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July 10, 2005

Barney M. Chan Hazardous Materials Specialist Alameda County Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-9335

# **RECEIVED**

By DEHLOPTOXIC at 9:37 am, Jul 05, 2006

Telephone: (510) 567-6765 FAX: (510) 337-9335

SUBJECT:

SUBSURFACE HYDROGEOLOGIC INVESTIGATION OF HYDROCARBONS AT THE

TOWATA PROPERTY LOCATED EAST OF THE FORMER BILL CHUN'S SERVICE

**STATION** 

(RE: 2301 SANTA CLARA AVENUE, ALAMEDA, CA 94501)

# **Dear Barney:**

Enclosed are the details of a subsurface hydrogeologic investigation for the Towata property located to the east of the former Bill Chun Service station investigation area. The Towata property was investigated, as required by Alameda County directives because the predominant groundwater gradient flow direction and gasoline constituent gradient trends have implied that the dissolved plume may be migrating from the previous investigation area towards the adjacent Towata Flower Shop building and the adjacent Green House located to the east of the Flower Shop. The results of this most recent investigation imply that gasoline contaminants may have emanated from the former Bill Chun Service station, either by groundwater gradient flow or via man-made conduits. Since this investigation was limited to the offsite distribution of gasoline constituents, assertions made which link offsite contaminants with onsite contaminants can only be considered conjecture at this time. The next groundwater monitoring event will combine the sampling of onsite, and off site, groundwater monitoring wells in order to better establish the concentration gradient trends between the two subsurface investigation areas.

Seven (7) groundwater monitoring were constructed, and the six (6) soil borings were excavated, during the first two weeks of May 2005. Three different types of drill rigs as well as hand augering had to be employed to accomplish this task due to heaving sands, limited access due to obstructions from buildings and underground utilities, and due to high pedestrian and automobile traffic generated by the numerous small businesses located in the path of the investigation area. The increase in the number of borings and wells over that which was originally proposed in the work plan was necessary to establish the limits of the gasoline constituents identified in the subsurface as feedback became available during the field investigation.

Sincerely,

Franklin J. Goldman

Certified Hydrogeologist No. 466

CERTIFIED HYDROGEOLOGIST

NO. 466

### **SUBSURFACE INVESTIGATION**

#### SITE LOCATION AND DESCRIPTION

The offsite investigation area is located in a commercial zone on the Island of Alameda. The site is bordered on the southeast by small businesses and to the south west by the former Bill Chun Service Station. Santa Clara Avenue borders the investigation area to the south, and an alley, which provides access to the investigation area, borders the site to the north.

#### WORK ACTIVITIES COMPLETED AND CHANGES TO THE WORKPLAN

Potential groundwater monitoring well locations were marked at the site in white paint prior to the commencement of drilling excavation activities. The soil boring locations were marked for Underground Service Alert which was contacted prior to drilling. Each soil boring location was screened with a magnetometer and was then hand augered to a depth of approximately five (5) feet bgs prior to excavation to avoid causing damage to underground piping and utility lines. Numerous underground utilities were exposed during hand augering activities so that the original borehole locations had to be moved to new locations. Due to limited access and heaving and caving sands, four different drilling methods were utilized to complete the borehole excavations.

Soil boring BA was originally excavated to 30 feet bgs with a 4 inch diameter soil stem auger with the Deep Rock DR10K drill rig to bypass caving sands. Later it was determined that it was possible to use the eight inch hollow stem, even with caving sands, and still obtain a representative hydropunch sample.

Soil boring BB was excavated to 23 feet bgs with an 8 inch diameter hollow-stem auger with the DR10 K drill rig. Sand was very dense at 21 ½ feet bgs.

Soil boring BC was excavated to 29 feet bgs with an 8 inch diameter hollow-stem auger with a the DR10 K drill rig. Wet caving sand hampered recovery and drilling below 25 feet bgs.

Soil boring BD was excavated to 25 feet bgs with an 8 inch diameter hollow-stem auger with the DR10 K drill rig. Sand appeared to be clean below 16 feet bgs.

