

ENVIRONMENTAL
PROTECTION

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**Well Survey, Conduit Study
and ASTM Tier 2 RBCA Analysis
New Genico Site
3927 E. 14th Street
Oakland, California**

VATC ASSOCIATES INC.

ENVIRONMENTAL, GEOTECHNICAL AND MATERIALS PROFESSIONALS

August 22 1997

Tommy A. Conner, Esq.
Law Offices of Tommy A. Conner
444 De Haro Street, Suite 121
San Francisco, CA 94107

Via Facsimile: (415) 621-3999


RE: Well Survey, Conduit Study and ASTM Tier 2 RBCA Analysis for
3927 East 14th Street, Oakland, California
ATC Project No. 61137.0004


Dear Mr. Conner:

ATC Associates Inc. (ATC) has completed the Well Survey, Conduit Study and Tier 2 Risk Based Corrective Action (RBCA) analysis for the New Genico site located at 3927 East 14th Street in Oakland, California. If you have any questions regarding this report please do not hesitate to contact the undersigned.

Sincerely,

ATC ASSOCIATES INC.


Dabra I. Sheldon
Senior Hydrogeologist
Project Manager


William G. Theyskens, CEG, CHG
Environmental/Geological Program Manager

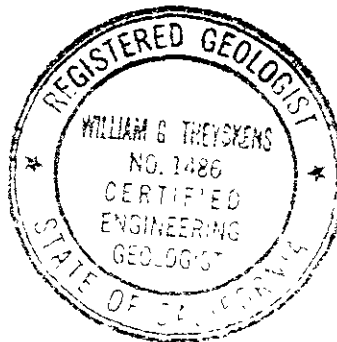


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1.0 INTRODUCTION

ATC Associates Inc. (ATC) is pleased to submit this report to present the results of a well survey, conduit study and an American Society of Testing and Materials (ASTM) standard Risk Based Corrective Action (RBCA) Tier 2 evaluation for the New Genico site (site), located at 3927 East 14th Street in Oakland, California. The location of the site is shown on Figure 1. The site plan is provided as Figure 2. The analysis is being performed in accordance with ATC's proposal number S97-0309, dated June 4, 1997. This RBCA analysis has been performed to assess the potential impact of contamination at the site and to support remedial actions that may be considered.

2.0 SITE BACKGROUND

2.1 Previous Investigations

One 550-gallon capacity underground storage tank (UST), reportedly used for the storage of waste oil, was located beneath the sidewalk in front of the New Genico facility on 40th Avenue, near the intersection of East 14th Street, in Oakland, California. The UST had reportedly been filled with concrete in about 1984. Two soil borings were drilled at the site in September, 1993 by John P. Cummings and Associates, and the results of this investigation were presented in a report dated September 30, 1993, entitled " Report on the Site Investigation, 3927 E. 14th Street, Oakland, California". The two borings, B-1 and B-2, were advanced at angles to depths of approximately 11 feet below ground surface (bgs). Soil samples were collected at depths of 4 and 7 feet bgs in each boring. Groundwater was not encountered in either boring. The soil samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg) and TPH as diesel (TPHd) in general accordance with Environmental Protection Agency (EPA) Method 8015; Total Oil and Grease (TOG) in general accordance with method 5520 D&F; benzene, toluene, ethylbenzene and total xylenes (BTEX compounds) in general accordance with EPA Method 8020; and the five heavy metals: Cadmium, Chromium, Lead, Nickel and Zinc using various methods. Benzene, TPHg and Halogenated Hydrocarbons were not detected in the soil samples. Five heavy metals, TPHg, TOG, toluene, ethylbenzene and total xylenes, were detected in the soil samples

Following this initial site work, an additional soil boring was advanced at the site and a groundwater monitoring well, HMW-1, was installed in the boring. The results of this investigation are presented in a report prepared by John P. Cummings and Associates.

Well Survey, Conduit Study and ASTM Tier 2 RBCA Evaluation
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dated July 4, 1994. TPHg, TPHd and TOG were detected in the groundwater sample collected from HMW-1.

At the request of the Alameda County Department of Environmental Health (ACDEH), an additional subsurface investigation was performed at the site in August, 1996. Additional data were requested by the ACDEH to evaluate whether the existing groundwater contamination detected at the site was originating at one or more sources. In response to this request, ATC conducted a soil and groundwater investigation that included the installation of three temporarily cased borings (TCBs). Soil and water samples were analyzed in the field to determine the location of monitoring wells. Two of these TCBs were converted into monitoring wells. Five soil samples from the borings were analyzed for TPHg and BTEX compounds.

