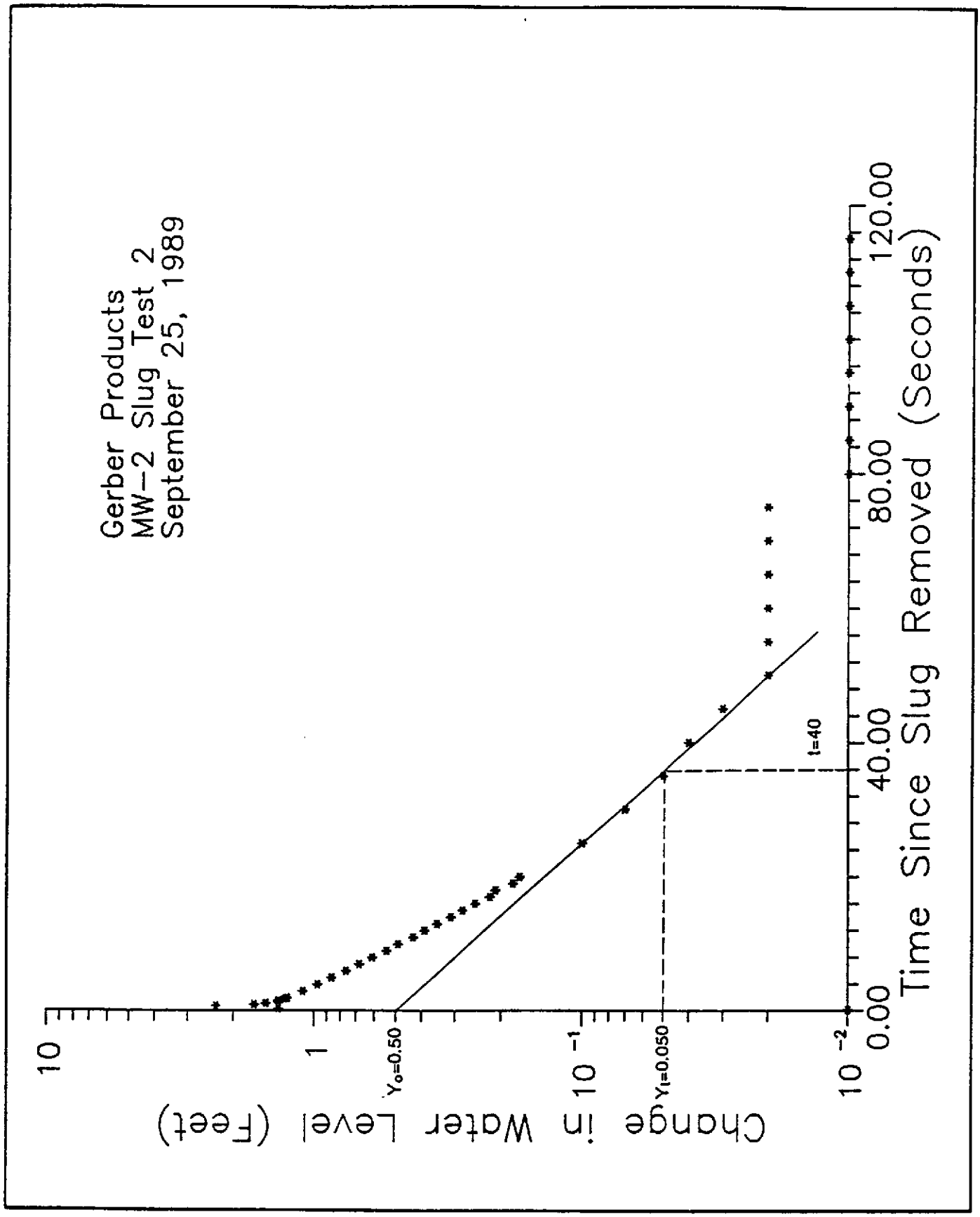
Harding Lawson Associates
Engineering and Environmental Services

MW-2 Slug Test 1
Gerber Products Company
Oakland, California

PLATE **B-1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459,001.02	GDS	12/89	

