Enclosure 6

Final Report

EXCELTECH

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February 20, 1987

Project No. 1467G

Owens-Illinois Glass
Container Division
One Sea Gate
Toledo, OH 43666

Attn: A.W. Long
Manager, Environmental Administration

Re: Soil and Groundwater Contamination Investigation
Owens-Illinois Facility, Oakland, California

Dear Mr. Long

In accordance with your request, we have performed a soil and groundwater investigation at the above referenced project. The report contains field investigation work, laboratory analyses, hydrogeologic setting, conclusions and recommendations.

We refer you to the text of the report for detailed discussion and recommendations. If you have any questions, please call.

Sincerely,
Exceltech, Inc.

Christopher M. Palmer
Engineering Geologist 1262

Michael Hansen
Manager, Geotechnical Services

CMP/MH/da

attached: 2 copies

SOIL AND GROUNDWATER

CONTAMINATION INVESTIGATION

for

OWENS-ILLINOIS GLASS CONTAINER DIVISION

3600 ALAMEDA AVENUE

OAKLAND, CALIFORNIA 94601

by

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FEBRUARY 1987

PROJECT NO. 1467G

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SECTION 1.0
EXECUTIVE SUMMARY

Exceltech, Inc. was retained by the Owens-Illinois Glass Container Division to investigate soil and groundwater contamination discovered during construction at the Owens-Illinois Oakland facility. The purpose of the investigation was to ascertain the extent of soil and groundwater contamination in the vicinity of two subsurface storage tank areas located on the site. This investigation was done to address both on-site soil and groundwater contamination and establish a groundwater monitoring network for the site. Please note that this summary is simply a synopsis of the major points of our report.

1. The site is underlain by surficial fill soils to depths of 1 to 5 feet, and at depth by native silty clay, clayey sand, silty sand and sandy gravels. The top of the uppermost water bearing stratum occurs at a depth of approximately 15 feet. The water bearing stratum is locally complexly interbedded and is underlain by a discontinuous clay aquiclude.

2. Groundwater is encountered at depths of 15 to 18 feet and is tidally influenced. Groundwater flow is generally toward the south and southwest and displays localized deflections.

3. The contamination of furnace fuel product adjacent to the maintenance

building appear to be the most contaminated region observed. The regions of severest soil contamination appear to occur in the vicinity of the ramp excavation and the southwest side of the maintenance building between wells MW-2 and MW-3. Floating product was observed in several wells with up to several feet of product observed in MW-2.

removal of 4 UST's

4. Soil contamination was observed when four additional subsurface tanks adjacent to the power and forming buildings were removed. About 350 cubic yards of contaminated soil were removed. Groundwater sample indicate slight hydrocarbon and oil and grease contamination. Since this contamination involves motor fuels (i.e., gasoline and diesel) it appears to be unrelated to the furnace fuel contamination near the maintenance building.

~~24K~~ ? 15K diesel

5. A recovery well was installed in the tank excavation adjacent to the maintenance building which previously held the 16,600 gallon subsurface tank. The tank and most severely contaminated soil have been removed and disposed. The recovery well utilizes an oil skimmer which skims product from the water surface. It is possible that remedial action (product recovery) could require a prolonged period of time.

Tank # 8

6. Traces of volatile organic compounds were revealed in up gradient wells MW-12 and 14.

SECTION 2.0
INTRODUCTION

This report presents the results of our soil and groundwater investigation of the petroleum product spill at the Owens-Illinois Glass Container Division manufacturing plant located in Oakland, California. The purpose of the investigation was to determine the extent of the soil and groundwater contamination discovered during construction of a ramp at the Owens-Illinois site.

The Owens-Illinois Glass Container factory is located at 3600 Alameda Avenue in Oakland, California. The factory occupies about a city block and is bordered by Alameda and Fruitvale Avenues and the Inner Harbor Channel and Alameda Island (see Drawing 1). The factory complex includes a glass making plant, warehouses and paved outdoor storage areas.

2.1 Background and Site Description

On July 9, 1986, during the construction of a new fork lift ramp intended to provide assess to the basement on the northern end of the Owens-Illinois plant, contaminated soil was uncovered which released a strong product odor. At that point construction activities were stopped, environmental agencies were notified, and Exceltech was requested to review the situation. An inspection

of the area was made and a sample of the soil from the trench floor was collected for analysis. Drilling and subsurface sampling were requested by Owens-Illinois management and were begun on July 11, 1986. This first drilling phase included fifteen exploratory borings and the installation of three monitoring wells (see Plate 2). The product leak was reported to the Bay Area Regional Water Quality Control Board by Owens-Illinois on July 18, 1986.

Exploratory drilling on the site revealed a contaminated area of product saturated soil in the area of the ramp and a 16,600 gallon subsurface furnace fuel storage tank adjacent to the machine shop maintenance building (see Plate 2). This tank had apparently been used to store a furnace fuel oil which was transmitted on request to Owens-Illinois by a subsurface pipeline. The last date of pipeline fuel transmission and quantity of the leak are not known. The use of the storage tank was apparently discontinued in the late 1960's.

Since use of the 16,600 gallon tank and pipeline has been discontinued, and the tank appeared to be in the area of the highest soil contamination, the tank was excavated and removed on September 16, 1986 by Exceltech crews. The pipeline leading to the tank was capped. Additionally, 148 cubic yards of contaminated soil were transported to the Chemical Waste Management, Kettleman Hills Class I disposal facility. A recovery well was installed at the end of September in the tank excavation and an oil skimming recovery device was installed to recover the product. The recovery well started operation in

mid-October, pumping the recovered oil to a 1,000 gallon above ground storage tank. Seven additonal montirong wells were installed in September and October, 1986 to define the contaminant plume. Depth to groundwater and product thickness measurements are being collected on a weekly basis.

Owens-Illinois was completing the planned removal of four additional subsurface storage tanks (one 350, two 8000 (4K ?) and one 12000 gallon) adjacent to the power building in November 1986. Soil contamination was observed in the excavation which held the two 8000-gallon tanks (one diesel, one unleaded gasoline) during tank removal. Additional soil contamination was noted when the 12000-gallon (lubrication oil) was removed. Approximately 350 cubic yards of contaminated soil was removed from the excavations and disposed off site. When the 350-gallon diesel tank was removed, soil contamination was not observed. However, since some contamination was evident, additional groundwater monitoring wells were installed to ascertain if groundwater contamination has occurred. Finally, several monitoring wells were placed to determine up-gradient groundwater at the northeastern and northwestern perimeter of the site.

SECTION 3.0

SUBSURFACE EXPLORATION

Our subsurface investigation included drilling 16 exploratory borings from July 23-25, and October 21, 1986 and installing 18 groundwater monitoring wells on July 24-25, September 29-30, October 22, November 24-25 and December 11-12, and 15, 1986. The exploratory borings and monitoring well locations are shown on the site plan, Drawings 2 and 3. All borings were drilled with a Mobile B53 truck mounted hollow-stem auger drill rig. Soil samples were collected at 5 foot intervals using a standard penetration sampler or a 2 inch I.D. modified California sampler. Each boring was advanced to the desired sampling depth and the sampler was driven 18 inches into the undisturbed soils ahead of the auger-bit using a 140 lb. free fall hammer. The sample was recovered and logged for lithology. The ends of the soil sample, which was contained in a pre-cleaned 2x6 inch brass tube, were then covered with aluminum foil and capped. The samples were then labeled, listed on a chain of custody form and placed in an refrigerated chest for transport to the laboratory.

All drilling and sampling equipment was steam cleaned between each use to reduce the chance of possible cross contamination between holes. During sampling, the sampler was washed with trisodium phosphate, (TSP) after each

sample and rinsed with fresh water before sampling. All brass liners were steam cleaned prior to their use.

Logs of all exploratory borings include soil descriptions and sampled depths, together with the results of selected laboratory tests are presented in Appendix A.

SECTION 4.0
MONITORING WELLS

Exceltech drilled and installed eighteen (18) groundwater monitoring wells in selected locations to sample and define groundwater contamination and to provide data on the direction of groundwater flow (see Drawings 3, 7 and 8).

4.1 Installation Methodology

The groundwater monitoring wells were drilled with a truck Mobile B53 mounted drill rig using 4-1/4" I.D. x 8" O.D. hollow-stem augers. The drill rig was situated over each well location and the hollow stem auger was used to advance the hole to the desired depth. Soil samples were collected and a log of each well boring was prepared in the field by a geologist using the above described drilling and sampling procedures. A well construction detail was prepared for each well and is included in Appendix A.

4.2 Construction Specifications

The monitoring wells installed on the site were constructed following the "Guidelines for Addressing Fuel Leaks" by Eisenberg and others (1985) of the San Francisco Bay Region Water Quality Control Board. This work was

performed under a permit issued by the Zone 7 Alameda County Flood Control and Water District.

The monitoring wells were constructed using threaded, flush joints, factory slotted 0.020-inch schedule 40 PVC screen and riser. No solvents or glues were used in the construction. After drilling, the casing was set into the hole through the hollow stem auger to the bottom of the hole. Number 4 aquarium washed silica sand was poured down the annulus using a hollow stem auger as a tremie line.

This installation technique allowed the formation of a sand pack around the well casing while minimizing the chance for native materials to plug the screen. The sand pack acts as a barrier to reduce the migration of silt and clay into developed well and to improve the wells hydraulic conductivity with the formation. Once the annulus was sand packed to the desired depth, a granular bentonite seal was placed on top of the sand. The remainder of the well annulus was filled with neat cement grout to seal the well from surface contamination. The top of the well was set in a traffic rated precast concrete box with an internal metal locking cover to provide security. Complete details of the construction of each of the wells and their depths is provided on the well details contained in Appendix A.

4.3 Monitoring Well Development

Upon completion of the monitoring wells, each well was developed using a clean five (5) foot long stainless steel bailer or a submersible nitrogen bladder pump. Water was removed from the wells alternating between the bailer and submersible bladder pump until twenty (20) gallons (a minimum of 4 borehole volumes) was removed. Well development helps to remove mud which accumulates in the well during construction and stabilizes the sand filter pack thereby improving hydraulic continuity with the surrounding formation. A nominal 24 hour recharge period enabled a representative sample of formation water to be collected, and look for floating product.

4.4 Surveying

The tops of both well casings and soil borings were surveyed to a U.S. Coast and Geodetic datum so their elevation could be accurately determined. This provides a known datum for presentation of cross sections and, together with aerial maps, makes it possible to calculate groundwater elevation and to contour flow direction. To ensure accurate distances and elevations, the survey of the monitoring wells and test borings were made with an electronic distance meter (EDM). After the elevation of the well heads had been determined, the elevation of the groundwater in the monitoring wells was determined using an electronic conductance probe.

SECTION 5.0

REGIONAL GEOLOGY AND HYDROGEOLOGY

The project site is located adjacent to the Alameda Harbor Channel and San Francisco Bay in Oakland, California. Geologic mapping by Helley and others (1972) show the region to be underlain by the Quaternary Merritt Sand, and sand, silt and clay of younger fluvial deposits. A review of map data compiled by Nichols and Wright (1971) shows numerous meandering marsh land stream channels existed very near the site which deposited fluvial sediments. These old channels have subsequently been obscured by recent development which has obliterated all surface expression.

Due to the site's proximity to the bay and complex depositional history of the East Bay margin, there is no known well defined shallow continuous aquifer directly underneath the site. Although several regional East Bay hydrogeologic studies have been done by the Californial/ Department of Water Resources, a comprehensive study that covers that portion of the bay fringe between Oakland and Alameda is unavailable. The Department of Water Resources is currently studying the occurrance and distribution of potentially useful aquifer in the Oakland Bay Plain region. It is unlikely there is a useful aquifer existing at depths of 12 to 18 feet due to potential salt water tidal influence and infiltration. Regional groundwater flow is southwest toward the bay fringe.

5.1 Site Geology

A total of 34 exploratory borings were placed on-site with the deepest borings advanced to a depth of 31.5 feet. These borings reveal that interbedded silty clay, clayey sand, sand and gravel underlie the site (see Cross Sections, Drawings 4, 5 and 6). In localized areas, fill soil has been placed for building foundations and pavements to depths of several feet. The fill is underlain by sandy and silty clay to depths of 9 to 14 feet. The sand and silty clay may form gradational contacts with underlying sandy clay, gravelly clay and sandy silt. Silty sands, clayey sands, sand and gravels form the uppermost water bearing zone or "A" aquifer, which occurs from depths of 15 to 30 feet. The aquifer lithology is variable and locally contains interbeds of clay up to several feet thick within beds of very clean sand and gravel. Gravelly beds become more prevalent at depths between 24 and 30 feet. (See Drawings 4, 5 and 6.)

Odor of petroleum product was noticed in every bore hole except MW-4, 11, 12, 13, 14, 15, 16, and 18. Soils stained by product ranged from depths of roughly 3.5 to 15 feet in the area of the maintenance building. Product was observed in biogenic structures (such as root holes and animal burrows), that cross cut bedding in the clays located in the unsaturated zone.

Groundwater was encountered between depths of 12 and 18 feet, and is tidally influenced. Thus, the tide and times of drilling the boring affect observing

location of first encountered groundwater. Locally, the aquifer sands and gravels porosity is reduced due to large percentages of silt or clay matrix. Groundwater movement was plotted on groundwater contour maps for both high and low tides (see Drawings 2, 7 and 8). Flow is generally southwest and west toward the harbor channel, and monitoring wells nearest the channel generally display the greatest tidal influence. Tidal influence observed in groundwater depth measurements near the maintenance building may range from several tenths of one foot to about 1.5 feet daily and may be as much as 6 feet near the harbor channel (see Drawings 7 and 8). Localized groundwater flow deflections may be caused by deep building foundations. An area of groundwater recharge causing a "mound" may exist near well MW-8 where cooling water used for glass manufacture flushes continually over the plant basement floor.

