BSK JOB No. P90103

REPORT
QUARTERLY GROUNDWATER SAMPLING
SAMPLING PERIOD NO. 4
FIRE STATION NO. 1
7494 DONOHUE DRIVE
DUBLIN, CALIFORNIA
JUNE 1991

BSK & Associates

BSK & Associates, Geotechnical Consultants, Inc

Geotechnical Engineering • Engineering Geology • Environmental Engineering • Engineering Laboratories • Chemical Laboratories

June 20, 1991

BSK JOB No. P90103

Dougherty Regional Fire Authority
9399 Fircrest Lane
San Ramon, California 94583

Attention: Mr. Tom Hathcox
Fire Marshal

SUBJECT: Quarterly Groundwater Sampling
Sampling Period No. 4
Fire Station No. 1
7494 Donohue Drive
Dublin, California

Gentlemen:

As requested and authorized, we have performed the fourth quarterly groundwater sampling of three groundwater monitoring wells at Fire Station No. 1, 7494 Donohue Drive, in Dublin, California.

The study site location with respect to surrounding geographical features is shown on Figure 1, Vicinity Map. The groundwater monitoring well locations, as well as the approximate layout of the former underground tank group, are shown also in Figure 1, Site Plan.

BACKGROUND

According to Fire Department authorities, three Underground Storage Tanks (USTs) containing gasoline and diesel were in use at the project site in the 1960's. The largest tank was 4,000 gallons in capacity and stored gasoline. The two smaller tanks were 550 gallons in capacity and stored diesel fuel and gasoline.

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[ ] Visalia, California 93291 • 808 E. Douglas Avenue • Telephone (209) 732-8857, Fax (209) 732-6570
[ ] Bakersfield, California 93304 • 117 "V" Street • Telephone (805) 327-0671, Fax (805) 324-4218
[X] Pleasanton, California 94566 * 5729 Fernandez Drive • Telephone (415) 462-4000, Fax (415) 462-6283
[ ] Sacramento, California 95829 • 9901 Horn Road, Suite C • Telephone (916) 363-1871, Fax (916) 363-1875
*1181 Quarry Lane, #300

In 1965 or 1966, the 550-gallon gasoline tank was observed to not maintain fuel levels, and was subsequently abandoned by grouting in place. The two remaining tanks were in use until 1989, when they were removed by Hageman-Shank, Inc. in November of that year. During removal, soils in the close vicinity of the previously abandoned tank were observed to be contaminated by petroleum product. Chemical tests revealed Total Petroleum Hydrocarbons (as gasoline) levels to 1500 parts per million.

Contaminated soil was removed from the tank excavation and aerated on-site, under a permit from the Bay Area Air Quality Management District (BAAQMD) and with the approval of the Alameda County Environmental Health Department (ACEH). Following adequate aeration of the soil pile, the excavated spoils were used as backfill in the UST group excavation, with approval by the ACEH.

In May and June of 1990, BSK & Associates installed three groundwater monitoring wells at the site, and performed soil and groundwater sampling and chemical analyses for contaminants derivative of gasoline and diesel fuel. The results of the BSK study, as well as a summation of previous work, were provided in BSK Report P90103, dated 27 June 1990. In that study, signifi- cant levels of soil contamination by Total Petroleum Hydrocarbons and Benzene were encountered. However, sampled groundwater did not reveal detectable contaminant concentrations. Since initial installation and testing, BSK has performed three quarterly groundwater samplings and testing (excluding the present sampling event) and found no detectable petroleum hydrocarbons in the water samples.

SITE LOCATION AND DESCRIPTION

The project site is the Dougherty Regional Fire Station No. 1, located at 7494 Donohue Drive in Dublin, California. The site is approximately one-third acre in size, and consists of a fire station building and paved parking area. The former tank group was located behind the fire truck garage, in the western portion of the site, as shown on Figure 1. The former tank excavation has been backfilled as described, and subsequently repaved with asphalt. A Convault-type above-ground tank is presently located at the former UST location.