15930



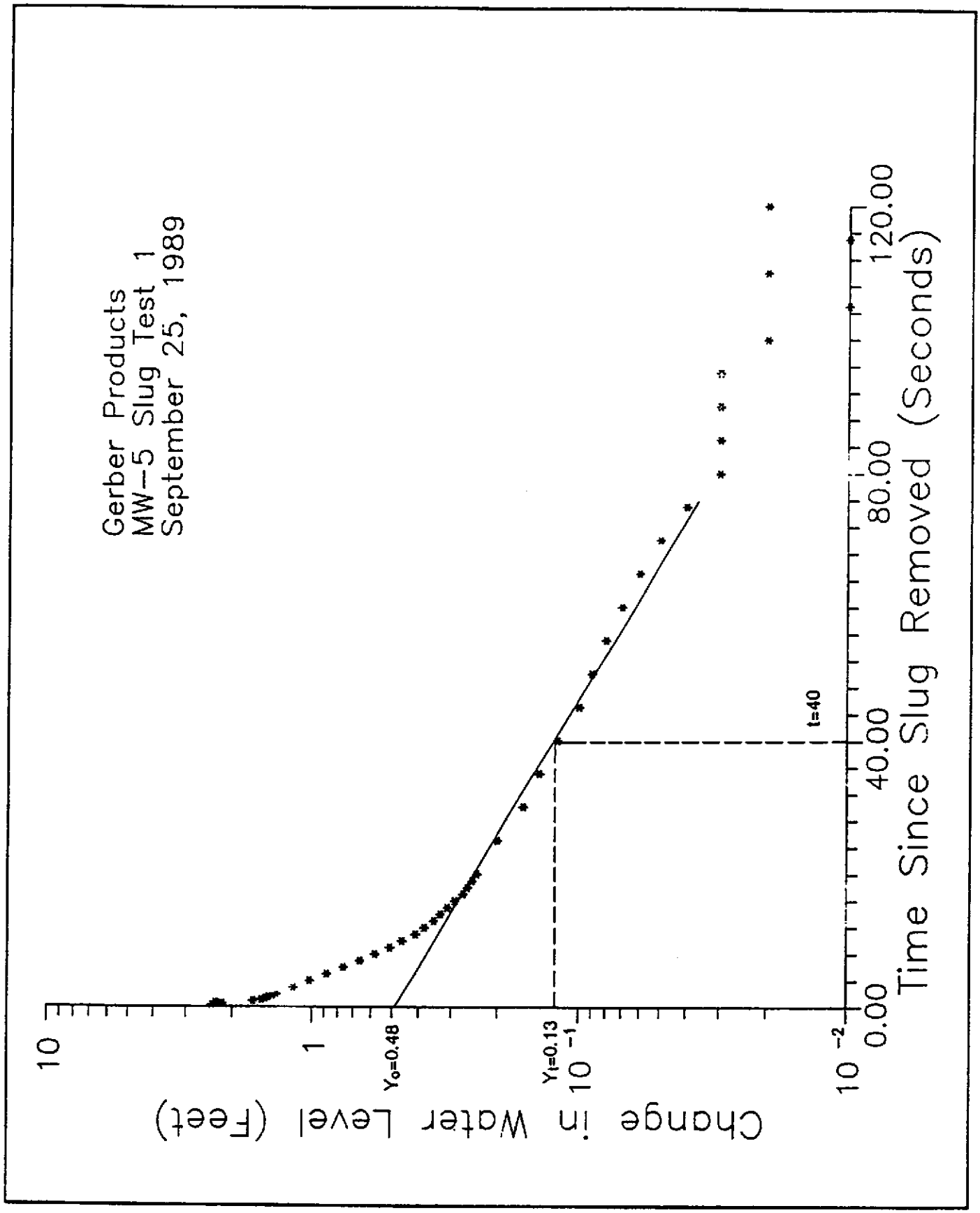
Harding Lawson Associates
Engineering and Environmental Services