In addition, the UST was removed from the ground during the soil and groundwater investigation. ATC observed the tank excavation and collected soil samples from around the excavation following tank removal. Five post-tank-removal soil samples were analyzed for TPHg, BTEX compounds and TPHd. One sample was collected from the bottom of the excavation following overexcavation and approximately 10 feet below ground surface (bgs). Four sidewall samples were collected at approximately 8 feet bgs.

Groundwater samples were collected from the TCBs and the monitoring wells and analysis of these samples indicated that TPHg and BTEX compounds were present. The investigation also suggested that the westerly extent of the benzene in groundwater is near well HMW-3. Benzene was reported at low concentrations in HMW-3 in August 1996, and has subsequently not been reported in this well.

A second, off-site, source of groundwater contamination is believed to be originating at the property across 40th Avenue from the site: Motor Partners, located at 1234 40th Avenue. Figure 2 shows the location of Motor Partners in relation to the site and shows the locations of the monitoring wells associated with the investigation of the groundwater plume originating at this adjacent property. Benzene concentrations detected in groundwater samples collected from the New Genico and Motor Partners' wells in May, 1997 are summarized below.

Well Survey, Conduit Study and ASTM Tier 2 RBCA Evaluation
 New Genico Site
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Well I.D.	Site	Benzene (ug/L)
HMW-1	New Genico	1100
HMW-2	New Genico	170
HMW-3	New Genico	Not detected
MW-1	Motor Partners	110
MW-2	Motor Partners	Not detected
MW-3	Motor Partners	140
MW-4	Motor Partners	5.6
		Note: concentrations given in micrograms per liter (ug/L).

These data suggest that the groundwater plumes from the New Genico site and the Motor Partners site have commingled. Furthermore, these data indicate that the New Genico site source area (HMW-1) has the highest concentrations (1,100 ug/L) of benzene and the concentration decreases rapidly in the downgradient direction, as indicated by the benzene concentration (5.6 ug/L) in MW-4 located about 15 feet downgradient of MW-1. In addition, benzene concentrations in samples from MW-3, located about 45 feet downgradient of MW-4, contain significantly higher concentrations (140 ug/L) of benzene. This pattern has been consistent since the initiation of sampling at the Motor Partners site, and this data further suggests that elevated benzene concentrations in samples from MW-3 are not attributable to the release at the New Genico site.

3.0 OBJECTIVES

The objectives of this study were to perform a conduit study to analyze the potential for the dissolved groundwater plume entering the subsurface utility backfill beneath 40th Avenue and conduct an ASTM Tier 2 RBCA evaluation in order to assist in determining the potential risk the site poses to potential on- and off-site receptors. The results of these evaluations will be used to determine viable corrective action alternatives.

4.0 CONDUIT STUDY

Design plans of subsurface sewer lines in the vicinity of the site were obtained from the Oakland Engineering Department (OED). It was considered a possibility that some component of the dissolved groundwater plume may be entering the permeable backfill around the subsurface utilities beneath 40th Avenue. In order to evaluate the possibility of groundwater entering the backfill around the sanitary and storm sewers, plans available at the OED were reviewed.

A representation of the sewer lines, adapted from a OED plan, is provided on Figure 3. As shown on Figure 3, the sanitary sewer line originates in front of the site beneath 40th Avenue and is designed to slope toward the southwest. Water levels measured beneath the site indicate that the water table is generally about 7 to 8 feet below ground surface (bgs) (ATC, June, 1997). Plans showing the elevations of the utilities beneath 40th Avenue in the vicinity of the site were not identified. However, it is ATC's experience that storm sewer and sanitary sewer lines are generally installed between about five and ten feet bgs. These data suggest that historically, the storm and sanitary sewer lines may have been in the saturated zone. Due to the southerly flow of groundwater in the vicinity of the site and the location of the sewer lines with respect to the site, it is likely that the groundwater plume originating at the site is entering the backfill for the sewer lines during periods of high groundwater.

