Weiss Associates Environmental and Geologic Services

5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: **510-450-6000**

STID 1111

August 4, 1997

97 AUG -6 AM 9:02
ENVIRONMENTAL PROTECTION

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

RE: Addendum to RBCA Evaluation
Former New Century Beverage Company
1150 Park Avenue, Emeryville, CA
WA Job # 14-0307-98

Dear Ms. Hugo:

This transmittal is submitted in response to your April 29 and May 13, 1997 letters that recommend case closure regarding the release associated with two fuel underground storage tanks removed from the subject site. On behalf of New Century Beverage, our intention with this transmittal and its attachments is to address items 1 through 12 of your April 29 letter, and to reiterate our December 9, 1996 request for case closure for the subject site. As such, this response represents an addendum to the December 9, 1996 Risk-Based Corrective Action (RBCA) Evaluation for the subject site, as requested in your clarification letter of May 13. For reference, copies of both your letters are included in Attachment A. Item by item responses to your questions are included below, and supporting information is attached. The item numbers below refer to the numbered comments in your April 29 letter.

Item 1, regarding ground water migration. WA agrees that the ground water plume is not expanding and may be characterized as stable. As requested, Attachment B includes a trend analysis examining benzene/TPH concentrations with time and distance for wells MW-5, MW-12, and MW-13.

Item 2, regarding the construction scenario. Attachment C includes revised Tables 2 and 3 from Dec 1996 RBCA Evaluation - Future Construction Scenario, Comparison of BETX and PAH concentrations to Tier 1 Risk Based Screening Levels, Former New Century Beverage Facility, Emeryville California. A revised Table 9, Proposed Cleanup Goals, is also included reflecting these changes. The soil ingestion rate has been revised to reflect a soil ingestion rate of 480 mg/day. Direct dermal contact and inhalation due to direct exposure with ground water have been added as potentially complete exposure pathways. Attachment E shows the RBSL calculations. The definition of surface soil has been extended to include samples up to 5 feet below ground surface, as requested in your May 13, 1997 letter. These changes do not result in any exceedances of calculated RBSLs for the relevant pathways.

Item 3, regarding evaluation of the off-site residential exposure pathway. Attachment D includes revised pages vi and 10, revisions to other affected pages, and revised Table 8, to clarify the evaluation of off-site residential exposure via the ground water pathway.

Item 4, regarding inclusion of hypothetical benzo(a)pyrene (BaP) concentrations in diesel contaminated soil. As requested, BaP has been assumed present in surface soil at the former dispenser location at a concentration equivalent to 0.07 mg BaP/kg diesel. This location was assumed to have 22,000 mg/kg diesel to calculate the corresponding hypothetical BaP concentration. The result is an assumed BaP concentration of 0.0015 mg/kg. Attachment E shows RBSL calculations for BaP. Attachment C includes the revised tables comparing the hypothetical BaP concentration to the RBSLs using the California Cancer slope factors (OEHHA, 1994) for both the construction and future commercial/industrial scenarios. In neither scenario does the hypothetical BaP concentration exceed the calculated RBSLs.

Item 5, regarding the Tier 2 evaluation for the indoor air pathway. WA agrees that the adaptation of the Jury model employed in the RBCA is in fact different than the Johnson and Ettinger model used to develop the Tier 1 RBSLs. Tier 2 specifically allows the use of more sophisticated modeling techniques, designed to reduce the conservatism built into the Tier 1 RBSLs. The model used here was taken from Sanders and Stern (*Calculation of Soil Cleanup Criteria for Carcinogenic Volatile Organic Compounds as Controlled by the Soil-to-Indoor Air Exposure Pathway*, Environmental Technology and Chemistry, Vol. 13 No. 8,1994). The natural attentuation half-lives were conservatively selected to represent worst case values from the data available in the literature. For the natural attentuation half-life of benzene in ground water, ASTM E-1739-95 RBCA Guidance Table X3.2 cites four specific sources for degradation rates. The cited values for benzene half-life in the saturated zone range from seven days to 99 days. ASTM also reports the range of values found in Howard, et. al. (Handbook of Environmental Degradation Rates, Lewis Publishers Inc, 1991) of 10 to 730 days for benzene half-life in the saturated zone. WA conservatively selected 730 days for this analysis. The regression analysis in response #1 supports this selection. For benzene half-life in the unsaturated zone, Howard 1991 appears to be the most commonly referenced work. The range of values reported there for benzene half-life in soil is five days to 16 days. Sanders and Stern used the 16-day value in their analysis. Of the data WA has reviewed, the 16-day half-life is the highest reported, with other data indicating the benzene half-life in soil to be as low as 4.5 hours in surface soils. Appendix E of the Dec 1996 RBCA shows the SSTL calculation, and used a 91-day half-life rather than the 365-day value misreported in the text. Based on the available data, a 91-day half-life for benzene in soil appears very conservative.

Attachment E provides a revised calculation of the SSTL for benzene in the soil to indoor air pathway, applying the extremely conservative half-life for benzene in the unsaturated zone (soil) of 365 days and adjusting the fraction organic carbon in the soil to 0.02, the California default value (PEA Guidance, CAL-EPA Guidance 1994). For completeness, Attachment E also includes the soil to outdoor air calculations. Site-specific half-lives for benzene in soil cannot be calculated as inadequate data are available. Instead, WA selected conservative values from the available literature, as is common practice in Tier 2 evaluations. For completeness and consistency, Attachment E includes the ground water to indoor air SSTL calculation also using the 0.02 foc California default value.

Item 6, regarding evaluation of the sub slab sampling analytic results with respect to RBSLs.

WA would like to reiterate that the subslab sampling conducted in 1996 is outside the scope of the Remedial Action Plan and is not related in any way to the open case regarding the former fuel tanks at the site. Therefore, we feel that these results are not salient to a decision on case closure by the ACHCSA. Further, these results have already been submitted to you at your request, in a transmittal dated April 22, 1997, and have been discussed with you in detail in earlier meetings regarding the subject site. Nonetheless, Attachment F includes the relevant TPH and BTEX results from the subslab sampling, and a comparison of the worst-case results to the relevant RBSLs or SSTLs established in the RBCA. As shown in Attachment F, no polynuclear aromatic hydrocarbons (PNAs) were detected in the soil samples collected and analyzed from the vicinity of the former diesel UST. Additionally, no BTEX compounds were detected at concentrations exceeding the relevant RBSLs or SSTLs established in the RBCA.

Item 7, regarding other chemicals of potential concern unrelated to the former USTs. As above, we note that the sub-slab sampling conducted in 1996 is outside the scope of the current open fuel tank case at the subject site. Again, these results have already been provided to you. Nonetheless, Attachment F includes the relevant data and a comparison of the maximum detected concentrations with the USEPA Region IX Second Half 1996 Commercial/Industrial PRGs. The PRGs presented reflect a 10^{-5} maximum individual excess cancer risk or a 1.0 Hazard Index, consistent with the RBSLs/SSTLs for BETX and PAH compounds in the RBCA evaluation. A comparison of the metals and VOCs detected in shallow soil samples shows that no metals or VOCs were detected at concentrations exceeding their respective PRGs.

Item 8, regarding natural attenuation at the site. The data included in Attachment B demonstrate that contaminant concentrations within the ground water plume are decreasing, strongly indicating that natural attenuation is occurring in the ground water beneath the site. The collection of additional field data to support a further evaluation of natural attenuation for the subject site is neither feasible nor warranted at this point in the closure process. We note, however, that the calculation of the Tier 2 SSTL for benzene in ground water for the off-site residential receptor does in fact represent a site-specific value. Appendix E of the Dec 1996 RBCA includes the site-specific SSTL calculations for ground water, generated using a site-specific dilution/attenuation factor (DAF) that reflects site-specific concentration and distance data from wells MW-5, MW-13, and MW-8.

Item 9, regarding site-specific cleanup criteria. No response necessary.

Item 10, regarding cumulative risk and hazard index. No response necessary. WA notes, however, that the ASTM RBCA process has no provision for evaluation of cumulative risk or cumulative hazard index.

Item 11, regarding Table 9 cleanup goals. As discussed above, the SSTLs developed for the off-site residential scenario already reflect site-specific dilution/attenuation of contaminants in the ground water plume. The SSTLs developed for the soil and ground water to indoor air pathways reflect conservative estimates of benzene decay (or half-life) in the subsurface. Site-specific data is not available to calculate site-specific decay rates for soil, nor does such a calculation appear necessary since the site "passes" at Tier 2 using the conservative values taken from the literature.

Item 12, regarding preparation of a Risk Management Plan. The requested Risk Management Plan is included under separate cover with this transmittal. It includes all the elements specified in

your April 29 letter, with the exception of the requested site development map. Since NCB is not the owner of the subject property, and is no longer the lessee of the former Del Monte parking lot property, NCB has no knowledge of or control over future development plans for the subject site. Therefore, NCB cannot supply the requested site development map. Further, NCB has no control over the implementation of the Risk Management Plan during development or future use of the site.

With this transmittal, WA and NCB believes we have satisfied your conditions for granting case closure at this site. At this time, we reiterate our request for case closure, and hope that ACHCSA will proceed to review this submittal with all due speed and reconsider this closure request. Thank you in advance for your prompt attention to this matter. If you have any questions regarding this submittal, please contact either Jim Ponton or me at (510) 450-6000.

Sincerely,
Weiss Associates

Carolyn J. Atwood, REA
Senior Project Engineer

James D. Ponton, R.G.
Project Geologist

Enclosed: Risk Management Plan, Former New Century Beverage Facility, 1150 Park Ave. Emeryville California

Attachments:

Attachment A:	ACHCSA letters dated April 29 and May 13, 1997
Attachment B:	Ground water trend analysis, Former New Century Beverage Facility, Emeryville California
Attachment C:	Revised Tables 2, 3, 4 and 5 from Dec 1996 RBCA Evaluation - Future Construction Scenario, Comparison of BETX and PAH concentrations to Tier 1 Risk Based Screening Levels, Former New Century Beverage Facility, Emeryville California. Revised Table 9 - Proposed Cleanup Goals, Former New Century Beverage Facility, Emeryville California
Attachment D:	Revised pages vi and 10, Table 8 from the Dec 1996 RBCA evaluation
Attachment E:	Revised Appendix D, RBSL Supporting Calculations Including BaP Revised Appendix E, Soil to Indoor Air SSTL Revised Appendix E, Ground Water to Indoor Air SSTL
Attachment F:	TPH, BTEX, and other COC Results from the June 1996 Subslab Sampling, Former New Century Beverage Facility, Emeryville California, and Comparison of Subslab and Initial Investigation Soil Sampling Results Case Concentrations with Relevant RBSLs, SSTLs, or USEPA Region IX Second Half 1996 PRGs

cc: Paul Morici, Pepsi-Cola Corporation
Jerry Tidwell, Pepsi-Cola Corporation
Burton Fohrman/Paul Milmed, White & Case
Raymond Plock, Raymond Plock and Associates
Mark Zemelman, Kaiser Foundation
Indrajit Obeysekere, Esq., Kaiser Foundation
Kevin Graves, RWQCB

JDP:dl

Weiss Associates *Environmental Science, Engineering and Management*

5500 Shellmound Street, Emeryville, CA 94608-2411 *FAX: 510-547-5043 Phone: 510-450-6000*

TRANSMITTAL

TO:	Medulah Logan	**DATE:**	November 7, 1997
COMPANY:	ACHCSA	**PROJECT #:**	14-0307-98
FROM:	Carolyn Atwood, 510-450-6175	**PHONE:** **FAX:**	510-567-6700 510-337-9335

ENCLOSED PLEASE FIND: Requested information RE August 4, 1997 submittal

VIA:	**FAX:**	**AS:**	**FOR:**
☐ Fax	# of pages: _____ (including this cover)	☐ Per our phone call	☐ Your information
☐ 1st Class Mail	☐ Hard Copy to follow	☐ You requested	☐ Return to you
☐ Overnight Delivery		☐ Is required	☐ Your action
☐ UPS (Surface)		☐ We believe you may be interested	☐ Your review & comments
☐ Courier			

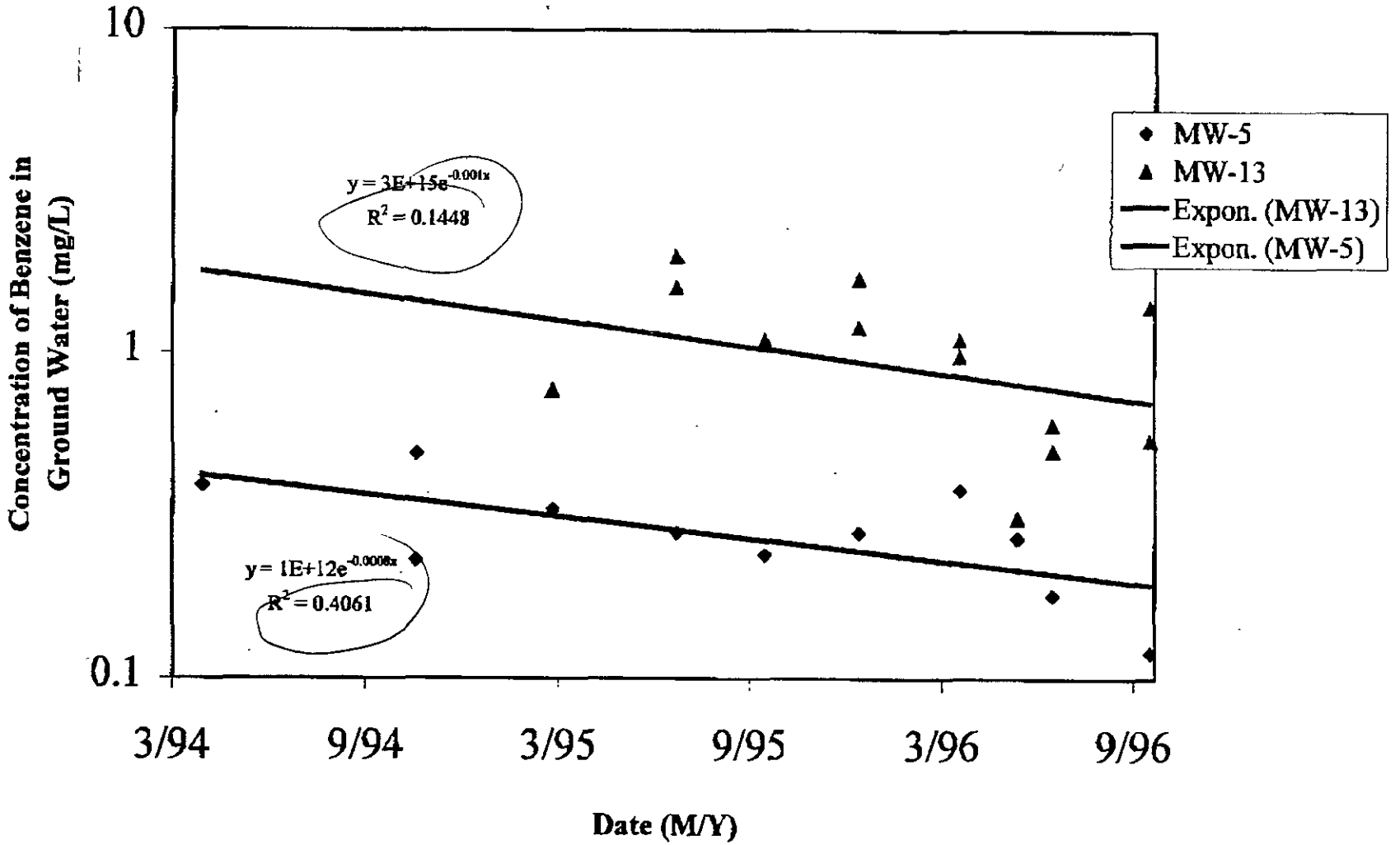
MS. LOGAN:

Per our conversation this afternoon, I have attached a revision to Figure 2, Benzene Concentrations (log scale) for MW-5 and MW-13, NCB 1150 Park Avenue Emeryville from our August 4, 1997 submittal to ACHCSA. The revision includes the R^2 values for the trend lines for benzene in these two wells.

In that same submittal we omitted trend lines for MW-12 because the concentrations of TPH and benzene in that well, while detectable, have historically been very low, indicating that MW-12 is outside the contaminant plume. Therefore, we felt the data from MW-5 and MW-13 were most illustrative.

Please call (510) 450-6000 if there are any problems with transmission

Benzene Concentrations with Time for MW-5 and MW-13



j:\peps\1239\rbcaaden\chartsr2.xls

11/7/97

Attachment A: ACHCSA letters dated April 29 and May 13, 1997

Attachment B: Ground water trend analysis, Former New Century Beverage Facility, Emeryville California

Attachment C: Revised Tables 2, 3, 4 and 5 from Dec 1996 RBCA Evaluation - Future Construction Scenario, Comparison of BETX and PAH concentrations to Tier 1 Risk Based Screening Levels, Former New Century Beverage Facility, Emeryville California. Revised Table 9 - Proposed Cleanup Goals, Former New Century Beverage Facility, Emeryville California.

Attachment D: Revised pages vi and 10, Table 8 from the Dec 1996 RBCA evaluation.

Attachment E: Revised Appendix E, Soil to Indoor Air SSTL
Revised Supporting Spreadsheets RBSL Calculations

Attachment F: TPH, BTEX, and other COC Results from the June 1996 Subslab Sampling, Former New Century Beverage Facility, Emeryville California and Comparison of Worst Case Concentrations with Relevant RBSLs, SSTLs, or USEPA Region IX Second Half 1996 PRGs.

ATTACHMENT A

ACHCSA LETTERS DATED APRIL 29 AND MAY 13, 1997

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

April 29, 1997

Mr. Jerry Tidwell
Pepsi-Cola Corporation
29000 Hesperian Blvd.
Hayward, California 94545

RE: **Former New Century Beverage Company**
1150 Park Avenue, Emeryville, California 94608 (STID# 1777)

Dear Mr. Tidwell:

The Alameda County Department of Environmental Health, Environmental Protection Division has completed review of the **Risk-Based Corrective Action (RBCA) Evaluation** prepared and submitted by Weiss Associates for the above referenced site. This evaluation recommends case closure regarding the release associated with the two fuel underground storage tanks removed from the subject site.

The Department has the following comments regarding the RBCA evaluation and the recommendation for site closure:

1) Groundwater monitoring data collected for three years (3/29/94 to 9/26/96) appears to indicate that the plume is stable. Monitoring well MW-13 located on the Del Monte site and leased by New Century Beverage Co. in November 1992 showed benzene concentration ranging from 310 ppb to 1,700 ppb. However, downgradient wells (MW-8, MW-11 and MW-14) found no detectable concentration of benzene during the entire monitoring period with the exception of one low hit in well MW-14 (2.9 ppb) in 3/96. The plume does not appear to be expanding and may be characterize as a stable plume. Further migration is not likely to occur since aggressive source removal had been conducted at the subject site.

   To address the concerns raised by Del Monte regarding continued migration of the plume to their property, a trend analysis should be conducted using the data collected for the three wells detecting benzene (MW-5, MW-12 and MW-13). The trend analysis should include the following: concentration vs. time, concentration vs. distance and log concentration vs. time. In addition, a regression analysis (best fit line) should also be performed.