As much as several feet of product have been observed in well MW-2 and this well consistently contains 2 to 4 feet product. The fluctuating groundwater surface seems to affect product movement by trapping product contained in soil during high tide and allowing product to drain during low tides. Given the occurrence of product observed in boreholes, areas of higher product contaminated soils are inferred to exist between MW-2 and the R well and the ramp excavation and the R well.

Motor fuel product was observed in soils near the four tank excavations adjacent to the power building. Contamination of unsaturated soil in this area

appears contained to the area immediately adjacent to the tank excavation. A sheen of product was observed only in MW-16.

SECTION 6.0

CHEMICAL ANALYSIS

A total of 91 soil samples and 34 groundwater samples were analyzed from the site. All soils, except 2 soil samples, were selectively analyzed for volatile organics and petroleum hydrocarbons. The remaining 2 soil samples were analyzed for polychlorinated biphenyls (PCB). These analyses were done to ascertain if PCB had migrated into the soil from PCB contamination which occurred inside the building basement. The~~re~~ ir analyses demonstrated that the PCBs are at very low levels, and are not a problem that is addressed in the investigation.

6.1 Methods

Chemical analytical protocol procedures used are similar to those outlined in the "Guidelines for Addressing Fuel Leaks" published by the San Francisco Bay Regional Water Quality Control Board. Soil samples were analyzed for total petroleum fuel hydrocarbons using RWQCB protocol and for chlorinated volatile compounds (using EPA Methods 8010 and 8020). Water samples were analyzed for PCBs using EPA Method 8080. The analytical reports are presented in Appendix B. Tabulated results are presented in Tables 1, 2, 3, and 4.

6.2 Results

Chemical analytical results for soil samples adjacent to the maintenance building show that the concentrations of volatile hydrocarbons greater than 1,000 parts per million (ppm) existed in exploratory boreholes BH-2, 5, 8, 11, and 15 and monitoring well MW-1. Exploratory borehole BH-7 revealed one soil sample that exceeded 10,000 ppm. Hydrocarbon contamination adjacent to the power building was limited from 1.1 ppm to 8.1 ppm.

Analytical results for oil and grease in soil adjacent to the maintenance building show greater than 1,000 ppm in exploratory boreholes BH-2, 5, 6, 8, 9, 13, 15, and monitoring well MW-3. Concentration of oil and grease greater than 10,000 ppm occurred in samples from exploratory borings BH-6, 7, 15, and monitoring well MW-2. Trace amounts of oil and grease were revealed in up-gradient wells MW-4, 11, 12 and 14. Oil and grease contamination adjacent to the power building varied from 20 ppm to 270 ppm.

Analytical results for groundwater samples collected from uncased exploratory borings for volatile hydrocarbons reveal concentrations ranging from about 1 to 150 ppm. A water sample collected from exploratory boring BH-15 (adjacent to the 16,600 gallon tank) contained 13,000 ppm volatile hydrocarbons. Concentrations of trichloroethlyene were noted at very low levels of 0.03 ppm in boring BH-8, and 0.014 ppm in boring BH-11.

Groundwater samples collected from permanent monitoring wells show volatile hydrocarbons range from 0.02 ppm to 1.4 ppm. Water sampled from MW-1 and MW-3 for common solvents revealed none detected. Floating product as a very thin film is observed with some regularity in wells MW-5, 6, and 9. Well MW-2 usually displays up to several feet of apparent product thickness, and product has readily recharged into well MW-2 when bailed.

Traces of volatile organic compounds were revealed in the "up gradient" monitoring wells (Mw-11, 12, and 14). Well MW-14 showed 19 ppm 1,1,1-trichloroethane compounds. Trace amounts of oil and grease were detected in MW-11, 12, and 14 and well MW-12 showed 10 ppb total volatile hydrocarbons.

SECTION 7.0
DISCUSSION

The product leak adjacent to the maintenance building in the vicinity of the pipeline feeding the old 16,600 gallon subsurface furnace fuel storage tank had leaked an unknown quantity of boiler-furnace fuel product. While the timing and quantity of leakage is unknown, site personnel have indicated that the leakage may have occurred from a single event. This contamination is characterized by a thick, oil-like product which has clogged in unsaturated soil. Locally the product has migrated through the unsaturated soil to shallow groundwater bearing sediments. Given the distribution of fill and native soils and buried foundations, the product has apparently migrated to the west of the maintenance building and north toward the ramp excavation. Product saturated soil was removed from the tank excavation in which the recovery well was constructed. Dissolved hydrocarbon product and oil and grease were observed in groundwater from the 10 to 100 ppm range. Floating product is regularly observed in well MW-2 and periodically observed as thin films or sheen observed in wells MW-3, 5, 6, 7, and 9. However, the presence of product in wells is affected by the daily tidal fluctuations, and product seems to be observed most often during low tide periods.

Very low concentrations of volatile organic compounds were detected in the grab water samples collected in July, 1986 from uncased boreholes BH-8 and

BH-11. Groundwater samples collected from permanent monitoring wells MW-1 and MW-3, which bracket the region of BH-8 and BH-11, were analyzed and revealed no volatile organic compounds detected. The source of the very low concentrations of volatile organics observed is unknown and may be attributed to surface contamination from the nearby maintenance shop parts cleaning area which entered borehole BH-8 and BH-11. Additionally, trace amounts of volatile organic compounds were detected in up-gradient wells and may indicate a possible off-site source. An up-gradient well, MW-4, has been consistently free of floating product, although trace quantities of volatile hydrocarbons, oil and grease were revealed by chemical analysis.

The most contaminated area adjacent to the furnace forming and power building is located in the vicinity of MW-16 and 17. Soil contamination is present but is far less severe than that near the maintenance building. Groundwater contamination is most severe in MW-17 which shows 5 ppb benzene. Approximately 350 cubic yards of contaminated soil was removed from the tank excavations and two new double contained subsurface tanks were replaced in the old tank excavation. Given the extent and types of contaminants present, this contamination appears to be a separate problem from that adjacent to the maintenance building to the west.

One recovery well has been installed on the site. The recovery system (R-well) located adjacent to the maintenance building consists of 36-inch diameter

well, 20 feet deep, placed in the gravel backfilled tank excavation. An oil skimmer unit skims product off the water surface and the recovered product is then transferred to one 1000 gallon surface storage tank. To date, about 270 gallons of product has been recovered. Efficiency of recovery well operation and quantity of recovered product are affected by tidally influenced groundwater movement. Filters on the skimmer occasionally clog due to soil particles suspended in the product and require periodic cleaning. Occasionally, extremely high tides may inhibit product recovery due to rapid water entry in the R well, shutting off the system.

The proximity of this site to the bay and tides strongly affects product movement. The rise and fall of the groundwater surface appears, over the years, to have spread the hydrocarbon contamination vertically in soil. Movement through artificial fill areas has tended to spread the product horizontally through soil. Drainage of the residual product is slow and occurs more often during low tide periods. However, an area in the vicinity of MW-2 appears to be a region where the product has pooled, and readily recharges in to MW-2 regardless of tidal movement. This may be related to the "reservoir" capacity of the sandy stratum containing product which appears to exist near MW-2. Interestingly, while tidal influences are strong, the product appears to remain localized in this area.

SECTION 8.0

CONCLUSIONS AND RECOMMENDATIONS

Soil and ground water contamination from hydrocarbon products have occurred in two areas at the Owens-Illinois Oakland facility. Several potential sources of contamination have been removed, and a recovery system installed at the severest contamination adjacent to the maintenance building. The extent of severest contamination appears to be confined to the vicinity of the R-well , MW-2, and boreholes BH-8, BH-6, and BH-7 (see Plate 5). Floating product is greatest at MW-2 and the R-well, and thins to film thickness at MW-5, 6, 7, and 9.

Subject to review by the State Regional Water Quality Control Board, product recovery and monitoring of wells should continue.

Future remedial action of product recovery is anticipated to be a long process given groundwater table fluctuations and apparent residual product in soil. Consideration of an additional recovery well should be given to a location near well MW-2. Since product readily recharges MW-2, and given the stratigraphy of the soils here, product seems to form a pool in this area. This additional R-well placement within the area of severest contamination would aid in product recovery. Currently, MW-2 has been used as a small recovery well by bailing to contribute additional product recovery.

It is recommended that remaining pipes and delivery lines be removed, together with excavation of excessively contaminated soil. An additional recovery well in or around MW-2 should enhance product recovery. This remedial action, together with continued monitoring of existing wells, should insure that off-site contaminant migration does not occur. Product accumulation appears localized, with very little dissolved constituents in groundwater. Groundwater which has been affected by product does not appear to comprise a useable aquifer resource given observed tidal connections with the bay.

REFERENCES CITED

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Helley, E.J., Lajoie, K.R. and Burke, D.B., 1972, Geologic map of Lake Cenozoic deposits, Alameda County, California: U.S. Geol. Survey Map MF-429.

Nichols, D.R. and Wright, N.A., 1971, Preliminary map of the historic margins of marchland, San Francisco Bay, California: U.S. Geol. Survey Open File Report.

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TABLE 1. Soil Boring Chemical Analyses

BORING NUMBER	SAMPLE DEPTH (ft.)	VOLATILE HYDROCARBONS mg/kg	OIL AND GREASE mg/kg	BENZENE mg/kg	TOLUENE mg/kg	XYLENE mg/kg
B1-1	3.5-4.5	830	470	2.2	0.85	2.7
B1-2	6-7	20	40	2.2	14	30
B1-3	10.5-11.5	380	20	5.3	4.4	1.1
B2-1	5-6	1500	3600	3.4	6.1	11
B2-2	10-11	1700	30	1.7	2.8	2.1
B2-3	15-16	160	<10	2.6	6.9	1.6
B3-1	2-3.5	NR	1100	30	57	15
B3-2	4-5.5	640	210	5.7	21	62
B4-4	14-15.5	2.8	30	0.042	0.53	1.4
B4-5	19-20.5	21	30	0.41	0.84	3.5
B5-1	2-3.5	NR	990	48	72	120
B5-2	4-5.5	1200	1800	6.7	83	200
B5-3	9-10.5	NR	210	+	30	100
B6-1	2-3.5	12	15000	NR	NR	NR
B6-3	10-11.5	49	1400	NR	NR	NR
B6-5	20-21.5	180	710	NR	NR	NR
B7-2	5-6.5	18	100	NR	NR	NR
B7-4	15-16.5	20000	18000	NR	NR	NR
B7-6	25-26.5	39	90	NR	NR	NR
B8-2	5-6.5	690	1400	NR	NR	NR
B8-4	15-16.5	540	1800	NR	NR	NR
B8-6	25-26.5	3900	5800	NR	NR	NR
B9-1	2-3.5	1600	2300	NR	NR	NR
B9-3	9-10.5	400	380	NR	NR	NR
B9-4	15-16.5	310	770	NR	NR	NR
B10-3	10-11.5	110	570	NR	NR	NR
B10-6	25-26.5	3.2	60	NR	NR	NR
B11-3	10-11.5	1700	250	NR	NR	NR
B11-4	15-16.5	67	350	NR	NR	NR
B11-6	25-26.5	8.3	30	NR	NR	NR
B12-2	5-6.5	130	360	NR	NR	NR

TABLE 1. Soil Boring Chemical Analyses (cont'd.)