To further investigate the possibility that the utility trenches were a preferential pathway for dissolved constituents in groundwater existing beneath 40th Avenue, ATC interviewed Oakland municipal workers. The maintenance division of the Oakland Department of Public Works (DPW) reported no evidence of sewer malfunction or petroleum hydrocarbon odor in the area of 40th Avenue. Because the sewer lines historically have reportedly worked properly, the Oakland DPW does not perform regular preventative maintenance of the sewer lines in the vicinity of the site. Furthermore, if a request is made, the DPW will come out to the site and open the sewer mains for screening for petroleum hydrocarbons.

5.0 ASTM TIER 2 RBCA EVALUATION

The ASTM standard RBCA Tier 2 evaluation was performed following Standard E 1739-95 and the Tier 2 Guidance Manual for Risk Based Corrective Action published by Groundwater Services, Inc. (GSI) of Houston, Texas.

5.1 Exposure Pathway Evaluation

Evaluation of the exposure pathways is the first step in the RBCA analysis. There are four steps used to determine which exposure pathways are valid for the site. These steps are described below.

5.1.1 Secondary Sources

The first step is to identify the sources of contamination. The primary source of the contamination at the site is the former UST. There are five potential secondary sources that must be evaluated when performing a RBCA analysis:

- affected surface soils;
- affected subsurface soils;
- dissolved groundwater plume;
- free-phase liquid plume, and
- affected surface soils, sediments or surface water.

Three of these five secondary sources are not present at the site, as described below.

- Surface soils (less than 3 feet below ground surface) were not collected and analyzed at the site; however, based on the mechanism of the release, it is not likely that surface soils would be affected.
- Evidence of free phase liquid was not reportedly observed during the subsurface investigation and the quarterly groundwater monitoring performed at the site. Free phase liquid is not considered a secondary source.
- Sediments and surface water are not present on site, or in the vicinity of the site, and therefore, are not considered secondary sources.

Subsurface soils, defined as soils at a depth greater than 3 feet below ground surface, are affected primarily at the location of the water table in the vicinity of the former UST. The results of excavation sampling performed after the removal of the UST suggests that the presence of residual soil contamination can be considered a secondary source.

The elevation of water levels measured in the on-site and off-site monitoring wells indicates that shallow groundwater flow in the vicinity of the site is toward the south. Assuming that biodegradation, adsorption, dispersion, and molecular diffusion are negligible, the dissolved Total Petroleum Hydrocarbons as gasoline (TPHg), and BTEX constituents, would be migrating in a southerly direction dissolved in the groundwater. Quarterly sampling and analyses indicate that dissolved concentrations of TPHg and BTEX constituents in groundwater have been generally constant since monitoring began in August, 1996.

Based upon the above discussion, surface soils, free-phase liquids, and sediments and surface water are not secondary sources at the site. Subsurface soils and the dissolved groundwater plume are the two secondary sources evaluated.

5.1.2 Transport Mechanisms

The second step in analyzing exposure pathways is to identify possible transport mechanisms. The potential transport mechanisms associated with affected subsurface soils and a dissolved groundwater plume are:

- volatilization and atmospheric dispersion;
- volatilization and enclosed space accumulation, and
- leaching and groundwater transport.

Volatilization and accumulation of BTEX constituents in the on-site building and buildings in the vicinity of the site is a potential transport mechanism. In addition, volatilization from the groundwater and atmospheric dispersion is considered a transport mechanism. The third transport mechanism is leaching from the affected soil to groundwater and the subsequent transport of the constituents in groundwater. All three of these transport mechanisms are viable at the site.

5.1.3 Exposure Pathway

Two potential exposure pathways are possible for the site:

- potable use of groundwater, and
- inhalation of vapor.

Direct exposure pathways occur when there is not a media transfer between the secondary source and the point of exposure. Drinking-affected groundwater is a potential direct exposure pathway. The inhalation of vapor volatilizing from the groundwater plume and/or the subsurface soil is a potential indirect exposure pathway.