2) The construction worker scenario evaluated impact of groundwater via the following exposure pathway: volatilization to outdoor air, vapor intrusion to buildings and ingestion . Since the shallow groundwater at the site fluctuates between 4 and 11 feet below grade, dermal contact and inhalation exposure pathways must also be evaluated.

   The soil ingestion rate used for construction worker was 100 mg/day (per the ASTM RBCA). Please recalculate the construction worker scenario using the soil ingestion rate of 480 mg/day recommended by USEPA.

3) The subject site is not planned for residential development. Mr. Ron Gerber of the City of Emeryville Redevelopment Agency informed me on 4/22/97 that the site is zoned as " Planned Unit Development / Commercial". It was my understanding that Del Monte was required to evaluate risks associated with a residential scenario for their property west of Watt Street for the proposed development of a medical center / hospital. Evaluation using off site residential receptor / groundwater ingestion is acceptable for the site. Please change the residential exposure scenarios found on pages vi and 10 to"off site residential scenario".

4) TPH diesel up to 22,000 ppm was detected in the dispenser soil sample collected at 1 foot bgs in 1994 during the removal of UST #1. PAHs analyses were not required at that time. However, the probable percent of benzo (a) pyrene can be calculated using 0.07 mg/kg benzo(a) pyrene in diesel. PAHs in soil should be evaluated using this result and determine if the RBSLs for PAHs in soil are exceeded..

5) A modified Jury Model was used for the Tier 2 evaluation of indoor inhalation pathway (commercial / industrial scenario) which assumes constant decay of the contaminants. This model is different from the Johnson and Ettinger Model used in the ASTM RBCA which assumes a constant source (steady state) without decay. A reference for the decay rates used (1 year for soil and 2 years for groundwater) should be provided. In addition, site specific decay rates should be calculated and used in the Tier 2 evaluation.

6) Please evaluate the analytic results of the sub slab sampling conducted prior to site demolition and determine if any RBSLs are exceeded.

7) Other chemicals of concern (COCs) identified at the site which are not related to the former USTs should be addressed separately prior to site closure. The maximum concentrations of COCs detected should be listed with the corresponding USEPA Preliminary Remedial Goals (PRGs).

8) An evaluation of natural attenuation occurring at the site should be performed. If possible, natural attenuation parameters should be collected at the site.

9) The clean up criteria established for soil on the Del Monte site west of Watt Street (100 ppm TPH gasoline, 200 ppm TPH diesel & 500 ppm TPH motor oil) does not necessarily apply for the subject site. The cleanup criteria established for any site should be site specific risk based clean up levels that are protective of public health, safety and the environment.

10) The RBCA Evaluation does not consider the cumulative risk and hazard index. The parameters used for the ASTM RBCA are very conservative (per our staff and RWQCB's toxicologists) and therefore, it is not necessary to consider the cumulative effect.

11) The proposed cleanup goals (see Table 9) for the subject site should be re-evaluated using site specific decay rates.

12) The subject site can be developed for commercial use provided an acceptable comprehensive risk management plan is submitted to this agency. The risk management plan should include at a minimum the following items:
- soil and groundwater management plan during construction activities
- appropriate health and safety plan should be prepared prior to and followed during any activities involving exposure to soil and groundwater contamination
- site mitigating measures to prevent any potential vertical conduits between the shallow and deeper aquifers
- institutional and /or engineering controls necessary to prevent- migration of pollution, impact to water quality & risks to human health and environment
- site development map showing areas to be landscaped, location of buildings, etc.

13) The subject site can be considered for closure with a long term management plan provided the items listed above are adequately addressed and the site meets all the criteria as a "low risk soils and groundwater case" per the RWQCB's Interim Guidance on Required Clean Up at Low Risk Fuel Sites, dated January 5, 1996.

If you have any questions regarding this letter or the subject site, please contact me at (510) 567-6780.

Sincerely,

Susan L. Hugo

Susan L. Hugo
Senior Hazardous Materials Specialist

c: Mee Ling Tung, Director, Environmental Health
Gordon Coleman, Acting Chief, Environmental Protection Division
Thomas Peacock, LOP Manager
Ravi Arunalantham, San Francisco Bay RWQCB
Kevin Graves, San Francisco Bay RWQCB
Sum Arigala, San Francisco Bay RWQCB
James Ponton / Carolyn Atwood, Weiss Associates, 5500 Shellmound Street Emeryville, CA 94608
SH/ ML/files

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

May 13, 1997

ENVIRONMENTAL HEALTH SERVICES
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

Mr. Jerry Tidwell
Pepsi-Cola Corporation
29000 Hesperian Blvd.
Hayward, California 94545

RE: Former New Century Beverage Company
1150 Park Avenue, Emeryville, California 94608 **(STID# 1777)**

Dear Mr. Tidwell:

The Alameda County Department of Environmental Health, Environmental Protection Division has the following comments and additional clarification in response to the letter dated May 6, 1997 from Weiss Associates:

1. This department prefers an addendum to the RBCA Evaluation to keep track of the changes done to the initial risk assessment.
2. The initial risk assessment has evaluated the ambient air pathway for groundwater. However, the risk assessment did not evaluate dermal contact with groundwater which is a probable exposure pathway for construction workers based on the presence of shallow groundwater at the site. In addition, all contaminants of concern present in the soil above five feet bgs. must be included in the evaluation of the surface soil pathway. Also, as mentioned in my letter dated April 29, 1997, the surface soil pathway should be recalculated using the soil ingestion rate of 480 mg/day for construction workers as recommended by USEPA.
3. According to the enclosed reference material, the 0.007 mg/kg of benzo (a) pyrene in diesel corresponds to 0.007 mg of benzo (a) pyrene in every kilogram of diesel.

5/27/97

If you have any questions regarding this letter or the subject site, please contact me at (510) 567-6780.

Sincerely,

Susan L. Hugo

Susan L. Hugo, Senior Hazardous Materials Specialist

enclosure

c: Mee Ling Tung, Director, Environmental Health
Gordon Coleman, Acting Chief, Environmental Protection Division
Ravi Arunalantham, San Francisco Bay RWQCB
Kevin Graves, San Francisco Bay RWQCB
James Ponton / Carolyn Atwood, Weiss Associates, 5500 Shellmound Street Emeryville, CA 94608
SH/ ML/files

ATTACHMENT B

GROUND WATER TREND ANALYSIS, FORMER NEW CENTURY BEVERAGE FACILITY, EMERYVILLE, CALIFORNIA

1.1 Objective

To further investigate plume status and migration at the former New Century Beverage Facility, located at 1150 Park Avenue, in Emeryville, California, a contaminant trend analysis has been conducted for wells in which benzene has been detected (MW-5 and MW-13). Data from MW-8 is also presented to illustrate the extent of benzene contamination at the site. These data are used to calculate a site-specific natural attentuation half-life for benzene in ground water.

1.2 Assumptions

For the ground water concentration trend analysis, it has been assumed that monitoring wells MW-5, MW-8, and MW-13 are representative of the worst-case ground water contamination at the former New Century Beverage Company facility in Emeryville, California. It has also been assumed that the trends observed in data from these wells are representative of the remainder of the site.

1.3 Method

For monitoring wells in which benzene has been detected at the former New Century Beverage Facility in Emeryville, California, charts of benzene and TVH-G concentration in ground water versus time, as well as benzene and TVH-G concentration in ground water versus distance have been constructed using available data from March 1994 to September 1996. For the concentration versus time data, linear and exponential regression lines have been plotted. The equation for the exponential regression lines allows for the determination of a biodegredation half-life, $T_{(½)}$:

$$T_{\left(\frac{1}{2}\right)} = \ln 2 / \lambda$$

where λ is the decay constant given in the exponential regression line in the form:

$$C = C_0 e^{-\lambda t}$$

where C = concentration in ground water, C_0 = initial concentration in ground water, and t = time (days). The natural attentuation half-life has been calculated for benzene and TVH-G in monitoring wells MW-5 and MW-13.

1.4 Result

Benzene and TVH-G concentrations in ground water detected in samples from monitoring wells MW-5 and MW-13 at the former New Century Beverage Company facility have decreased from March 1994 to September 1996 (Figures 1, 2 and 3). From the available data, natural

attentuation half-lives have been determined to vary from 693 to 866 days for benzene and from 408 to 495 days for TVH-G (Table 1).

Benzene and TVH-G concentrations in ground water detected in samples from monitoring wells MW-5, MW-13, and MW-8 at the former New Century Beverage Company facility show the typical concentration trend with distance from the source area. Although a slight increase in concentrations is observed from a distance of 40 to 140 ft from the source (MW-5 and MW-13), concentrations drop to below the detection limit at 260 ft from the source (MW-8) (Figures 4 and 5). These results confirm the ideas that the plume does not appear to be expanding and further migration is not likely to occur. These results support the previous recommendation for closure presented in the Risk-Based Corrective Action Evaluation.

FIGURES

TABLES

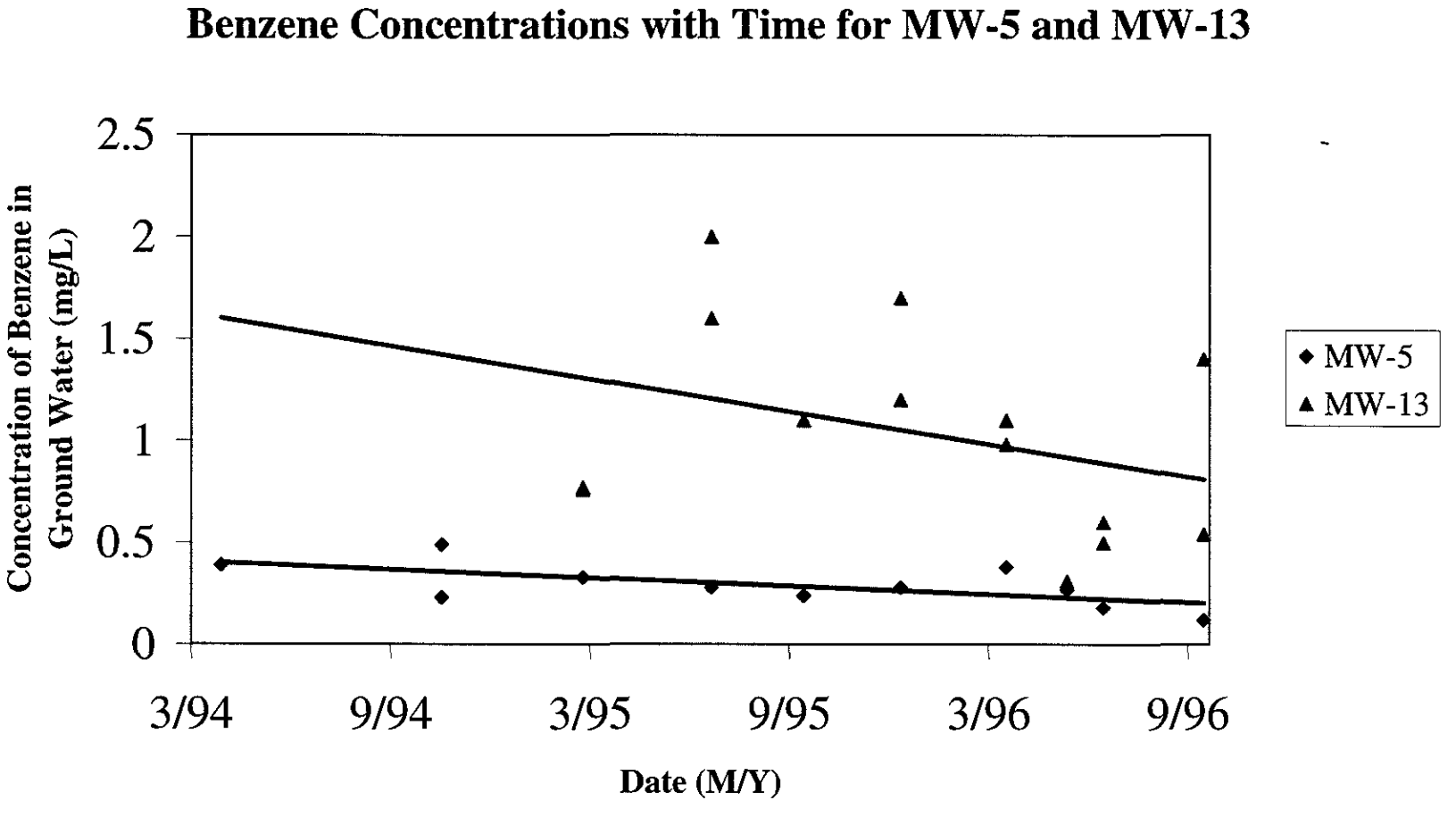


Figure 1. Benzene Concentrations with Time for MW-5 and MW-13, New Century Beverage Facility, 1150 Park Avenue, Emeryville, California.

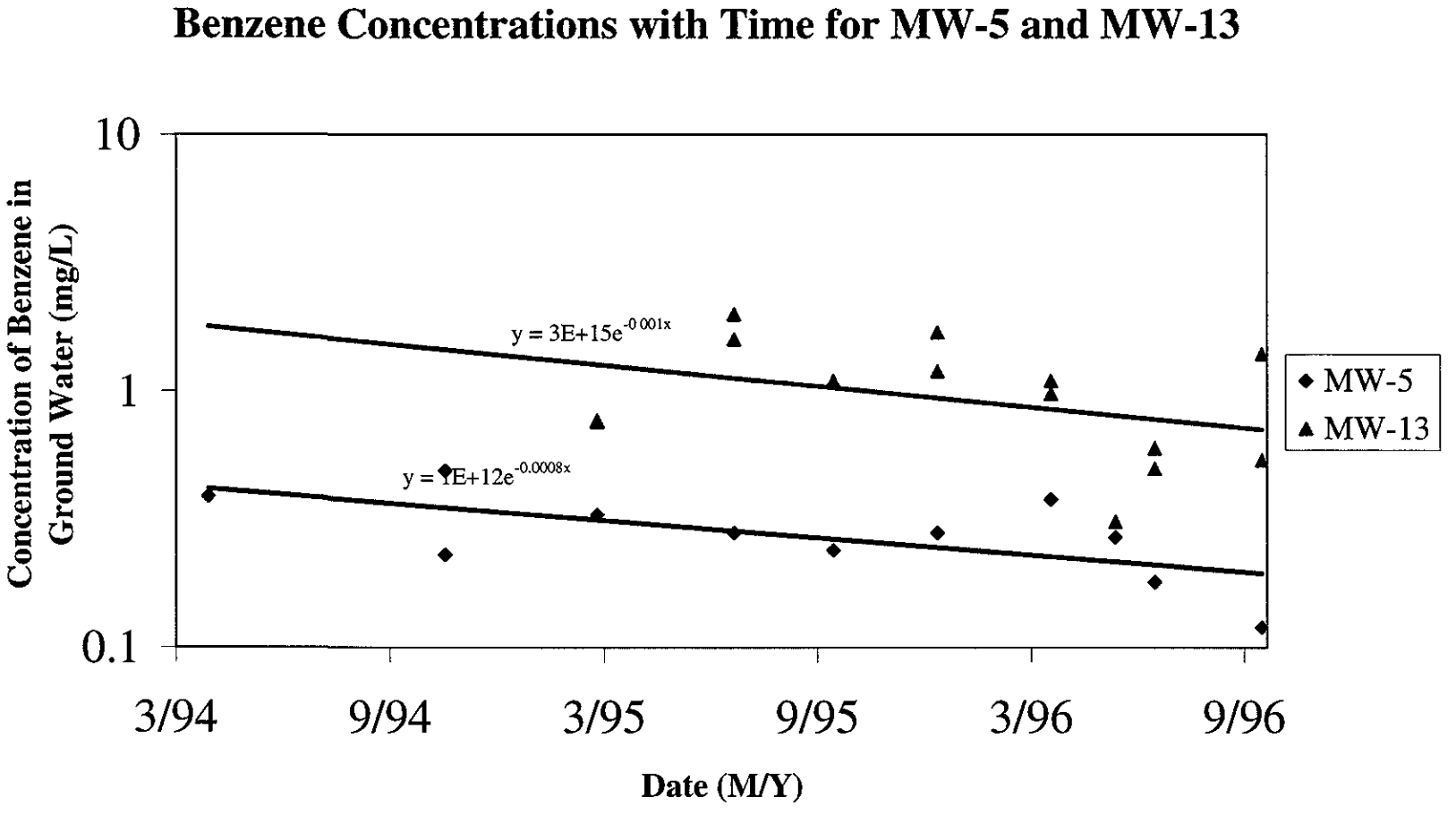


Figure 2. Benzene Concentrations with Time (Log Scale) for MW-5 and MW-13, New Century Beverage Facility, 1150 Park Avenue,

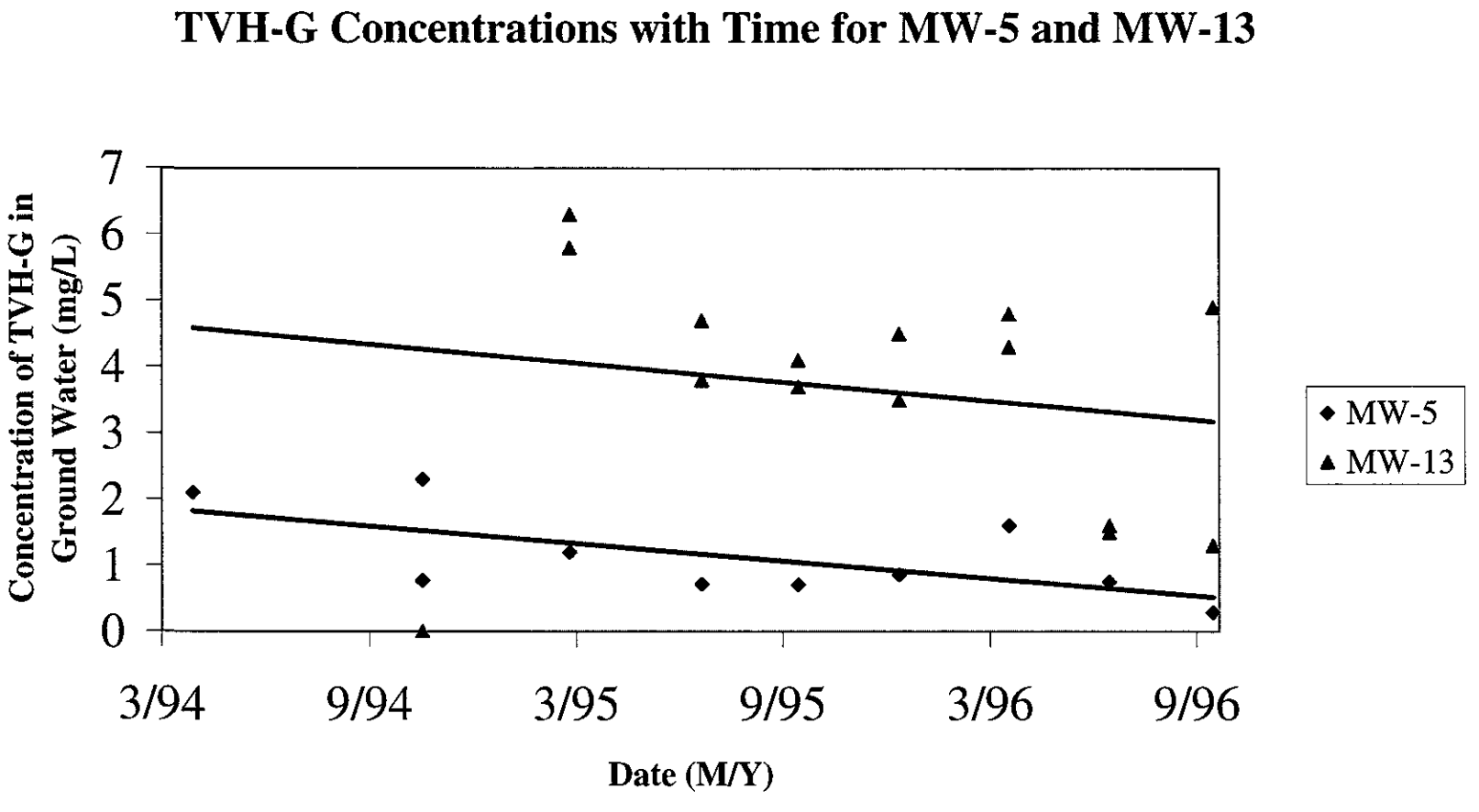


Figure 3. TVH-G Concentrations with Time for MW-5 and MW-13, New Century Beverage Facility, 1150 Park Avenue,