BORING NUMBER	SAMPLE DEPTH (ft.)	VOLATILE HYDROCARBONS mg/kg	OIL AND GREASE mg/kg	BENZENE mg/kg	TOLUENE mg/kg	XYLENE mg/kg
B12-4	15-16.5	130	310	NR	NR	NR
B12-5	20-21.5	0.23	90	NR	NR	NR
B13-3	10-11.5	580	2100	NR	NR	NR
B13-6	25-26.5	47	210	NR	NR	NR
B14-2	5-6.5	180	200	NR	NR	NR
B14-4	15-16.5	110	20	NR	NR	NR
B14-6	25-26.5	63	320	NR	NR	NR
B15-1	2-3.5	51	390	NR	NR	NR
B15-3	10-11.5	2300	13000	NR	NR	NR
B15-4	15-16.5	250	1300	NR	NR	NR
B15-5	20-21.5	4200	11000	NR	NR	NR
B15-6	25-26.5	40	90	NR	NR	NR
R-1	4'	22000	20000	310	1000	1500
R-2	8'	1300	3000	5.3	28	110
R-3	12'	2000	840	1.4	27	67
R-4	16'	510	20000	5.2	120	70
R-5	20'	2800	56000	71	+	310

NR - Not Requested

\+ - Not Calculable

TABLE 2. Monitoring Well Boring Chemical Analyses - Soil

MONITORING WELL BORING NUMBER	SAMPLE DEPTH (ft.)	VOLATILE HYDROCARBONS mg/kg	OIL AND GREASE mg/kg	BENZENE mg/kg	TOLUENE mg/kg	XYLENE mg/kg
MW1-1	5-6.5	3.6	460	ND	ND	ND
MW1-2	10-11.5	4.3	100	ND	ND	ND
MW1-3	15-16.5	2000	4500	ND	12	60
MW1-4	20-21.5	18	90	ND	ND	ND
MW1-5	25-26.5	8.1	130	ND	ND	ND
MW1-6	28.5-30	5.1	100	ND	ND	ND
MW2-1	5-6.5	7.3	50000	ND	ND	ND
MW2-2	10-11.5	33	140	ND	0.12	0.80
MW2-3	15-16.5	41	70	ND	1.0	0.51
MW2-4	20-21.5	110	9600	ND	ND	1.4
MW2-5	25-26.5	31	90	ND	ND	ND
MW2-6	28.5-30	66	80	ND	ND	ND
MW3-1	5-6.5	18	130	ND	ND	ND
MW3-2	10-11.5	10	110	ND	ND	ND
MW3-3	15-16.5	24	70	ND	ND	ND
MW3-4	20-21.5	19	100	ND	ND	ND
MW3-5	25-26.5	9.3	40	ND	ND	ND
MW3-6	28.5-30	17	90	ND	ND	ND
MW4-1	3.5-5	ND	ND	ND	ND	ND
MW4-2	8.5-10	ND	ND	ND	ND	ND
MW4-3	13.5-15	ND	ND	ND	ND	ND
MW5-2	8.5-10	ND	ND	ND	ND	ND
MW5-3	13.5-15	110	ND	ND	ND	ND
MW5-4	18.5-20	ND	ND	ND	ND	ND
MW6-2	8.5-10	ND	ND	ND	ND	ND
MW6-3	13.5-15	ND	5.2	ND	ND	ND
MW6-4	18.5-20	ND	ND	ND	ND	ND
MW7-1	3.5-5	ND	ND	ND	ND	ND
MW7-2	8.5-10	ND	ND	ND	ND	ND
MW7-3	13.5-15	120	11	ND	ND	0.45

TABLE 2. Monitoring Well Boring Chemical Analyses - Soil (cont'd.)

MONITORING WELL BORING NUMBER	SAMPLE DEPTH (ft.)	VOLATILE HYDROCARBONS mg/kg	OIL AND GREASE mg/kg	BENZENE mg/kg	TOLUENE mg/kg	XYLENE mg/kg
MW8-2	10	530	470	ND	0.21	1.7
MW8-3	15	130	170	0.059	0.59	4.8
MW10-1	5	<3	90	ND	ND	ND
MW10-2	10	260	1400	ND	0.12	0.84

MONITORING WELL BORING NUMBER	SAMPLE DEPTH (ft.)	EXTRACTABLE HYDROCARBONS mg/kg	OIL AND GREASE mg/kg	BENZENE mg/kg	TOLUENE mg/kg	XYLENE mg/kg
MW14	10	ND	300	NR	NR	NR
MW15-1	5	ND	ND	NR	NR	NR
MW15-2	10	1.9	20	NR	NR	NR
MW16-1	5	1.7	270	NR	NR	NR
MW16-2	10	ND	65	NR	NR	NR
7-1	5	ND	ND	NR	NR	NR
MW17-2	10	8.1	25	NR	NR	NR
MW18-1	5	ND	20	NR	NR	NR
MW18-2	10	ND	90	NR	NR	NR

ND - Not Detected

NR - Not Requested

TABLE 3. Groundwater Chemical Analyses

BORING NUMBER	TOTAL VOLATILE HYDROCARBONS mg/l	OIL AND GREASE mg/l	BENZENE mg/l	TOLUENE mg/l	XYLENE mg/l	TCE mg/l	TCA mg/l	TRANS 1,2-DCE	1,1-DCE	1,1-DCA
B-1	75	60	1.8	2.0	5.6	NR	NR	NR	NR	NR
B-2	11	90	1.3	0.76	0.32	NR	NR	NR	NR	NR
B-3	14	150	0.64	0.0005	1.0	NR	NR	NR	NR	NR
B-4	26	14	0.0005	0.079	1.3	NR	NR	NR	NR	NR
B-6	73	7200	ND	ND	ND	ND	ND	ND	ND	ND
B-7	1.7	2700	ND	ND	ND	ND	ND	ND	ND	ND
B-8	9.8	320	ND	ND	ND	0.03	<0.001	0.12	ND	ND
B-9	26	35	ND	ND	ND	ND	ND	ND	ND	ND
B-10	150	40	ND	ND	ND	ND	ND	ND	ND	ND
B-11	86	46	ND	ND	ND	0.014	<0.001	0.002	ND	ND
B-12	9.1	130	ND	ND	ND	ND	ND	ND	ND	ND
B-13	28	100	ND	ND	ND	ND	ND	ND	ND	ND
B-14	0.52	25	ND	ND	ND	0.01	0.021	0.002	ND	ND
B-15	13000	400000	ND	ND	ND	0.5	0.013	ND	0.013	2.2
MONITORING WELL NUMBER										
MW-1	ND	25	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	FP	--	--	--	--	NR	NR	NR	NR	NR
MW-3	ND	18	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3. Groundwater Chemical Analyses (cont'd.)

MONITORING WELL NUMBER	TOTAL VOLATILE HYDROCARBONS mg/l	OIL AND GREASE mg/l	BENZENE mg/l	TOLUENE mg/l	XYLENE mg/l	TCE mg/l	TCA mg/l	TRANS 1,2-DCE	1,1-DCE	1,1-DCA
MW-4	0.02	7.2	ND	ND	ND	NR	NR	NR	NR	NR
MW-5	1.4	24	ND	ND	0.0066	NR	NR	NR	NR	NR
MW-6	FP	--	--	--	--	NR	NR	NR	NR	NR
MW-7	0.26	8.0	ND	ND	ND	NR	NR	NR	NR	NR
MW-8	1.3	14	ND	ND	0.001	NR	NR	NR	NR	NR
MW-9	FP	--	--	--	--	NR	NR	NR	NR	NR
MW-10	0.38	7.2	ND	ND	ND	NR	NR	NR	NR	NR
MW-11	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	0.1	2.5	0.00049	0.001	0.0013	ND	ND	ND	ND	ND
MW-13	ND	57.0	ND	ND	ND	NR	NR	NR	NR	NR
MW-14	ND	3.2	ND	ND	ND	ND	0.019	ND	ND	ND
MW-15	0.12	1.2	ND	ND	0.00092	NR	NR	NR	NR	NR
MW-16	ND	1.2	ND	ND	ND	NR	NR	NR	NR	NR
MW-17	0.24	2.4	0.005	0.0012	0.014	NR	NR	NR	NR	NR
MW-18	ND	1.6	ND	ND	ND	NR	NR	NR	NR	NR

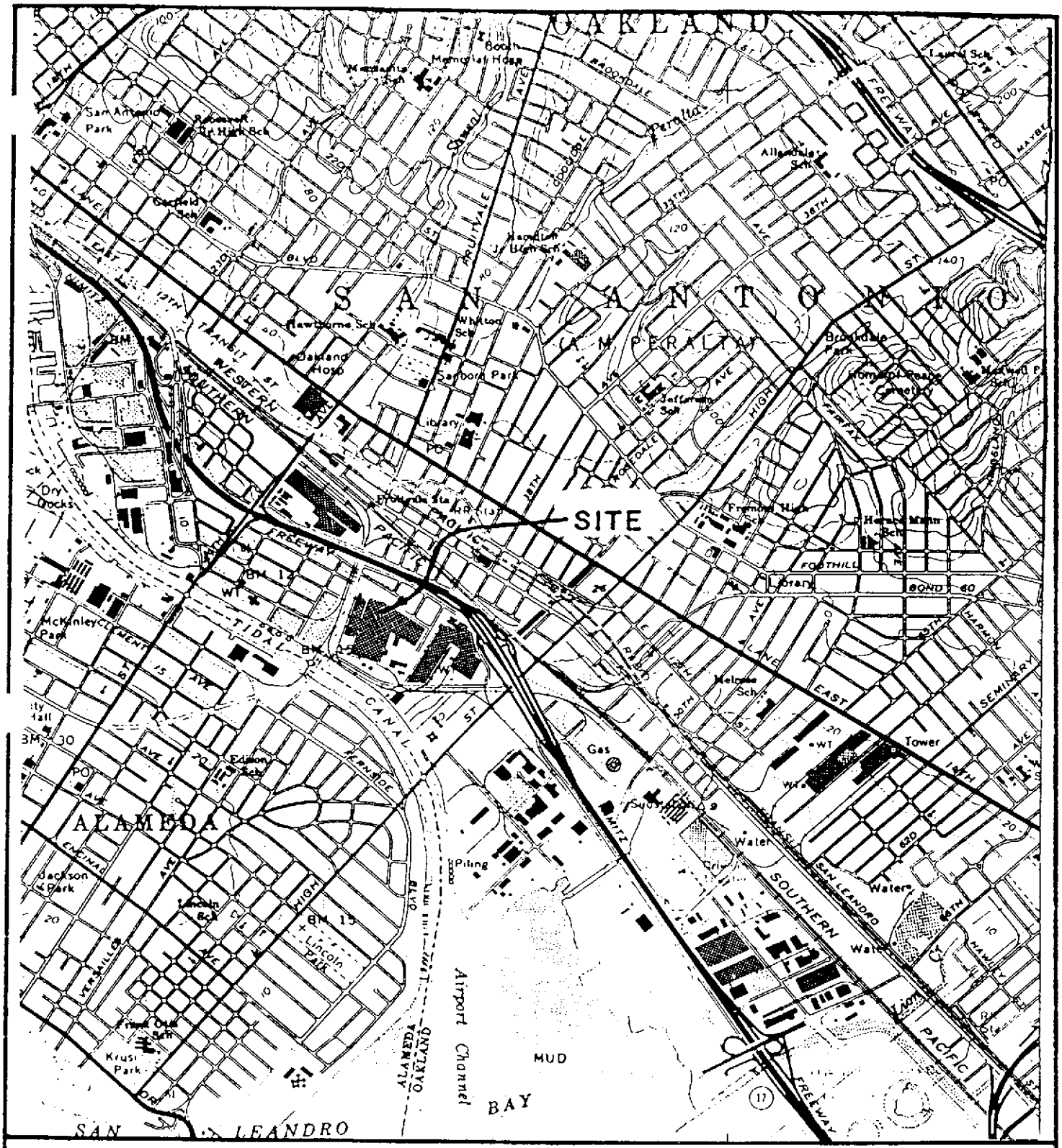
TCE - Trichloroethylene
TCA - Trichloroethane
DCE - Dichloroethylene
DCA - Dichloroethane

ND - Not Detected
NR - Not Requested
FP - Floating Product
-- No Analysis

TABLE 4. Water Sample Analysis - Polychlorinated Biphenyls

BOREHOLE	PCB CONCENTRATION mg/kg	AROCLOR	ANALYSIS BY
B-1	9.1	1260	Trace Analysis Laboratories
B-1	8.5	NR	Thermo-Analytical
B-2	ND	NR	

ND - Not Detected
NR - Not Requested



REGIONAL SITE MAP

SOIL & GROUND WATER INVESTIGATION	#1467 G	
OWENS-ILLINOIS GLASS CONTAINER DIVISION	SCALE: 1:20,000	DRAWN BY: K.S.
OAKLAND, CALIFORNIA	DATE: 11-4-86	

APPENDIX A

Logs of Exploratory Borings
Monitoring Well Details

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-1

DATE DRILLED: 7/10/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	TVH ppm	Oil & Grease ppm	COMMENTS
0			SILTY SAND mottled brown, medium grained strong product odor, free product, very moist	SM				Angle drilled Samples pushed
5	1-1					830	470	
	1-2		CLAYEY SAND, gray, fine grained, free product, wet	SC		20	40	
10	1-3		SANDY CLAY, mottled brown, 25% sand, free product	CL		380	20	
			Bottom of Boring = 11.5 feet					
15								
20								
25								
30								
35								

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-2

DATE DRILLED: 7/10/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	TVH mg/kg	Oil & Grease mg/kg
0			SILTY SANDY CLAY, blue gray, stiff, moist product odor	CL	10		
5	2-1		SILTY SAND, Brown to gray, fine grained strong odor, free product, medium dense	SM	29	1500	3600
10	2-2		SANDY CLAY, mottled brown, 30% sand, strong odor, free product, very moist	CL	19	1700	30
15	2-3				20	160	40
			Bottom of Boring = 16 feet				
20							
25							
30							
35							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-3

DATE DRILLED: 7/10/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	TVH mg/kg	Oil & Grease mg/kg
0	3-1		SILTY SANDY CLAY, blue gray, 30-40% sand, strong product odor, moist	CL	17	1800	1100
5	3-2	▽			10	1600	440
10	3-3		SILTY SAND, black, medium grained, dense very strong product odor, wet	SM	36	18000	8700
15	3-4				23	1300	1100
20	3-5		SAND and SILTY GRAVEL, brown, coarse, weak product odor, very dense	SM/GM	46		
25	3-6		SILTY SANDY CLAY, brown, 10-15% sand, slight product odor, moist	CL	20		
			Bottom of Boring = 25.5 feet				
30							
35							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-4

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	TVH mg/kg	Oil & Grease mg/kg	Comments
0	4-1		SILTY SANDY CLAY, blue-gray, 25-30% sand very strong fuel odor, stiff	CL	14			Well MW-9 installed in Boring B-4
5	4-2				12	640	210	
10	4-3		SILTY SAND, blue gray, medium grained strong product odor, medium dense, moist	SM	23			
15	4-4				11	8.8	30	
20	4-5		SANDY CLAY, brown, 20-25% sand, strong fuel odor, very stiff, wet	CL	21			
25	4-6				20			
			Bottom of Boring = 25.5 feet					
30								
35								
40								