MW-2 Slug Test 2
Gerber Products Company
Oakland, California

PLATE
B-2

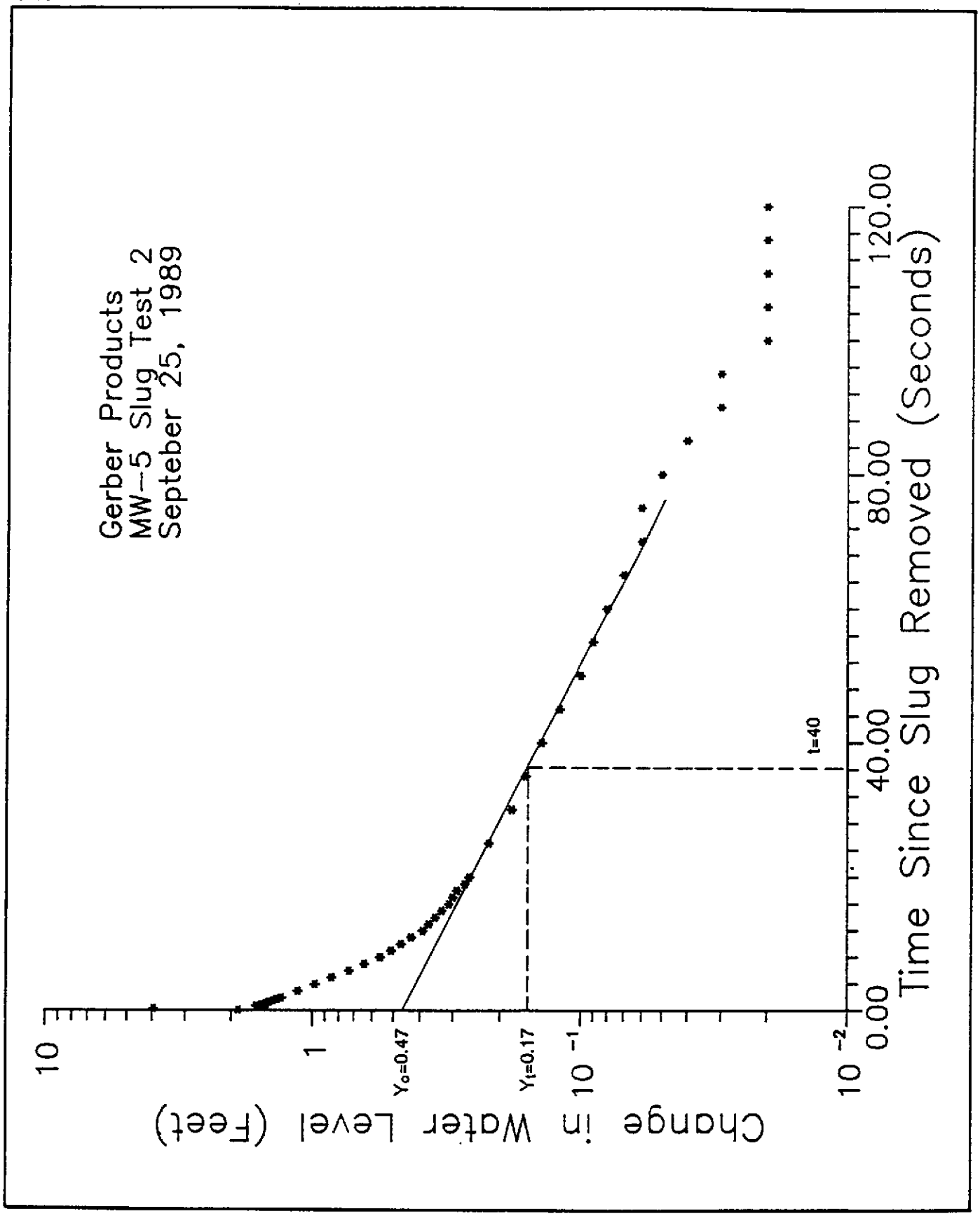
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	19459,001.02	JDS	12/89	