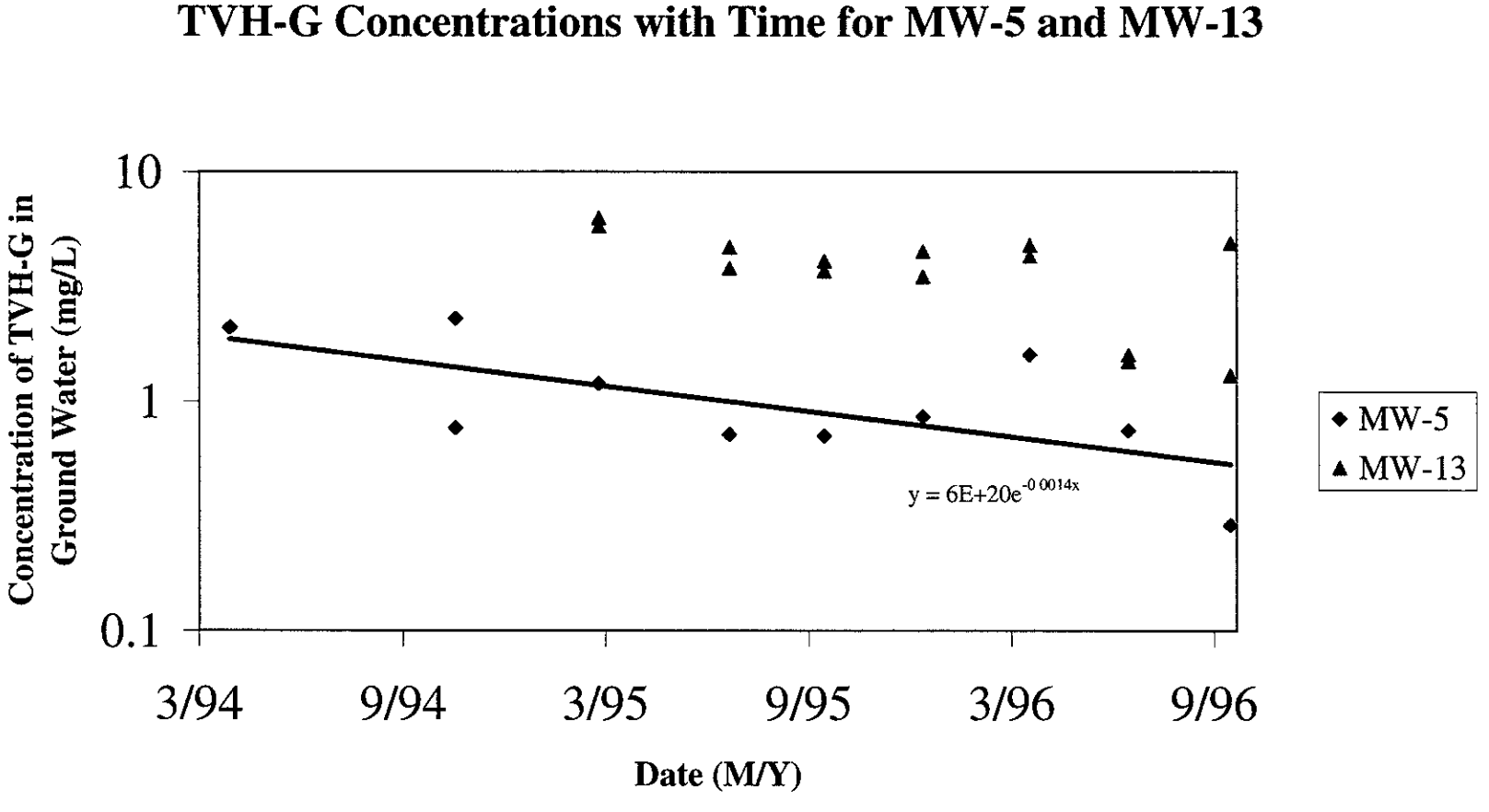


Figure 4. TVH-G Concentrations (Log Scale) with Time for MW-5 and MW-13, New Century Beverage Facility, 1150 Park Avenue, Emeryville, California.

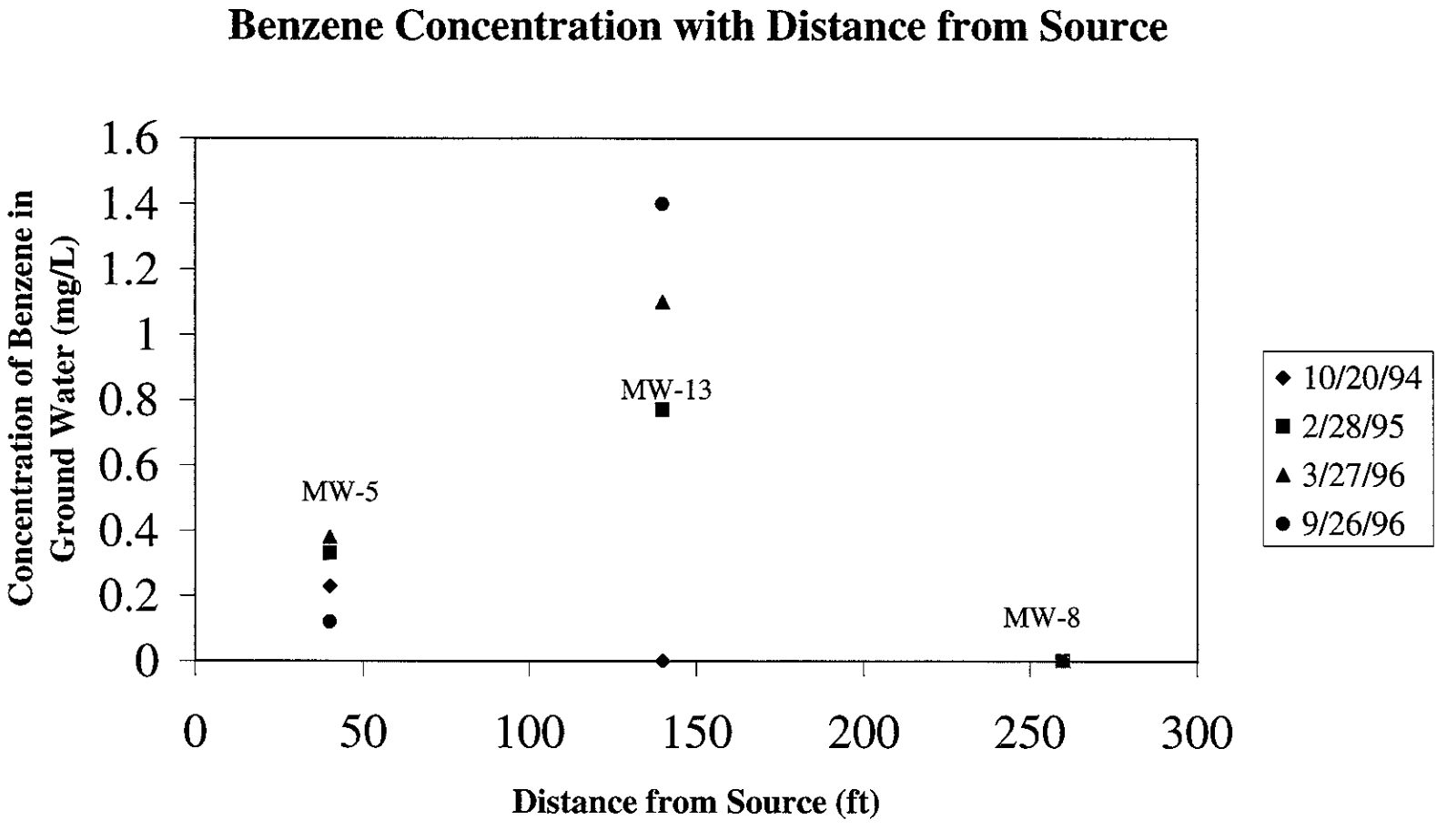


Figure 5. Benzene Concentrations with Distance, New Century Beverage Facility, 1150 Park Avenue, Emeryville, California.

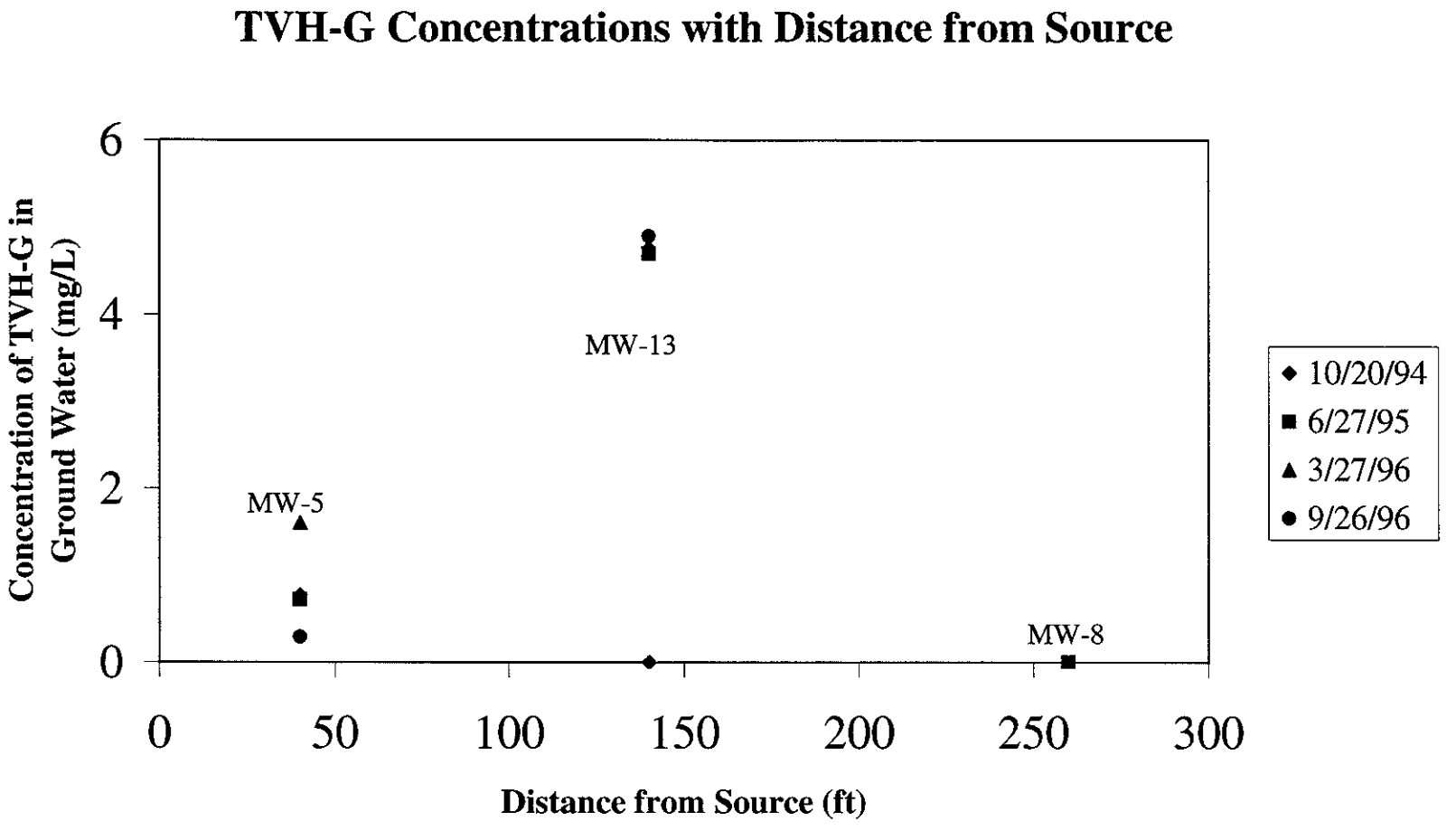


Figure 6. TVH-G Concentrations with Distance, New Century Beverage Facility, 1150 Park Avenue, Emeryville, California.

Table 1. Natural Attenuation Half-Lives for Benzene and TVH-G, New Century Beverage Facility, 1150 Park Avenue, Emeryville, California.

Compound	Well Name/ Location	Half-Life (days)
Benzene	MW-5	866
Benzene	MW-13	693
TVH-G	MW-5	495
TVH-G	MW-13	408

ATTACHMENT C

REVISED TABLES 2, 3, 4, AND 5 FROM DECEMBER 1996 RBCA EVALUATION – FUTURE CONSTRUCTION SCENARIO, COMPARISON OF BTEX AND PAH CONCENTRATIONS TO TIER 1 RISK BASED SCREENING LEVELS, FORMER NEW CENTURY BEVERAGE FACILITY, EMERYVILLE, CALIFORNIA

AND

REVISED TABLE 9 – PROPOSED CLEANUP GOALS, FORMER NEW CENTURY BEVERAGE FACILITY, EMERYVILLE, CALIFORNIA

Table 2. **Future Construction Receptors** - Comparison of **BETX** Concentrations to Tier 1 Risk-Based Screening Levels - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California.

Source Medium	Exposure Pathway	Potentially Complete Pathway?	Benzene		Ethylbenzene		Toluene		Xylenes	
			Maximum Detected Concentration[a]	RBSL[b]	Maximum Detected Concentration[a]	RBSL[c]	Maximum Detected Concentration[a]	RBSL[c]	Maximum Detected Concentration[a]	RBSL[c]
Soil (mg/kg)	Volatilization to Outdoor Air	Yes	1.7 *B-40, 10 ft 10/10/94*	16.6	21 *D-2, 3.5 ft 8/05/94*	RES	21 *D-2, 3.5 ft 8/05/94*	RES	100 *D-2, 3.5 ft 8/05/94*	RES
	Vapor Intrusion to Buildings	No	1.7 *B-40, 10 ft 10/10/94*	0.4	21 *D-2, 3.5 ft 8/05/94*	13,750[d]	21 *D-2, 3.5 ft 8/05/94*	681	100 *D-2, 3.5 ft 8/05/94*	RES
	Ingestion/Dermal/Inhalation	Yes	1.7 *B-40, 10 ft 10/10/94*	257	21 *D-2, 3.5 ft 8/05/94*	97,400[d]	21 *D-2, 3.5 ft 8/05/94*	172,000[d]	100 *D-2, 3.5 ft 8/05/94*	RES
	Leachate to Ground Water for Ingestion	No	1.7 *B-40, 10 ft 10/10/94*	2.1	21 *D-2, 3.5 ft 8/05/94*	20,125	21 *D-2, 3.5 ft 8/05/94*	4,513	100 *D-2, 3.5 ft 8/05/94*	RES
Ground Water (mg/l)	Volatilization to Outdoor Air	Yes	1.7 *MW-13 12/20/95*	667.5	0.67 *MW-13 6/25/96*	>S	0.018 *MW-12 12/20/95*	>S	0.50 *MW-12 12/20/95*	>S
	Vapor Intrusion to Buildings	No	1.7 *MW-13 12/20/95*	2.6	0.67 *MW-13 6/25/96*	>S	0.018 *MW-12 12/20/95*	>S	0.50 *MW-12 12/20/95*	>S
	Ingestion	No	1.7 *MW-13 12/20/95*	0.36	0.67 *MW-13 6/25/96*	128	0.018 *MW-12 12/20/95*	255	0.50 *MW-12 12/20/95*	>S
	Direct Contact	Yes	1.7 *MW-13 12/20/95*	452	0.67 *MW-13 6/25/96*	>S	0.018 *MW-12 12/20/95*	>S	0.5 *MW-12 12/20/95*	>S

Notes:

RBSL = ASTM RBCA Tier 1 Risk-Based Screening Level
RES = Selected risk level is not exceeded for pure compound present at any concentration in soil.
>S = At pure compound solubility (mg/l), selected risk level is not exceeded.
a = Location and date of sample indicated. Concentrations for ground water are the highest detected onsite during the most recent four quarters of ground water sampling (December 1995 - September 1996).
b = The RBSLs used for benzene are based on a carcinogenic risk of 1 in 100,000 (10^{-5}) and California Department of Health Services' standard cancer slope factor of 0.1 mg/kg-day.
c = The RBSLs used for non-carcinogenic compounds are based on a chronic hazard quotient of 1.0.
d = The calculated RBSLs exceed the estimated soil saturation values, calculated per ASTM 1995 Table x2.5 and could be shown as RES.

Table 3. **Future Construction Receptors** - Comparison of **PAH** Concentrations to Tier 1 Risk-Based Screening Levels - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California.

Source Medium	Exposure Pathway	Potentially Complete Pathway?	Naphthalene		Fluoranthene		Fluorene		Pyrene		Benzo(a)pyrene[c]	
			Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]
Soil (mg/kg)	Volatilization to Outdoor Air	Yes	<20	RES	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	RES
	Vapor Intrusion to Buildings	No	<20	1,338	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	NC
	Ingestion/Dermal/Inhalation	Yes	<20	7,530	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	2.3
	Leachate to Ground Water for Ingestion	No	<20	803	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	NC
Ground Water (mg/l)	Volatilization to Outdoor Air	Yes	0.0041 *MW-13 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	0.0034 *MW-5 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	ND	NC
	Vapor Intrusion to Buildings	No	0.0041 *MW-13 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	0.0034 *MW-5 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	ND	NC
	Ingestion	No	0.0041 *MW-13 6/25/96*	5.1	0.0005 *MW-5 6/25/96*	50	0.0034 *MW-5 6/25/96*	50	0.0005 *MW-5 6/25/96*	>S	ND	NC
	Direct Contact	Yes	0.0041 *MW-13 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	0.0034 *MW-5 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	ND	NC

Notes:

PAH = Polynuclear Aromatic Hydrocarbon
RBSL = ASTM RBCA Tier 1 Risk-Based Screening Level
RES = Selected risk level is not exceeded for pure compound present at any concentration in soil.
<n = Not detected above laboratory method detection limit of n mg/kg
NC = Not calculated
ND = Not Detected
>S = At pure compound solubility (mg/l), selected risk level is not exceeded.
a = Location and date of sample indicated. Concentrations for ground water are the highest detected onsite.
b = The RBSLs used for non-carcinogenic compounds are based on a chronic hazard quotient of 1.0.
c = Benzo(a)pyrene assumed present, per ACHCSA, at 0.07 mg/BaP per kg diesel, assuming 22,000 mg/kg diesel worst case.