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-5

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease
0	5-1		SANDY CLAY, black to gray, 20-30% sand strong product odor, very stiff, moist	CL	14	1400	990
5	5-2				18	1200	1800
10	5-3		CLAYEY SAND, blue gray, 20% clay, strong product odor, loose, moist	SC	7	930	210
			Bottom of Boring = 10.5 feet				
15							
20							
25							
30							
35							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-6

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			CONCRETE				
	6-1		GRAVELLY SAND, dark brown, fill	SP		12	1500
5	6-2		SANDY CLAY, gray to black, 30% sand stiff to very stiff, strong product odor, free product	CL	25	49	1400
10	6-3	▽			13		
15	6-4				27		
			CLAYEY SILTY SAND to SILTY CLAYEY SAND, loose, strong product odor, wet	SM/SC			
20	6-5				7	180	710
25	6-6		GRAVELLY SAND to SANDY GRAVEL, brown, very dense, strong product odor, wet	SP/GM	50		
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-7

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0	7-1		SANDY GRAVEL, Brown, damp, fill	GM			
5	7-2		SANDY CLAY, Gray black, 15% sand, very stiff, slight product odor, moist	CL	18	18	1000
10	7-3				17		
15	7-4		SAND, blue, medium grained, dense, free product -becomes wet	SP	48	20000	18000
20	7-5		CLAYEY SILTY SAND, brown, medium dense, strong product odor	SM	12		
25	7-6		-contains silt interbeds, strong product odor		17	38	90
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-8

DATE DRILLED: 7/24/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			SANDY GRAVEL, green, fill	GW			
	8-1		SANDY CLAY, gray to black, 20% sand, moderate to strong product odor, stiff to very stiff, very moist	CL	10		
5	8-2				18	690	1400
10	8-3	▽	-free product		19		
			GRAVELLY SAND, blue gray, medium grained free product, dense, moist				
15	8-4				49	540	180
20	8-5				16		
			SILTY SAND, blue gray, fine grained, rare gravel, strong product odor, medium dense				
25	8-6				17	3900	5800
			Bottom of Boring = 26.5 feet				
30							
35							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-9

DATE DRILLED: 7/24/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			PAVEMENT SECTION				
	9-1		GRAVELLY SAND, black, medium grained, weak product odor, dense, moist, contains fill	SW	49	1000	2300
5	9-2		SANDY CLAY, black, 20% sand, strong product odor, very stiff	CL	17		
10	9-3				34	400	380
15	9-4		SILTY SAND, blue gray, strong product odor, dense, moist	SM/SP	41	310	720
20	9-5		SANDY CLAY, brown, 10-20% sand, product odor, very stiff, moist	CL	34		
25	9-6				21		
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-10

DATE DRILLED: 7/24/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			PAVEMENT SECTION				
	10-1		SANDY GRAVEL to GRAVELLY SAND, black contains fill	GW/SW	24		
5	10-2		SANDY SILTY CLAY, black to gray, 10-20% sand, slight product odor, very stiff to stiff, moist	CL	24		
10	10-3				8	3.2	520
15	10-4	▽	GRAVELLY SAND, blue to gray, free product dense, very moist	SW	42		
20	10-5		SANDY CLAY, brown gray, 10-20% sand, strong product odor, stiff, moist to wet	CL	11		
25	10-6		SANDY GRAVEL, brown, 30% sand, product odor, moist	GW	30		
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: B-12

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg		
0			PAVEMENT SECTION						
	12-1		SILTY SAND, dark brown, contains minor gravel, weak product odor, medium dense	SM	21				
5	12-2		SANDY CLAY, gray to glack, 30% sand, strong product odor, very stiff, moist	CL	21	130	360		
10	12-3	▽			17				
15	12-4		SILTY SAND, blue, strong product odor medium dense	SM	24	130	310		
20	12-5		SILTY CLAY, brown gray, weak product odor stiff, moist	CL	11	0.23	90		
25	12-6		SANDY GRAVEL, brown, 20-30% sand, very dense, wet	GW	37				
			Bottom of Boring = 26.5 feet						
30									
35									

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-13

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			PAVEMENT SECTION				
	13-1		SILTY SAND, black, rare gravel, weak product odor, loose, moist, contains fill	SM	12		
5	13-2		SANDY CLAY, gray to black, 20% sand, stiff to very stiff moist	CL	24		
10	13-3	▽			10	580	2100
15	13-4		SILTY SAND, blue gray, rare gravel, free product, dense, wet	SM	43		
20	13-5		GRAVELLY SANDY CLAY, brown, 3% gravel weak product odor, very stiff, very moist	CL	26		
25	13-6				20	47	200
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-14

DATE DRILLED: 7/24/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0			PAVEMENT SECTION				
	14-1		GRAVELLY SAND, green, contains fill	SP			
	14-2		SANDY CLAY, black, 30% sand, weak product odor, very stiff, moist	CL	14		
5					24	180	200
	14-3		SANDY CLAY, gray, 20% sand, weak product odor, very stiff, moist	CL			
10					17		
15	14-4		SILTY SAND, blue gray 15-20% sand, weak product odor, very stiff, moist	SM	21	110	20
20	14-5		SANDY CLAY, brown, 15-20% sand, weak product odor, very stiff, moist	CL	24		
25	14-6		GRAVELLY SAND to SANDY GRAVEL, brown very dense, wet	SW/GW	75	63	320
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : B-15

DATE DRILLED: 7/25/86

LOGGED BY: BM

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	VH mg/kg	Oil & Grease mg/kg
0	15-1		SAND AND GRAVEL FILL	SP/GW	13	51	390
5	15-2		SANDY CLAY, gray, 20-40% sand, product odor, firm to hard	CL	7		
10	15-3		-free product		7	2300	13000
15	15-4				40	250	1300
20	15-5		CLAYEY SAND, black, strong product odor, saturated with product, medium dense	SC	11	4200	11000
25	15-6		CLAYEY SANDY GRAVEL, brown, free product wet	GC	35	40	90
			Bottom of Boring = 26.5 feet				
30							
35							
40							

EXCELTECH

BORING NO.: B-16

PROJECT NAME: Owens-Illinois

DATE DRILLED: 10/22/86

PROJECT NUMBER: 1467G

LOGGED BY: CMP

EXPLORATORY BORING LOG

Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			PAVEMENT SECTION		
			SILTY CLAY, black, moderate to high plasticity, strong product odor, may contain fill, stiff, damp	CL	
5	16-1		-disseminated gravel <5%		10
			-color change to blue, strong product odor		
10	16-2		SILTY CLAY, blue gray, sand <5%, moderate to high plasticity, rootholes, burrows, stiff, damp	CL	14
		▽	nearly saturated		
15	16-3		CLAYEY SAND to SANDY CLAY, gray, sand 45-55%, clay 45-55% as matrix, disseminated plant framents, rare gravel, strong product odor, medium dense to very stiff, wet	SC/CL	25
			Bottom of Boring = 15 feet		

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-1

DATE DRILLED: 9/12/86

LOGGED BY: BM

EXPLORATORY BORING LOG

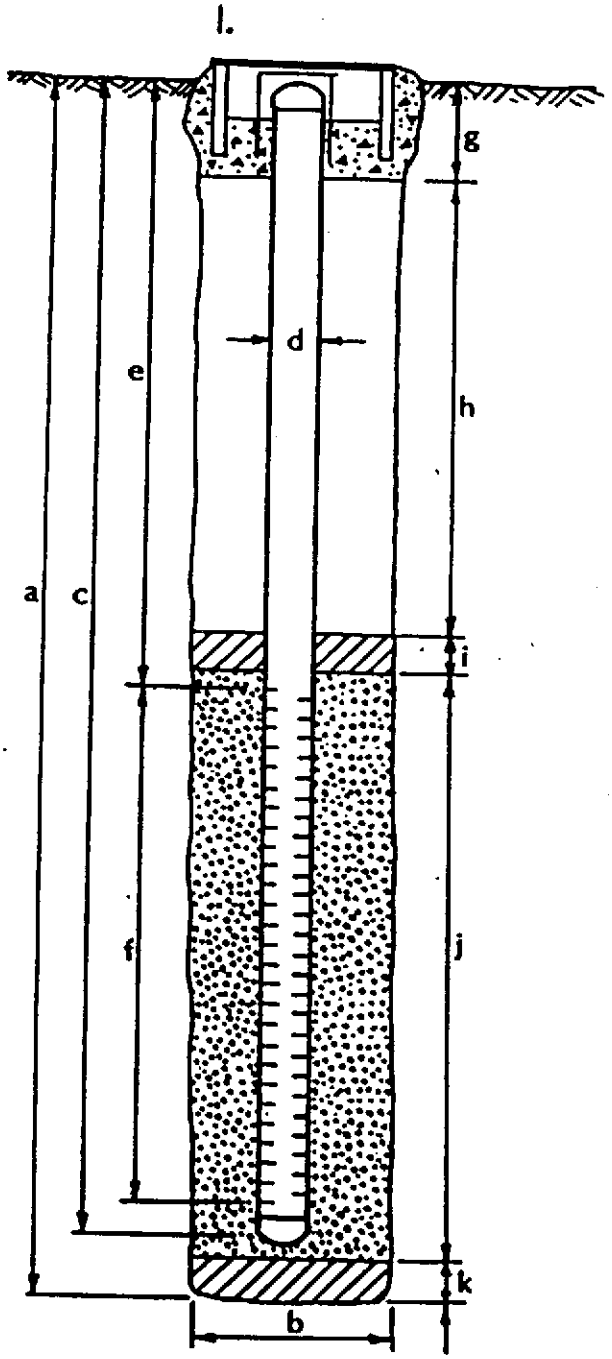
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			Pavement Section		
			Sandy/Silty CLAYS, Black, slightly moist	CL	
5	1-1		Sandy CLAYS, Brown, slightly moist, very stiff, 20-25% Sand and Silt Content		24
10	1-2	▼	Sandy CLAYS, Blue, moist, Stiff, 30-40% Sand and Silt Homogeneous increase in Sand Content		11
			Clayey/Silty SANDS, Blue, Very Moist, Slight petroleum odor .	SC/SM	
15	1-3		Gravelly Coarse SANDS to Coarse Sandy GRAVELS, Black, Wet, Dense, very strong product odor, saturated	SP/GM	41
20	1-4		Sandy CLAYS, Brown, Very Moist to Wet, Stiff, Slight Fuel Odor, Strong odor in water	CL	14
25	1-5		Brown Sandy GRAVELS grading to Silty gravelly SANDS at 26½', Wet, Dense, No odor increase sands with depth	GM/SP	40
30	1-6				39
			Bottom of Boring = 30 feet		
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO.

BORING / WELL NO. MW-1
TOP OF CASING ELEV. 16.02
GROUND SURFACE ELEV.
DATUM US Coast Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 29 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 8 ft.
f. Perforated length 21 ft.
Perforated interval from 29 to 8 ft.
Perforation type Machine
Perforation size 0.010 inches
g. Surface seal 1.5 ft.
Seal material Cement/Christy Box
h. Backfill 3.5 ft.
Backfill material Cement
i. Seal 2 ft.
Seal material Bentonite
j. Gravel pack 22 ft.
Pack material #4 Sand
k. Bottom seal ft.
Seal material None
l. Steel Locking Casing Inside
Christy Box

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-2

DATE DRILLED: 9/12/86

LOGGED BY: BM

EXPLORATORY BORING LOG

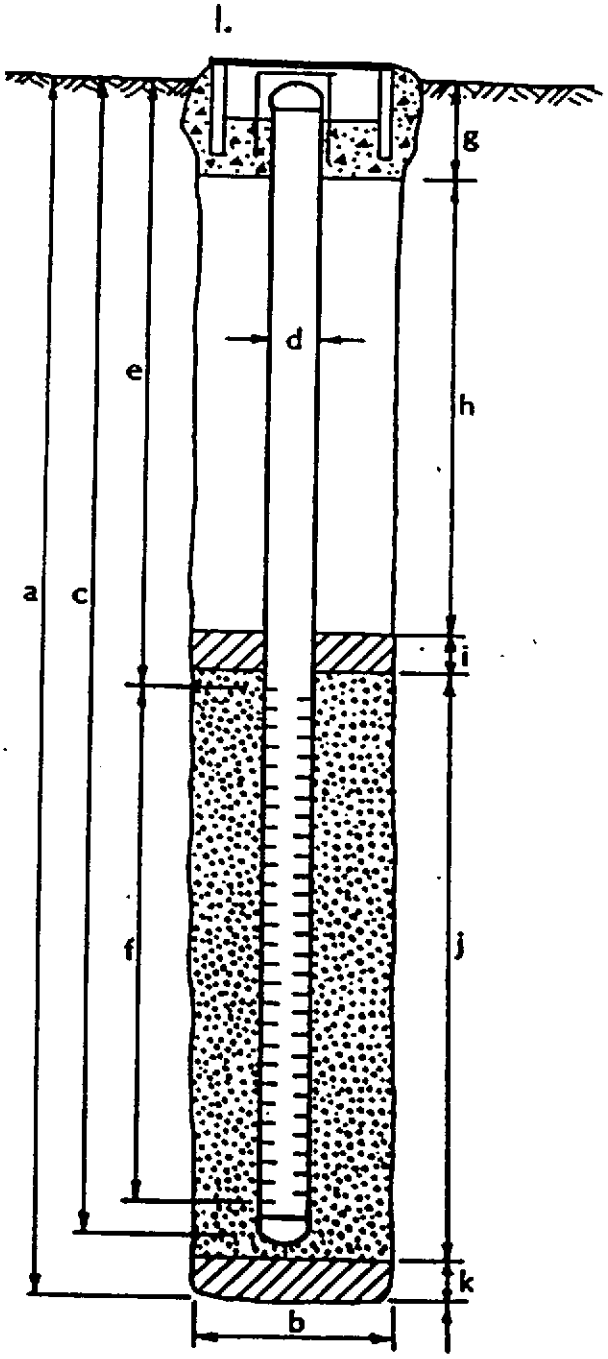
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			Pavement Section		
5	2-1		Sandy/Silty CLAYS, Black, Moist, Stiff	CL	13
10	2-2		Sandy CLAYS, Blue, Moist, Stiff, 20-30% Sand Content, Slight Fuel Odor		12
15	2-3	▼ ▽	Silty SANDS, Blue, Moist, Very firm, slight fuel odor	SM	25
20	2-4		Blue Gravelly, Med-grained SANDS, wet very strong fuel odor with visible oil droplets in soil	SP	12
25	2-5		Sandy CLAY to Clayey Fine to Med-grained SANDS, Brown, very stiff to medium dense	CL SC	21
30	2-6				20
			Bottom of Boring = 30 feet		
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO.