15931

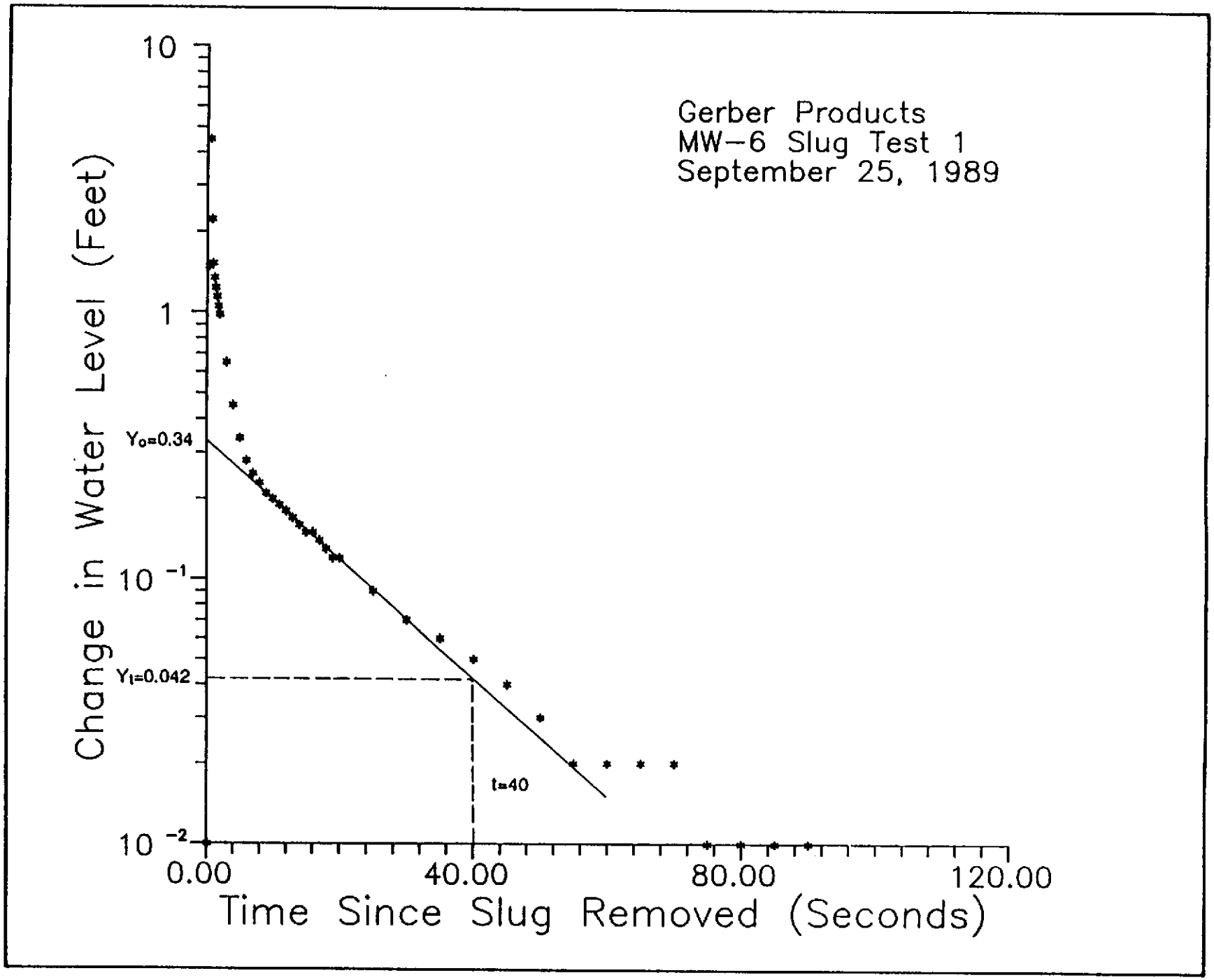


Harding Lawson Associates Engineering and Environmental Services	**MW-5 Slug Test 1** Gerber Products Company Oakland, California			PLATE **B-3**
DRAWN	JOB NUMBER 19459,001.02	APPROVED JDS	DATE 12/89	REVISED DATE

15932



Harding Lawson Associates Engineering and Environmental Services	**MW-5 Slug Test 2** Gerber Products Company Oakland, California			PLATE **B-4**
DRAWN	JOB NUMBER 19459,001.02	APPROVED JPS	DATE 12/89	REVISED DATE



15933

Harding Lawson Associates
Engineering and Environmental Services

MW-6 Slug Test 1
Gerber Products Company
Oakland, California

DRAWN
JOB NUMBER
APPROVED
DATE
REVISED DATE

PLATE
B-5

Appendix B

SLUG TEST DATA

Appendix B

SLUG TEST DATA

LIST OF ILLUSTRATIONS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 08/04/89
DATE REPORTED: 08/15/89