Table 4. **Future Commercial/Industrial Receptors** - Comparison of **BETX** Concentrations to Tier 1 Risk-Based Screening Levels - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California.

Source Medium	Exposure Pathway	Potentially Complete Pathway?	Benzene		Ethylbenzene		Toluene		Xylenes	
			Maximum Detected Concentration[a]	RBSL[b]	Maximum Detected Concentration[a]	RBSL[c]	Maximum Detected Concentration[a]	RBSL[c]	Maximum Detected Concentration[a]	RBSL[c]
Soil (mg/kg)	Volatilization to Outdoor Air	Yes	**1.7** *B-40, 10 ft 10/10/94*	**1.33**	21 *D-2, 3.5 ft 8/05/94*	RES	21 *D-2, 3.5 ft 8/05/94*	RES	100 *D-2, 3.5 ft 8/05/94*	RES
	Vapor Intrusion to Buildings	Yes	**1.7** *B-40, 10 ft 10/10/94*	**0.032**	21 *D-2, 3.5 ft 8/05/94*	1,100[d]	21 *D-2, 3.5 ft 8/05/94*	54.5	100 *D-2, 3.5 ft 8/05/94*	RES
	Surficial Soil (0-5 ft depth): Ingestion/Dermal/Inhalation	Yes	0.51 *D-2, 3.5 ft 8/05/94*	29	21 *D-2, 3.5 ft 8/05/94*	11,500[d]	21 *D-2, 3.5 ft 8/05/94*	18,700[d]	100 *D-2, 3.5 ft 8/05/94*	208,000[d]
	Leachate to Ground Water for Ingestion	No	1.7 *B-40, 10 ft 10/10/94*	0.17	21 *D-2, 3.5 ft 8/05/94*	1,610	21 *D-2, 3.5 ft 8/05/94*	361	100 *D-2, 3.5 ft 8/05/94*	RES
Ground Water (mg/l)	Volatilization to Outdoor Air	Yes	1.7 *MW-13 12/20/95*	53.4	0.67 *MW-13 6/25/96*	>S	0.018 *MW-12 12/20/95*	>S	0.50 *MW-12 12/20/95*	>S
	Vapor Intrusion to Buildings	Yes	**1.7** *MW-13 12/20/95*	**0.21**	0.67 *MW-13 6/25/96*	>S	0.018 *MW-12 12/20/95*	85	0.50 *MW-12 12/20/95*	>S
	Ingestion	No	1.7 *MW-13 12/20/95*	0.029	0.67 *MW-13 6/25/96*	10.2	0.018 *MW-12 12/20/95*	20.4	0.50 *MW-12 12/20/95*	>S

Notes:

RBSL = ASTM RBCA Tier 1 Risk-Based Screening Level
RES = Selected risk level is not exceeded for pure compound present at any concentration in soil.
>S = At pure compound solubility (mg/l), selected risk level is not exceeded.
a = Location and date of sample indicated. Concentrations for ground water are the highest detected onsite during the most recent four quarters of ground water sampling (December 1995 - September 1996).
b = The RBSLs used for benzene are based on a carcinogenic risk of 1 in 100,000 (10^{-5}) and California Department of Health Services' standard cancer slope factor of 0.1 mg/kg-day.
c = The RBSLs used for non-carcinogenic compounds are based on a chronic hazard quotient of 1.0.
d = The calculated RBSLs exceed the estimated soil saturation values calculated per ASTM 1995 Table x2.5 and could be shown as RES.

Table 5. **Future Commercial/Industrial Receptors** - Comparison of **PAH** Concentrations to Tier 1 Risk-Based Screening Levels - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California (continued).

Source Medium	Exposure Pathway	Potentially Complete Pathway?	Naphthalene		Fluoranthene		Fluorene		Pyrene		Benzo(a)pyrene	
			Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]	Maximum Detected Conc.[a]	RBSL[b]
Soil (mg/kg)	Volatilization to Outdoor Air	Yes	<20	RES	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	RES
	Vapor Intrusion to Buildings	Yes	<20	107	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	RES
	Surficial Soil (0-5 ft depth): Ingestion/Dermal/Inhalation	Yes	<20	1,900	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	0.26
	Leachate to Ground Water for Ingestion	No	<20	64.2	<1.0	NC	<2.0	NC	<1.0	NC	0.00154	NC
Ground Water (mg/l)	Volatilization to Outdoor Air	Yes	0.0041 *MW-13 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	0.0034 *MW-5 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	ND	5,985
	Vapor Intrusion to Buildings	Yes	0.0041 *MW-13 6/25/96*	12.3	0.0005 *MW-5 6/25/96*	9.7	0.0034 *MW-5 6/25/96*	>S	0.0005 *MW-5 6/25/96*	>S	ND	84.12
	Ingestion	No	0.0041 *MW-13 6/25/96*	0.409	0.0005 *MW-5 6/25/96*	4.09	0.0034 *MW-5 6/25/96*	4.09	0.0005 *MW-5 6/25/96*	3.07	ND	NC

Notes:

PAH = Polynuclear Aromatic Hydrocarbon
RBSL = ASTM RBCA Tier 1 Risk-Based Screening Level
NC = Not calculated
ND = Not Detected
<**n** = Not detected above laboratory mehtod detection omit of **n** mg/kg
RES = Selected risk level is not exceeded for pure compound present at any concentration in soil
>S = At pure compound solubility (mg/l), selected risk level is not exceeded
a = Location and date of sample indicated. Concentrations for ground water are the highest detected on-site
b = The RBSLs used for non-carcinogenic compounds are based on a chronic hazard quotient of 1.0

Table 9. Proposed Cleanup Goals - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

Chemical of Concern	Proposed Cleanup Goal Soil (mg/kg)	Ground Water (mg/L)
Benzene	1.7	2.03
Ethylbenzene	575[1]	3.65
Toluene	54.5	7.3
Xylenes	208,000[1]	73
Naphthalene	22.9	0.146
Fluorene	NC	1.46
Fluoranthene	NC	1.46
Pyrene	NC	1.10
Benzo(a)Pyrene	0.26	NC

Notes:

NC = Not Calculated, contaminant not present in this media
1 = The proposed cleanup goals exceed the estimated soil saturation values for these compounds, as calculated per ASTM 1995 Table x2.5

ATTACHMENT D

REVISED PAGES iv, vi, 10, 12, 13, 15, AND 17, AND TABLE 8 FROM THE DECEMBER 1996 RBCA EVALUATION

FIGURES

TABLES

SUMMARY

Weiss Associates (WA) completed this Risk-Based Correction Action (RBCA) Evaluation for the former New Century Beverage Company Facility in Emeryville, California. The evaluation was performed in accordance with the American Society for Testing and Materials Standard E 1739-95, *Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM, 1995). This evaluation also serves as a formal amendment to the Remedial Action Plan submitted in Jan 1995 and approved in August 1995. The objective of this evaluation is to determine the most appropriate future action for subsurface petroleum hydrocarbons from the former site USTs based on site-specific characteristics of the site and the extent and nature of these chemicals of concern (COCs).

The evaluation assesses potential impacts of these COCs on future potential site occupants and on ground water quality. The COCs include benzene, ethylbenzene, toluene, xylenes, naphthalene, fluorene, fluoranthene and pyrene. WA evaluated three different exposure scenarios in this assessment: construction, commercial/industrial, and offsite residential. The construction scenario was added at the request of the Alameda County Health Care Services Agency (ACHCSA). For each exposure scenario, potentially complete exposure pathways were identified and evaluated.

WA established Tier 1 risk-based screening levels (RBSLs) for each COC/potentially complete exposure pathway pair in each scenario. These conservative Tier 1 RBSLs were established using the models and recommended parameter values in the ASTM Standard. Tier 1 RBSLs represent extremely conservative concentrations, below which no significant adverse effects on human health are expected to occur. For those contaminant/pathway pairs for which the conservative Tier 1 RBSLs were exceeded in a particular medium (surface soil, subsurface soil, or ground water), WA completed a Tier 2 analysis. Tier 2 site-specific target levels (SSTLs), which represent the same level of health protection as the Tier 1 RBSLs, were developed using generally accepted modeling methods with site-specific characterization data. The Tier 2 SSTL is a site-specific, rather than generic, level below which contaminants are not expected to pose a significant threat to human health, including by ground water ingestion.

The Tier 1 RBSLs and Tier 2 SSTLs developed in this analysis are WA's recommended final cleanup levels for the subsurface petroleum hydrocarbons that have resulted from the former site USTs. Therefore, they represent a proposed modification to the target levels previously recommended by the ACHCSA in its August 1995 approval of the Remedial Action Plan.

The 1995 source area excavations removed much of the vadose zone source area, reducing future leaching of hydrocarbons into ground water and removing most soil with more than 100 parts per million (ppm) total petroleum hydrocarbons (TPH). This analysis shows that worst-case (maximum) site-specific levels of contaminants of concern remaining in the subsurface do not exceed Tier 1 RBSLs or Tier 2 SSTLs for any of the three exposure scenarios. Therefore, residual contaminants do not appear to pose any significant risk to future potential receptors at the site, nor to

offsite residential use of shallow ground water. Petroleum hydrocarbons in ground water are limited to a stable, onsite plume. Furthermore, natural attenuation is likely to eventually reduce hydrocarbon concentrations to below maximum contaminant levels for drinking water.

Therefore, WA recommends no further action as the most appropriate action for the former site USTs, based on the excavation of the source areas associated with the former underground tanks, the comparison of site data to RBSLs and SSTLs, and the stability of the dissolved hydrocarbon plume. WA further recommends that ACHCSA consider these USTs for closure.

- Ingestion of, inhalation of or dermal contact with surficial soil containing COCs
- Inhalation of outdoor air containing volatilized COCs from ground water
- Inhalation of indoor air containing volatilized COCs from ground water

Ingestion of ground water is not considered potentially complete for onsite commercial or industrial receptors. Water will likely be supplied by the local water utility, the East Bay Municipal Utility District. Also, the local permitting agency requires a 50-ft deep sanitary seal for municipal and industrial supply wells. A seal this deep will probably prevent the migration of impacted ground water into any future supply well installed on the property.

Offsite Residential Scenario - Ground Water Considerations

WA has identified ingestion of ground water by offsite residential receptors as highly unlikely but possible. Subsurface hydrocarbons are not near or below residential property, and therefore, no residential receptors are currently exposed to petroleum hydrocarbons. However, WA has assumed for the purpose of this evaluation that the industrial supply well might be used for municipal well and that it is downgradient of the site. These are very conservative assumptions considering that WA's well survey identified the well as an industrial supply well, and that it is crossgradient, not downgradient, of the site. Nevertheless, to demonstrate that the well will not be impacted by COCs from the site, WA has considered the well as a potential receptor. Therefore, WA has evaluated the following potentially complete exposure pathway for an offsite residential scenario:

- Impact of ground water for ingestion by COCs in soil leachate
- Ingestion of ground water containing COCs

3.3 Site Classification and Initial Response Action

ASTM Standard E 1739-95 recommends classifying the site while investigation data are assembled to determine the most appropriate initial response action to protect potential receptors. The classification criteria, presented in Table 1 of the Standard, are qualitative. Based upon current site conditions, the site best satisfies the criteria for Classification 3, possible "Long-term (>2 years) threat to human health, safety, or sensitive environmental receptors." This description is the most appropriate because surface soils containing COCs are possibly accessible to the public; the shallowest, potable ground water is likely more than 50 ft below impacted soil; shallow ground water is non-potable and not likely be used; and no buildings are above subsurface COCs.

The initial response action is to "Notify appropriate authorities, property owners, and potentially affected parties, and only evaluate the need to monitor ground water and evaluate effects of natural attenuation on dissolved plume migration,...leachate migration,...[and] dissolved plume migration and restrict access to surface soils." New Century informed all involved parties, has installed 14 ground water monitoring wells monitored ground water beneath the site since March 1994. Up until the site demolition, surface soils were covered by concrete slab or asphalt. Therefore, New Century has satisfied the initial response action.

- Inhalation of outdoor air containing volatilized benzene from soil
- Inhalation of indoor air containing volatilized benzene from soil
- Inhalation of indoor air containing volatilized benzene from ground water

All maximum COC concentrations are below the offsite residential RBSLs except the following potentially complete exposure pathways for benzene (Tables 6 and 7):

- Leachate from soil to ground water designated for potential ingestion
- Ingestion of benzene in ground water designated for potential municipal supply

The offsite residential RBSLs were used for ground water because the exposure scenario assumes an offsite residential supply.

3.4.3 Tier 1 Recommendations

The comparison of site-specific maximum contaminant concentrations to conservative Tier 1 RBSLs indicates that no significant adverse risk is posed to future construction workers by the maximum concentrations of subsurface COCs at the site. Therefore, no further action is warranted based on the evaluation of the construction scenario.

For future potential on-site commercial/industrial receptors, the comparison of site-specific maximum contaminant levels to conservative, Tier 1 RBSLs indicates that no significant adverse risk is associated with petroleum-related impacts at the site, with the possible exception of benzene impacts.

Maximum benzene concentrations in soil and ground water exceed the conservative RBSLs for three potentially complete exposure pathways. Because the assumptions in the Tier 1 evaluation very conservatively estimate the risk posed by residual petroleum hydrocarbons beneath the site, and because ample site-specific investigation data are available, WA believes the most appropriate option is to assess each of these pathways specifically in a Tier 2 evaluation.

To evaluate the potential for known petroleum hydrocarbons in soil and ground water to impact potential offsite residential receptors through ground water ingestion, the Tier 1 analysis has very conservatively compared worst-case on-site COC concentrations to offsite residential Tier 1 RBSLs. Even using the very conservative approach, no significant adverse health affects are predicted as a result of the xylene, ethylbenzene, toluene, pyrene, flourene, naphthalene, or flouranthene in ground water. Benzene concentrations in onsite ground water do, however, exceed the conservative Tier 1 RBSL for offsite residential ingestion. The known ground water plume is stable and limited to the site, and future use of shallow onsite ground water is not a reasonable assumption. Furthermore, because monitoring data to date show that the plume is stable, it is extremely unlikely that offsite migration will occur. Nonetheless, WA has opted to evaluate the benzene impacts on shallow ground water further at Tier 2. In Tier 2, as discussed below, the nearest known ground water supply well will be used as the most reasonable assumed point of exposure.

3.5 Tier 2 Evaluation

The objective of this Tier 2 evaluation is to use site-specific data to determine site-specific target levels (SSTLs) for comparison to site-specific levels of COCs, followed by a determination of the need for further action. Tier 2 SSTLs are typically less than Tier 1 conservative RBSLs, not because they represent a lesser protection to human or ecological receptors, but because the site-specific evaluation eliminates some of the very conservative assumptions used to formulate the RBSLs. In fact, like Tier 1 RBSLs, Tier 2 SSTLs are conservative estimates of the maximum concentrations that do not pose a significant risk to identified receptors. Once the SSTLs are established, WA compares them to maximum site concentrations and makes a recommendation based on this comparison.

3.5.1 Tier 2 Site-Specific Target Levels

The Tier 1 evaluation identified four pathways for which the maximum benzene concentrations in soil and ground water exceeded RBSLs. Only these pathways are evaluated at Tier 2. Three of these are associated with benzene vapor pathway exposures for future commercial receptors, and two are concerning ingestion of ground water for postulated offsite residential exposure. WA derived a SSTL for benzene for each of these pathways as described below. The SSTLs are provided in Table 8 and calculations for each SSTL are included in Appendix E.

Volatilization from Soil to Outdoor Air - Commercial/Industrial Scenario

To establish an appropriate SSTL for benzene in soil, WA used an adaptation of the Jury contaminant transport model as described in Sanders and Stern (1994). Jury originally published this model, describing the transport of organic compounds from a contaminant source through soil in a series of papers in 1983 and 1984, followed by a paper in 1990 (Jury, *et al.*, 1983; Jury, *et al.*, 1984a,b,c; Jury, *et al.*, 1990.) Jury's model, which has been widely used in environmental risk assessments, addresses transport from soil through a thickness of overlying soil to ground surface. It further assumes first-order degradation of the contaminant over time in the media of concern and can be solved for assuming either a finite or infinite contaminant source with a specified initial contaminant concentration.

Using site-specific data, WA calculated the dose and target risk level presented by the maximum benzene concentration in site soil. Then, WA determined the dose that would result in a risk level of 10^{-5} and, with this adjusted dose, back-calculated to a soil concentration using the same site-specific data. This back-calculated concentration is the SSTL for this pathway. WA's calculations are shown in Appendix E.

WA input conservative parameters into the model. The maximum benzene concentration in soil, 1.7 ppm at 10 ft depth, was used as the representative concentration in soil. The model assumes all soil between 0.5 and 10 ft has this representative concentration. It also assumes a vadose zone half life for benzene of 365 days, generally accepted as a very conservative value for the vadose zone. The other soil and chemical parameters used to calculate the SSTL are the same values used by the Standard to calculate the Tier 1 RBSL.

Leachate from Soil to Ground Water for Ingestion

To calculate a SSTL, WA modeled leaching of benzene from soil into ground water using the Tier 1 default values for soil and chemical parameters that are proposed by the ASTM Standard. After establishing a concentration in ground water based on the soil leachate, the model proceeds as described below for the ground water ingestion SSTL.

Ground Water Ingestion – Offsite Residential Scenario

Although shallow ground water beneath the site vicinity has no current or likely future use, WA conservatively assumed that a reported industrial supply well, located a half-mile crossgradient of the site, is hypothetically downgradient of the site and used for municipal supply. WA modeled benzene transport toward this hypothetical receptor by calculating a site-specific dilution-attenuation factor (DAF). The DAF is calculated empirically from concentrations in ground water detected along the longitudinal axis of the dissolved plume. Once the DAF is established, a curve is selected for the site and projected downgradient to predict a concentration at the hypothetical receptor location. The DAF is normalized to the maximum acceptable concentration at the receptor location and the model back-calculates the maximum acceptable concentration at the source that could hypothetically result in the acceptable concentration at the down-gradient location.

For this evaluation, WA selected data from boring B-40, the location of the maximum benzene concentration detected onsite, well MW-13 and MW-8. The acceptable or target concentration at the downgradient point of exposure was set at the MCL for benzene, 1 ppb. The model estimates a SSTL at the source above the solubility limit for benzene. The calculations are presented in Appendix D.

3.5.2 Comparison of Site Concentrations with Site-Specific Target Levels

Table 8 presents a SSTL summary, and compares the SSTLs with maximum on-site contaminant concentrations. As shown, the site-specific maximum contaminant concentrations are below Tier 2 SSTLs for each pathway evaluated at Tier 2.

3.5.3 Tier 2 Recommendations

Considering that the Tier 2 evaluation models rigorously applied conservative input values to formulate each SSTL and that the resulting SSTLs were compared to *maximum* site concentrations, this Tier 2 evaluation clearly demonstrates that benzene in the subsurface does not pose a risk to human health in a commercial/industrial or offsite residential scenario. Therefore, WA recommends no further risk evaluation concerning petroleum hydrocarbons in soil and ground water beneath the site, and recommends that no further action at the site is necessary.