To assess the likelihood that groundwater in the vicinity of the site is being used and/or will be used for potable water, personnel from ATC requested a Well Inventory Report from the Alameda County Public Works Agency. The request included all monitoring and production wells, active, inactive, destroyed and cathodic protection wells within a one-half mile radius of the site. Results of this survey indicate that there are numerous groundwater monitoring wells, and several groundwater extraction and treatment wells, within a one-half mile radius of the site. Three irrigation wells were located within one-

half mile of the site. One was identified about 3/8-mile west-northwest of the site in a hydraulically cross-gradient direction. The second irrigation well was identified about 3/8-mile southwest of the site in a hydraulically cross-gradient direction. The third irrigation well was located about 3/8-mile north-northwest of the site in a hydraulically upgradient direction. Existing or decommissioned drinking water wells were not located within a one-half mile radius of the site. This suggests that groundwater in the vicinity of the site is not presently being used for drinking water. In addition, the large number of groundwater monitoring and extraction wells in the vicinity of the site indicates that groundwater quality in the vicinity of the site has been adversely impacted by human use. It is, therefore, highly unlikely that groundwater in the vicinity of the site would be used in the foreseeable future for potable water. The use of groundwater as potable water is, therefore, not considered a pathway and is not evaluated.

Therefore, only indirect exposure pathways are evaluated. The inhalation of vapor volatilized from the groundwater plume, and the inhalation of vapor volatilized from the subsurface soils at the site are potential exposure pathways that are evaluated.

The next step in evaluating complete exposure pathways is identifying potential on-site and off-site receptors.

5.1.4 Potential Receptors

In order to assess potential receptors, ATC personnel performed a reconnaissance of the area surrounding the site, on August 7, 1997. The site, and the area to the northwest of the site, are non-residential. The area southeast of the site is residential. Residential property exists adjacent to the site and adjacent to the Motor Partners site across 40th Avenue. Sensitive habitats, such as wetlands, were not observed during the reconnaissance. The potential receptors are on-site occupants of non-residential structures and off-site occupants of residential structures.

6.0 RBCA MODEL

Using the RBCA Tier 1 and 2 software (version 1.01) developed by GSI in cooperation with the ASTM committee, the RBCA analyses were performed. The Tier 1 analysis was performed initially. The Tier 1 analysis involves comparing the concentrations of the constituents of concern to generic Risk-Based Screening Levels (RBSLs) to determine whether further evaluation is required. RBSL values are calculated using standard exposure equations and reasonable maximum exposure estimates stipulated in Environmental Protection Agency (EPA) guidelines. The RBSLs are designed to be conservative; and, if they are not exceeded, remedial action is not indicated. If RBSLs

are exceeded, then a Tier 2 analysis is typically performed. The Tier 2 analysis involves calculating individual Site Specific Target Levels (SSTLs) for each of the COCs. The SSTLs are allowable levels of constituents that can remain in the secondary source and not result in an exceedance of the target risk level for the constituent. The software uses simple analytical models in conjunction with additional site data to calculate Tier 2 SSTLs in a manner consistent with the ASTM standard.

6.1 RBCA Tier 1 Analysis

6.1.1 Constituents of Concern

According to the ASTM standard, TPH is not to be modeled when performing a RBCA evaluation. The following Constituents of Concern (COC) were therefore identified for the site:

- benzene;
- ethylbenzene;
- toluene, and
- total xylenes.

An initial RBCA Tier 1 analysis was performed using the complete exposure pathways described. Source area soil and groundwater concentrations were used as representative concentrations. Concentrations of the groundwater sample collected from HMW-1 during the most recent groundwater sampling event (May, 1997) were used for the representative groundwater concentrations. These concentrations are:

- 1,100 ug/L benzene;
- 290 ug/L ethylbenzene;
- 100 ug/L toluene, and
- 340 ug/L total xylenes.

ok.

The average concentration of the soil samples collected from the walls and bottom of the excavation made during removal of the UST in August 1996 was used for the representative subsurface soil concentration. These concentrations are:

- 0.22 milligrams per kilogram (mg/Kg) benzene;
- 0.92 mg/Kg ethylbenzene;
- 1.9 mg/Kg toluene, and
- 10 mg/Kg total xylenes

ok.

#2 550-0-10'
BTEX S &
.16 .62 1.7 4.1 4.0 1.5
differs from 9/19/96
results for
Tank Pit 10'

6.1.2 Tier 1 Analysis Results

RBSLs calculated using the Tier 1 analysis are shown below in comparison to the representative subsurface soil and groundwater concentrations.

*Commercial soil vol. to outdoor using
 EPA SF (.029) @ 10⁻⁶
 S/B*

SS soil to bld^{com} 10⁻⁴ is 0.49, 10⁻⁵ is 0.05 ppm

Compound	Soil RBSL (mg/Kg)	Representative Soil Conc. (mg/Kg)
benzene	0.43 ← 0.13	0.22
ethylbenzene	>res	1.9
toluene	510	0.92
total xylenes	>res	1.0

note: >res indicates RBSL is greater than constituent residual saturation value

As shown in the above table, RBSLs for benzene, toluene, ethylbenzene and total xylenes for soil are not exceeded by the representative concentrations of the COCs. This indicates that no further action would be required for subsurface soil contamination.