The Fire Station property is fenced on the south, west, and north perimeters. It is bound to the east by Donohue Drive, to the north by an open, concrete-lined storm channel, to the west by an apartment complex, and to the south by a vacant lot and parking area. Surrounding neighborhoods are primarily residential, with extensive commercial development located one to two blocks to the south. The site area is located near the center of the San Ramon Valley, at a surface elevation of approximately 350 feet above mean sea-level. Topography slopes gently to the east-southeast at a gradient of approximately one and one-half percent.

GROUNDWATER SAMPLING

Groundwater Monitoring Wells MW-1, MW-2, and MW-3, were sampled on May 13, 1991. The field procedures utilized for sampling are presented below.

Each monitoring well was first measured for water depth using a Solinst electric sounding tape marked in twentieths of a foot. Measurements were made from the top of the well casing and extrapolated to 1/100 of a foot. The well water was then observed for floating and sinking immiscible layers, surface sheen and odor using a clear PVC bailer with a point-source ball-check arrangement. Following observation, each well was purged of four volumes of well water using a PVC bailer. At regular intervals during purge, a water sample was obtained and tested for pH, electrical conductivity, and temperature. These results were recorded for each sample for record of purge adequacy. Upon purge completion, each well was re-measured for depth to groundwater to assure a minimum of 80 percent well water level recovery, prior to sampling. Once recovery was assured, the wells were sampled for the subject contaminants using a teflon bailer with a point source ball-check arrangement. Following sample withdrawal, each well was then re-secured and sealed.

As described, a field log for each well was prepared containing depth to water data, measured parameters, sampling information, etc. The Well Field Logs are presented in Figures 2, 3, and 4 of this report.

Equipment used during sampling, purging and field analyses was thoroughly cleaned using a non-phosphate wash and rinse prior to each usage, in order to prevent cross-contamination between wells or with other project sites.

Purged and other effluent samples from each well, not utilized as test samples, were placed into DOT-approved 55-gallon drums for storage until sample analyses determined the condition of the water. Each drum was labeled as to the origin of its contents, suspected contaminants, owner and date of sampling event.

Each groundwater sample obtained was placed into the receptacle specified for the respective analysis, sealed, labeled and refrigerated for immediate delivery to our State-certified analytical laboratory.

HYDROLOGIC CONDITIONS

As stated previously, groundwater levels were measured prior to sampling on May 13, 1991. Groundwater was found to be at a depth of approximately 8 to 9 feet below grade. Precise groundwater measurements with respect to individual well-head elevations enabled a derivation of shallow groundwater flow direction and gradient. As shown on Figure 5, Groundwater Flow Direction And Gradient, flow direction was measured to be S82°E with a gradient of 0.8 percent. In comparison to the direction and gradient measured in March of 1991, flow has rotated to the south by approximately 5 degrees. Gradient has increased five-tenths of a percent. Depth to groundwater from the tops of the well casings has decreased 0.16 foot. The precise reason for flow direction change is unknown, but may be attributed to seasonal fluctuations in groundwater level and flow direction, or in response to a man-made alteration of the flow regime.

CHEMICAL ANALYSES

Water samples obtained from Wells MW-1, MW-2, and MW-3 were tested for the presence of Benzene, Toluene, Xylene and Ethylbenzene (BTXE), and Total Volatile Hydrocarbons (TVH) as gasoline.

A summation of the chemical analyses results is presented in the following tables. The Chemical Test Data Sheet is presented as Figure 6. The project Chain-of-Custody documentation is provided as Figure 7.

WATER ANALYSES

TABLE 1
(Results in PPB)

Sample Location Boring Number	Benzene (1.0*)	Toluene (100)+	Xylene (1750)*	Ethylbenzene (680)*
MW-1	ND	ND	ND	ND
MW-2	ND	ND	ND	ND
MW-3	ND	ND	ND	ND

ND - None Detected

+ - DHS Action Level

*DHS Primary Drinking Water Standard (3/89)

TABLE 2
(Results in PPB)

Sample Location Boring Number	TVH (100)*
MW-1	ND
MW-2	ND
MW-3	ND

ND - None Detected

*Quantified Action Levels are not provided for this parameter. The amount given is often informally used as a threshhold value.

CONCLUSIONS

As demonstrated by the preceding tables, groundwater does not currently appear to be affected by soils contaminated with the residual concentrations of hydrocarbons discovered during our initial study, or by other sources.