The Tier 2 evaluation assesses not only potential risk to human health but also to the potential degradation of ground water quality. Even though benzene concentrations in the stable on-site plume exceed the California Department of Health Services maximum contaminant level for

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 RBCA Conclusions

The objective of this RBCA evaluation was to assess the most appropriate future action for petroleum hydrocarbons from the former site USTs based on the risk to human health and ground water quality posed by these petroleum hydrocarbons in soil and ground water beneath the site. The evaluation can be summarized as follows:

- BETX and four PAHs--naphthalene, fluorene, flouranthene and pyrene--have been identified as subsurface chemicals of concern potentially from the former site USTs.
- Three potential exposure scenarios were examined in this analysis. Future workers in a construction or commercial/industrial scenario are the most likely receptors. Exposure to offsite residential receptors through ground water ingestion is a possible but improbable scenario. No sensitive environmental receptors were identified near the site; therefore, risks to environmental receptors were not considered.
- Potentially complete exposure pathways were identified for all scenarios, and site-specific contaminant concentrations were compared to conservatively-derived Tier 1 RBSLs.
- No Tier 1 RBSLs were exceeded for the construction scenario. All site-specific maximum concentrations of all COCs except benzene were below the Tier 1 RBSLs for the commercial/industrial scenario. Maximum benzene concentrations in soil exceed RBSLs for volatilization from soil into outdoor air, volatilization from soil into indoor air, and volatilization from ground water into indoor air. Benzene in ground water exceeded the Tier 1 RBSL for offsite residential soil leachate to ground water and ground water ingestion
- Tier 2 SSTLs were developed for those pathway/contaminant pairs for which maximum site-specific COC concentrations exceeded the Tier 1 RBSLs using generally accepted modeling methodologies and site-specific characterization data.
- Maximum benzene concentrations in soil and ground water are below Tier 2 SSTLs for all pathways examined.
- Based on WA's ground water modeling to establish a SSTL for the ground water ingestion pathway, the dissolved plume appears stable. It is unlikely that the plume will degrade ground water quality in the site vicinity.

Table 8. Comparison of Maximum **Benzene** Concentrations to Tier 2 Site-Specific Target Levels - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California.

Source Medium	Receptor Scenario	Exposure Pathway	Benzene	
			Maximum Detected Concentration[a]	Site-Specific Target Level[b]
Soil (mg/kg)	Commercial/ Industrial	Volatilization to Outdoor Air	1.7 *B-40, 10 ft 10/10/94*	71
	Commercial/ Industrial	Volatilization to Indoor Air	1.7 *B-40, 10 ft 10/10/94*	1.7
	Residential	Leachate to Ground Water for Ingestion	1.7 *B-40, 10 ft 10/10/94*	RES
Ground Water (mg/l)	Commercial/ Industrial	Volatilization to Indoor Air	1.7 *MW-13 12/20/95*	2.03
	Residential	Ingestion	1.7 *MW-13 12/20/95*	>S

Notes.

RES = Selected risk level is not exceeded for pure compound present at any concentration in soil.

>S = At pure compound solubility (mg/l), selected risk level is not exceeded.

a = Location and date of sample indicated. Concentrations for ground water are the highest detected onsite during the most recent four quarters of ground water sampling (December 1995 - September 1996).

b = Site-specific target levels are based on a carcinogenic risk of 1 in 100,000 (10^{-5}) and California Department of Health Services' cancer slope factor of 0.1 mg/kg-day.

ATTACHMENT E

REVISED APPENDIX E, SOIL TO INDOOR AIR SSTL
REVISED APPENDIX E, SOIL TO OUTDOOR AIR SSTL
REVISED APPENDIX E, GROUND WATER TO INDOOR AIR SSTL
REVISED APPENDIX D, RBSL CALCULATIONS INCLUDING BaP

Vapor Pathway Risk Screening Model, Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, CA

WA implementation of Jury model, from Sanders and Stern 1994

Appendix E - CALCULATIONS - Commercial Receptor - Soil to Indoor Air SSTL

Diffusivity Parameters (symbol notation from ASTM for consistency)

Source		benzene	Chemical Name
		Chemical Specific Parameters	
ASTM 95	H	0.222	Henry's Constant
Howard	Thalf	365	Contaminant Half Life (d)
Calculated	μ	0.693147	First order rate constant ($years^{-1}$)
ASTM 95	D^{air}	9.30E-06	Air Diffusion Coefficient (m^2/s)
ASTM 95	D^{wat}	1.10E-09	Water Diffusion Coefficient (m^2/s)
ASTM 95	f_{oc}	0.02	Organic Carbon Fraction
ASTM 95	K_{oc}	0.038	Organic Carbon Partition Coefficient (m^3/Kg) (Log Koc = 1.58)
		Soil Specific Parameters	
ASTM 95	ρ_s	1700	Bulk Density(kg/m^3)
ASTM 95	θ_{as}	0.26	Air Content (v/v)
ASTM 95	θ_{ws}	0.12	Water Content (v/v)
ASTM 95	θ_t	0.38	Porosity (v/v)
calc, Jury	D^{eff}_{soil}	3.441672	Effective Diffusion Coefficient - Soil (m^2/year)
		Building Floor Parameters	
Lindeburg	$\rho_{s,concrete}$	2,378	Bulk Density (kg/m^3) 150 lb/ft^3 concrete with 1% air by volume
ASTM 95	n	0.01	Areal Fraction of Cracks in Floor
ASTM 95	$L_{concrete}$	0.15	Concrete Slab Thickness (m)
Calculated	$\theta_{as,concrete}$	0.01	Concrete Air Content (v/v)
Calculated	$\theta_{ws,concrete}$	0	Concrete Water Content (v/v)
Calculated	$\theta_{t,concrete}$	0.01	Concrete Porosity (v/v)
calc, Jury	$D^{eff}_{concrete}$	0.077505	Effective Diffusion Coefficient - Concrete (m^2/year)

Dose Integration Parameters

	Integration Constants	
ICs	969.5384	ICs=(Co*A*I)/Qb (mg/m)
	Integration Time Limits	
t_o	0.01	Lower time Limit (years)
t_f	25	Upper time Limit (years)
Intervals	2000	Number of intervals of Integration
dt	0.01	Finite time differential (years)

Results

	Integration Error Estimate		
Integration Error (%) =	0.002844	OK - Integration Error is < 1%	
	Chemical Dose Calculation		
Calculated Dose (mg) =	183.8549	=	1.0E-05 risk
Acceptable Dose (mg)	179	=	1.0E-05 risk
	Calculated SSTL		
SSTL (mg/kg)	1.7	Soil Vapor Intrusion to Indoor Air	

Formulas Presented on Following Page

Site Specific Parameters (symbol notation consistent with Sanders and Stern)

Site Spec	C_{soil}	1.70	Representative Soil Concentration (mg/kg)	Boring B-40, 10 ft depth, 10/10/94
Calculated	Co	2.89	Soil Concentration by Volume (g/m^3)	using 1.7 density
Site Spec	L	0.30	Depth to Contamination (m)	first detected benzene at 1 ft
Site Spec	A	3679	Zone of Influence, Building Area (m^2)	assumes 120 x 330 ft building over plume
ASTM 95	Qb	9139	Building Ventilation Rate (m^3/Hr)	ht= 300 cm(ASTM 95), vent rate = .00023/sec (ASTM 95)
ASTM 95	I	20	Inhalation volume (m^3/day)	20 m^3/day(ASTM 95)

Vapor Pathway Risk Screening Model, Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, CA

WA implementation of Jury model, from Sanders and Stern 1994

Appendix E - CALCULATIONS - Commercial Receptor - Soil to Indoor Air SSTL

Formulas

Diffusivity

$$D^{eff} = \frac{\left(\theta_{as}^{10/3} D^{air} H + \theta_{ws}^{10/3} D_{wat}\right) / \theta_t^{\,2}}{\left(\rho_s f_{oc} K_{oc} + \theta_{ws} + \theta_{as} H\right)}$$

Dose

$$Dose = \frac{C_0 AI}{Q_b} \int_o^t e^{\left(-\mu t - \frac{L^2}{4 D^{eff} t}\right)} \left(\frac{D^{eff}}{\pi t}\right)^{1/2} dt$$

For transport media with more than one Diffusivity
ie. Soil Diffusivity and Building Foundation Diffusivity

$$Dose = \frac{C_0 AI}{Q_b} \int_o^t \frac{1}{\frac{1}{X_1} + \frac{1}{X_2}} dt$$

Where

$$X_1 = e^{\left(-\mu t - \frac{L^2}{4 D^{eff}_{soil} t}\right)} \left(\frac{D^{eff}_{soil}}{\pi t}\right)^{1/2}$$

$$X_2 = e^{\left(-\mu t - \frac{L_{concrete}^{\,2}}{4 D^{eff}_{concrete} t}\right)} \left(\frac{D^{eff}_{concrete}}{\pi t}\right)^{1/2}$$

Vapor Pathway Risk Screening Model, Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, CA

WA implementation of Jury model, from Sanders and Stern 1994
Modified 8/2/97 for addendum to RBCA evaluation

Appendix E - CALCULATIONS - Commercial Receptor - Soil to Outdoor Air SSTL

Diffusivity Parameters (symbol notation from ASTM for consistency)

Source			
		Chemical Specific Parameters	
		benzene	Chemical Name
ASTM 95	H	0.222	Henry's Constant
Revised	Thalf	365	Contaminant Half Life (d)
Calculated	μ	0.693147	First order rate constant (years^{-1})
ASTM 95	D^{air}	9.30E-06	Air Diffusion Coefficient (m^2/s)
ASTM 95	D^{wat}	1.10E-09	Water Diffusion Coefficient (m^2/s)
ASTM 95	f_{oc}	0.02	Organic Carbon Fraction
ASTM 95	K_{oc}	0.038	Organic Carbon Partition Coefficient (m^3/Kg)
			(Log Koc = 1.58)
		Soil Specific Parameters	
ASTM 95	ρ_s	1700	Bulk Density(kg/m^3)
ASTM 95	θ_{as}	0.26	Air Content (v/v)
ASTM 95	θ_{ws}	0.12	Water Content (v/v)
ASTM 95	θ_t	0.38	Porosity (v/v)
calc, Jury	D^{eff}_{soil}	3.441672	Effective Diffusion Coefficient - Soil (m^2/year)

Dose Integration Parameters

	Integration Constants	
ICs	2.23	ICs=(Co*A*I)/Qb (mg/m)
	Integration Time Limits	
t_o	0.01	Lower time Limit (years)
t_f	25	Upper time Limit (years)
Intervals	2000	Number of intervals of Integration
dt	0.01	Finite time differential (years)

Results

Integration Error Estimate

Integration Error (%) = 2.48E-02 OK - Integration Error is < 1%

Chemical Dose Calculation

Calculated Dose (mg) =	4.27	=	2.4E-07 risk
Acceptable Dose (mg)	179	=	1.0E-05 risk

Calculated SSTL

SSTL (mg/kg)	71 Soil Vapor to Outdoor Air

Site Specific Parameters (symbol notation consistent with Sanders and Stern)

Site Spec	C_{soil}	1.70	Representative Soil Concentration (mg/kg)	Boring B-40 10 ft depth, 10/10/94
Calculated	Co	2.89	Soil Concentration by Volume (g/m^3)	using 1.7 density
Site Spec	L	0.30	Depth to Contamination (m)	first detected benzene at 1 ft
ASTM 95	δ	2	Ambient Air Mixing height (m)	
ASTM 95	Γ	15	Width of Source Area Parallel to Wind (m)	
ASTM 95	U_{air}	2.25	Ambient Wind Speed (m/sec)	
ASTM 95	I	20	Inhalation volume (m^3/day)	

Formulas

Diffusivity

$$D^{eff} = \frac{\left(\theta_{as}^{10/3} D^{air} H + \theta_{ws}^{10/3} D_{wat}\right) / \theta_t^{2}}{\left(\rho_s f_{oc} K_{oc} + \theta_{ws} + \theta_{as} H\right)}$$

Dose

$$Dose = \frac{C_0 \Gamma I}{U_{air} \delta} \int_{t_o}^{t_f} e^{\left(-\mu t - \frac{L^2}{4 D^{eff} t}\right)} \left(\frac{D^{eff}}{\pi t}\right)^{1/2} dt$$

Vapor Pathway Risk Screening Model, Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, CA

WA implementation of Jury model, from Sanders and Stern 1994
Modified 8/2/97 for addendum to RBCA Evaluation

Appendix E - CALCULATIONS - Commercial Receptor - Ground Water to Indoor Air SSTL

Diffusivity Parameters (symbol notation from ASTM for consistency)

Source		benzene	Chemical Name
		Chemical Specific Parameters	
ASTM 95	H	0.222	Henry's Constant
Site	Thalf	730	Contaminant Half Life (d)
Calculated	μ	0.346574	First order rate constant (years^{-1})
ASTM 95	D^{air}	9.30E-06	Air Diffusion Coefficient (m^2/s)
ASTM 95	D^{wat}	1.10E-09	Water Diffusion Coefficient (m^2/s)
ASTM 95	f_{oc}	0.02	Organic Carbon Fraction
ASTM 95	K_{oc}	0.038	Organic Carbon Partition Coefficient (m^3/Kg)
			(Log Koc = 1.58)
		Soil Specific Parameters	
ASTM 95	ρ_s	1700	Bulk Density(kg/m^3)
ASTM 95	θ_{as}	0.26	Air Content (v/v)
ASTM 95	θ_{ws}	0.12	Water Content (v/v)
ASTM 95	θ_t	0.38	Porosity (v/v)
calc, Jury	D^{eff}_{soil}	3.441672	Effective Diffusion Coefficient - Soil (m^2/year)
		Building Floor Parameters	
Lindeburg	$\rho_{s,concrete}$	2,378	Bulk Density (kg/m^3) 150 lb/ft^3 concrete with 1% air by volume
ASTM 95	n	0.01	Areal Fraction of Cracks in Floor
ASTM 95	$L_{concrete}$	0.15	Concrete Slab Thickness (m)
Calculated	$\theta_{as,concrete}$	0.01	Concrete Air Content (v/v)
Calculated	$\theta_{ws,concrete}$	0	Concrete Water Content (v/v)
Calculated	$\theta_{t,concrete}$	0.01	Concrete Porosity (v/v)
calc, Jury	$D^{eff}_{concrete}$	0.077505	Effective Diffusion Coefficient - Concrete (m^2/year)

Dose Integration Parameters

	Integration Constants	
ICs	570.3167	ICs=(Co*A*I)/Qb (mg/m)
	Integration Time Limits	
t_o	0.01	Lower time Limit (years)
t_f	25	Upper time Limit (years)
Intervals	300	Number of intervals of Integration
dt	0.08	Finite time differential (years)

Results

	Integration Error Estimate		
Integration Error (%) =	5.10E-02	OK - Integration Error is < 1%	
	Chemical Dose Calculation		
Calculated Dose (mg) =	149.5547	=	8.4E-06 risk
Acceptable Dose (mg)	179	=	1.0E-05 risk
	Calculated SSTL		
SSTL (mg/L)	2.03	Ground Water Volatilization to Indoor Air	

Formulas Presented on Following Page

Site Specific Parameters (symbol notation consistent with Sanders and Stern)

Site Spec	Co	1.7	Representative Ground Water Concentration (mg/L) = (g/m^3)	MW-13, 12/20/1995, max in past year
Site Spec	L	2.31	Depth to Contamination (m)	shallowest MW-5 water depth recorded
Site Spec	A	3679	Zone of Influence, Building Area (m^2)	assumes 120 x 330 ft building over plume
ASTM 95	Qb	9139	Building Ventilation Rate (m^3/Hr)	ht= 300 cm(ASTM 96), vent rate = .00023/sec (ASTM96)
ASTM 95	I	20	Inhalation volume (m^3/day)	20 m^3/day(ASTM 96)

Vapor Pathway Risk Screening Model, Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, CA

WA implementation of Jury model, from Sanders and Stern 1994
Modified 8/2/97 for addendum to RBCA Evaluation

Appendix E - CALCULATIONS - Commercial Receptor - Ground Water to Indoor Air SSTL

Formulas

Diffusivity

$$D^{eff} = \frac{\left(\theta_{as}^{10/3} D^{air} H + \theta_{ws}^{10/3} D_{wat}\right) / \theta_t^{2}}{\left(\rho_s f_{oc} K_{oc} + \theta_{ws} + \theta_{as} H\right)}$$

Dose

$$Dose = \frac{C_0 AI}{Q_b} \int_{t_o}^{t_f} e^{\left(-\mu t - \frac{L^2}{4 D^{eff} t}\right)} \left(\frac{D^{eff}}{\pi t}\right)^{1/2} dt$$

For transport media with more than one Diffusivity
ie. Soil Diffusivity and Building Foundation Diffusivity

$$Dose = \frac{C_0 AI}{Q_b} \int_{t_o}^{t_f} \frac{1}{\frac{1}{X_1} + \frac{1}{X_2}} dt$$

Where

$$X_1 = e^{\left(-\mu t - \frac{L^2}{4 D^{eff}_{soil} t}\right)} \left(\frac{D^{eff}_{soil}}{\pi t}\right)^{1/2}$$

$$X_2 = e^{\left(-\mu t - \frac{L_{concrete}^{2}}{4 D^{eff}_{concrete} t}\right)} \left(\frac{D^{eff}_{concrete}}{\pi t}\right)^{1/2}$$