GW vap intrusion to bld^{com} 10⁻⁵ is .21

Compound	Groundwater RBSL (mg/L)	Representative Groundwater Conc. (mg/L)
benzene	0.081 S/B .023	1.2
ethylbenzene	>sol	0.17
toluene	93	0.53
total xylenes	>sol	0.49

note: >sol indicates RBSL is greater than constituent solubility

10⁻⁶ atm. GW vap intrusion to bld using SF (.029)

As shown in the above table, groundwater RBSLs for toluene, ethylbenzene and total xylenes are not exceeded by the representative concentrations. However, the RBSL for benzene is exceeded by benzene's representative concentration. Therefore, a Tier 2 RBCA analysis of the effect of benzene dissolved in groundwater on the identified receptors was performed.

6.2 RBCA Tier 2 Analysis

6.2.1 Constituents of Concern

Because much of the site is underlain by groundwater not affected by the release from the UST, a representative concentration of benzene was calculated using an area-weighted average method. The area of the site was taken to be the portion of the property, 14,000 square feet, occupied by New Genico. The New Genico property fronts on 40th Avenue and extends from 40th Avenue to 39th Avenue. An area-weighted average concentration

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factors in the percentage of the site that is underlain by the variable concentrations of constituents dissolved in groundwater. The most recent analytical results (May, 1997) were used. Concentrations of benzene dissolved in groundwater beneath the site were contoured. Much of the site is not underlain by the dissolved plume. In order to have conservative concentrations, the sample from HMW-3 that contained non-detectable concentrations of benzene was taken to contain a benzene concentration equivalent to one-half its detection limit. The weighted average of benzene beneath the site was estimated to be 0.25 mg/L.

I don't see how this was done.

Using this concentration, the indoor and outdoor air pathways were evaluated. Default parameters were used for the model input with the exception of the following site-specific data:

- depth to water table = 8 feet;
- enclosed space volume / infiltration area = 1143 centimeters, and
- aerial fraction of cracks in the foundation = 286 square feet.

The enclosed space volume is the volume of air within the building. The infiltration area is the area the building occupies which is the theoretical area where vapors could infiltrate into the building.

6.2.2 Model Output

need to see GSI printout.

Under Tier 2, the groundwater SSTL for benzene was determined. The results are presented below in comparison to the representative benzene concentration.

Compound	SSTL (mg/L)	Representative Concentration (mg/L)
benzene	0.19	0.25

As shown on the above table, the representative concentration is above the SSTL for benzene.

7.0 CONCLUSIONS

Based on the information presented in this report, current regulatory guidelines, and the judgment of ATC, the following conclusions are presented:

- Based on the hydraulic gradient on-site, as interpreted from historic groundwater level measurements, groundwater flows in a southerly direction in the immediate vicinity of the site.
- Benzene concentrations in groundwater decrease rapidly downgradient of the source area. Concentrations in the latest groundwater sampling round decrease from 1,100 ug/L in HMW-1 (located at the source) to 5.6 ug/L in MW-4, located 15 feet downgradient of the source. This indicates that the New Genico site is not contributing significantly to the benzene plume beneath 40th Avenue and suggests that the elevated concentrations observed in MW-3 and HMW-2, located further downgradient, are from a second off-site source.
- Based on benzene concentrations, the site would not be considered a low risk groundwater case as described in the RWQCB memorandum which discusses low risk groundwater cases.
- The area-weighted average of residual concentrations of benzene in groundwater at the site is above the calculated SSTL for the indirect exposure pathway of volatilization from impacted groundwater to indoor air; however, the magnitude of the exceedance of the concentration above the SSTL is small.
- Considering the current building usage, which involves the use of a variety of petroleum products and volatile organic compounds, and the fact that the bay door located proximate to the former UST location has been observed to generally be open during the building's occupancy, air monitoring for benzene to establish the potential for contribution of benzene to indoor air from volatilization from impacted groundwater, is not feasible and is not warranted.
- Benzene in groundwater, originating from the former New Genico UST area, is apparently localized. Concentrations in benzene become elevated further downgradient of the former UST location, suggesting an alternate source.
- There is currently insufficient data to assess the potential risk to off-site occupants of residential structures, however it appears that such risks, if they exist, would not be

the result of the migration of benzene-impacted groundwater from the New Genico site.