This sampling event represents the final sampling for the agreed upon period of one year of quarterly sampling. If continued sampling or other related action at this site is desired by regulatory agencies, we would appreciate the opportunity to provide further services. If planned construction at the site requires removal and/or replacement of existing monitoring wells, or removal of existing contaminated soil, we would appreciate the opportunity to provide these services as well.

REPORT DISTRIBUTION

Copies of this report should be submitted to the Alameda County Environmental Health District for their review. We are providing you with extra copies for this purpose. We understand that copies of this report will be forwarded by ACEH to the Regional Water Quality Control Board in Oakland for their review.

LIMITATIONS

The findings and conclusions presented in this report are based on field review and observations, and from the limited testing program described in this report. This report has been prepared in accordance with generally accepted methodologies and standards of practice in the area. No other warranties, expressed or implied, are made as to the findings, conclusions and recommendations included in the report.

The findings of this report are valid as of the present. The passage of time, natural processes or human intervention on the property or adjacent property can cause changed conditions which can invalidate the findings and conclusions presented in this report.

BSK & Associates is pleased to have been of service to you during this project. If you have questions concerning the contents of this report, please do not hesitate to contact us.

* * * *

The following figures are attached and complete this report:

FIGURE 1	Vicinity Map and Site Plan
FIGURES 2 - 4	Well Field Logs
FIGURE 5	Groundwater Flow Direction and Gradient

APPENDIX "A"

FIGURE A-1	Laboratory Chemical Test Data Sheets
FIGURE A-2	Project Chain-of-Custody Record

Respectfully submitted,

BSK & Associates

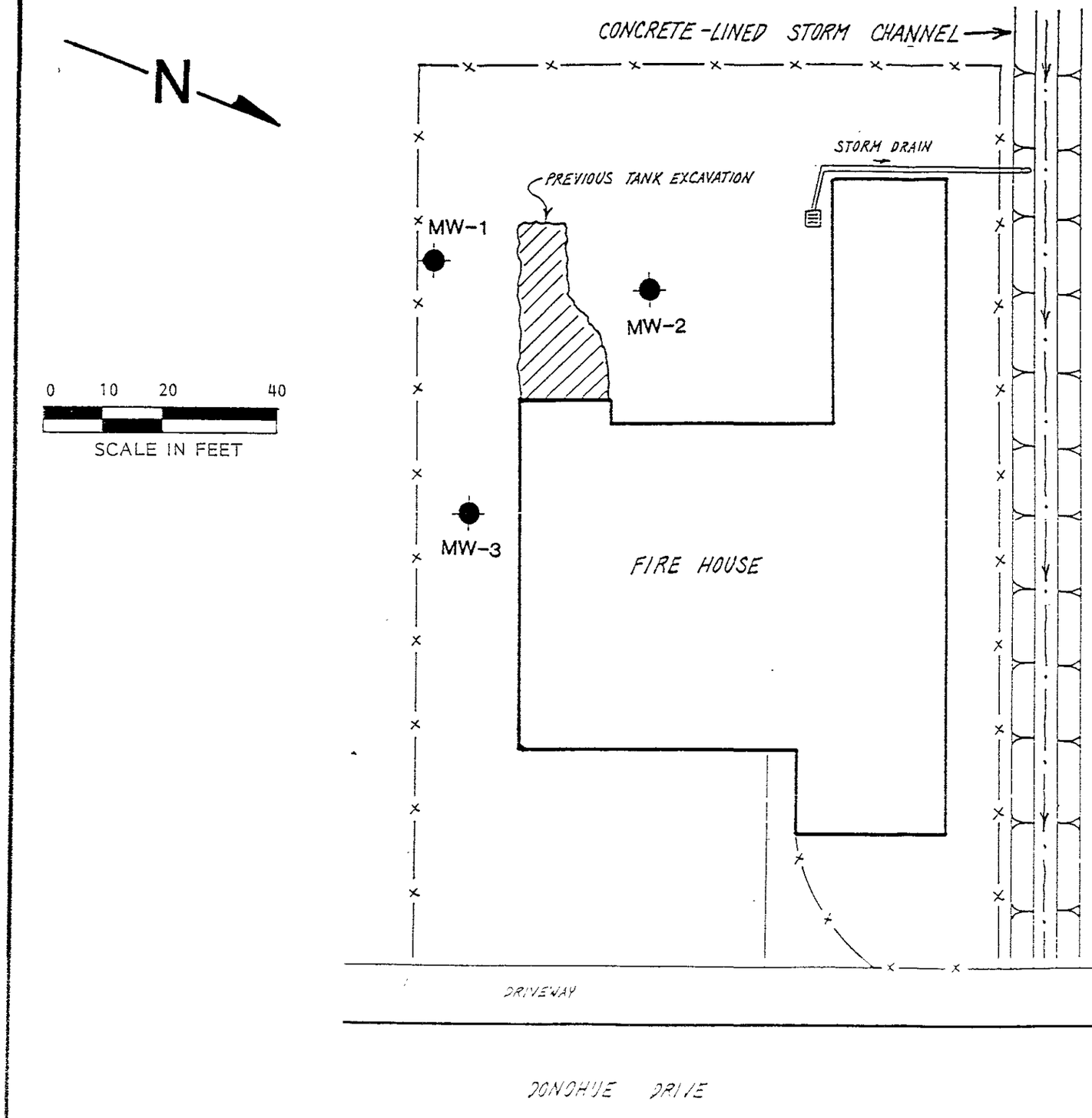
Alex Y. Eskandari, P.E.
Project Manager
C.E. 38101