Soil boring BE was excavated to 26 ½ feet bgs with an 8 inch diameter hollow-stem auger with the DR10 K drill rig after encountering a pipe in the 1<sup>st</sup> hole and brick and rubble in the second and third holes. The fourth hole was terminated at 26 ½ feet to assure proper well construction.

Soil boring BF was ultimately excavated to 15 feet bgs with a hand auger due to limited access. The portable limited access rig with an 8 inch hollow stem was originally employed, however, the auger encountered a pipe at a depth of six feet bgs. The hole continued with a hand auger to eight feet bgs and was abandoned due to caving sands. A second hole was hand augered which encountered a shallow gas line. Finally, a third hole was successfully hand augered to 15 feet bgs and a well was constructed.

Soil boring BG was installed to a depth inside the Green House to a depth of 20 feet bgs with the portable drill rig. A second concrete slab was encountered at a depth of two feet bgs. The hole originally was drilled to 24 feet bgs but was redrilled to 20 feet with a wooden plug due to heaving sands. An 8 inch diameter well was installed to 20 feet bgs. A Prepack screen was installed along with the sand pack to compensate for caving and heaving sands.

Soil Boring BH was excavated to 30 feet bgs with the 10K rig and a well was installed. Prepack screen was used along with the sand pack to accommodate caving sands.

Soil Boring BI was drilled with the limited access 8X8 drill rig to a depth of 21 feet bgs.

Soil borings BJ and BK were hand augered to 13 and 11 feet bgs due to limited access and were converted to wells with Prepack screen.

Soil Boring BL was drilled with the limited access 8X8 drill rig to a depth of 24 feet bgs and Prepack screen was installed. Soft soils at 25 feet made keeping a straight hole difficult.

Soil Boring BM was installed as a well to 30 feet bgs.

Originally, laboratory analyses were to be restricted to analysis of Gasoline Ranged Organics (GROs), BTEX, and lead scavengers only. After solvent type odors were identified in soil boring BF during the initial phase of the field investigation, additional laboratory analytical procedures were authorized by Alameda County Health to identify the unknown chemicals. Additional laboratory testing revealed the presence of oxygenates and also verified that chlorinated solvents were not present. During the field investigation, laboratory samples were submitted to the lab in three separate deliveries. The second and third delivery of laboratory samples included testing for oxygenates after the sample collected from boring BF revealed that oxygenates are present in the subsurface.

#### SOIL SAMPLING PROCEDURES FOR BORING & GROUNDWATER MONITORING WELL EXCAVATIONS

Seven (7) wells and six (6) soil borings were excavated and constructed by Clearheart Drilling, a C-57 drilling licensed driller. All borehole logging was performed by a State Certified Hydrogeologist who kept a detailed hydrostratigraphic log of each borehole, noting lithologic changes, hydrogeological characteristics, sample locations, and well construction. Soil sampling was performed where appropriate in order of identify significant changes in soil hydrostratigraphy and to provide a sufficient representation of the distribution of contaminants in the subsurface. The excavations were sampled by collecting soil with a split spoon sampler in brass sleeves and by Hydropunch where hydrocarbon contaminants were suspected.

Soil samples were collected with a two (2) inch inner diameter, three (3) foot long, split spoon sampler depending upon the soil stratigraphy and contaminants encountered. The soil samples were obtained by the compressive force of a 140 lb hammer dropped from a height of 18 inches. The soil samples were extruded into six (6)-inch long steel sample liners. Soil samples were chosen for lab analyses based upon obvious olfactory and visual evidence of contamination, by photoionization detector (PID) screening and/or at significant changes in hydrostratigraphic horizons. Soil and groundwater samples collected from hand auger borings were undisturbed and grab samples, respectively (See Table I for lab result trends & Appendix A for Laboratory Data Sheets).