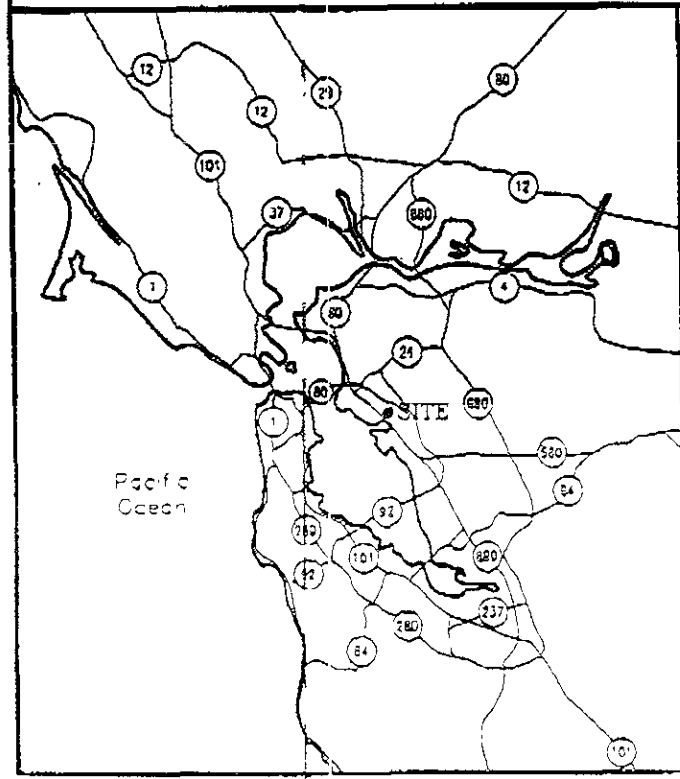
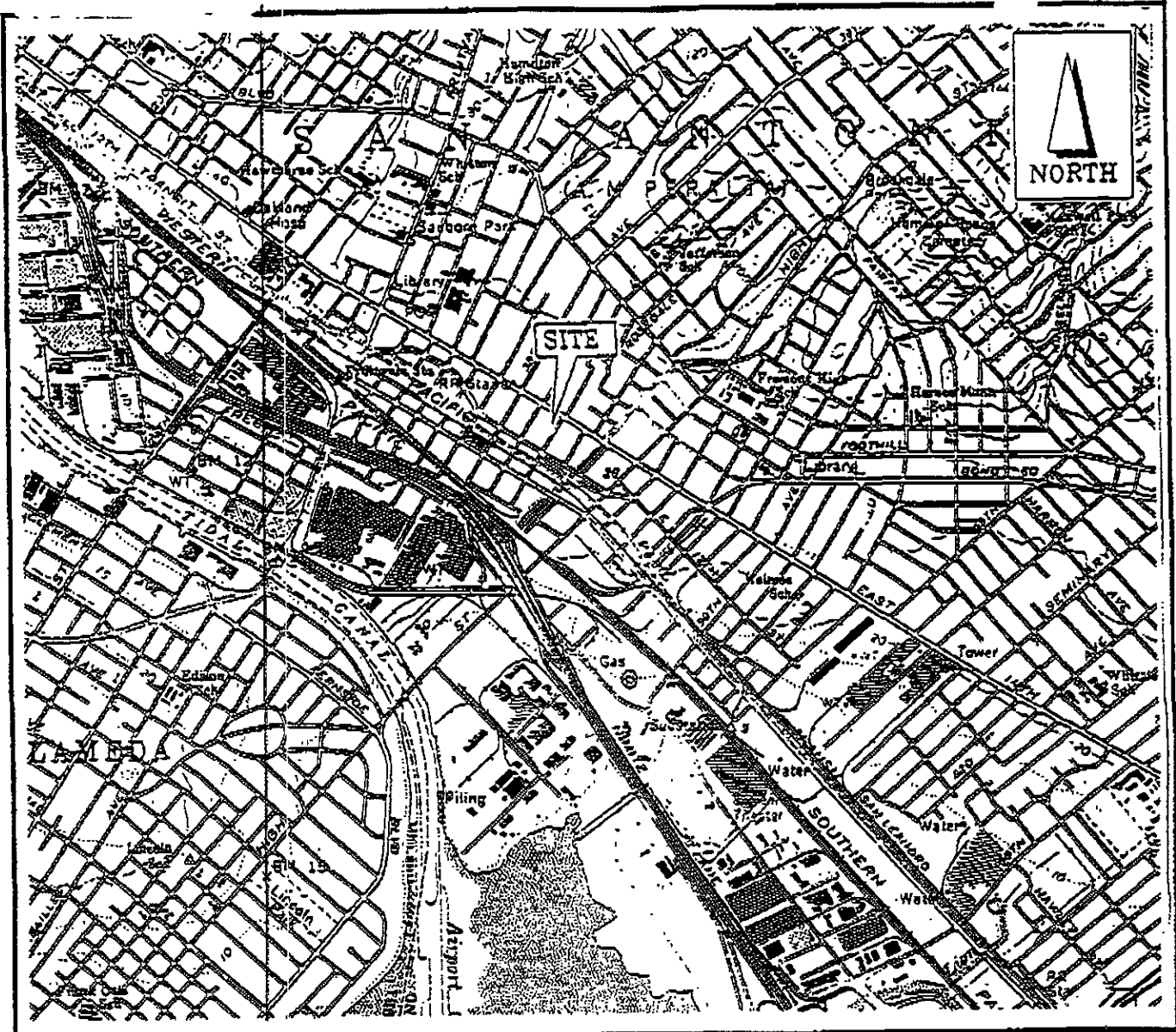
8.0 RECOMMENDATIONS