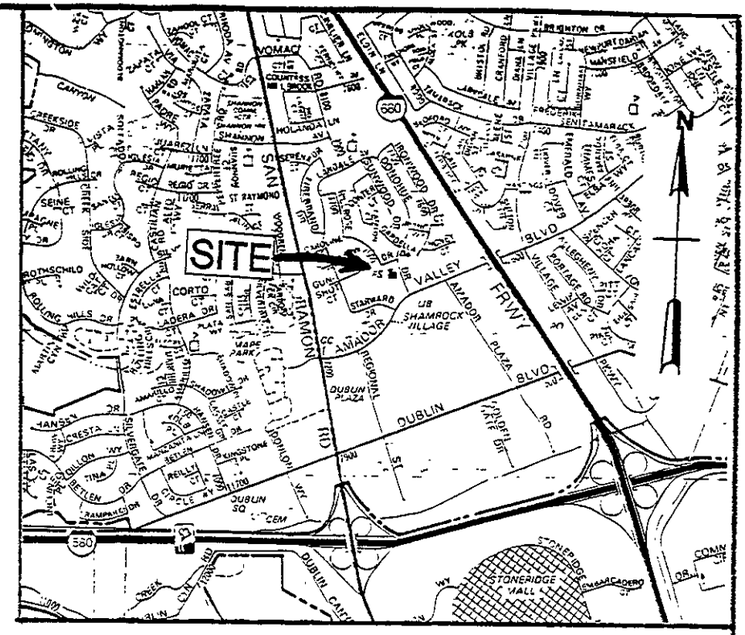
REGISTERED PROFESSIONAL ENGINEER
YAHYA ESKANDARI
No. C038101
Exp. 3/31/93
CIVIL
STATE OF CALIFORNIA

for Martin Cline
Staff Geologist

AYE/MC:hhc
(MISC3:J04)

Distribution:
Dougherty Regional Fire Authority (5 copies)





VICINITY MAP

LEGEND:

MW - Denotes Approximate Location of Monitoring Facilities installed on 5/16 and 5/17/90

Base By: Hageman-Schank, Inc., or not titled: "Site Map", Figure 2, undated

SITE PLAN

QUARTERLY GROUNDWATER SAMPLING
SAMPLING PERIOD NO. 4
FIRE STATION NO. 1
7494 DONOHUE DRIVE
DUBLIN, CALIFORNIA
JUNE 1991

BSK Job No. 290103
June 199.
FIGURE: 1

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Project No.: P90103
Date: June 1991
Figure No.: 2