Pepsi Emeryville RBCA
Comm/Ind Scenario-Revised
August 1997

		Commercial/Industrial RBSLs								
Chemical Specific Parameters		Benzene	Toluene	EB	Xylenes	Naphth.	Fluorene	Fluoranth.	Pyrene	BaP
Carcinogenic/noncarcinogenic		c	nc	nc	nc	nc	nc	nc	nc	c
Henry's Constant	H	0.22	0.26	0.32	0.29	0.049	4.87E-03	2.79	2.91E-07	5.80E-08
Air Diffusion Coefficient (cm^2/s)	D^{air}	9.30E-02	0.085	0.076	0.072	0.072	3.63E-02	3.02E-02	2.72E-02	5.00E-02
Water Diffusion Coefficient (cm^2/s)	D^{wat}	1.10E-05	9.40E-06	8.50E-06	8.50E-06	9.40E-06	7.88E-06	6.35E-06	7.24E-06	5.80E-06
Effective Diffusion Coefficient soil (cm^2/s) cal	D^{eff}_s	7.26E-03	6.63E-03	5.93E-03	5.62E-03	5.62E-03	2.84E-03	2.36E-03	1.50E-01	5.98E-01
Carbon - Water Sorption Coefficient (L/kg)	k_{oc}	38	134.90	95.5	239.9	1288.2	7244.35	38018.94	38018.9	389045.1
Log carbon-water sorption (calculated) (L/kg)	Log Koc	1.58	2.13	1.98	2.38	3.11	3.86	4.580000004	4.58	5.59
Soil-water sorbtion coeff (calculated)	k_s	0.38	1.35	0.96	2.40	12.88	72.44	380.19	380.19	3890.45
Solubility (mg/l)	S	1750	535	152	198	31	1.69	0.206	0.132	1.20E-03
Reference dose oral	RfDo		0.2	0.1	2	0.004	0.04	0.04	0.03	
Reference dose - inhal	RfDi		0.11	0.29	2	0.004	0.04	0.04	0.03	
Cancer slope factor-inhal (kg-day/mg)	SFi	0.1								3.9
Cancer slope factor- oral (kg-day/mg)	SFo	0.1								12
Calculated parameters										
Volatilization factors, subsoil -> outdoor (mg/m	VFsamb	1.10E-03	3.94E-04	1.27E-03	1.10E-03	2.00E-04	1.02E-05	2.50E-03	3.23E-08	2.97E-12
Vol factor surficial soil-ambient air (1)	VFss-1	6.69E-08	4.00488E-08	4.89598E-08	2.96589E-08	5.37E-09	5.09E-10	4.84E-09	1.25E-11	3.4793E-12
Vol factor surficial soil - ambient air (2)	VFss-2	7.19E-06	7.1912E-06	7.1912E-06	7.1912E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.1912E-06
Max vol factor (correction to ASTM)	VFss	7.19E-06	7.1912E-06	7.1912E-06	7.1912E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.1912E-06
Surficial soil part - ambient air	VFp	2.3E-12	2.3E-12	2.3E-12	2.3E-12	2.30E-12	2.30E-12	2.30E-12	2.30E-12	2.3E-12
Soil conc for sat vapor and pore-water (mg/kg)	Csat	847.74	780.73	163.33	497.76	401.76	122.55	78.42	50.19	4.67
Commercial/Industrial RBSLs										
RBSL - outdoor ambient air (ug/m^3 - air)		**1.43**	**562**	**1482**	**10220**	**20**	**204**	**204**	**153**	**0.04**
RBSL - subsurface soil to outdoor air (mg/kg)		**1.30**	**1427**	**1171**	**9317**	**102**	**20002**	**82**	**4749129**	**12341113**
RBSL - surficial soil (mg/kg)		**28.34**	**18453**	**10974**	**202430**	**1368**	**13684**	**13684**	**10263**	**0.26**
RBSL - gw to outdoor air (mg/l)		**52.82**	**2.09E+04**	**5.33E+04**	**4.08E+05**	**2.00E+03**	**1.50E+05**	**2.81E+03**	**3.11E+07**	**9361.33**
RBSL - gw to indoor air (mg/l)		**0.214**	**81.79**	**203.37**	**1587.54**	**12.28**	**1874.31**	**9.67**	**435497.12**	**131.578**
Note RBSL = >RES if calculated RBSL > calculated Csat; =>S if calculated RBSL > solubility										
Calculated using Tier 1 methodology. Adjusted for CA benzene cancer slope factor										
Target HI = 1, target cancer risk = 1E-5										
Groundwater pathway calculated parameters										
Vol factor gw->ambient air	VFwamb	2.71E-05	2.69E-05	2.78E-05	2.51E-05	1.02E-05	1.36E-06	7.29E-05	4.93E-09	3.92E-09
Effective Diffusion Coefficient gw(cm^2/s) calc	D^{eff}_{ws}	1.11E-03	9.31E-04	7.82E-04	7.77E-04	1.88E-03	2.51E-03	2.35E-04	1.52E-01	6.08E-01
Effective Diffusion Coefficient cap(cm^2/s) cal	D^{eff}_{cap}	2.17E-05	1.80E-05	1.50E-05	1.50E-05	4.66E-05	3.19E-04	4.34E-06	4.84E+00	19.4419528
Effective Diffusion Coefficient crack(cm^2/s) c	D^{eff}_{crack}	7.26E-03	6.63E-03	5.93E-03	5.62E-03	5.62E-03	2.84E-03	2.36E-03	1.50E-01	5.98E-01
Vol factor gw->enclosed space air	VFwesp	6.68E-03	6.87E-03	7.29E-03	6.44E-03	1.66E-03	1.09E-04	2.11E-02	3.52E-07	2.79E-07

		Construction RBSLs								
Chemical specific parameters		Benzene	Toluene	EB	Xylenes	Naphth.	Fluorene	Fluoranth.	Pyrene	BaP
Carcinogenic/noncarcinogenic		c	nc	nc	nc	nc	nc	nc	nc	c
Henry's Constant	H	0 22	0.26	0.32	0.29	0 049	4.87E-03	2.79	2.91E-07	5 80E-08
Air Diffusion Coefficient (cm^2/s)	D^{air}	9.30E-02	0.085	0.076	0.072	0.072	3 63E-02	3.02E-02	2.72E-02	5.00E-02
Water Diffusion Coefficient (cm^2/s)	D^{wat}	1.10E-05	9.40E-06	8.50E-06	8.50E-06	9.40E-06	7.88E-06	6.35E-06	7.24E-06	5.80E-06
Effective Diffusion Coefficient soil (cm^2/s) calc	D^{eff}_s	7.26E-03	6.63E-03	5.93E-03	5.62E-03	5.62E-03	2.84E-03	2.36E-03	1.50E-01	5.98E-01
Carbon - Water Sorption Coefficient (L/kg)	k_{oc}	38	134.90	95.5	239.9	1288 2	7244.35	38018.94	38018.9	389045.1
Log carbon-water sorption (calculated) (L/kg)	Log Koc	1.58	2.13	1.98	2.38	3.11	3.86	4.58	4.58	5.58999995
Soil-water sorbtion coeff (calculated)	k_s	0.38	1.35	0.96	2.40	12.88	72.44	380.19	380.19	3890.45
Solubility (mg/l)	S	1750	535	152	198	31	1.69	0.206	0.132	1.20E-03
Reference dose oral	RfDo		0.2	0.1	2	0.004	0.04	0.04	0.03	
Reference dose - inhal	RfDi		0.11	0 29	2	0.004	0.04	0.04	0.03	
Cancer slope factor-inhal (kg-day/mg)	SFi	0.1								3.9
Cancer slope factor- oral (kg-day/mg)	SFo	0.1								12
Molecular weight	MW	78	92	106	106	128	166	180	202	252
Calculated parameters										
Volatilization factors, subsoil -> outdoor (mg/m^3-	VFsamb	1.10E-03	3.94E-04	1.27E-03	1.10E-03	2.00E-04	1.02E-05	2 50E-03	3.23E-08	2.97E-12
Vol factor surficial soil-ambient air (1)	VFss-1	6.69E-08	4.00E-08	4.90E-08	2.97E-08	5.37E-09	5.09E-10	4.84E-09	1.25E-11	3.48E-12
Vol factor surficial soil - ambient air (2)	VFss-2	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06
Max vol factor (correction to ASTM)	VFss	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06	7.19E-06
Surficial soil part - ambient air	VFp	2 3E-12	2.3E-12	2.3E-12	2.3E-12	2.30E-12	2.30E-12	2 30E-12	2.30E-12	2.3E-12
Soil conc for sat vapor and pore-water (mg/kg)	Csat	847.74	780.73	163 33	497.76	401.76	122.55	78.42	50.19	4.67
Vol factor gw direction contact-ambient air	VFsw	4 22E-08	3.90E-08	3.64E-08	3.63E-08	3.18E-08	2.01E-08	2.81E-08	3.59E-12	6 65E-13
Inverse overall mass transfer coefficient	1/Ki	7.90E+02	8 56E+02	9.17E+02	9 18E+02	1.05E+03	1.66E+03	1.19E+03	9.27E+06	5.01E+07
Overall mass tranfer coefficient	Ki	1.27E-03	1.17E-03	1 09E-03	1.09E-03	9.55E-04	6 03E-04	8.43E-04	1.08E-07	2.00E-08
Construction RBSLs										
RBSL - outdoor ambient air (ug/m^3 - air)		**17.89**	**7026**	**18524**	**127750**	**256**	**2555**	**2555**	**1916**	**0.46**
RBSL - subsurface soil to outdoor air (mg/kg)		**16.28**	**17836**	**14632**	**116457**	**1276**	**250029**	**1023**	**59364108**	**154263919**
RBSL - surficial soil (mg/kg)		**2.57E+02**	**1.72E+05**	**9.74E+04**	**1.84E+06**	**7.53E+03**	**7.53E+04**	**7.53E+04**	**5.65E+04**	**2.28E+00**
RBSL - gw to outdoor air (mg/l)		**660.24**	**2.61E+05**	**6.66E+05**	**5.10E+06**	**2.50E+04**	**1.88E+06**	**3.51E+04**	**3.89E+08**	**117016.68**
RBSL - gw to indoor air (mg/l)		**2.678**	**1.02E+03**	**2.54E+03**	**1.98E+04**	**1.54E+02**	**2.34E+04**	**1.21E+02**	**5.44E+06**	**1644.721**
RBSL - direct contact with groundwater (mg/l)		**4.52E+02**	**1.60E+06**	**1.61E+06**	**1.62E+06**	**5.36E+06**	**1.43E+07**	**1.37E+07**	**1.62E+07**	**3.77E+01**
Calculated using Tier 1 methodology, assuming 2 year construction duration. Adjusted for CA benzene cancer slope factor										
Target HI = 1, target cancer risk = 1E-5										
Groundwater pathway calculated parameters										
Vol factor gw->ambient air	VFwamb	2.71E-05	2.69E-05	2 76E-05	2.51E-05	1.02E-05	1.36E-06	7.29E-05	4.93E-09	3.92E-09
Effective Diffusion Coefficient gw(cm^2/s) calc	D^{eff}_{ws}	1.11E-03	9 31E-04	7.82E-04	7.77E-04	1.88E-03	2.51E-03	2.35E-04	1.52E-01	6.08E-01
Effective Diffusion Coefficient cap(cm^2/s) calc	D^{eff}_{cap}	2.17324E-05	1.80072E-05	1.49801E-05	1.49977E-05	4.6596E-05	0.000319273	4.34299E-06	4.837106311	19 44195279
Effective Diffusion Coefficient crack(cm^2/s) cal	D^{eff}_{crack}	7.26E-03	6 63E-03	5.93E-03	5 62E-03	5.62E-03	2 84E-03	2.36E-03	1.50E-01	5.98E-01
Vol factor gw->enclosed space air	VFwesp	6.68E-03	6 87E-03	7.29E-03	6 44E-03	1.66E-03	1 09E-04	2.11E-02	3.52E-07	2.79E-07

ATTACHMENT F

TPH, BTEX, AND OTHER COC RESULTS FROM THE JUNE 1996 SUBSLAB SAMPLING, FORMER NEW CENTURY BEVERAGE FACILITY, EMERYVILLE, CALIFORNIA
(TABLES 2, 3, 5, AND 7 FROM PREVIOUS SUBMITTALS)

AND

COMPARISON OF SUBSLAB AND INITIAL INVESTIGATION SOIL SAMPLING RESULTS WITH RELEVANT RBSLs, SSTLs, OR USEPA REGION IX SECOND HALF 1996 PRGs
(TABLE 1)

Table 2. Volatile Organic Compounds in Soil. Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - Subslab Sampling May and July 1996.

Borehole-Sample Depth (ft)	Date Sampled	Method /Lab (a)	B	T	E	X	1,1-DCA	1,2-DCA	1,1-DCE	1,2-DCE Trans/Cis	1,2-DCP	Methylene chloride (b)	PCE	1,1,1-TCA	TCE	VC	Freon 11	Other VOCs
			<---------- parts per billion ---------->															
B64-1.5	05/07/96	GCMS/SAL	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0	**14**	**15**	<5 0	<5 0	<5.0	<5 0	<5.0
B65-1.5	05/07/96	GCMS/SAL	<5.0	<5 0	**980**	**1,100**	<5.0	<5.0	<5.0	<5.0	<5.0	**5.3**	<5 0	<5 0	<5 0	<5.0	<5 0	<5.0
B66-1.5	05/07/96	GCMS/SAL	<5 0	<5 0	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0	<5 0	**14**	<5.0	<5.0	<5 0	<5 0	<5 0	<5.0
B67-1 5	05/07/96	GCMS/SAL	<5 0	<5.0	<5 0	<5 0	<5 0	<5.0	<5 0	<5.0	<5.0	**6.3**	<5 0	<5.0	<5.0	<5.0	<5 0	<5.0
B68-1 5	05/07/96	GCMS/SAL	<5.0	<5.0	<5 0	<5.0	<5 0	<5 0	<5.0	<5.0	<5.0	**16**	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0
B69-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5 0	<5.0	<5 0	<5.0	<5.0	<5 0	**11**	<5 0	<5 0	<5.0	<5.0	<5.0	<5.0
B70-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5 0	<5 0	<5 0	<5 0	<5.0	<5 0	<5.0	**5.7**	<5 0	<5 0	<5.0	<5.0	<5.0	<5.0
B70-4.0	05/07/96	GCMS/SAL	---	---	---	---	<5.0	<5 0	<5.0	<5.0	<5.0	**25**	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0
B71-1.5	05/08/96	GCMS/SAL	<5.0	<5.0	<5 0	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	**67**	<5.0	<5.0	<5.0	<5.0	<5 0	<5 0
B71-3 5	05/07/96	GCMS/SAL	---	---	---	---	<5 0	<5.0	<5.0	<5 0	<5 0	**14**	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0
B72-1 5	05/07/96	GCMS/SAL	<5.0	<5 0	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0	<5.0	**28**	**21**	<5.0	<5.0	<5.0	<5.0	<5.0
B72-3 5	05/08/96	GCMS/SAL	---	---	---	---	<5.0	<5 0	<5.0	<5.0	<5.0	**16**	**100**	<5.0	<5 0	<5.0	<5.0	<5.0
B73-1.5	05/08/96	GCMS/SAL	<5.0	<5 0	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0	<5 0	**30**	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0
B73-3.5	05/08/96	GCMS/SAL	---	---	---	---	<5.0	<5.0	<5.0	<5.0	<5 0	**23**	**5**	<5.0	<5.0	<5.0	<5.0	<5.0
B74-1.5	05/08/96	GCMS/SAL	<5 0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0	**44**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B74-3.5	05/08/96	GCMS/SAL	---	---	---	---	<5.0	<5 0	<5.0	<5 0	<5 0	**<5.0**	<5.0	<5 0	<5.0	<5 0	<5.0	<5.0
B75-1.5	05/08/96	GCMS/SAL	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0	<5.0	<5 0	**<5.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B75-3 5	05/08/96	GCMS/SAL	---	---	---	<5 0	<5.0	<5 0	<5 0	<5.0	<5.0	**22**	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0
B76-1.5	05/08/96	GCMS/SAL	<5.0	<5.0	<5 0	<5 0	<5.0	<5.0	<5 0	<5.0	<5.0	**<5.0**	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0
B76-3.5	05/08/96	GCMS/SAL	---	---	---	<5.0	<5 0	<5.0	<5.0	<5 0	<5.0	**18**	**13**	<5.0	<5.0	<5.0	<5.0	<5.0
B77-1 5	05/08/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0	<5 0	<5 0	<5.0	**24**	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0
B77-4 5	05/08/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.3**	<5.0	<5.0	<5 0	<5 0	<5.0	<5.0
B78-1.5	05/08/96	GCMS/SAL	<5 0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5 0	<5 0	<5.0	<5.0	<5.0
B78-3.5	05/08/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	**5.4**	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0
B79-1 5	05/08/96	GCMS/SAL	<5.0	<5.0	<5 0	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5 0	<5 0	<5.0	<5.0	<5.0
B79-3.5	05/08/96	GCMS/SAL	---	---	---	<5 0	<5.0	<5.0	<5.0	<5.0	<5.0	**7.6**	<5 0	<5.0	<5.0	<5.0	<5.0	<5 0
B80-1.5	05/08/96	GCMS/SAL	<5 0	<5.0	<5.0	<5 0	<5.0	<5 0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5 0	<5 0	<5.0	<5.0	<5 0
B80-5.0	05/08/96	GCMS/SAL	<5 0	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	<5 0	**6.6**	<5 0	<5 0	<5.0	<5.0	<5.0	<5 0
B81-3 0	05/08/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5 0	<5.0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5.0	<5.0	<5.0	<5 0	<5 0
B81-5.0	05/08/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5 0	**5**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B82-1.5	05/07/96	GCMS/SAL	<5.0	<5 0	<5 0	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0	**7.7**	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0
B82-4 0	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0	**7.2**	<5.0	<5.0	<5.0	<5 0	<5 0	<5.0

Table 2. Volatile Organic Compounds in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - Subslab Sampling May and July 1996.

Borehole-Sample Depth (ft)	Date Sampled	Method /Lab (a)	B	T	E	X	1,1-DCA	1,2-DCA	1,1-DCE	1,2-DCE Trans/Cis	1,2-DCP	Methylene chloride (b)	PCE	1,1,1-TCA	TCE	VC	Freon 11	Other VOCs
			<---------- parts per billion ---------->															
B83-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**7.4**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B83-3.5	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**11**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B84-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**6.1**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B85-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**11**	**17**	<5.0	<5.0	<5.0	<5.0	<5.0
B85-3.5	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**9.6**	**51**	<5.0	<5.0	<5.0	<5.0	<5.0
B86-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	**13**	<5.0	<5.0	<5.0/120	<5.0	**16**	**320**	**36**	**120**	<5.0	<5.0	<5.0
B86-3.5	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0/77	<5.0	**9.2**	**120**	<5.0	**47**	<5.0	<5.0	<5.0
B87-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**14**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B87-3.5	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**7**	**6.9**	<5.0	<5.0	<5.0	<5.0	<5.0
B88-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	6.1	<5.0	<5.0	<5.0	<5.0	<5.0	**8.1**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B88-3.5	05/07/96	GCMS/SAL	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B89-1.5	05/07/96	GCMS/SAL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**6.2**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B96-1.5	07/29/96	GCMS/SAL	---	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-97-1.5	07/29/96	GCMS/SAL	---	---	---	---	<5.0	<5.0	<5.0	<5.0	<5.0	**<5.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Abbreviations.

1,1-DCA = 1,1-dichloroethane
1,2-DCA = 1,2-dichloroethane
1,1-DCE = 1,1-dichloroethylene
1,2-DCE =1,2-dichloroethylene
1,2-DCP = 1,2-dichloropropene
Methchlde = methylene chloride (dichloromethane)
PCE = tetrachloroethylene

Abbreviations cont.:

1,1,1-TCA = 1,1,1-trichloroethane
1,1,2-TCA = 1,1,2-trichloroethane
TCE = trichloroethylene
VC = vinyl chloride
Freon 11 = trichlorofluoromethane
--- = not analyzed

Footnotes:

(a) GCMS = Gas Chromatograph/Mass Spectrometer
SAL = Superior Analytical Laboratory, Martinez, California
(b) Methylene Chloride - Possible laboratory contaminant.

Table 3. Metals in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - Subslab Sampling May and July 1996.

Borehole-Sample Depth (ft)	Date Sampled	Lab	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
			<---------- parts per million ---------->																
B64-1 5	05/07/96	SAL	<5 0	5.7	280	0.52	0.94	40	10	27	640	0.26	1.4	38	<5 0	<1.0	<10	31	130
B70-1 5	05/07/96	SAL	<5 0	<5.0	200	0.59	0.75	34	10	24	26	0.11	1.3	46	6.5	<1 0	<10	30	80
B72-1.5	05/07/96	SAL	<5 0	5.5	160	0.43	0.83	31	8.2	21	130	0.32	<1.0	31	<5.0	<1 0	<10	26	110
B74-1 5	05/08/96	SAL	<25	<25	130	<1.3	1.5	41	17	24	<1.3	0.08	<5.0	64	<25	<5.0	<10	39	82
B76-1 5	05/08/96	SAL	<25	<25	160	<1.3	<1.3	28	17	23	48	0.1	<5.0	41	<25	<5 0	<50	33	87
B78-3.5	05/08/96	SAL	<25	<25	300	<1.3	1.7	38	27	30	140	0.18	<5.0	62	<25	<5.0	<50	41	230
B80-5.0	05/08/96	SAL	<25	<25	200	<1.3	1.4	32	20	24	<1.3	0.06	<5.0	55	<25	<5.0	<50	43	61
B81-5.0	05/08/96	SAL	<5.0	7	140	0.62	0.47	26	12	18	5.9	0.07	1.1	28	<5 0	<1 0	<50	33	37
B83-1.5	05/07/96	SAL	<25	<25	170	<1.3	<1.3	37	16	23	<1.3	0.1	<5.0	58	<25	<5.0	<50	39	78
B90-1 5	07/29/96	SAL	---	---	---	---	---	---	---	---	8.5	---	---	---	---	---	---	---	---
TTLC			500	500	1,000	75	100	2,500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000

Abbreviations:

SAL= Superior Analytical Laboratory, Martinez, California
TTLC = Total Threshold Limit Concentration
--- = Not analyzed

Table 5. Hydrocarbons in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - July 1996.