Each soil sample collected was covered at each end of the metal cylinder with aluminum foil, plastic end caps, and sealed with duct tape to adhere the caps to the liners at each end, to hermetically seal the samples. The soil samples were labeled with a non-toxic ink field marker as to the depth and location the sample was collected, the sample number, and the project name and inserted into a plastic Zip-Lock bag and then placed into an ice chest for transport back to the laboratory. The chain-of-custody was similarly designated and included the date and time the sample was collected as well as the depth interval. Soil samples were analyzed for Gasoline Ranged Organic (GRO) and BTEX .

The sampler was decontaminated before and after each use by rinsing with an Alconox solution wash and fresh tap water rinse. All rinseate water, purge water, and soil waste were stored in 55 gallon DOT approved drums. The drums have been stored onsite until authorization for transport to legal point of disposal is made.

#### SOIL STRATIGRAPHY

Most of the soils encountered to a depth of 30 feet bgs were predominantly comprised of non-cohesive medium sands. The only exception was a clayey sand encountered between 5 ½ to 6 feet bgs in boring BG, 6 to 7 feet in boring BF, 5 ½ to 7 feet in boring BH, and 7 ½ to 9 feet in boring BL (See Appendix B for Soil Boring Logs). This is in contrast with the soils encountered at the subsurface investigation area located at the Former Bill Chun Service station, at 2301 Santa Clara Ave, which exhibited more fine grained soils such as clays, silts and finer grained sands.

#### **WELL CONSTRUCTION**

The wells were constructed with a 0.02 inch PVC schedule 40 slotted casing and schedule 40, 2 inch diameter PVC blank casing or a 0.01 inch Prepacked well screen where applicable. No. 212 silica sand pack was placed in the annular space between the screened casing and the open borehole to one to three feet above the top of the screen. Prepacked screen was used in most cases due to the caving and heaving sands encountered in every borehole. The non-cohesive sands hampered efforts to place PVC screen without bridging.

The bentonite seals were placed at thickness of one to three feet thick and were placed on top of the sand pack in the annular space. A Type II cement bentonite grout was then tremmied from the bottom up to within approximately 1 ½ foot from the top of the surface cover. A continuous concrete pour was then placed on top of the grout to the surface where it was finished with a 3 inch high concrete apron or flush concrete finish around a Boart Longyear well box and locking well cap (See Figure 1 for Well Construction Details).

## DISCRETE DEPTH WATER SAMPLING WITH HYDROPUNCH

Water samples were collected by hydropunch in order to provide vertical profiling as stipulated in the County approved workplan. The Hydropunch sampler was typically hammered one to four feet and then retracted one to three feet to expose the screen to allow formation water to enter the center of the exposed screen. A plastic disposable check valve bailor was then lowered down the center of the Hydropunch screen to capture the groundwater from the desired short screened interval. The bailor was lowered to the bottom and pulled to the surface to be decanted from the bottom of the bailor by temporarily unplugging the check valve until water flowed freely into the glass sample container. Water samples were contained in 40-milliliter VOA vials for GRO, BTEX, oxygenates, and lead scavenger analyses. The samples were labeled and stored on ice at 4 degrees centigrade until delivered, under chain-of-custody procedures, to a State-certified analytical laboratory.

A water level meter was used to measure the depth to groundwater in the groundwater monitoring wells and open soil borings. The measurements were read to the nearest 100th of an inch from the top of casing. The groundwater gradient flow direction was determined to be to the east at 0.014 ft/ft (See Figure 2 for Groundwater Gradient Flow and Direction & Appendix C for the Certified Well Survey). The land survey for the Towata Property, located at 2305-2311 Santa Clara Ave., has been tied into the groundwater monitoring well data points located at the Former Bill Chun Service Station site located at 2301 Santa Clara Ave. A survey of the building structures relative to the well data points was also performed in order to provide a reference between sensitive receptors and subsurface contamination.