LAB NUMBER: 17953

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 14 SOIL SAMPLES

JOB #: 19459,001.02
LOCATION: GERBER

RESULTS: SEE ATTACHED

Laboratory Director

LABORATORY NUMBER: 17953
CLIENT: HARDING LAWSON ASSOCIATES
JOB NUMBER: 19459,001.02
JOB LOCATION: GERBER

DATE RECEIVED: 08/04/89
DATE ANALYZED: 08/09/89
DATE REPORTED: 08/15/89

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 602/8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
17953-1	89080301	ND(10)	ND(5)	30	ND(5)	ND(5)
17953-2	89080302	400	1,900	1,400	4,100	11,000
17953-3	89080303	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17953-4	89080304	34	140	200	270	430
17953-5	89080305	140	670	790	1,300	4,900
17953-6	89080306	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17953-7	89080307	130	900	ND(100)	1,500	3,400
17953-8	89080308	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17953-9	89080309	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17953-10	89080310	300	3,300	420	8,200	12,000
17953-11	89080311	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17953-12	89080312	ND(10)	47	ND(5)	ND(5)	ND(5)
17953-13	89080313	470	1,900	580	7,200	22,000
17953-14	89080314	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	8
%RECOVERY	103

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street. Berkeley. CA 94710. Phone (415) 486-0900

LABORATORY NUMBER: 17958
CLIENT: HARDING LAWSON ASSOCIATES
JOB NUMBER: 19459,001.02
JOB NAME: GERBER PRODUCTS

DATE RECEIVED: 08/04/89
DATE ANALYZED: 08/07/89
DATE REPORTED: 08/16/89

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 602/8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
17958-1	89084001	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17958-2	89084002	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17958-3	89084003	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)
17958-4	89084004	ND(10)	ND(5)	ND(5)	ND(5)	ND(5)

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	<1
%RECOVERY	96

LABORATORY DIRECTOR

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 10/05/89
DATE REPORTED: 10/17/89

LAB NUMBER: 18434

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 3 SOIL SAMPLES

JOB #: 19459,001.02
LOCATION: GERBER

RESULTS: SEE ATTACHED

M. E. Printers
QA/QC Officer

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18434
CLIENT: HARDING LAWSON ASSOCIATES
JOB NUMBER: 19459,001.02
JOB LOCATION: GERBER

DATE RECEIVED: 10/05/89
DATE ANALYZED: 10/16/89
DATE REPORTED: 10/17/89

Total Volatile Hydrocarbons (TVH) by EPA 8015
Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 602/8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
18434-1	89100502	ND(10)	18	23	8.0	27
18434-2	89100503	270	2,000	900	1,600	3,800
18434-3	89100504	ND(10)	33	34	5.5	26

ND = None Detected; Limit of detection is indicated in parentheses.

QA/QC SUMMARY

%RPD	<1
%RECOVERY	87

ng L n As tes
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: _____

Samplers: N.E.P

Job Number: 19459.001.02

Name/Location: GERBER

Project Manager: NEP

Recorder: NE Pedersen (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
SO			X					89	08	01	89	08	03		6.0-6.5' SB-1
SO			X							02					10.0-10.5' SB-1
SO			X							03					6.0-6.5' SB-2
SO			X							04					SB-2 9.0-9.5'
SO			X							05					SB-2 15.5-16'
SO			X							06					SB-3 6.0-6.5'
SO			X							07					SB-3 9.0-9.5'
SO			X					89	08	08	89	08	03		SB-3 15.0-15.5'

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	
						X	13 TPH GAS + MOD 8015
						X	
						X	
						X	
						X	
						X	
						X	
						X	
						X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
NE Pedersen		
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT		

Laboratory Copy White Project Office Copy Yellow Field or Office Copy Pink

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: _____

Samplers: NCP

Job Number: 19459,001.02

Name/Location: CERBER

Project Manager: NCP

Recorder: NCP (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
SO			X					89	02	03	09	02	03		SB-4 5.0-5.5'
SO			X							10	89	02	03		SB-4 10.0-10.5'
SO			X							11	89	02	03		SB-4 15.0-15.5'
SO			X							12	89	02	03		SB-5 5.0-5.5'
SO			X							13	89	02	03		SB-5 10.25-10.50'
SO			X					89	02	03	89	02	03		SB-5 15.0-15.5'

ANALYSIS REQUESTED	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllmt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	BTXE&T & H GAS	MOD 8015
							X	X	
							X	X	
							X	X	
							X	X	
							X	X	
							X	X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) NCP	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT		