BORING / WELL NO. MW-2
TOP OF CASING ELEV. 17.11
GROUND SURFACE ELEV.
DATUM US Cost Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 30 ft.
Material Hollowstem Auger
d. Diameter 2 in.
e. Depth to top perforations 10 ft.
f. Perforated length 20 ft.
Perforated interval from 30 to 10 ft.
Perforation type Machine
Perforation size 0.010
g. Surface seal 1.5 ft.
Seal material Cement/Christy box
h. Backfill 5.5 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 22 ft.
Pack material #4 Sand
k. Bottom seal ft.
Seal material None
l. Steel locking casing inside Christy box

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-3

DATE DRILLED: 9/12/86

LOGGED BY: BM

EXPLORATORY BORING LOG

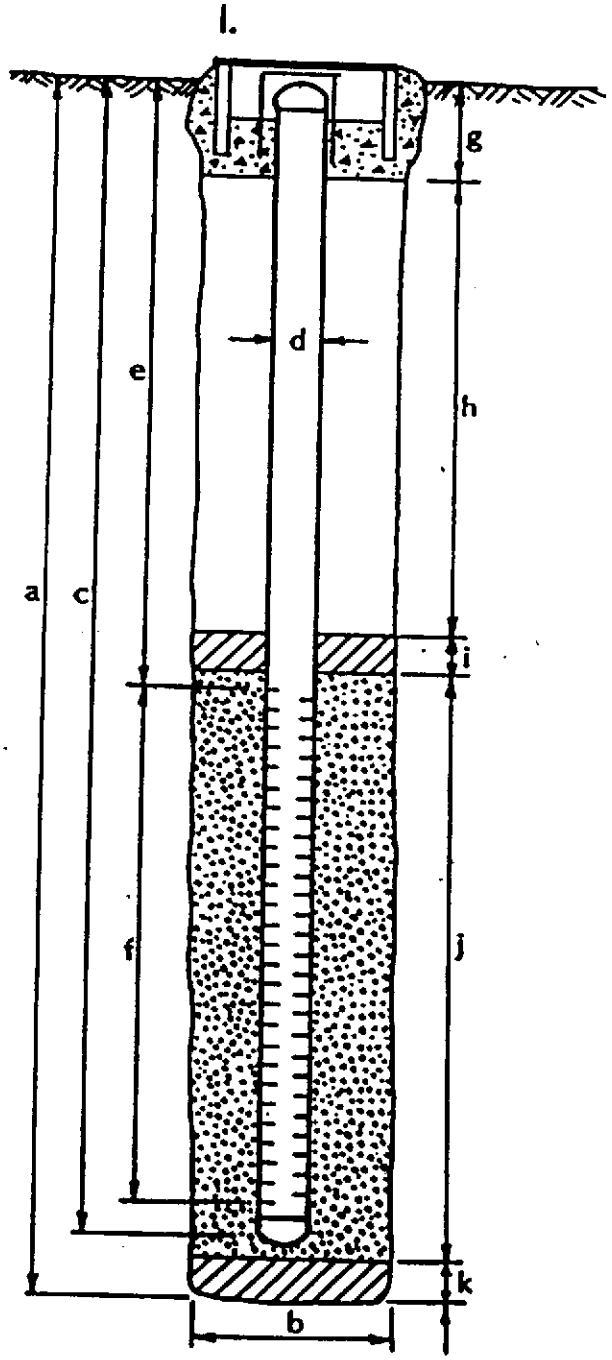
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			4" Asphalt 8" Base Silty Sand & Gravel fill with wood frag.		
			Clayey Fine Sand, Black, wet, petroleum odor, loose fill	SC	
5			Silty CLAYS, Gray/Blue, moist, stiff	CL	17
10					21
		▼			
15			Silty SAND to Clayey Fine to Med-grained SANDS, Tan/Gray, wet, very firm	SM/SC	29
20					23
			Sandy CLAY, Brown, Moist, Stiff	CL	
25					20
			Silty SANDS to Gravelly SANDS, Brown fine to coarse grained	SM/GP	
30					27
			Bottom of Boring = 31 feet		
35					
0					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY ~~Alameda~~
WELL PERMIT NO.

BORING / WELL NO. MW-3
TOP OF CASING ELEV. 15.46
GROUND SURFACE ELEV.
DATUM US Coast Geodetic



EXPLORATORY BORING

a. Total depth 31 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 30 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 10 ft.
f. Perforated length 20 ft.
Perforated interval from 30 to 10 ft.
Perforation type Machine
Perforation size 0.010
g. Surface seal 1.5 ft.
Seal material Cement/Christy box
h. Backfill 5.5 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 23 ft.
Pack material #4 Sand
k. Bottom seal ft.
Seal material None
l. Steel locking casing inside christy box

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-4

DATE DRILLED: 9/29/86

LOGGED BY, BM.

EXPLORATORY BORING LOG

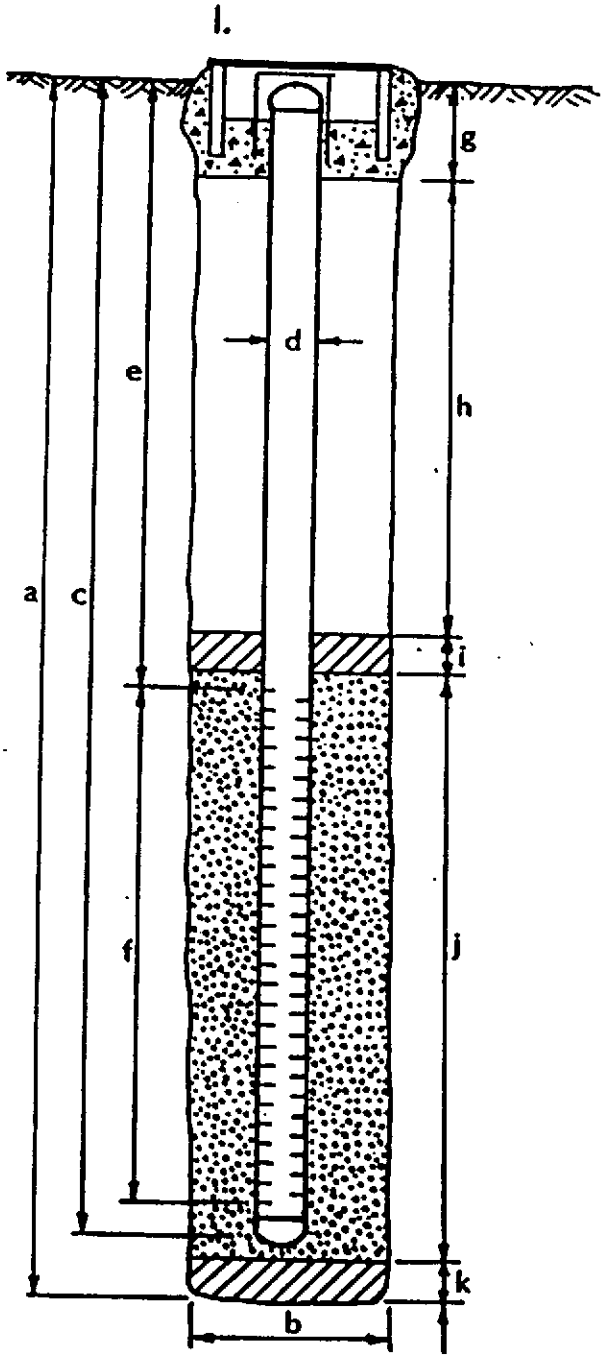
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			Pavement Section		
			GRAVELLY SANDY SILT, yellow brown, 20% gravel, 30% sand 50% Silt may contain fill	ML	
5			GRAVELLY SANDY CLAY, yellow brown, 15% gravel, 30% sand, 55% clay, moderately plastic, hard	CL	35
10		▼	-interbed of highly plastic clay -decreasing gravel and sand		3
		▽	-increasing gravel		
15			CLAYEY SANDY GRAVEL, yellow brown, 10% clay, 40% sand, 50% gravel, saturated very dense	GC	69
20			GRAVELLY CLAY, brown, 10% sand, 15% gravel rootholes or barrows open and wet, moderately plastic, hard	CL	29
25			SANDY CLAYEY GRAVEL, Brown 10% sand, 15% clay, 75% gravel, wet, dense	GC	42
			SANDY CLAY, yellow brown, 10% sand, moderate plasticity, damp, hard		
30			-becomes gravelly		34
			Bottom of Boring = 30 feet		
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86265

BORING / WELL NO. MW-4
TOP OF CASING ELEV. 16.02
GROUND SURFACE ELEV. _____
DATUM US Coast and Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 28.5 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 8.5 ft.
f. Perforated length 20 ft.
Perforated interval from 28.5 to 8.5 ft.
Perforation type Machine
Perforation size 0.020 inch
g. Surface seal 1.5 ft.
Seal material Cement/Christy box
h. Backfill 5.0 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 21 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Steel locking case inside Christy box

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-5

DATE DRILLED: 9/29/86

LOGGED BY: CMP

EXPLORATORY BORING LOG

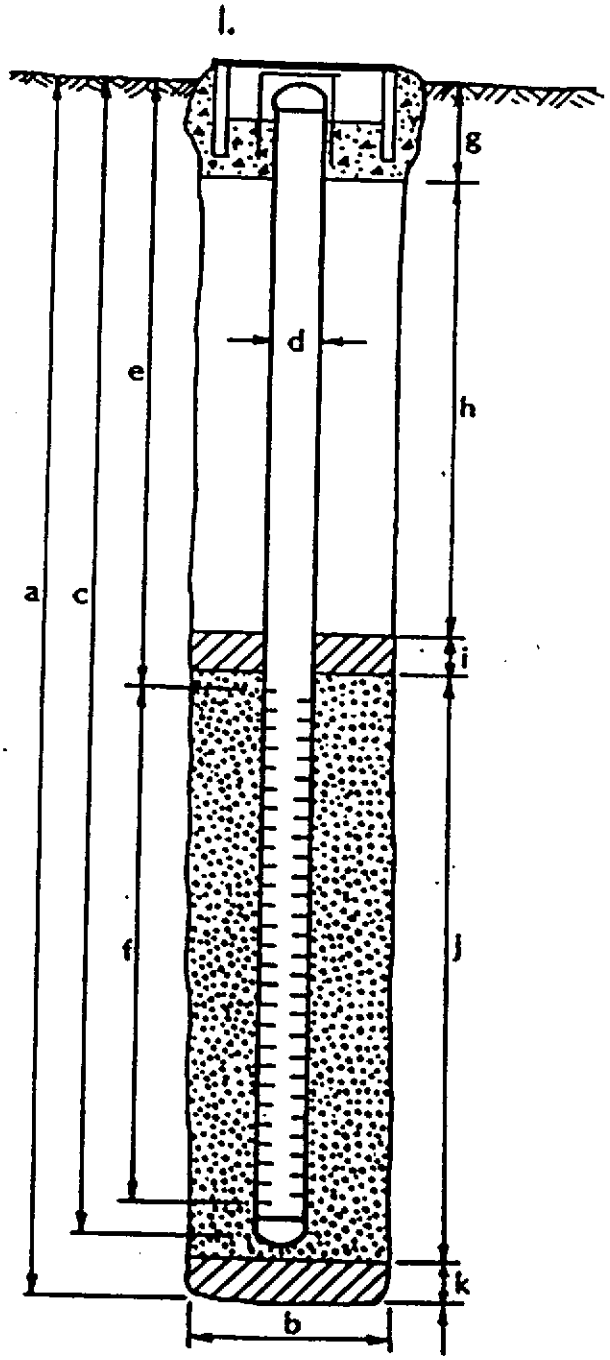
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			SILTY CLAY, black moderate to high plasticity, damp, may contain fill	CL-CH	
5			SAND, gray, fine-grained, <50% fines, loose -minor gravel	SP	6
10			SANDY CLAY, gray, 40% sand, high plasticity, very moist, firm	CL	6 5
15		▼	CLAYEY SAND, stained gray green, clay 40% odor and free product in soil, medium dense, rootholes and burrows	SC	23
20		▽	-becomes wet at 18.5 feet, free product -less clay		25
25			CLAYEY SANDY GRAVEL, Stained gray, 15% clay, 20% sand 65% gravel, sand and clay beds, increasing clay content with depth free product, very dense	GC/GW	55
30			CLAYEY SAND and SANDY CLAY INTERBEDDED, yellow brown, clayey sand, interbeds 0.5 to 1.0 inch thick, sandy clay beds 4.0" to 1 foot thick, rootholes or burrows, stiff, damp	GC/CL	13
			Bottom of Boring = 30 feet		
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86265