## LAB RESULTS AND DATA EVALUATION

GRO and benzene contaminants were identified in soil and appear to be centered around the rear entrance of the Flower Shop where subsurface piping and old fill soils and construction debris were encountered which could serve as a conduit for the spread of contamination (See Map Figures 3, 4, 5, & 6). Dissolved GRO and Benzene

contaminants were identified in groundwater along the entire breadth of the investigation area and appear to be emanating from the west in the general direction of the former Bill Chun's Service Station (See Map Figures 7, 8, 9 & 10). TBA, MTBE, and 1,2, DCA were identified in several wells, however, no discernable pattern has emerged (See Map Figure 11). In addition, the water samples collected from the Hydropunch sampler cannot be considered to provide a representative distribution of these two oxygenates and one lead scavenger due to the sampling procedures. These contaminants may, however, provide corroborative evidence of dissolved constituent trends developed in the next groundwater monitoring event.

#### CONCLUSIONS

The results of this most recent offsite investigation imply that dissolved hydrocarbon contaminants may have migrated beneath the Flower Shop from the former Bill Chun Service station, either under the influence of the predominant groundwater gradient flow direction and/or along under ground man made conduits such as a sewer line. There is a sewer line which appears to run from the Chun garages to beneath the Flower Shop.

Since this investigation was limited to the offsite distribution of gasoline constituents, assertions made which link offsite contaminants with onsite contaminants can only be considered conjecture at this time. The next groundwater monitoring event will combine the sampling of onsite and off site wells in order to better establish the connection between the two investigation areas.

#### RECOMMENDATIONS

Perform sampling of all on and off site wells. Initiate indoor air sampling after the dissolved contaminant plumes have been established onsite and off site.

#### LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied, is made as to the professional advice presented herein. The analyses, conclusions and recommendations contained in this report are based upon site conditions as they existed at the time of the investigation and they are subject to change. The conclusions presented in this report are professional opinions based solely upon visual observations made within individual soil excavations and of the site and vicinity as well as on interpretations of available information as designated in this report. Franklin J. Goldman, maintains that the limited scope of services performed in the execution of this investigation may not be sufficient to satisfy the needs, and/or requirements of all regulatory agencies or other users. Any use or reuse of this document, its findings, its conclusions and/or recommendations presented herein, is done so at the sole risk of the said user.

Table 1
Indicator Hydrocarbons in Soil in ppm for Samples collected for Chun

Indicator riyo	ai ucai bulis	111 3011 111	ppm for samples coll	ected for Chair
Sample ID	Date Sampled	TPH(g) <sup>+</sup>	Benzene	1,2 DCA EDB
BA @ 10.5 - 11	05-02-05	1,900	8.2	<0.005 <0.005
BA @ 15.5 - 16	05-02-05	0.62	0.19	<0.005 <0.005
BA @ 20 - 20.5	05-02-05	8.1	0.62	<0.005 <0.005
BB @ 10.5 - 11	05-02-05	<0.5	<0.002	<0.005 <0.005
BB @ 15.5 - 16	05-02-05	<0.5	<0.002	<0.005 <0.005
BC @ 10.5 - 11	05-02-05	<0.5	<0.002	<0.005 <0.005
BD @ 10.5 - 11	05-02-05	<0.5	<0.002	<0.005 <0.005
BD @ 15.5 - 16	05-02-05	<0.5	<0.002	<0.005 <0.005
BD @ 20.5 - 21	05-03-05	<0.5	<0.002	<0.005 <0.005
BE @ 8 - 8.5	05-04-05	9,100	30	<1.0 <1.0
BE @ 10.5 - 11	05-04-05	520	4.1	<0.05 <0.05
BE @ 20 - 20.5	05-04-05	<0.5	0.0066	<0.005 <0.005

Sample ID	Date Sampled	DIPE	ETBE	MTBE	TAME	ТВА
C @ 15.5 - 16						

Sample ID	Date Sampled	TPH(g)+	Benzene
BF @ 5.5 - 6	05-09-05	<0.5	<0.002
BF @ 9 - 9.5	05-10-05	<0.5	<0.002
BF @ 11 - 11.5	05-10-05	<0.5	0.11
BG @ 5.5 - 6	05-10-05	<0.5	<0.002
BG @ 10 - 10.5	05-10-05	<0.5	<0.002
BG @ 15 - 15.5	05-10-05	<0.5	<0.002