WELL FIELD LOG

WELL DEVELOPMENT: ____ Date: ____
SAMPLE COLLECTION: X Date: 5/13/91

PROJECT NAME AND LOCATION: Fire Station No. 1,
Dublin, California

PERSONNEL: M. Cline
WEATHER: Cloudy

WELL INFORMATION:

Well No.: MW-1
Depth to Water: 8.91 feet
Well Depth: 29 feet
Water Volume: 3.3 gallons
Reference Elevation: 350.00
Groundwater Elevaton: 341.09
Measurement Technique: Electric well sounder

Date Purged: 05/13/91
Purge Method: PVC Bailer
Purge Begin: NA
End Purge: NA
Purge Rate: NA

IMMISCIBLE LAYERS:

Top: None observed, no odor
BOTTOM: 1' clay - colloids, no odor
Detection Method: Visual; olfactory
Collection Method: PVC bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	pH	TEMP. (F°)	COLOR/COMMENTS
13:27	3.5	2750	6.9	69.3	
13:32	7.0	2760	6.0	70.0	
13:37	10.5	2790	5.7	71.2	
13:42	14.0	2780	5.7	70.2	

SAMPLE COLLECTION DATA:

Sampling Equipment: Teflon point source bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
13:50	TVH & BTXE	240 ml. vials with HCL	10 feet

Field Observations: ____

BSK & Associates

Project No.: P90103
Date: June 1991
Figure No.: 3

WELL FIELD LOG

WELL DEVELOPMENT: ____ Date: ____
SAMPLE COLLECTION: X Date: 05/13/91

PROJECT NAME AND LOCATION: Fire Station No. 1
Dublin, California

PERSONNEL: M. Cline
WEATHER: Cloudy

WELL INFORMATION:

Well No.: MW-2
Depth to Water: 8.37 feet
Well Depth: 29 feet
Water Volume: 3.4 gallons
Reference Elevation: 349.54
Groundwater Elevaton: 341.17
Measurement Technique:

Date Purged: 05/13/91
Purge Method: PVC bailer
Purge Begin: NA
End Purge: NA
Purge Rate: NA

IMMISCIBLE LAYERS:

Top: None observed, no odor BOTTOM: 6" clay colloids, no odor
Detection Method: Visual; olfactory
Collection Method: PVC bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	pH	TEMP. (F°)	COLOR/COMMENTS
12:28	3.5	2670	7.2	69.2	
12:33	7.0	2750	6.2	71.1	
12:38	10.5	2790	6.0	71.7	
12:44	14.0	2770	5.9	70.4	

SAMPLE COLLECTION DATA:

Sampling Equipment: Teflon point source bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
12:55	TVH & BTXE	240 ml. Vials with HCL	10 feet

Field Observations:

BSK & Associates

Project No.: P90103
Date: June 1991
Figure No.: 4

WELL FIELD LOG

WELL DEVELOPMENT: ____ Date: ____
SAMPLE COLLECTION: X Date: 5/13/91

PROJECT NAME AND LOCATION: Fire Station No. 1
Dublin, California

PERSONNEL: M. Cline
WEATHER: Cloudy

WELL INFORMATION:

Well No.: MW-3
Depth to Water: 8.76 feet
Well Depth: 29 feet
Water Volume: 3.2 gallons
Reference Elevation: 349.60
Groundwater Elevaton: 340.84
Measurement Technique: Electric well sounder

Date Purged: 5/13/91
Purge Method: PVC bailer
Purge Begin: NA
End Purge: NA
Purge Rate: NA

IMMISCIBLE LAYERS:

Top: None observed, no odor BOTTOM: 1' clay - colloids, no odor
Detection Method: Visual; olfactory
Collection Method: PVC bailer

WELL DEVELOPMENT/PURGE DATA:

TIME	VOLUME REMOVED (gallons)	ELECTRICAL CONDUCTIVITY (Ec/Range)	pH	TEMP. (F°)	COLOR/COMMENTS
14:33	3.5	2940	6.9	74.9	
14:39	7.0	2910	5.8	75.1	
14:44	10.5	2900	5.7	74.5	
14:50	14.0	2870	5.6	75.1	
14:55	15.0	2860	5.6	74.0	

SAMPLE COLLECTION DATA:

Sampling Equipment: Teflon point source bailer

TIME	ANALYSIS	AMOUNT/CONTAINER USED	SAMPLE INTERVAL
15:00	TVH & BTXE	240 ml. Vials with HCL	10 feet

Field Observations: ____

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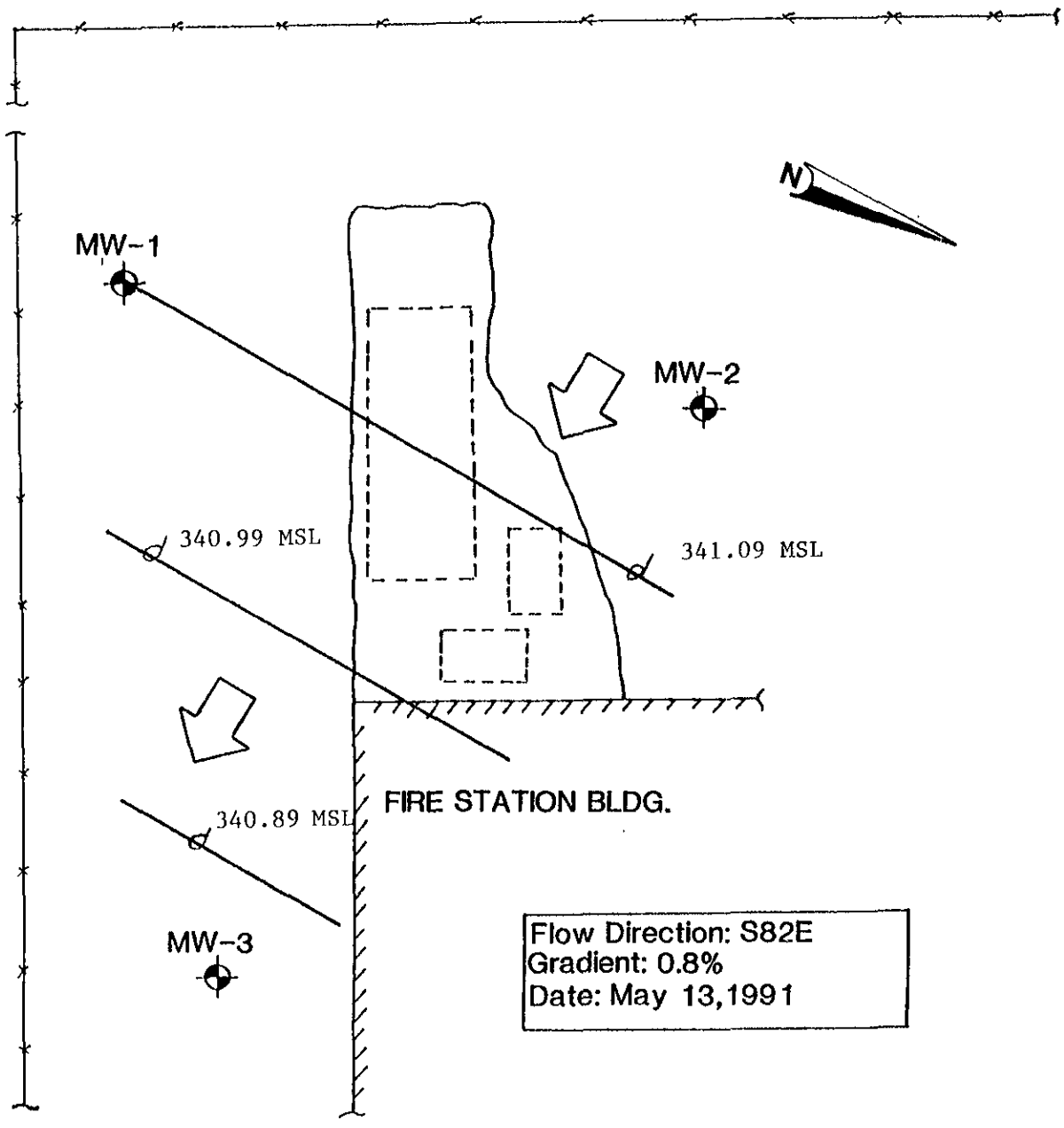