Based on the data and conclusions presented in this report, and the judgment by ATC, the following recommendations are presented for your consideration:

- Implementation of interim remedial measures proximate to the former New Genico UST location should be performed.
- Further characterization of the plume of benzene-impacted groundwater should be performed as required by ACDEH.
- Continue quarterly groundwater monitoring as required by the ACDEH and the RWQCB.

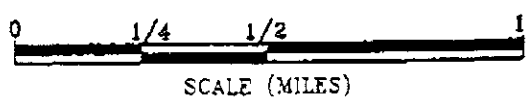
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New Genico Site
3927 East 14th Street
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Figure 1 - Site Location Map



Notes:

- 1) All locations and dimensions are approximate.
- 2) Base map from USGS Oakland East (1961) Quadrangle, 7.5 Minute Series Topographic. Photorevised in 1980.



ATC ASSOCIATES INC.
 Environmental, Geotechnical and Materials Professionals

SITE LOCATION MAP
 3927 E. 14TH STREET
 OAKLAND, CALIFORNIA

PROJECT NO. 61137.0004 | FIGURE 1

Well Survey, Conduit Study and ASTM Tier 2 RBCA Evaluation
New Genico Site
3927 East 14th Street
Oakland, California

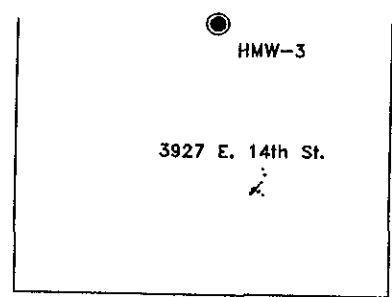
Figure 2 - Site Plan



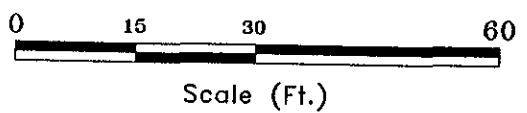
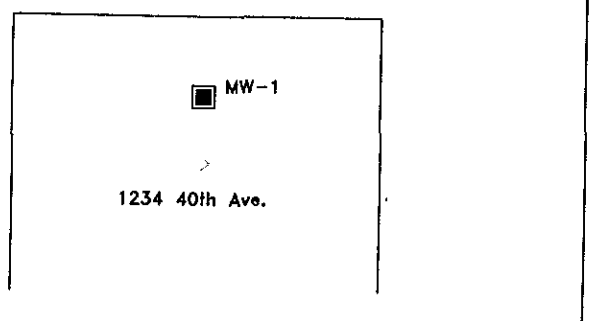
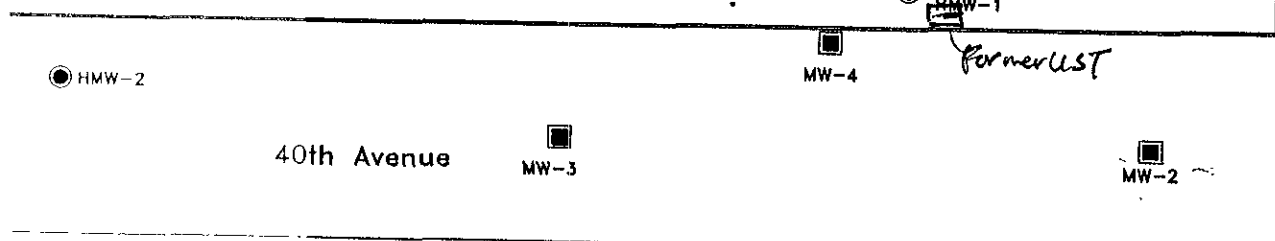
gradients