Sample ID	Date Sampled	TPH(g) <sup>+</sup>	Benzene
BH @ 8 - 8.5	05-09-05	<0.5	<0.002
BH @ 12.5 - 13	05-10-05	<0.5	<0.002
BH @ 18 - 18.5	05-10-05	<0.5	<0.002
BH @ 26 - 26.5	05-10-05	<0.5	<0.002
BI @ 8 - 8.5	05-10-05	32	0.13
BI @ 13.5 - 14	05-10-05	<0.5	<0.002
BJ @ 8.5 - 9	05-10-05	<0.5	<0.002
BK @ 8.5 - 9	05-10-05	56	0.36
BL @ 8.5 - 9	05-10-05	<0.5	<0.002
BM @ 8.5 - 9	05-10-05	<0.5	<0.002

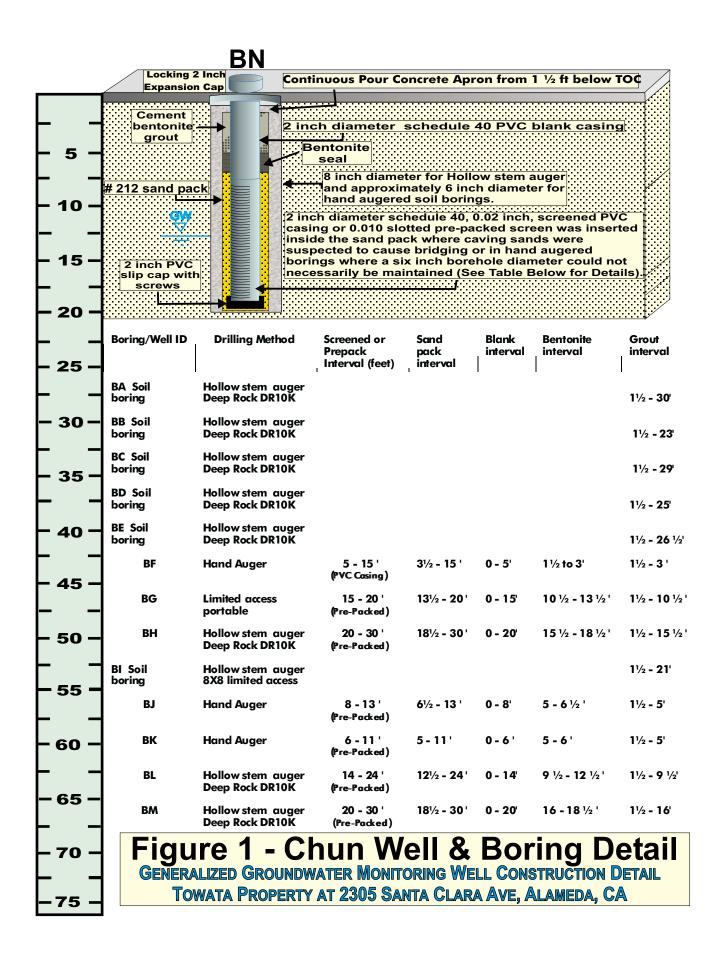
# Indicator Hydrocarbons in Groundwater Hydro Punch Samples (ppb) for Chun