GROUNDWATER FLOW DIRECTION AND GRADIENT

LEGEND

- Approximate Location of Former Underground Storage Tanks
- Direction of Groundwater Flow
- Monitoring Well Location and Designation

340.89 MSL - Line of Equal Groundwater Elevation (Mean Sea Level)

BSK Job No. P90103
June 1991
FIGURE: 5

BSK & Associates

CHECKED BY _____

DATE _____

BY _____

APPENDIX "A"

BSK & ASSOCIATES' LABORATORY CHEMICAL TEST DATA

BSK & Associates

BSK Analytical Laboratories

1414 Stanislaus Street * Fresno, California 93706 * Telephone (209) 485-8310 * Fax (209) 485-6935

FIGURE: A-1

BSK-Pleasanton
Dublin Fire Station
P90103

Date Reported 05/24/91

Date Sampled 05/13/91

Date Received 05/14/91

Sample Type Liquid

Date Analyses Completed 05/21/91

Lab Number	Sample Description
Ch912320-1	1350 hrs. MW-1 #1
Ch912320-2	1255 hrs. MW-2 #1
Ch912320-3	1500 hrs. MW-3 #1

Water Analyses for BTXE and TVH

Results Reported in Micrograms per Liter (ug/L)

Compound	Lab # 2320-1	Lab # 2320-2	Lab # 2320-3	Detection Limit (DLR)
Benzene	ND	ND	ND	0.5
Toluene	ND	ND	ND	0.5
Ethylbenzene	ND	ND	ND	0.5
Total Xylene Isomers	ND	ND	ND	0.5
Total Volatile Hydrocarbons	ND	ND	ND	50.00

Method: BTXE-EPA 8020 TVH-EPA 8015M

ND: None Detected

DLR: Detection Limit For the Purposes of Reporting

Cynthia Pigman
QA/QC Supervisor

Michael Brechmann,
Organics Supervisor

BSK Log Number 2320

ANALYSIS REQUEST/CHAIN OF CUSTODY RECORD

1000-7955

Client Name: Dublin Fire Station	Project or P.O. #: 790103
Address: 1181 Quarry Ln.	Phone #: (415)462-4000
City, State, Zip: Pleasanton, CA	Report attention: Alex Eskandari

Lab Use Only in this section

Analysis required: TVH & BTXE; Hazardous sample / Special handling required

5-24-91

Date sampled	Time sampled	Type (See key below)	Sampled by: M. Cline — Sample description	Number of containers	Lab Sample number	Sample Seals (See key below)	TVH & BTXE	Remarks
5-13-91	13:50	L	MW-1 #1	2	-1	P	X	2x40ml
↓	12:55	L	MW-2 #1	2	-2	↓	X	↓
↓	15:00	L	MW-3 #1	2	-3	↓	X	

IMPORTANT NOTICE: No samples will be analyzed without an authorized signature in this section.

I am hereby requesting BSK's Normal Chain-of-Custody Procedures for the above samples. I understand that these procedures are generally consistent with those outlined in the U.S. E.P.A. SW 846 and that there is no extra charge for this service.

By: Marty Cli — Authorized Signature

I am hereby requesting BSK's Formal Chain-of-Custody Procedures for the above samples. I understand that these procedures are generally consistent with those outlined in U.S. EPA Contract Laboratory Program Statement of Work, Section F, and that there is a charge of $50.00 per work order or $5.00 a bottle, whichever is greater.

By: _____ Authorized Signature

Signature	Print Name	Company	Date	Time
Relinquished by: Marty Cli	Martin Cline	BSK Pleasanton	5-13-91	16:32
Received by: Carol Harris	C. Harris	BSK Lab	5/14/91	1550
Relinquished by				
Received by				
Relinquished by				
Received by				

BSK & Associates Chemical Laboratories

1414 Stanislaus Street Fresno, California 93706

Telephone (209) 485-8310 • Fax (209) 485-7427

KEY: Type: AQ–Aqueous SL–Sludge SO–Soil PE–Petroleum OT–Other
Seals: P–Present A–Absent B–Broken
DISTRIBUTION: WHITE, CANARY - LABORATORY PINK - ORIGINATOR
Note:
Samples are discarded 14 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

FIGURE: A-2