BORING / WELL NO. MW-5
TOP OF CASING ELEV. 16.19
GROUND SURFACE ELEV. _____
DATUM US Coast Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 28.5 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 8.5 ft.
f. Perforated length 20 ft.
Perforated interval from 28.5 to 8.5 ft.
Perforation type Machine
Perforation size 0.020
g. Surface seal 1.0 ft.
Seal material Cement/Christy box
h. Backfill 4.5 ft.
Backfill material Cement
i. Seal 2.0 ft.
Seal material Bentonite
j. Gravel pack 21 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Steel locking casing inside christy box

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO. : MW-6

DATE DRILLED: 9/29/86

LOGGED BY: CMP

EXPLORATORY BORING LOG

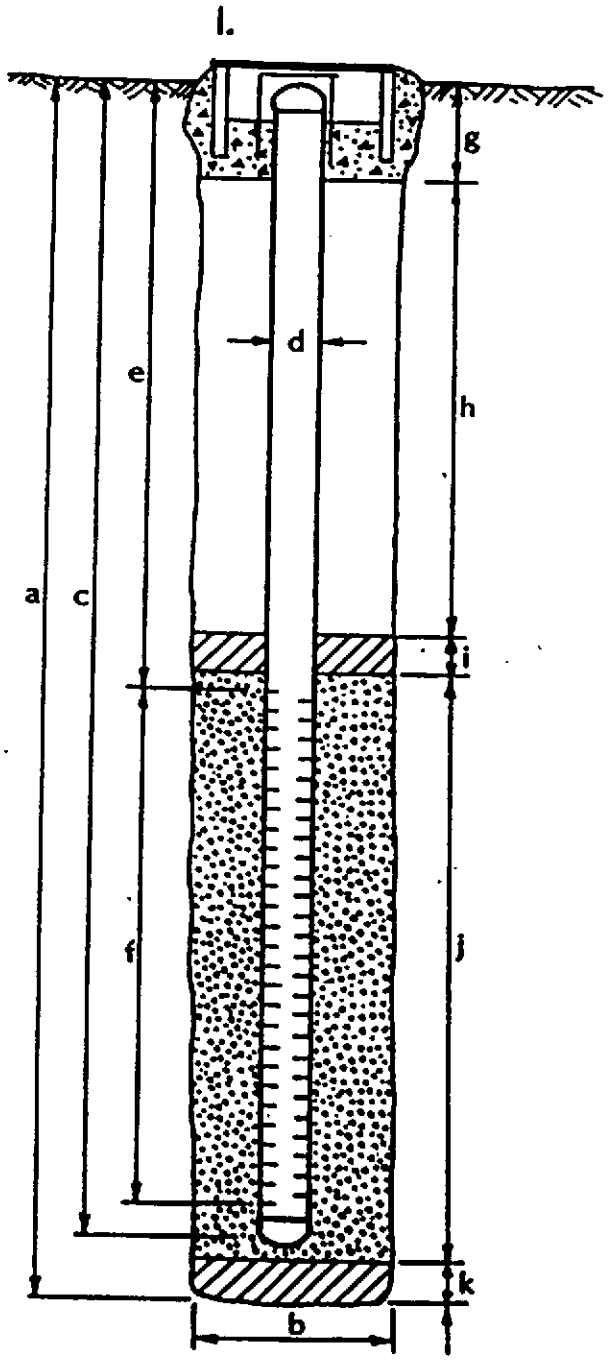
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			SANDY SILT FILL, contains rocks, concrete refuse, damp	ML	
5			SILTY CLAY, Black, moderate to high plasticity, damp	CL-CH	22
10			SANDY SILTY CLAY, yellow brown, 10-15% fine sand, rootholes and burrows, faint bedding, moderate plasticity, stiff	CL	11
15		▼	CLAYEY SAND to SANDY CLAY, stained brown, free product, 40-60% sand, rootholes in filled with plant matter	SC/CL	19
20		▽	-becomes interbedded at 18.5, becomes wet at 19, product decreases with depth, becomes very sandy at 20		72/11
25			-clay interbed from 23.5 to 24, much free product		27
30			GRAVELLY CLAY, brown, 20-40% fine to medium gravel, bedded, nearly saturated to damp		31
			Bottom of Boring = 30'		
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86265

BORING / WELL NO. MW-6
TOP OF CASING ELEV. 17.48
GROUND SURFACE ELEV. _____
DATUM US Coast & Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 28.5 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 12.5 ft.
f. Perforated length 16 ft.
Perforated interval from 28.5 to 12.5 ft.
Perforation type Machine
Perforation size 0.020
g. Surface seal 1.5 ft.
Seal material Cement/Christy box
h. Backfill 9.5 ft.
Backfill material Cement
i. Seal 2 ft.
Seal material Bentonite
j. Gravel pack 17.5 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Steel locking casing inside Christy box.

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: MW-7

DATE DRILLED: 9/30/86

LOGGED BY: CMP

EXPLORATORY BORING LOG

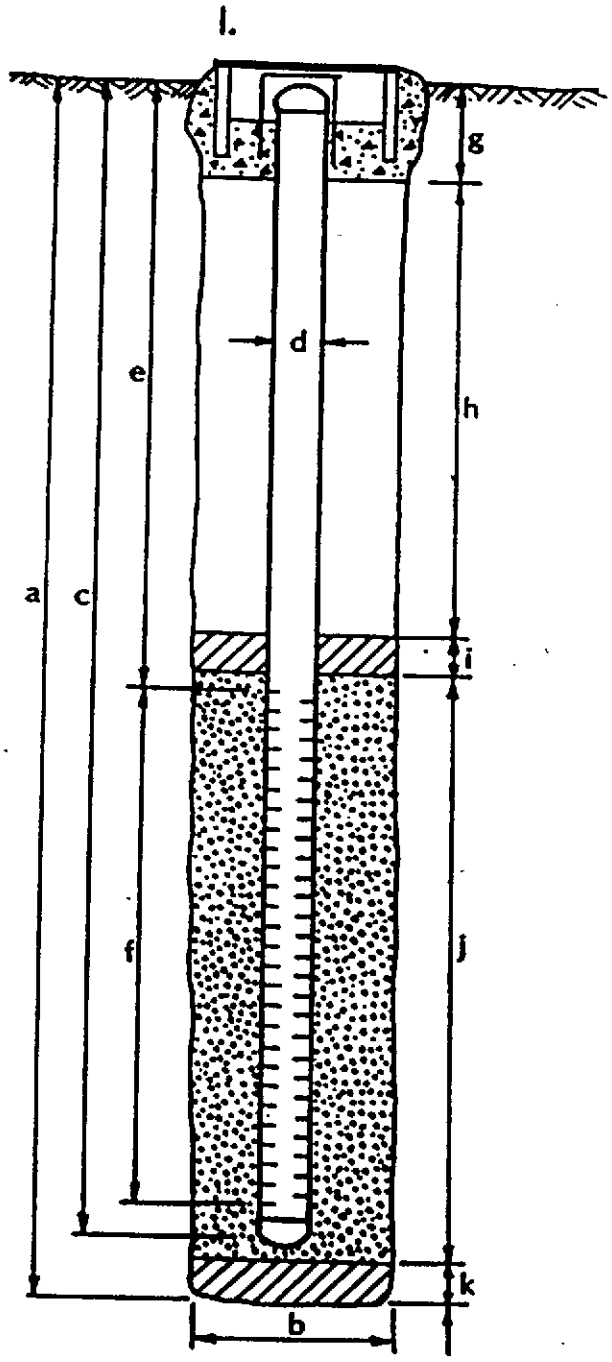
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			CLAYEY SILT, dark yellowish brown, moderated plastic, hard, contains fill	ML	
5					36
			SILTY CLAY, very dark brown to brown, 15% sand disseminated, moderately expansive contains rootholes, stiff	CL	
10		▼			12
15			SAND and SILTY SAND, discolored to gray and blue gray, petroleum odor, 2-5% silt, rare gravel, dense, free product at 15'	SP-SM	47
		▽	-becomes silty, weak petroleum odor gradational contact, becomes red brown wet		
20			SILTY CLAY, brown 10% fine sand disseminated moderate plasticity, very stiff	CL	13
25					17
			Bottom of Boring = 25 feet		
30					
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86265

BORING / WELL NO. MW-7
TOP OF CASING ELEV. 16.11
GROUND SURFACE ELEV. _____
DATUM US Coast & Geodetic



EXPLORATORY BORING

a. Total depth 25 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 23.5 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 12.5 ft.
f. Perforated length 11 ft.
Perforated interval from 23.5 to 12.5 ft.
Perforation type Machine
Perforation size 0.020
g. Surface seal 1.5 ft.
Seal material Cement/Christy Box
h. Backfill 7 ft.
Backfill material Cement
i. Seal 2.5 ft.
Seal material Bentonite
j. Gravel pack 13 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Steel locking casing inside Christy box.

EXCELSIOR

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: MW-8

DATE DRILLED: 10/22/86

LOGGED BY: CMP

EXPLORATORY BORING LOG

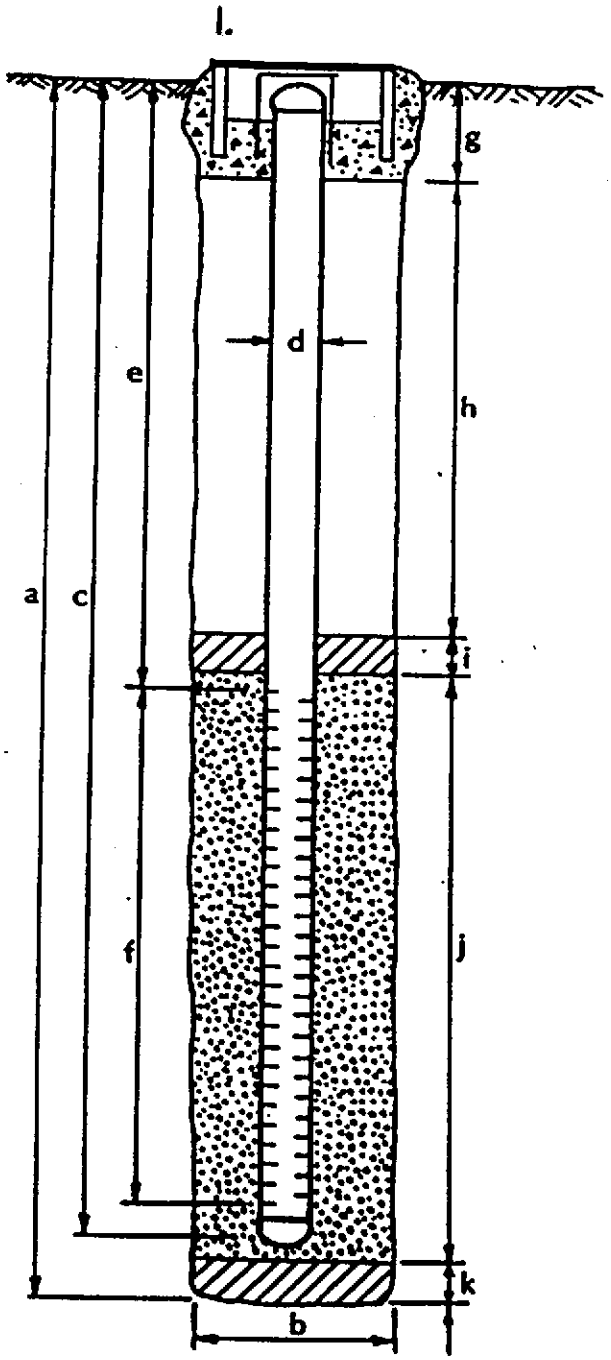
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			PAVEMENT SECTION		
			SILTY CLAY, black, moderate to high plasticity, weak product odor, may contain fill, moist	CL	
			strong product odor, fine sand 10%		
5	8-1		SILTY CLAY, gray, moderate to high plasticity, product odor, plant infilled root holes, very stiff, moist	CL	12
10	8-2	▼			31
			CLAYEY SAND, gray, sand 70%, clay 30% as matrix, massive, burrows and root holes, strong product odor, very moist, dense	SC	
15	8-3	▽			34
			SAND to CLAYEY SAND, gray product stain to depth of 21', yellow brown below 21', sand 70% to 95%, clay disseminated, massive, medium dense, wet	SP-SC	
20	8-4				16
			SILTY CLAY, yellow brown, fine to coarse sand 5% moderate to high plasticity massive, stiff, damp	CL	
25	8-5		SANDY GRAVEL, yellow brown, fine to coarse sand 25%, gravel 65%, clay matrix 10% very dense, wet	GW	80
30	8-6		SILTY CLAY, yellow brown, fine sand 5% gravel 5%, moderate plasticity, massive very stiff, damp	CL	18
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86279

BORING / WELL NO. MW-8
TOP OF CASING ELEV. 16.57'
GROUND SURFACE ELEV. _____
DATUM US Coast Geodetic



EXPLORATORY BORING

a. Total depth 30 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 28.5 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 9 ft.
f. Perforated length 13.5 ft.
Perforated interval from 28.5 to 15 ft.
Perforation type Machine
Perforation size 0.020
g. Surface seal 1 ft.
Seal material Christy box/cement
h. Backfill 8.0 ft.
Backfill material Cement
i. Seal 3 ft.
Seal material Bentonite
j. Gravel pack 16 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Steel locking casing in Christy box.