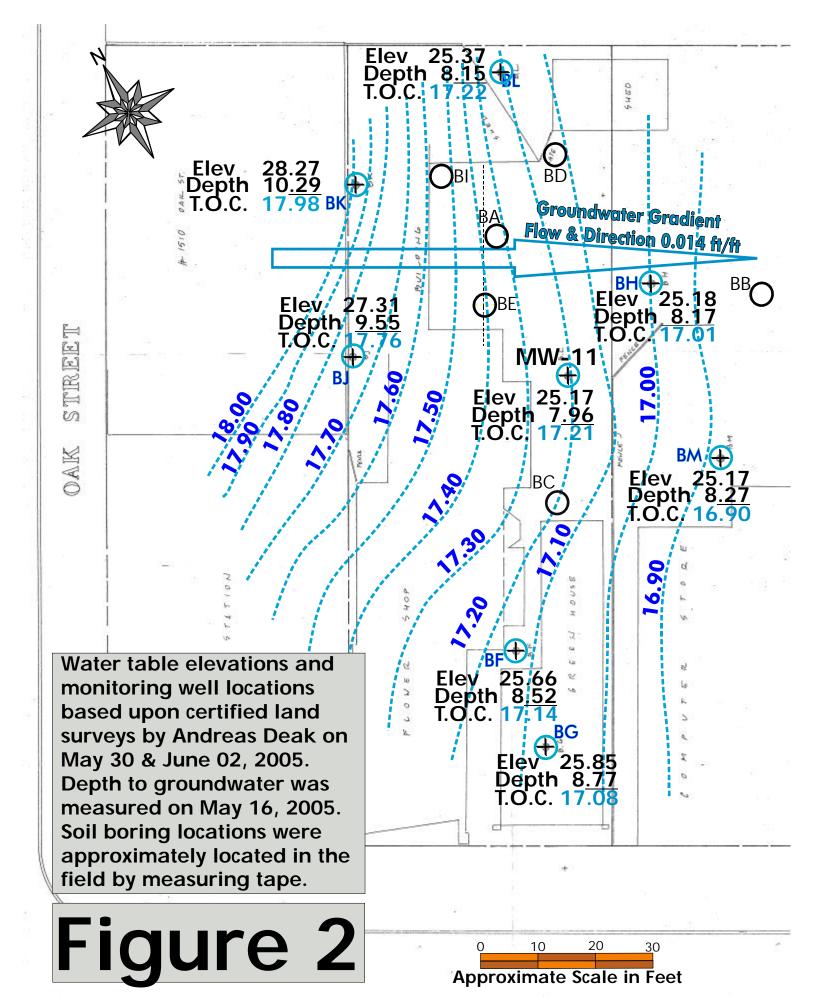
Sample ID	Date Sampled	TPH(g) <sup>+</sup>	Benzene	1,2 DCA EDB
BAHP @ 21 - 24	05-02-05	3,000	380	<5 <5
BAHP @ 27.5 - 30	05-02-05	28,000	950	<50 <50
BBHP @ 11.5 - 14.5	05-02-05	<100	<0.5	<5 <5
BBHP @ 22 - 23	05-02-05	<100	<0.5	<5 <5
BCHP @ 12.5 - 15	05-03-05	18,000	5,400	15 <0.5
BCHP @ 15.5 - 16	05-03-05	NA	130	15 <0.5
BCHP @ 22.5 - 25	05-03-05	120	39	1.6 <0.5
BDHP @ 13 - 15	05-03-05	<100	<0.5	<0.5 <0.5
BDHP @ 22.5 - 25	05-03-05	<100	<0.5	6.0 <0.5
BEHP @ 12.5 - 14.5	05-04-05	87,000	11,000	<50 <50
BEHP @ 23 - 25	05-04-05	1,700	390	4.6 <0.5