Laboratory Copy White Project Office Copy Yellow Field or Office Copy Pink

[illegible] Engineering [illegible] Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: _____

Samplers: G. LIEBERMAN

Job Number: 19459.001.02

Name/Location: GERBER

Project Manager: NCP

Recorder: NC Pozoneff (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
50			X					89	10	C502	89	10	05		SB-6 5.0 - 5.5'
50			X					89	10	C503	89	10	C5		SB-6 10.5 - 11.6
50			X					89	10	C504	89	10	C5		SB-6 15.0 - 15.5'

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllmt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPHG AS W/BTEX	400 BOIS
							X	
							X	
							X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) NC Pozoneff	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
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CHAIN OF CUSTODY FORM

Lab: _____

Samplers: G. LIEBERMAN

Job Number: 19459.001.02

Name/Location: GERBER

Project Manager: NCR

Recorder: NC Pogoundjian (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
SO			X					89	10	CS01	89	10	05		SB-6 10.0 - 10.5'

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	NUTRIENT PROFILE	MICROBIAL TESTS

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) NC Pogoundjian	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
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DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 11.00
METHOD OF SHIPMENT		

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CHAIN OF CUSTODY FORM

Lab: Curtis & Thompkins

Samplers: John Skalbeck

Job Number: 19459.001.02

Name/Location: Gerber Products Oakland

Project Manager: NCP

Recorder: John Skalbeck (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
SO			X					89	09	4001	81	08	04	0934	MW-10 6.0'-6.5'
SO			X					89	09	4002	81	08	04	1046	MW-10 12.0'-12.5'
SO			X					89	09	4003	81	08	04	1337	MW-9 6.0'-6.5'
SO			X					89	09	4004	81	08	04	1358	MW-9 12.0'-12.5'

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	BTEX & TPH (GAS)
							X
							X
							X
							X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) John Skalbeck	RECEIVED BY: (Signature) Ann Kolpak	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT		

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Appendix D

LABORATORY ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES

Appendix D

LABORATORY ANALYTICAL REPORTS FOR GROUND-WATER SAMPLES
GROUND-WATER SAMPLE IDENTIFICATION KEY

Sample ID	Monitoring Well Number
MW010808	MW-1
MW020808	MW-2
MW030808	Field Blank
MW040808	MW-4
MW050808	MW-5
MW060808	MW-6
MW070808	MW-7
MW080808	MW-8
MW090808	MW-9
MW100808	MW-10

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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 08/08/89
DATE REPORTED: 08/30/89

LAB NUMBER: 17977

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 10 WATER SAMPLES

JOB #: 19459,001.02
LOCATION: GERBER PRODUCTS

RESULTS: SEE ATTACHED

NOTE: All samples were originally analyzed and quantified on 8/9/89. Samples were subsequently reanalyzed to achieve lower detection limits at the request of the client. Quantifications from the first analysis, which was closer to the sampling event, have generally been reported and are marked with an asterisk (*). Surrogate recoveries from both sets of analyses are reported.

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW020808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/23/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	ND	1
1,1-dichloroethane	ND	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	ND	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	48 *	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	9 *	1
chlorobenzene	ND	1
ethyl benzene	33 *	1

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	55 *	1

QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	109%	96%
Toluene-d8	101%	103%
Bromofluorobenzene	95%	90%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-2
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459.001.02
SAMPLE ID: MWO50808

DATE RECEIVED: 08/08/89
DATE ANALYZED: 08/09/89
DATE REPORTED: 08/16/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	49	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	8	5
chlorobenzene	ND	5
ethyl benzene	15	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	63	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	106%
Toluene-d8	99%
Bromofluorobenzene	96%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW080808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/23/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	ND	1
1,1-dichloroethane	ND	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	ND	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	1,900 *	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	820 *	1
chlorobenzene	ND	1
ethyl benzene	1,000 *	1

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	3,600 *	1

QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	102%	104%
Toluene-d8	99%	88%
Bromofluorobenzene	104%	92%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-4
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW060808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/23/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	ND	1
1,1-dichloroethane	ND	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	ND	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	45 *	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	8 *	1
chlorobenzene	ND	1
ethyl benzene	15 *	1