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

MW-9
BORING NO. : (B-4)

DATE DRILLED: 7/23/86

LOGGED BY: BM

EXPLORATORY BORING LOG

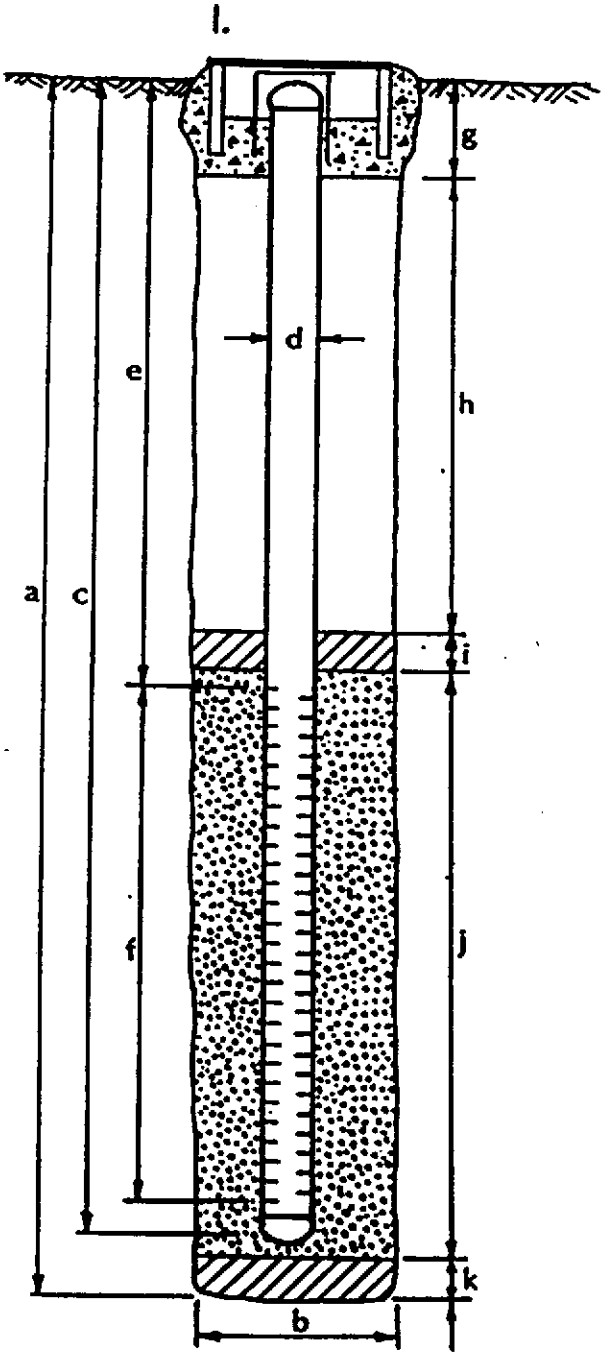
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs	TVH mg/kg	Oil & Grease mg/kg	Comments
0	4-1		SILTY SANDY CLAY, blue-gray, 25-30% sand very strong fuel odor, stiff	CL	14			Well MW-9 installed in Boring B-4
5	4-2				12	640	210	
10	4-3		SILTY SAND, blue gray, medium grained strong product odor, medium dense, moist	SM	23			
15	4-4				11	8.8	30	
20	4-5		SANDY CLAY, brown, 20-25% sand, strong fuel odor, very stiff, wet	CL	21			
25	4-6				20			
			Bottom of Boring = 25.5 feet					
30								
35								

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86279

BORING / WELL NO. MW-9
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. 7.33
DATUM U.S. Coast & Geodetic



EXPLORATORY BORING

a. Total depth 16 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 20 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations _____ ft.
f. Perforated length _____ ft.
Perforated interval from 15 to 5 ft.
Perforation type Machine
Perforation size 0.020
g. Surface seal _____ ft.
Seal material None - Ramp to be built
h. Backfill _____ ft.
Backfill material Cement
i. Seal 2.0 ft.
Seal material Bentonite
j. Gravel pack 11.5 ft.
Pack material #4 Sand
k. Bottom seal - ft.
Seal material None
l. Sluff to 15' deep

Note leave 3' PVC standing out of hole.
Well installed in borehole B-4

EXCELTECH

PROJECT NAME: Owens-Illinois

PROJECT NUMBER: 1467G

BORING NO.: MW-10

DATE DRILLED: 10/22/86

LOGGED BY: CMP

EXPLORATORY BORING LOG

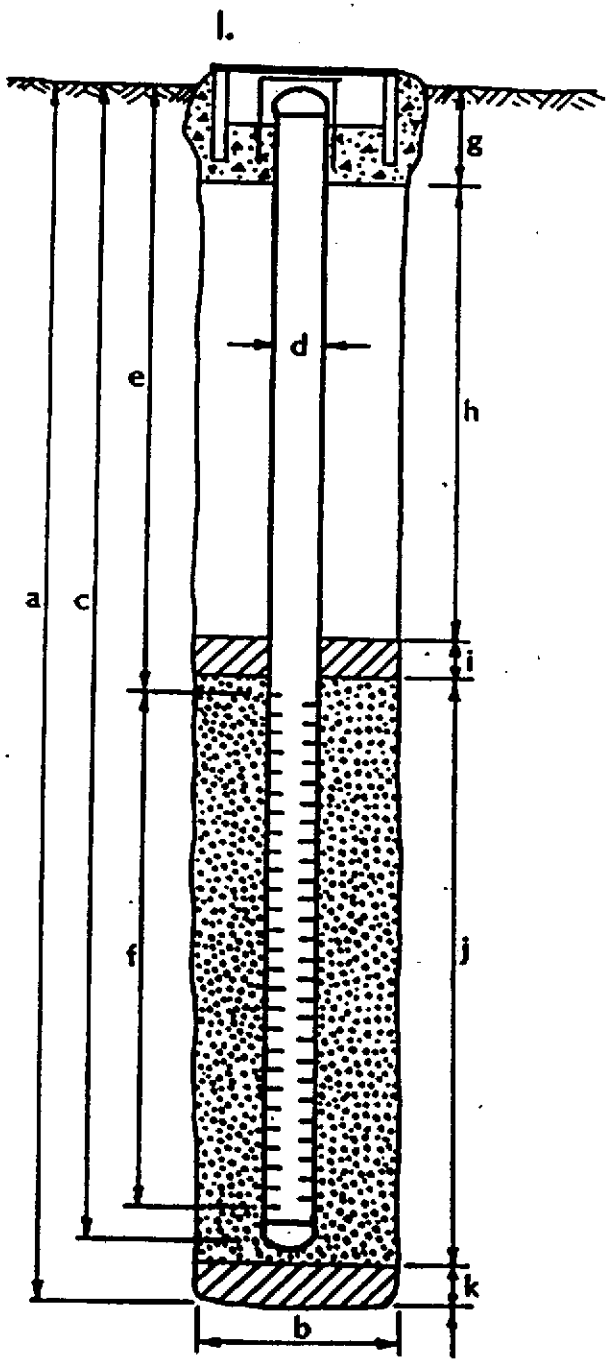
Depth, ft.	Sample No.	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs
0			PAVEMENT SECTION		
	10-1		SILTY CLAY, black, gravel 5% disseminated, moderate to high plasticity, may contain fill, very stiff, damp	CL	19
5			SILTY CLAY, greenish gray, very fine sand 5% massive, weak product odor, very stiff	CL	
10	10-2	▼	-fine sand 15%, burrows		7
			-nearly saturated		
15	10-3	▽	CLAYEY SAND, yellow brown with green gray stains, fine-medium sand 70%, clay 30% as matrix & contains thin clay lenses, vertical burrows, weak product odor, medium dense, yields water slowly	SC	15
	10-4		-less clay from 16' to 18.5'		
20			-increasing clay 19' to 20'		10
			SILTY CLAY, yellow brown with gray mottles, fine sand 10% disseminated, root holes infilled with plant fragments, moderate plasticity, stiff, locally wet root holes, over-all damp	CL	
25	10-5				11
			Bottom of Boring = 25 feet		
30					
35					

EXCELTECH

Monitoring Well Detail

PROJECT NUMBER 1467G
PROJECT NAME Owens-Illinois
COUNTY Alameda
WELL PERMIT NO. 86279

BORING / WELL NO. MW-10
TOP OF CASING ELEV. 15.96'
GROUND SURFACE ELEV. _____
DATUM US Coast and Geodetic



EXPLORATORY BORING

a. Total depth 25 ft.
b. Diameter 8 in.
Drilling method Hollowstem Auger

WELL CONSTRUCTION

c. Casing length 25 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 10 ft.
f. Perforated length 15 ft.
Perforated interval from 25 to 10 ft.
Perforation type Machine
Perforation size 0.020"
g. Surface seal 1.0 ft.
Seal material Christy box in cement
h. Backfill 5.5 ft.
Backfill material Cement
i. Seal 1.5 ft.
Seal material Bentonite
j. Gravel pack 17 ft.
Pack material #4 Sand
k. Bottom seal _____ ft.
Seal material None
l. Christy box with steel locking interior casing

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545 *(415) 783-6960*

DATE: 7/15/86

LOG NO.: 3838

CUSTOMER: Exceltech Inc.

REQUESTER: Brad McCardell

PROJECT: No. 1467, Owens

		Sample Type: Water		
Constituent	Units	B-1	B-2	Open Pit
Chlorinated Volatile Organics (EPA 601):				
Bromodichloromethane	mg/l		0.0036	
Bromoform	mg/l		0.011	0.00049
Carbon tetrachloride	mg/l		0.0012	
Chlorobenzene	mg/l		0.0044	0.00020
Chloroethane	mg/l	0.0012		
Chloroform	mg/l			0.00011
2-Chloroethyl vinyl ether	mg/l		0.0020	
Chloromethane	mg/l	0.011		
1,2-Dichlorobenzene	mg/l		0.00068	0.0010
1,3-Dichlorobenzene	mg/l		0.0072	0.00092
1,4-Dichlorobenzene	mg/l		0.00056	
1,1-Dichloroethane	mg/l	0.0010		
1,1-Dichloroethylene	mg/l	0.00043		
Dichloromethane	mg/l	0.0029	0.00026	0.00061
1,3-Dichloropropylenes	mg/l		0.0012	
1,1,2,2-Tetrachloroethane and tetrachloroethylene	mg/l		0.0019	0.00014
All others	mg/l	<0.0001	<0.0001	<0.0001
Aromatic Volatile Organics (EPA 602):				
Benzene	mg/l	1.8	3.1	0.14
Ethyl benzene	mg/l	2.6	0.55	0.070
Toluene	mg/l	2.0	0.76	0.14
Xylenes	mg/l	5.6	0.32	0.13
All others	mg/l	<0.02	<0.02	<0.02
Volatile hydrocarbons	mg/l	75	11	1.5
Oil and grease	mg/l	60	90	43

Constituent	Units	Sample Type: Soil B 1-1	B 1-2	B 1-3
Chlorinated Volatile Organics (EPA 8010):				
Chloroform	mg/kg	0.026		
1,2-Dichlorobenzene	mg/kg			0.096
1,4-Dichlorobenzene	mg/kg			0.082
Dichloromethane	mg/kg	0.053		0.058
1,2-Dichloropropane	mg/kg			0.050
Tetrachlorethylene	mg/kg			0.025
All others	mg/kg	<0.01	<0.01	<0.01
Aromatic Volatile Organics (EPA 8020):				
Benzene	mg/kg	2.2	2.2	5.3
Toluene	mg/kg	0.85	14	4.4
Xylenes	mg/kg	2.7	30	1.1
All others	mg/kg	< 0.1	<0.1	<0.1
Volatile hydrocarbons	mg/kg	830	20	380
Oil and grease	mg/kg	470	40	20

Constituent	Units	Sample Type: Soil B 2-1	B 2-2	B 2-3
Chlorinated Volatile Organics (EPA 8010):				
Chlorobenzene	mg/kg	0.023		
Chloroethane	mg/kg	0.015		
Chloroform	mg/kg	0.040	0.023	
1,4-Dichlorobenzene	mg/kg	0.026		
Dichloromethane	mg/kg	0.052	0.033	
All Others	mg/kg	<0.01	<0.01	<0.01
Aromatic Volatile Organics (EPA 8020):				
Benzene	mg/kg	3.4	1.7	2.6
Toluene	mg/kg	6.1	2.8	6.9
Xylenes	mg/kg	11	2.1	1.6
All others	mg/kg	<0.1	<0.1	<0.1
Volatile hydrocarbons	mg/kg	1500	1700	160
Oil and grease	mg/kg	3600	30	<10

Louis DePuni
for S. C. Furman, Ph.D.
Laboratory Director

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545 *(415) 783-6960*

TAL

DATE: 7/15/86

LOG NO.: 3833

CUSTOMER: Exceltech Inc.