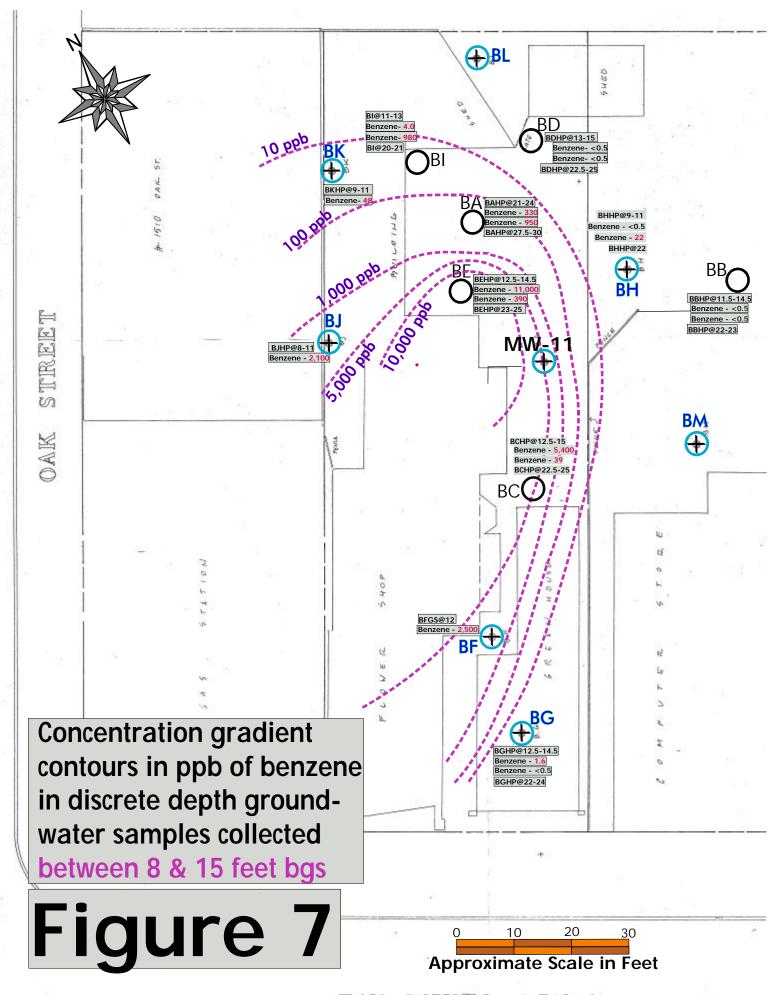
	Sample ID	Date Sampled	Napthalene	Styrene	MTBE	TBA
ВС	HP @ 21 - 24	05-03-05	210	4.7	6.5	170

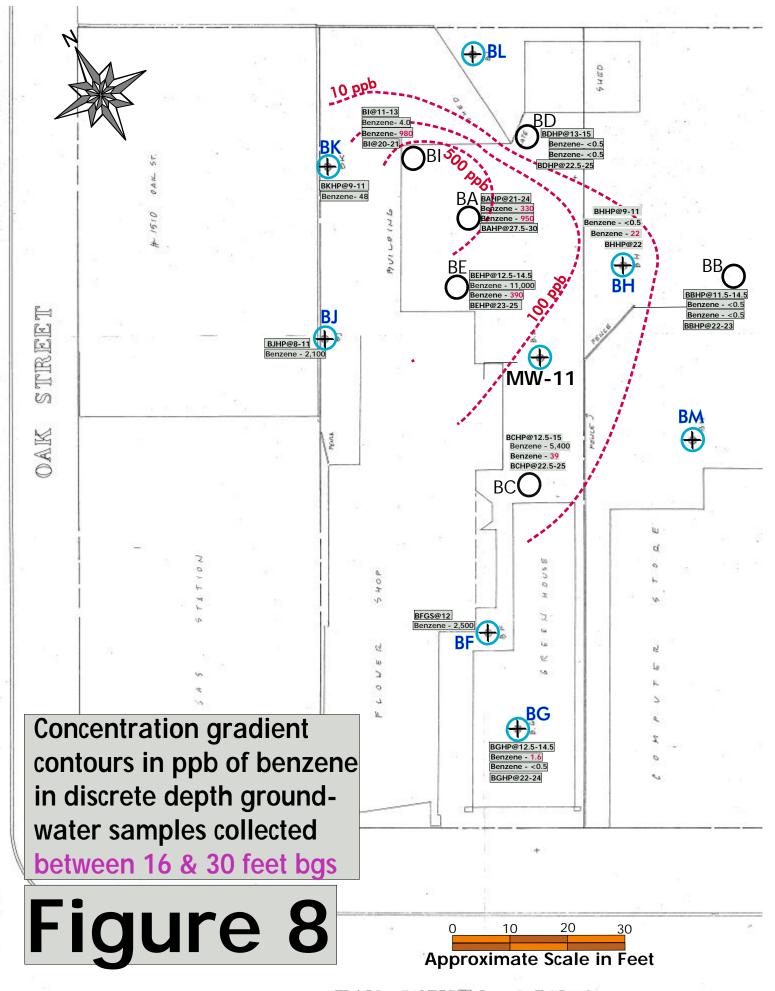
Sample ID	Date Sampled	TPH(g) <sup>+</sup>	Benzene	1,2 DCA EDB	MTBE	TBA
BFGS @ 12	05-10-05	4,600	2,500	<5 <5	<20 <20	<100 <100
BGHP @ 12.5 - 14.5	05-10-05	<100	1.6	<0.5 <0.5	<2 <2	<10 <10
BGHP @ 22 - 24	05-10-05	<100	<0.5	<0.5 <0.5	<2 <2	<10 <10