Borehole-Sample Depth (ft)	Date Samped	Analytical Lab	TEPH-D	TEPH-U	TVPH-G	TVPH-U	PNA
			<---------- parts per million ---------->				
B96-1.5	07/29/96	SAL	340	ND	---	---	ND
B96-7.5	07/29/96	SAL	880	---	---	---	ND
B97-1.5	07/29/96	SAL	<1	ND	---	---	ND
B97-7.5	07/29/96	SAL	460	---	---	---	ND

Abbreviations:

TEPH-D = Total Extractable Petroleum Hydrocarbons - Diesel
TEPH-U = Total Extractable Petroleum Hydrocarbons - Unknown hydrocarbons
TVPH-G = Total Volatile Petroleum Hydrocarbons - Gasoline range
TVPH-U = Total Volatile Petroleum Hydrocarbons - Unknown hydrocarbons
PNA = Polynuclear Aromatic Hydrocarbons by EPA Method 8310
SAL = Superior Analytical Laboratory, Martinez, California
--- = Not analyzed
ND = None detected

Table 7. Hydrocarbons and pH in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - May and July 1996.

Borehole-Sample Depth (ft)	Date Samped	Analytic Lab	pH	TEPH-D	TEPH-U	TVPH-G	TVPH-U	PAH
				<---------- parts per million ---------->				
B64-1.5	05/07/96	SAL	7.2	<2.5	68(a)	---	---	---
B65-1.5	05/07/96	SAL	---	<1	42(b)	<200 (c)	1,700	---
B68-1.5	05/07/96	SAL	---	<1	4(a)	---	---	---
B69-1.5	05/07/96	SAL	6.3	---	---	---	---	---
B70-1.5	05/07/96	SAL	8.0	<1	25(a)	---	---	---
B70-4.0	05/07/96	SAL	6.8	---	---	---	---	---
B71-1.5	05/08/96	SAL	8.7	<1	1(a)	---	---	---
B71-3.5	05/08/96	SAL	6.4	---	---	---	---	---
B72-1.5	05/08/96	SAL	7.4	<10	55(a)	---	---	---
B72-3.5	05/08/96	SAL	6.5	---	---	---	---	---
B73-1.5	05/07/96	SAL	7.3	<13	320(a)	---	---	---
B73-3.5	05/07/96	SAL	6.6	---	---	---	---	---
B74-1.5	05/08/96	SAL	6.9	<1	nf	---	---	---
B74-3.5	05/08/96	SAL	6.6	---	---	---	---	---
B75-1.5	05/08/96	SAL	7.0	<1	17(a)	---	---	---
B75-3.5	05/08/96	SAL	6.5	---	---	---	---	---
B76-1.5	05/08/96	SAL	7.3	<1	2(a)	---	---	---
B76-3.5	05/08/96	SAL	6.6	---	---	---	---	---
B77-1.5	05/08/96	SAL	8.1	<1	46(a)	---	---	---
B77-4.5	05/08/96	SAL	7.4	---	---	---	---	---
B78-1.5	05/08/96	SAL	6.8	---	---	---	---	---
B78-3.5	05/08/96	SAL	7.0	---	---	---	---	---
B79-1.5	05/08/96	SAL	8.0	---	---	---	---	---
B79-3.5	05/08/96	SAL	7.8	---	---	---	---	---
B80-1.5	05/08/96	SAL	7.5	---	---	---	---	---

Table 7. Hydrocarbons and pH in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - May and July 1996.

Borehole-Sample Depth (ft)	Date Samped	Analytic Lab	pH	TEPH-D	TEPH-U	TVPH-G	TVPH-U	PAH
				<---------- parts per million ---------->				
B80-5.0	05/08/96	SAL	7.0	---	---	---	---	---
B81-3.0	05/08/96	SAL	7.4	---	---	---	---	---
B81-5.0	05/08/96	SAL	6.8	<1	nf	---	---	---
B82-1.5	05/07/96	SAL	---	---	---	---	---	---
B82-4.0	05/07/96	SAL	---	---	---	---	---	---
B83-1.5	05/07/96	SAL	6.5	---	---	---	---	---
B83-3.5	05/07/96	SAL	6.3	---	---	---	---	---
B84-1.5	05/07/96	SAL	7.4	---	---	---	---	---
B85-1.5	05/07/96	SAL	7.6	<1	10(a)	---	---	---
B85-3.5	05/07/96	SAL	---	<1	nf	---	---	---
B86-1.5	05/07/96	SAL	7.9	<20	73(a)	---	---	---
B86-3.5	05/07/96	SAL	---	<1	nf	---	---	---
B87-1.5	05/07/96	SAL	6.7	<1	2(a)	---	---	---
B87-3.5	05/07/96	SAL	---	<1	nf	---	---	---
B88-1.5	05/07/96	SAL	6.7	---	---	---	---	---
B88-3.5	05/07/96	SAL	7.4	---	---	---	---	---
B89-1.5	05/07/96	SAL	7.6	<1	45(a)	---	---	---
B90-2.0	07/29/96	SAL	---	<1	---	<1	---	---
B91-2.0	07/29/96	SAL	---	<1	33(d)	<1	---	---
B92-1.5	07/29/96	SAL	---	<1	---	<1	---	---
B93-1.5	07/29/96	SAL	---	<1	---	<1	---	---
B96-1.5	07/29/96	SAL	---	340.0	nf	---	---	nf
B96-7.5	07/29/96	SAL	---	880.0	---	---	---	nf
B97-1.5	07/29/96	SAL	---	<1	nf	---	---	nf

Table 7. Hydrocarbons and pH in Soil, Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California - May and July 1996.

Borehole-Sample Depth (ft)	Date Samped	Analytic Lab	pH	TEPH-D	TEPH-U	TVPH-G	TVPH-U	PAH
				<---------- parts per million ---------->				
B97-7.5	07/29/96	SAL	---	460.0	---	---	---	nf
0796-01*	07/29/96	SAL	---	---	---	---	---	nf
0796-02*	07/29/96	SAL	---	---	---	---	---	nf

Abbreviations:

TEPH-D = Total Extractable Petroleum Hydrocarbons - Diesel
TEPH-U = Total Extractable Petroleum Hydrocarbons - Unknown hydrocarbons
TVPH-G = Total Volatile Petroleum Hydrocarbons - Gasoline range
TVPH-U = Total Volatile Petroleum Hydrocarbons - Unknown hydrocarbons
PAH = Polynuclear Aromatic Hydrocarbons by SW-846 Methods 8310/3550
--- = Not analyzed
nf = None found
* = ground water samples from MW-1 (0796-01) and MW-2 (0796-02)

Footnotes:

(a) Heavier hydrocarbons were found in the range of diesel, but do not resemble a diesel fingerprint. Possible motor oil.
(b) Lighter and heavier hydrocarbons were found in the range of diesel, but do not resemble a diesel fingerprint. Possible mixture of gasoline and diesel.
(c) Hydrocarbons were found in the range of gasoline, but do not resemble a gasoline fingerprint.
(d) Hydrocarbons were found in the range of motor oil.

Table. 1 Subslab and Initial Investigation Soil Sampling Results Compared to USEPA Region IX Industrial PRGs - Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California

Compounds Detected	Maximum Concentration Detected (ppm)	Sample ID	RBSL, SSTL or PRG [1] (ppm)	Carcinogen (CA) or Non-Carcinogen (NC)
Metals				
Antimony	<25	-	680	NC
Arsenic	7	B81-5.0	22 [2]	NC
Arsenic	7	B81-5.0	24 [3]	CA
Barium	300	B78-3 5	100,000	NC (MAX)
Beryllium	0.62	B81-5.0	11	CA
Cadmium	1.7	B78-3.5	850	NC
Chromium VI	41	B74-1.5	640	CA
Cobalt	27	B78-3.5	97,000	NC
Copper	30	B78-3.5	63,000	NC
Lead	640	B64-1.5	1,000	NC
Mercury	0.32	B72-1.5	68 [4]	NC
Molybdenum	1 4	B64-1.5	8,500	NC
Nickel	64	B74-1.5	34,000	NC
Selenium	6.5	B70-1.5	8,500	NC
Silver	<5 0	-	8,500	NC
Thallium	<50	-	NONE	NC
Vanadium	43	B80-5.0	12,000	NC
Zinc	230	B78-3.5	100,000	NC (MAX)
Volatile Organic Compounds				
Benzene	0.007	B48-5.0	1.7 [5]	CA
Toluene	<0 005	-	54.5 [6]	NC (SAT)
Ethylbenzene	0.980	B65-1.5	575 [6]	NC (SAT)
Xylenes	1 100	B65-1.5	208,000 [6]	NC (SAT)
1,1-Dichloroethane	0.013	B86-1.5	1,700	NC
1,2-Dichloroethane	<0 005	-	5.5	CA
1,1-Dichloroethene	<0.005	-	0.8	CA
Cis-1,2-Dichloroethene	<0.005	-	100	NC
Trans-1,2-Dichloroethene	0 120	B86-1 5	270	NC
1,2-Dichloropropane	<0.005	-	6.8	CA
Methylene chloride	0.067	B71-1.5	180	CA
Tetrachloroethene (PCE)	0 320	B86-1.5	170	CA
1,1,1-Trichloroethane	0.036	B86-1.5	3,000	NC (SAT)
Trichloroethene (TCE)	0.120	B86-1.5	70	CA
Trichlorofluoromethane (Freon 11)	<0.005	-	1,300	NC
Vinyl chloride	<0.005	-	0.35	CA

(1) PRGs for Carcinogens at Cancer Risk = 1E-5, PRGs for Non-Carcinogens at Hazard Quotient = 1

(2) Non-carcinogenic endpoint

(3) Carcinogenic endpoint applies to As(III)

(4) PRG for mercury reported as methyl mercury

(5) For Benzene, value is SSTL from Risk-Based Corrrective Action analysis

(6) For Toluene, Ethylbenzene, and Xylenes, values are RBSLs from Risk-Based Corrrective Action analysis

Abbreviations

USEPA = Unites States Environmental Protection Agency
PRG = Preliminary Remediation Goal (for Industrial Soil), from August 1, 1996 EPA Region IX version
ppm = Parts per million
- = Sample ID not given because compound was not detected in any samples
NC = Non-Carcinogen
CA = Carcinogen
SAT = Value for PRG is based on the soil saturation equation
MAX = Value for PRG is a non-risk based "ceiling limit" concentration = 100,000 mg/kg

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SITEWIDE RISK MANAGEMENT PLAN

for

Former New Century Beverage Company Facility
1150 Park Avenue
Emeryville, California

prepared by

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

WA Job # 14-0307-98

Submitted to

Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94102

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August 4, 1997

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James D. Ponton
California Registered Geologist No. 6106

Weiss Associates work for the former New Century Beverage Company facility was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate and satisfy the scope of work prescribed by the client for this project. The data, findings, recommendations, specifications or professional opinions were prepared solely for the use of the New Century Beverage Company in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either express or implied, and are not responsible for the interpretation by others of the contents herein.

Carolyn J. Atwood Date
Senior Project Engineer, R.E.A. No. 01704

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FIGURES

TABLES

1. PURPOSE AND SCOPE

This Sitewide Risk Management Plan (SRMP) has been prepared for at the former New Century facility located at 1150 Park Avenue in Emeryville, California (the Site) (Figure 1) at the request of the Alameda County Health Care Services Agency (ACHCSA), based on their letter dated April 29, 1997. The plan includes a discussion of the site background including remedial actions undertaken at the site, residual chemical constituents in site soil and ground water, and the results of the Risk-Based Corrective Action evaluation prepared for the site. The SRMP further describes the risk management measures that should be implemented to manage existing, low level shallow soil and shallow ground water contamination that are proposed to remain in place following closure of this site.

2. SITE BACKGROUND

2.1 Site History and Current Use

The site of interest is shown in Figure 1. Soft drink production, packaging, and distribution began on the 2.9-acre 1150 Park Avenue site in 1958. The bottling plant was constructed on the site of the former Oakland Ball Park. Historic aerial photographs and fire insurance maps show the site as undeveloped, except for a residence, prior to its use as a ball park in about 1913.

Between 1958 and 1995, the bottling plant housed administrative offices, a quality control laboratory, a production area which included soft-drink canning, a packaging area, product storage, and two underground storage tanks (USTs) (Figure 2). The USTs consisted of one 10,000 gallon UST (UST #1) formerly located along the northwest side of the building. That tank was used to store gasoline from about 1958 to 1987, and diesel from 1987 until it was taken out of service in 1993. The second tank was a 10,000 gallon diesel UST which was removed in 1987 from a location near the main Park Avenue entrance to the facility (UST #2).

The warehouse north of the main building was used to store products packaged for distribution, and also contained the vehicle maintenance shop. Operations at the plant included treatment of incoming municipal water; formulation and canning of soft drinks; packaging and warehousing of canned product for distribution; and vehicle and equipment maintenance.

From November 1992 until June 1996, New Century Beverage (NCB) also leased the adjacent 2.1-acre unpaved parcel west of the property from Del Monte Foods (Figure 2). This parcel was used for delivery truck and employee parking, as Del Monte did prior to the lease arrangement. Based on aerial photographs, the 2.1-acre Del Monte parcel was part of the ball park and was unpaved and unimproved thereafter.

In August 1996, New Century demolished the plant. The site is currently unpaved, fenced, and has no structures on it.

2.2 Topography

The Site is located about 40 ft above mean sea level on an alluvial plain that gently slopes toward San Francisco Bay, located about one-half mile to the west (Figure 1). The north-northwest trending Berkeley Hills are about two miles to the east. Ground surface at the site slopes gently southwest, and north of the site, the topography slopes northwest toward Temescal Creek, about 1,500 ft north of the Site. The Site is currently an unpaved, vacant lot.

2.3 Hydrogeology

The uppermost sediments beneath the site vicinity have been characterized as Quaternary alluvial and fluvial deposits consisting primarily of fine sand, silt and silty clay (Helley, 1972). Interfluvial basin deposits consisting of plastic silty clay and clay underlie the fluvial deposits. Descriptions of soil samples from the New Century site indicate that the site is underlain by interfingering sediments ranging from silty clay to silty sand, sediments with low to moderate estimated permeabilities.

Since monitoring commenced in 1994, ground water beneath the site has fluctuated seasonally between 4 and 11 ft below grade. Ground water consistently flows southwestward towards the San Francisco Bay at an average gradient of 0.017 ft/ft. This flow direction is consistent with the flow direction beneath the adjacent Del Monte property, located immediately west of the site (CH_2M HILL, 1992).

2.4 Adjacent Hydrocarbon Sources

Previous investigations have identified numerous potential off-site sources of hydrocarbons in the surrounding commercial/industrial neighborhood. Adjacent properties with former or existing underground fuel tanks include: Standard Brands Paint, (a former gasoline service station northeast of the site); the former Emeryville Fire Department Station east of the site; the "Corner Site," (a former gasoline service station southeast of the site); and the United States Post Office, located east of the site (Figure 2). All four properties are located upgradient of the New Century property. Based on the distribution of hydrocarbons in ground water beneath the New Century site, it appears that petroleum hydrocarbons have migrated onto the New Century property from the Standard Brands property or the former Emeryville Fire Department and the Corner Site.

2.5 Site Environmental History

New Century Beverage has fully characterized the site. Table 1 presents a summary of completed investigation and remedial activities conducted at the site. The site characterization has included drilling and sampling soil and ground water from 97 soil borings and installing and sampling a network of 14 ground water monitoring wells.

2.6 Summary of Site Remedial Activities

In August 1995, the Alameda County Health Care Services Agency (ACHCSA) approved the Remedial Action Plan (RAP) for the Site (WA, 1995). The RAP was developed to address the occurrence of fuel hydrocarbons in soil and ground water in the vicinity of the two former USTs described in Section 2.1 (Figure 2). The RAP evaluated four alternative remedial actions which included: 1) no action; 2) soil excavation and ground water monitoring; 3) ground water extraction and treatment in addition to alternative #2; and 4) soil vapor extraction and ground water monitoring.

Soil excavation of hydrocarbon-impacted soil in the vicinity of the two UST source areas was selected as the most feasible remedial option for the site.

In October and November of 1995, WA excavated source area soils in the vicinity of the two former underground storage tanks on the site in accordance with the approved RAP (Figure 2). Soil was excavated from the vicinity of UST #1 and from the vicinity of UST #2. Post excavation soil samples collected from the UST #1 excavation indicated that the remaining soils in the vicinity of UST #1 were below the 100 parts per million (ppm) TPH target level provided by the ACHCSA in their approval of the RAP. Residual hydrocarbons exceeding the 100 ppm TPH-G initial target level were and are present in the vicinity of UST#2.

In November 1995, following the removal of source area soils in the vicinity of UST #2, WA installed additional shallow soil borings (B-50 through B-63) in the vicinity of the former diesel tank to further characterize the lateral extent of hydrocarbon-impacted soil in the area of the tank. Total extractable petroleum hydrocarbons as diesel (TEPH-D) above the 100 ppm TPH target level established by the ACHCSA were encountered on the north and west sides of the excavation. Additionally, soil samples analyzed from the vicinity of UST #2 contained no PNAs.

In July 1996, WA collected additional soil samples near former UST #2. To specifically determine the presence or absence of polynuclear aromatic hydrocarbons (PNAs) in surface soils and subsurface soils in the vicinity of former diesel UST #2, soils samples from B-96 and B-97 were collected at 1.5 and 7.5 feet, and analyzed for BETX, TEPH-D, and PNAs, the latter by EPA method 8310/3550. Samples from B-94 and B-95 were collected and held pending the outcome of samples in the vicinity, and were not analyzed. Analytic results for all soil borings were presented in the December 9, 1996 RBCA evaluation for the site (WA, 1996b).

Prior to demolition in May-June of 1996, subslab soil samples were collected throughout the site (borings B-64 through B-95).

Based on the August 1995 approval of the RAP for this site by the ACHCSA, four quarters of ground water monitoring data in the areas of the two USTs subsequent to excavation of source area soils were required for this site. The third quarter 1996 sampling event represents the fourth of the required four events. Ground water monitoring results have been summarized in the December 9, 1996 RBCA evaluation for this site. Ground water monitoring has been discontinued, based on completion of the required sampling.