REQUESTER: Mike Hansen

PROJECT: #1467, Owens

	Sample Type: Soil	
Constituent	Units	#1
Volatile Aromatic Organics (EPA 8020):		
Benzene	mg/kg	470
Toluene	mg/kg	720
Xylenes (Dimethyl benzenes)	mg/kg	460
All Others	mg/kg	< 1
Chlorinated Volatile Organics (EPA 8010):		
Chloroethane	mg/kg	0.88
Trichloroethylene	mg/kg	0.024
All Others	mg/kg	< 0.01
Total Volatile Hydrocarbons	mg/kg	5600
Oil and Grease	mg/kg	2600

for Louise DuPuis
S. C. Furman, Ph.D.
Laboratory Director

SF:mln

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545 *(415) 783-6960*

DATE: 7/21/86

LOG NO.: 3858

CUSTOMER: Exceltech Inc.

REQUESTER: Mike Hansen

PROJECT: No 1467, Owens

Sample Type	Sample	PCB Concentration	Aroclor
Oil		mg/kg	
	B-1	9.1	1260

for S. C. Furman, Ph.D.
Laboratory Director

SF:mln

TMA
Thermo Analytical Inc.

TMA/ERG
1400 West 53rd Street
Suite 460
Emeryville, CA 94608-2946
(415) 652-2300

July 23, 1986

Exceltech
41628 Christy St.
Fremont, CA 94538

Attention: Mike Hansen

Report #8180 P.O. #3899

Project Name: Owens Project #1467.

Subject: Two (2) oil-water samples submitted for rush PCB analysis on July 21, 1986.

Procedure: The oil layer of the sample is analyzed for PCB by following EPA Method 600/4-81-045. The samples are diluted directly with hexane and cleaned up with a sulfuric acid treatment prior to injection into a gas chromatograph equipped with a Ni63 electron capture detector. Quantitation is performed against standards made from known concentrations of Aroclors. The limit of detection for this method of analysis is one part per million (mg/L).

Results: The results are shown in the table below:

ERG #	CLIENT ID	PCB CONCENTRATION (mg/L)
8180-1	Boring 1	8.5
8180-2	Boring 2	ND(1)

ND = None detected. The limit of detection is in ( ).

Submitted by:

Robert B. Flay
Manager, Organics Department

RBF:sml

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545 *(415) 783-6960*

TAL

DATE: 7/23/86

LOG NO.: 3869

CUSTOMER: Exceltech Inc.

REQUESTER: Mike Hansen

PROJECT: No. 1467, Owens Illinois

Sample Type	Sample	PCB Concentration	Aroclor
Oil		mg/kg	
	B-1	60	1260
	B-2	23	1260

for S. C. Furman, Ph.D.
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Trace Analysis Laboratory, Inc.
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TAL

DATE: 8/4/86

LOG NO.: 3865

CUSTOMER: Exceltech, Inc.

REQUESTER: Mike Hansen

PROJECT: No. 1467, Owens Illinois

Sample Type	Sample	Volatile Hydrocarbons	Oil & Grease	Benzene	Toluene	Xylene	Total PCB's
Soil		mg/kg	mg/kg				mg/kg
	B3-1	1,800	1,100				
	B3-2	1,600	440				
	B3-3	18,000	8,700				
	B3-4	1,300	1,100				
	B4-2	640	210				
	B4-4	2.8	30				
	B4-5	21	30				
	B5-1	1,400	990				
	B5-2	1,200	1,800				
	B5-3	930	210				
	R-1	22,000	20,000				2.0 (Aroclor 1260)
	R-2	1,300	3,000				
	R-3	2,000	840				
	R-4	510	20,000				
	R-5	2,800	56,000				
Water		mg/l	mg/l	mg/l	mg/l	mg/l	
	B-3	14	150	0.64	<0.0005	1.0	
	B-4	26	14	<0.0005	0.079	1.3	

S. C. Furman, Ph.D.
Laboratory Director

SCF:les

Trace Analysis Laboratory, Inc.
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TAL

DATE: 9/03/86

LOG NO.: 3955

DATE SAMPLED: 8/19/86

DATE RECEIVED: 8/19/86

CUSTOMER: Exceltech Inc.

REQUESTER: Mike Hansen

PROJECT: No. 1467, Owens Illinois

	Sample Type: Oil	
Constituent	Units	16,000 gal. tank
Flash point	°F	>192
Chlorinated Hydrocarbons	mg/l	<0.0002
PCB	mg/kg	<1

S. C. Furman, Ph.D.
Laboratory Director

SF:mln

Trace Analysis Laboratory, Inc.
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TAL

DATE: 8/15/86

LOG NO.: 3865

CUSTOMER: Exceltech Inc.

REQUESTER: Mike Hansen

PROJECT: No. 1467, Owen's Illinois

inaccurate

Sample Type	Sample	Benzene	Toluene	Xylene
Soil		mg/kg	mg/kg	mg/kg
	B3-1	30	57	15
	B3-2	2.9	3.7	23
	B3-3	160	160	130
	B3-4	44	61	140
	B4-2	5.7	21	62
	B4-4	0.042	0.53	1.4
	B4-5	0.41	0.84	3.5
	B5-1	48	72	120
	B5-2	6.7	83	200
	B5-3	*	30	100
	R-1	310	1,000	1,500
	R-2	5.3	28	110
	R-3	1.4	27	67
	R-4	5.2	120	70
	R-5	71	*	310

* Not calculable

Note: The Benzene, Toluene and Xylene calculations are based on FID detector only. The FID gives a response to all the hydrocarbons eluted from the GC column including aromatics. The results of the B.T.X. might be higher than the real value due to the response of other hydrocarbons which are eluted at the same times as the B.T.X.

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SF:mln

Sample Type: Water

Constituent	Units	6	7	8	9	10	11
1,1,2,2 - Tetra chloro-ethane and 1,1,1,2 - Tetrachloroethane	mg/l			<0.001			<0.001
Trichloroethylene	mg/l			0.030			0.014
All Others	mg/l			<0.001			<0.001

Constituent	Units	12	13	14
Volatile Hydrocarbons	mg/l	9.1	28	0.52
Oil and Grease	mg/l	130	100	25
Halogenated Volatile Organics (EPA 8010):				
Trans-1,2-Dichloro-ethylene	mg/l			0.0020
1,1,2,2 - Tetra chloro-ethane and 1,1,1,2 - Tetrachloroethane	mg/l			0.021
Trichloroethylene	mg/l			0.010
All Others	mg/l			<0.001

Sample Type: Oil

Constituent	Units	15	Oil from 16,000 Gallon Tank	Sump
Volatile Hydrocarbons	mg/kg	13,000		
Oil and Grease	mg/kg	400,000	420,000	
Halogenated Volatile Organics (EPA 8010):				
1,1-Dichlorethane	mg/kg	2.2		
1,1-Dichloroethylene	mg/kg	0.013		
1,1,2,2-Tetrachloro-ethane and 1,1,1,2-Tetrachloroethane	mg/kg	0.013		
Trichloroethylene	mg/kg	0.50		
All Others	mg/kg	<0.01		
PCB's		<1.0		<1.0
Extractable Hydro-carbons	mg/kg			95,000

Louis DePuni
for S. C. Furman, Ph.D.
Laboratory Director

SCF:les

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545 *(415) 783-6960*

TAL

DATE: 8/14/86

LOG NO.: 3882 and 3888

CUSTOMER: Exceltech, Inc.

REQUESTER: Mike Hansen

PROJECT: No. 1467, Owens Illinois

Sample Type: Soil

Constituent	Units	6-1	6-3	6-5	7-2	7-4	7-6
Volatile Hydrocarbons	mg/kg	12	49	180	18	20,000	39
Oil and Grease	mg/kg	15,000	1,400	710	100	18,000	90
		8-2	8-4	8-6	9-1	9-3	9-4
Volatile Hydrocarbons	mg/kg	690	540	3,900	1,600	400	310
Oil and Grease	mg/kg	1,400	1,800	5,800	2,300	380	770
		10-3	10-6	11-3	11-4	11-6	12-2
Volatile Hydrocarbons	mg/kg	110	3.2	1,700	67	8.3	130
Oil and Grease	mg/kg	570	60	250	350	30	360
		12-4	12-5	13-3	13-6	14-2	14-4
Volatile Hydrocarbons	mg/kg	130	0.23	580	47	180	110
Oil and Grease	mg/kg	310	90	2,100	210	200	20
		14-6	15-1	15-3	15-4	15-5	15-6
Volatile Hydrocarbons	mg/kg	63	51	2,300	250	4,200	40
Oil and Grease	mg/kg	320	390	13,000	1,300	11,000	90
PCB's:							
Aroclor 1242	mg/kg			1.7			2.3
All Others	mg/kg			<1			<1

Sample Type: Water

Constituent	Units	6	7	8	9	10	11
Volatile Hydrocarbons	mg/l	73	1.7	9.8	26	150	86
Oil and Grease	mg/l	7,200	2,700	320	35	40	46
Halogenated Volatile Organics (EPA 8010):							
Trans-1,2-Dichloro-ethylene	mg/l			0.12			0.0020

Trace Analysis Laboratory, Inc.
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TAL

DATE: 10/6/86

LOG NO.: 4032

DATE SAMPLED: 9/12/86

DATE RECEIVED: 9/17/86

CUSTOMER: Exceltech Inc.

REQUESTER: Brad McCardell

PROJECT: No. 1467, Owen's Illinois

Sample Type	Sample	Volatile Hydrocarbons	Benzene	Toluene	Xylene	Oil and Grease
Soil		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	MW1-1	3.6	<0.5	<0.5	<0.5	460
	MW1-2	4.3	<0.1	<0.1	<0.1	100
	MW1-3	2000	<1.0	12	60	4500
	MW1-4	18	<0.5	<0.5	<0.5	90
	MW1-5	8.1	<0.1	<0.1	<0.1	130
	MW1-6	5.1	<0.1	<0.1	<0.1	100
	MW2-1	7.3	<0.1	<0.1	<0.1	50000
	MW2-2	33	<0.1	0.12	0.80	140
	MW2-3	41	<0.1	1.0	0.51	70
	MW2-4	110	<0.1	<0.1	1.4	9600
	MW2-5	31	<0.1	<0.1	<0.1	90
	MW2-6	66	<0.1	<0.1	<0.1	80
	MW3-1	18	<0.1	<0.1	<0.1	130
	MW3-2	10	<0.5	<0.5	<0.5	110
	MW3-3	24	<0.5	<0.5	<0.5	70
	MW3-4	19	<0.1	<0.1	<0.1	100
	MW3-5	9.3	<0.5	<0.5	<0.5	40
	MW3-6	17	<0.5	<0.5	<0.5	90

Susan R. Setzer
Assistant Laboratory Director

SRS:mln

Trace Analysis Laboratory, Inc.
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TAL

DATE: 10/10/86

LOG NO.: 4058

DATE SAMPLED: 9/23/86

DATE RECEIVED: 9/23/86

CUSTOMER: Exceltech Inc.

REQUESTER: Brad McCardell

PROJECT: No. 1467G, Owens Illinois

Sample Type	Sample	Volatile Hydrocarbons	Benzene	Toluene	Xylene	Oil and Grease
Water		mg/l	mg/l	mg/l	mg/l	mg/l
	MW1	<0.01	<0.01	<0.01	<0.01	25
	MW3	<0.01	< .01	< .01	< .01	18

Susan R. Setzer
Assistant Laboratory Director

SRS:mln

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TAL

DATE: 10/20/86

LOG NO.: 4079

DATE SAMPLED: 9/29/86

DATE RECEIVED: 10/1/86

CUSTOMER: Exceltech Inc.

REQUESTER: Chris Palmer

PROJECT: No. 1467-G

Sample Type	Sample	Volatile Hydrocarbons	Benzene	Toluene	Xylene	Extractable Hydrocarbons
Soil		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	MW4-1	<2.0	<0.1	<0.1	<0.1	<0.08
	MW4-2	<2.0	<0.1	<0.1	<0.1	<0.08
	MW4-3	<2.0	<0.1	<0.1	<0.1	<0.08
	MW5-2	<2.0	<0.1	<0.1	<0.1	<0.08
	MW5-3	110	<0.1	<0.1	<0.1	<0.08
	MW5-4	<2.0	<0.1	<0.1	<0.1	<0.08
	MW6-2	<2.0	<0.1	<0.1	<0.1	<0.08
	MW6-3	<2.0	<0.1	<0.1	<0.1	5.2
	MW6-4	<2.0	<0.1	<0.1	<0.1	<0.08
	MW7-1	<2.0	<0.1	<0.1	<0.1	<0.08
	MW7-2	<6.0	<0.1	<0.1	<0.1	<0.08
	MW7-3	120	<0.1	<0.1	0.45	11

Susan R. Setzer
Assistant Laboratory Director

SRS:mln

Trace Analysis Laboratory, Inc.
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DATE: 10/22/86

LOG NO.: 4096

DATE SAMPLED: 10/3/86

DATE RECEIVED: 10/7/86

CUSTOMER: Exceltech Inc.

REQUESTER: Chris Palmer

PROJECT: No. 1467G, Owens Illinois

Sample Type	Sample	Volatile Hydrocarbons	Benzene	Toluene	Xylene	Oil and Grease
Water		mg/l	mg/l	mg/l	mg/l	mg/l
	MW-4	0.02	< 0.005	< 0.005	< 0.005	7.2
	MW-5	1.4	< 0.005	< 0.005	0.0066	24
	MW-7	0.26	< 0.005	< 0.005	< 0.005	8.0

Susan R. Setzer
Assistant Laboratory Director

SRS:mln