Residential



Residential



East 14th Street



EXPLANATION

-  Groundwater Monitoring Well
HMW-3 (3927 E. 14th St.)
-  Groundwater Monitoring Well
MW-1 (1234 40th Ave.)

Notes:

1. Base Map developed from survey map provided by Kier & Wright

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SITE VICINITY MAP
3927 E. 14th Street
Oakland, California

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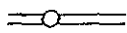

Figure 2

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Figure 3 - Utility Locations

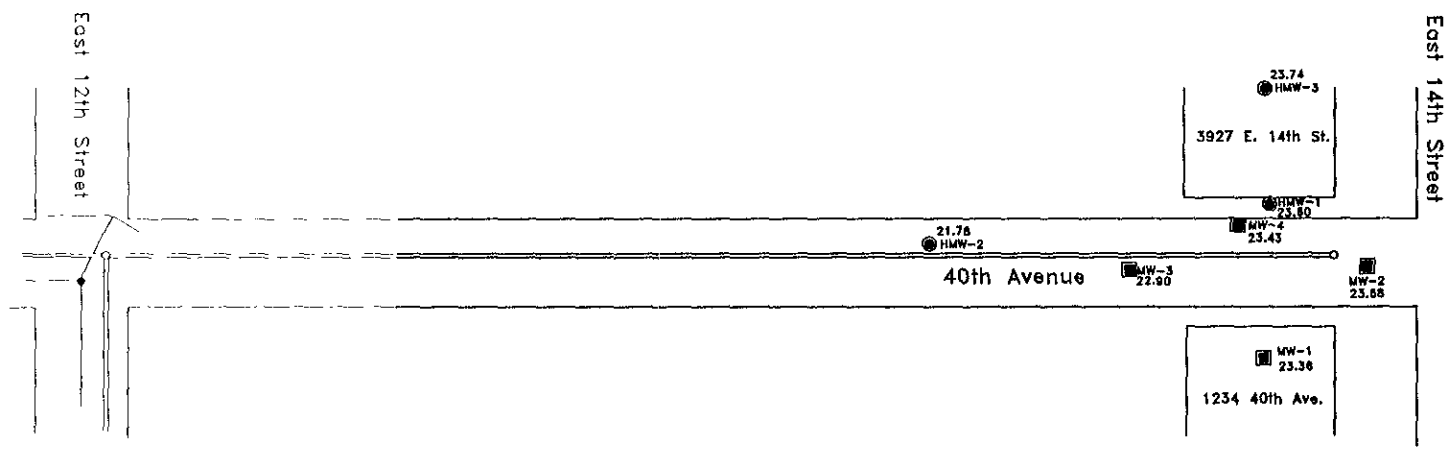
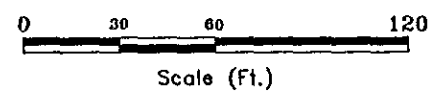


EXPLANATION

- 
 Groundwater elevation
(28 May 1997)
- 
 23.74
 Groundwater Monitoring Well
 HMW-3 (3927 E. 14th St.)
- 
 Groundwater Monitoring Well
 (1234 40th Ave.)
 MW-1
- 
 Sanitary sewer location
- 
 Storm sewer location

Notes:

1. Base Map developed from survey map provided by Kler & Wright.
2. Locations of sanitary and storm sewers obtained from Oakland Engineering Department.



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STORM AND SANITARY SEWER LOCATIONS
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Project No. 61137.0004 Figure 3