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	74 *	1

QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	108%	91%
Toluene-d8	100%	100%
Bromofluorobenzene	99%	89%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW040808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/22/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	ND	1
1,1-dichloroethane	ND	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	ND	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	ND	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	ND	1
chlorobenzene	ND	1
ethyl benzene	ND	1
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	ND	1
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	106%	95%
Toluene-d8	105%	108%
Bromofluorobenzene	99%	92%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-8
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW010808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/23/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	47 *	1
1,1-dichloroethane	9 *	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	21 *	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	ND	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	ND	1
chlorobenzene	ND	1
ethyl benzene	ND	1

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	ND	1

QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	109%	98%
Toluene-d8	103%	107%
Bromofluorobenzene	98%	88%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977-10
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459,001.02
SAMPLE ID: MW100808

DATE RECEIVED: 08/08/89
ANALYSIS 1 (*) 08/09/89
ANALYSIS 2 08/23/89
DATE REPORTED: 08/30/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	2
bromomethane	ND	2
vinyl chloride	ND	2
chloroethane	ND	2
methylene chloride	ND	1
trichlorofluoromethane	ND	1
1,1-dichloroethene	ND	1
1,1-dichloroethane	ND	1
trans-1,2-dichloroethene	ND	1
chloroform	ND	1
1,2-dichloroethane	ND	1
1,1,1-trichloroethane	ND	1
carbon tetrachloride	ND	1
bromodichloromethane	ND	1
1,2-dichloropropane	ND	1
cis-1,3-dichloropropene	ND	1
trichloroethylene	ND	1
dibromochloromethane	ND	1
1,1,2-trichloroethane	ND	1
benzene	ND	1
trans-1,3-dichloropropene	ND	1
2-chloroethylvinyl ether	ND	2
bromoform	ND	1
1,1,2,2-tetrachloroethane	ND	1
tetrachloroethylene	ND	1
toluene	ND	1
chlorobenzene	ND	1
ethyl benzene	ND	1

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	2
carbon disulfide	ND	1
2-butanone	ND	2
vinyl acetate	ND	2
2-hexanone	ND	2
4-methyl-2-pentanone	ND	2
styrene	ND	1
total xylenes	ND	1

QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	111%	93%
Toluene-d8	103%	103%
Bromofluorobenzene	102%	90%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 17977
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19459.001.02
JOB NAME: GERBER PRODUCTS

DATE RECEIVED: 08/08/89
DATE ANALYZED: 08/10/89
DATE REPORTED: 08/28/89

Total Volatile Hydrocarbons as Gasoline in Aqueous Solutions
EPA 8015 (Modified)
Extraction Method: EPA 5030 (Purge & Trap)

LAB ID	CLIENT ID	GASOLINE (mg/L)
17977-1	MW020808	1.1
17977-2	MW050808	ND(0.05)
17977-3	MW080808	77
17977-4	MW060808	1.0
17977-5	MW030808	ND(0.05)
17977-6	MW040808	ND(0.05)
17977-7	MW070808	ND(0.05)
17977-8	MW010808	ND(0.05)
17977-9	MW090808	ND(0.05)
17977-10	MW100808	ND(0.05)

ND = NONE DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC SUMMARY

Duplicate: Relative % Difference	5
Spike: % Recovery	113

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CHAIN OF CUSTODY FORM

Lab: [illegible]

Samplers: [illegible]

Job Number: 10459 001.02

Name/Location: GERBER PRODUCTS

Project Manager: NICK DONADIEU

Recorder: [illegible] (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240 VOLATILES	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb. GAS
2	X				2			MW	02	02223	89	02	03	0740	MW-2			X				X
								MW	05					1011	5							
								MW	08					1245	8							
								MW	06					1 . .	6							
								MW	03					1 4 4	FB							
								MW	04					1 2 1	4							
								MW	07					1 2 4	7							
								MW	01					1 . .	1							
								MW	09					1 . .	9							
								MW	10					1 . .	10							

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						NORMAL TURNAROUND

CHAIN OF CUSTODY RECORD

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RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) [illegible] DATE/TIME 9/23	RECEIVED FOR LAB BY: (Signature) [illegible]	DATE/TIME 9/24/89 1010

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OAKLAND, CALIFORNIA

February 21,1990

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QUALITY CONTROL REVIEWER

Stanley H. Walker CEG 1294

for Ronald N. Stoufer
Engineering Geologist - 1206