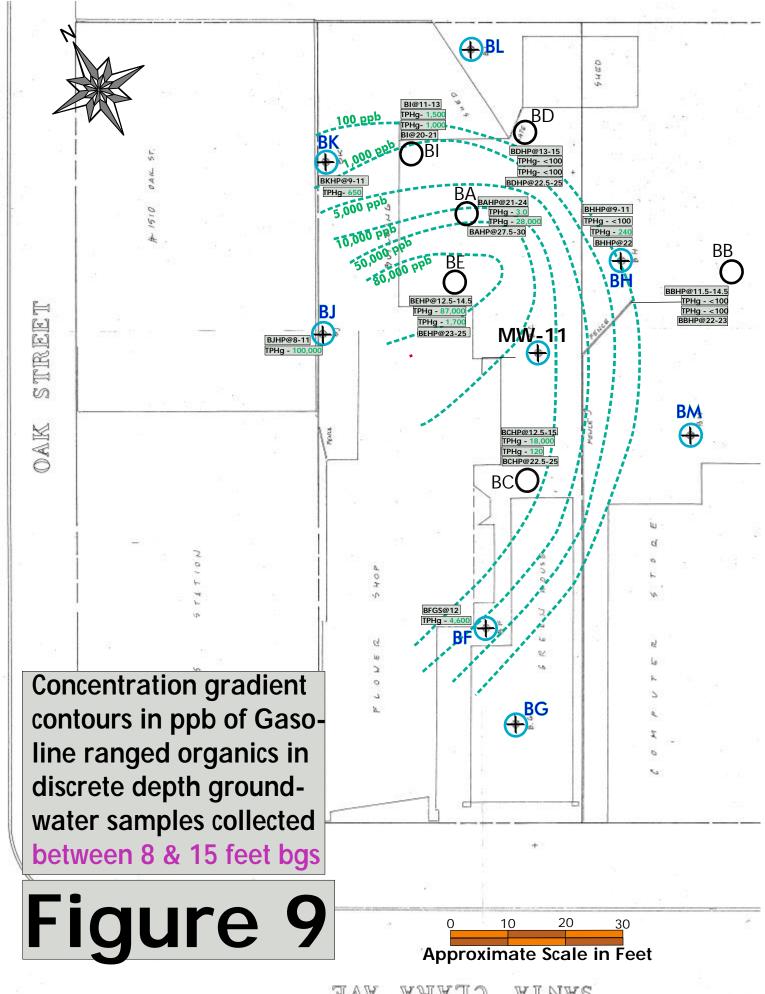
Sample ID	Date Sampled	TPH(g)+	Benzene	1,2 DCA EDB	MTBE	ТВА
BHHP @ 9 - 11	05-11-05	<100	<0.5	<0.5 <0.5	<2	<10
BHHP @ 22	05-11-05	240	22	8.4 <0.5	27	56
BI @ 11 - 13	05-12-05	1,500	4.0	<0.5 <0.5	<2	<10
BI @ 20 - 21	05-12-05	1,000	980	20 <0.5	94	110
BJHP @ 8 - 11	05-12-05	100,000	2,100	<50 <50	<200	<1,000
BKHP @ 9 - 11	05-12-05	650	48	<0.5 <0.5	<2	<10











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