3. RESIDUAL CHEMICAL CONSTITUENTS IN SITE SOIL AND GROUND WATER

3.1 Identification of Chemicals of Concern

Site investigations have identified specific COCs that are associated with gasoline and diesel in soil and ground water. The COCs considered in the Risk-Based Corrective Action (RBCA) Risk Evaluation (WA, 1996b) for the Site include BTEX and four PNAs: naphthalene, fluoranthene, fluorene and pyrene. Although benzo(a)pyrene was not detected in any soil samples at the site, it was included at a presumptive level in the RBCA addendum (WA 1997) at the request of the ACHCSA.

Although sporadic and trace concentrations of halogenated volatile organic compounds (HVOCs) have been detected in Site soil and ground water, these HVOCs were not considered in the RBCA evaluation because it is unlikely that they originated from the former on-site USTs. Similarly, metals have been detected in site soils but in areas unassociated with the former tanks. However, WA compared the maximum concentration of each HVOC in soil and ground water and each metal in soil with USEPA PRGs. All maximum HVOC and metal concentrations are below their respective USEPA PRGs.

Total petroleum hydrocarbons (TPH) as TPH has not been identified as a contaminant of concern, following the ASTM guidance. However, it should be noted that TPH as both gasoline and diesel remain present above detection limits in some areas on-site. Specifically, TPH is present in site subsurface soil beneath the former dispensers and at the limits of excavation for the two former underground tanks (Figure 2). The maximum detected TPH concentration was 22,000 ppm (mg/kg) as diesel, near the former dispenser location.

The distribution of the COCs considered in the RBCA evaluation is discussed below.

3.2 Residual Constituents in Surface Soil

No PNAs have been identified in surface soil (soil between ground surface and 3 ft depth) based on sampling conducted in 1996. Other COCs above laboratory method detection limits have been identified in three areas:

1. BETX near the former (UST #1) and associated product piping and dispensers (Figure 2). WA excavated surface soil in November 1995 from the area south of the tank, but due to the presence of a site building at the time, over-excavation to completely remove all hydrocarbon-contaminated soil could not be completed. Benzene at 0.008 ppm and 5.2 ppm xylenes remain in surface soil in this area.

2. Ethylbenzene and xylenes beneath the former vehicle maintenance area located in the southwest corner of the former warehouse (Figures 2 and 5). A maximum of 0.98 ppm ethylbenzene and 1.1 ppm xylenes have been detected. Hydrocarbons in the former vehicle maintenance area are not associated with the underground fuel tanks.
3. Xylenes beneath the chemical storage area in the southeastern portion of the property (Figure 2). Xylenes at 6.1 ppm were detected in one soil sample. Again, hydrocarbons not associated with the underground tanks were not considered in the RBCA evaluation.

Since the date that surface soil samples giving these results were collected, the buildings and other structures on-site have been demolished or removed from the site. During the demolition, it is likely that surface soils in each of these areas were significantly disturbed, likely resulting in significant aeration of these soils and a resulting decrease in COC concentration.

3.3 Residual Constituents in Subsurface Soil

No PNAs have been identified in subsurface soil (soil below 3 ft depth per American Society for Testing and Materials (ASTM) definition) based on sampling conducted in 1996. BTEX and TPH, however, have been identified in unsaturated subsurface soil in two areas:

1. In the vicinity of the former (UST #1) and associated product piping and dispensers and in the smear zone above the water table downgradient of UST #1. WA over-excavated impacted subsurface soil from south of the tank in November 1995. Up to 1.7 ppm benzene remains in subsurface soil.
2. In the vicinity of the former (UST #2) and in the smear zone above the water table downgradient of UST #2. WA over-excavated impacted subsurface soil from west of the tank in November 1995. Based on soil sample results, no benzene remains in soil around UST #2.

Xylenes at 0.008 ppm were detected in unsaturated, subsurface soil in two other areas of the site. However, because no other hydrocarbons were detected in soil from these areas, WA has concluded that these positive detections are not significant. Furthermore, this level is below the xylene concentration used in the RBCA evaluation.

3.4 Residual Constituents in Ground Water

COCs have been detected in ground water samples from monitoring wells and in grab ground water samples from borings on-site. Limited hydrocarbon impacts have been identified in ground water in these areas:

1. Near and downgradient of former UST #1 and #2. New Century has been monitoring ground water near and downgradient of these two source areas since 1994. During the most recent four quarters of monitoring, the maximum detected benzene concentration was 1.7 ppm in MW-13. Toluene, xylenes, and ethylbenzene are also present in MW-13 between 0.0006 and 0.786 ppm. Low

concentrations between 0.0005 and 0.0034 ppm of four PNAs likely associated with diesel also have been detected in MW-5 and/or MW-13: pyrene, fluorene, flouranthene, and naphthalene.

2. Beneath the northeast corner of the site. Petroleum hydrocarbons in ground water in this area are likely from an upgradient, off-site source. Grab ground water samples from boring B-10 contained 0.034 ppm benzene. Only up to 0.021 ppm benzene was detected in samples from well MW-2.

3. Beneath the southeast corner of the site. Petroleum hydrocarbons in ground water in this area are also likely from an upgradient, off-site source. Only 0.001 ppm benzene was detected in a grab sample from boring B-3 and no BETX were detected in samples from wells MW-3 and MW-4.

Because petroleum hydrocarbons in the latter two areas are the result of off-site sources, WA did not considered data from these areas in the RBCA evaluation. However, the maximum hydrocarbon concentrations in the latter two areas are lower than hydrocarbon concentrations associated with the site source areas.

Figure 5 shows the extent of known petroleum-hydrocarbon related ground water contamination at the site, based on the most recent 1996 ground water monitoring data.

4. SUMMARY OF RISK-BASED CORRECTIVE ACTION EVALUATION

In 1996, WA completed a RBCA Evaluation for the former New Century Beverage Company Facility in Emeryville, California (WA 1996b). In response to comments from the ACHCSA in a letter dated April 29, 1997, WA prepared an addendum to the RBCA (WA 1997). The evaluation was performed in accordance with the ASTM Standard E 1739-95, *Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM, 1995), and additionally included a construction scenario at the request of the ACHCSA. The evaluation also served as a formal amendment to the Remedial Action Plan submitted in January 1995 and approved in August 1995. The objective of the evaluation was to determine the most appropriate future action in relation to the presence of subsurface petroleum hydrocarbons from the former site USTs based on site-specific characteristics of the site and the extent and nature of the COCs.

4.1 Potential Receptors

Based on previous investigations, potential receptors to COCs beneath the site where identified and are presented below.

4.1.1 Human Receptors

Because all site buildings have been demolished and the site is vacant, no current residential or commercial human receptors exist at the site. No off-site receptors are impacted by the known hydrocarbon plume. According to the Emeryville Planning Department, the property is zoned for commercial development, therefore the future workers would be potential receptors. The RBCA therefore evaluated a hypothetical future commercial receptor and a hypothetical future construction worker on-site, as well as an off-site residential receptor.

4.1.2 Ground Water Wells in the Site Vicinity

There is no current or anticipated future use of ground water at the site. During site demolition, an apparent former water supply well was discovered. According to anecdotal evidence from a former employee of the NCB facility, the well was originally drilled in the 1950's for possible plant water supply, but the water quality and quantity were not adequate. Therefore, the well was never used. The discovery was reported to the ACHCSA and the Alameda County Flood Control and Water Conservation Department (ACFCWCD), the local well permitting agency. The well was destroyed under permit from Zone 7 Water District in November 1996. The well did not appear to be screened in the first water-bearing zone.

According to the ACFCWCD, no documented domestic or municipal supply wells are within one-half mile of the site. ACFCWCD records show that one industrial supply well is located at 3516 Adeline Street, near the intersection of Adeline and Hollis Streets, about a half-mile south (crossgradient) of the site. The well was installed to 97 ft below ground surface in 1936. It is not known whether the well still exists and is actively used. To be conservative, WA assumed this well to be a potential receptor for the purpose of the RBCA evaluation.

ACFCWCD will allow supply wells near or on the site in the future. However, the ACFCWCD requires a 50-ft deep sanitary seal for municipal and industrial supply wells, and therefore, it is not probable that petroleum hydrocarbons in shallow ground water beneath the site would impact water captured by a future supply well.

4.1.3 Environmental Receptors

WA reviewed topographic maps and surveyed the site vicinity and did not identify any potential sensitive environmental receptors. San Francisco Bay is about one-half mile to the west and Temescal Creek, which flows into the Bay, is about 1,500 ft north of the site. Based on their distance from their site, and the known extent of the shallow ground water contaminant plume, WA does not consider either surface water body to be a potential receptor of COCs from the site.

4.2 Summary of Risks to the Potential Receptors

The RBCA evaluation assessed potential impacts of the COCs on future potential site occupants and on ground water quality, by developing site-specific target levels for each COC for comparison with site characterization data. The COCs include benzene, ethylbenzene, toluene, xylenes, naphthalene, fluorene, fluoranthene, pyrene, and benzo(a)pyrene. For the RBCA, WA evaluated three different exposure scenarios in the assessment: construction, commercial/industrial, and residential. The construction scenario was added at the request of the ACHCSA. For each exposure scenario, potentially complete exposure pathways were identified and evaluated and the conclusions for the evaluations are summarized below.

WA established Tier 1 risk-based screening levels (RBSLs) for each COC/potentially complete exposure pathway pair in each scenario. These conservative Tier 1 RBSLs were established using the models and recommended parameter values in the ASTM Standard. Tier 1 RBSLs represent extremely conservative concentrations, below which no significant adverse effects on human health are expected to occur. For those contaminant/pathway pairs for which the conservative Tier 1 RBSLs were exceeded in a particular medium (surface soil, subsurface soil, or ground water), WA completed a Tier 2 analysis. Tier 2 site-specific target levels (SSTLs), which represent the same level of health protection as the Tier 1 RBSLs, were developed using generally accepted modeling methods with site-specific characterization data. The Tier 2 SSTL is a site-specific, rather than generic, level below which contaminants are not expected to pose a significant threat to human health, including by ground water ingestion.

The 1995 source area excavations removed much of the vadose zone source area, reducing future leaching of hydrocarbons into ground water and removing most soil with more than 100 ppm TPH. This analysis shows that worst-case (maximum) site-specific levels of COCs remaining in the

subsurface do not exceed Tier 1 RBSLs or Tier 2 SSTLs for any of the three exposure scenarios. Therefore, residual contaminants do not appear to pose any significant risk to future potential receptors at the site, nor to off-site residential use of shallow ground water. Petroleum hydrocarbons in ground water are limited to a stable, on-site plume. Furthermore, natural attenuation is demonstrably occurring within the plume, and is likely to eventually reduce hydrocarbon concentrations to below maximum contaminant levels for drinking water.

5. SITE MANAGEMENT CONTROLS

This Section presents the descriptions of the site management controls that should be implemented prior to initiating any activities at 1150 Park Avenue, Emeryville, CA. The following descriptions are intended to guide the development of the site management control documents. The specific site management control documents are not included in this plan because at this time the proposed plan for the development of the site is not known in detail to New Century Beverage, nor does New Century Beverage have any control over future development of the property.

5.1 Construction Management Plan

The property may be redeveloped in the future. Before the site is redeveloped, a Site Construction Management Plan should be prepared and will address the environmental issues associated with construction at the site. The plan should include, at a minimum, procedures for:

- handling chemically impacted soils and water as may be required by federal, state, or local agencies;
- institutional and/or engineering controls necessary to prevent migration of pollution during construction (as in the case of a construction related dewatering program or site regrading project);
- preventing any potential vertical conduits between the shallow and deeper aquifers during construction;
- as necessary if ACHCSA does not approve the removal of existing ground water monitoring wells prior to construction activities, protecting existing wells on-site or destroying wells under proposed buildings and potentially reinstalling the wells after construction; and,
- handling heavy construction equipment that might encounter contaminated subsurface soils.

Further, a site-specific Health and Safety Plan, discussed below, should be prepared.

5.2 Health and Safety Plan

Prior to initiating any site activities that may involve exposure to contaminants in soil or ground water a site specific Health and Safety Plan should be prepared in compliance with OSHA, Cal-OSHA and local regulations. The Health and Safety Plan should be submitted for review to the Alameda County Department of Environmental Health (ACDEH) and the Regional Water Control Board (RWQCB). The Health and Safety Plan should be followed during any site activity involving potential exposure to soil and ground water contamination.

A Health and Safety plan typically includes the following information: project safety authority matrix, analysis of potential chemical and physical hazards, work implementation plan identifying exclusion zones, transition zones and support zones, discussion of personal protective equipment including levels of protection, respiratory protection and clothing, environmental monitoring plans, decontamination procedures, waste disposal, discussion of safe work practices, emergency response procedures, training requirements, medical surveillance plan, and recordkeeping plan.

5.3 Mitigation Measures to Prevent Future Vertical Conduits

Future vertical conduits for transport of contaminants from known areas of subsurface soil and shallow ground water contamination beneath the site could be formed by improperly installed future water supply wells, or during the installation of deep pilings or structural supports that extend through the known contaminated portion of the shallow subsurface aquifer into the deeper aquifer beneath the site.

Regarding the installation of future water supply wells, the ACFCWCD requires a 50-ft deep sanitary seal for municipal and industrial supply wells (Alameda County Ordinance 73-68) for all new well construction. Available site characterization data indicates that neither the existing subsurface soil contamination nor the existing shallow ground water contamination extends to this depth. Further, Chapter II section 13 of the Department of Water Resources Water Well Standards: State of California states that "In areas where a well penetrates more than one aquifer, and one or more of the aquifers contains water that, if allowed to mix in sufficient quantity, will result in a significant deterioration of the quality of water in the other aquifers...., the strata producing such poor-quality water should be sealed off to prevent entrance of the water into the well or its migration to other aquifer(s)." Therefore, proper installation of any future water supply well on the site in accordance with Alameda County and State Department of Water Resources regulations should preclude any such installation from providing a vertical conduit for contaminant migration to the deeper aquifer, without any additional controls.

Regarding the installation of deep pilings or structural supports that might extend through the subsurface shallow ground water contamination and into the deeper aquifer, based on general construction practices in the vicinity of the site, no such issues are expected to arise during construction. New Century Beverage has no knowledge of specific development or construction plans for the site.

5.4 Controls to Prevent Migration of Pollution

Based on the site characterization completed to date, the known ground water contamination plume is stable (not expanding) and is decreasing in concentration. Contaminated soils in the UST source areas have been removed to the extent feasible, and remaining levels of contaminants do not exceed the risk-based target levels established by the RBCA evaluation and addenda. Therefore, NCB believes there is limited or no potential for further migration of contaminants in the subsurface under undisturbed conditions (for example, prior to or following construction). Therefore, NCB does not believe that additional controls are necessary to prevent migration of contaminants before or after construction at the site.

During construction, mitigation of pollutant migration will be addressed in the Construction Management Plan.

5.5 Site Development

The property is zoned for light industrial and commercial use. New Century Beverage understands that the property is currently under consideration for development by Pixar as an office building. However, New Century Beverage is not responsible for and does not have access to specific plans for development of the site. Therefore, no such plans are included with this document. Moreover, the RBCA evaluation has shown that existing levels of contaminants present in the site subsurface should not pose an unacceptable chronic human health risk for either future commercial receptors or construction receptors on-site. Therefore, NCB does not believe that any special considerations be given to address the presence of low levels of contaminants in the subsurface in developing the site, with respect to these exposure scenarios.

6. REFERENCES

CH_2M Hill, 1992, Quarterly Monitoring Report, letter report to Mark Rosenquist of Del Monte Foods regarding Del Monte Plant No. 35 West Parcel, Emeryville, California, August 13, 1992, 5 pp. inc. 2 tbl. and 1 fig., 1 attachment.

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Weiss Associates, 1995, Remedial Action Plan for the New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California, January 27, 1995, 28 pp., 4 appendices.

Weiss Associates, 1996a, Third Quarter 1996 Status Report for the New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California, November 15, 1996, 5 pp., 4 figs., 5 tbls., 1 attachment.

Weiss Associates, 1996b, Risk-Based Corrective Action Evaluation Plan for the New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California, December 9, 1996, 19 pp., 4, figs., 9 tbls., 5 appendices.

Weiss Associates, 1997, Letter to ACHCSA providing Addenda to RBCA Evaluation, July **[x]**, 1997.

Table 1. Summary of Environmental Activities - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

Activity Date Completed	Result
UST #1 and #2 Installations 1958	The property's USTs may have been installed as early as when the beverage production facility was constructed.
UST #2 Removal March 1987	One 10,000-gallon diesel UST (UST #2) was removed from the southwest portion of the property. No TPH-D was detected in soil samples from beneath the tank. No notes are available about the condition of the UST upon its removal. The other UST (UST #1), which had previously stored gasoline, was converted for diesel storage.
UST #1 Decommissioning 1993	The remaining UST (UST #1) was decommissioned but not removed.
Subsurface Investigation October 1993	As part of a subsurface investigation for Del Monte Plant 35, CH_2M HILL drilled borings A20-K-04 and A20-K-05 on the Del Monte property across the property line from the New Century facility. Soil from boring A20-K-05, located about 100 ft southwest of remaining New Century UST #1, contained 110 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) and ground water from the boring collected on the adjacent Del Monte property about 50 ft west of former UST #2 contained 220 ppm TPH-D. A grab ground water sample from the same boring contained 1,900 parts per billion (ppb) TPH-G.
Subsurface Investigation June-October 1994	WA drilled soil borings B-1 through B-48 and installed ground water monitoring wells MW-1 through MW-12 to: • Characterize soil and ground water around four onsite potential source areas--UST #1, former UST #2, a vehicle maintenance shop, and an above ground chemical storage area; • Assess if COCs from offsite sources were in ground water beneath the site; and • Determine the extent of subsurface COCs that were associated with potential source areas. Four areas of petroleum hydrocarbon-impacted ground water were identified: • Gasoline constituents were detected at and downgradient (southwest) of the gasoline UST #1; • Diesel constituents were detected at and downgradient of the former diesel UST #2; • Gasoline and diesel constituents were detected beneath the northeastern portion of the property, which is downgradient of an UST on the adjacent Emeryville Fire Department property, a former UST at the former Oliver Rubber Company and a reported subsurface fuel release at the United States Post Office; and

Table 1. Summary of Environmental Activities - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California (Continued)

Activity Date Completed	Result
Subsurface Investigation June-October 1994 (continued)	• Low concentrations of gasoline constituents were detected beneath the southeastern corner of the property, which is adjacent to a former gasoline service station at the Corner Site restaurant. Except for only 0.007 ppm in one sample, no benzene was detected in unsaturated soil, but a maximum of 1,800 ppb benzene was detected in ground water.
UST #1 Removal July 1994	WA coordinated the removal of remaining UST #1 and the associated product piping and dispenser. No holes were noted in the tank and up to 170 ppm TPH-G was detected in soil beneath the tank. Soil from beneath the dispensers contained up to 1,300 ppm TPH-G, 22,000 total petroleum hydrocarbons as diesel (TPH-D) and 0.51 ppm benzene.
Hydraulic Tests October 1994	WA conducted slug tests on wells MW-5, MW-6, MW-10, MW-11 and MW-12 to estimate the hydraulic conductivity of sediments beneath the site. Based on the test results, hydraulic conductivities ranged between 0.01 and 0.00002 ft per minute.
Remedial Action Plan Submittal January 1995	WA completed a remedial action plan (RAP). The RAP evaluated possible remedial alternatives and selected soil excavation and continued ground water monitoring as the most appropriate option for the site.
Soil Excavation October 1995	As proposed in the RAP, WA excavated hydrocarbon-bearing soil from the areas surrounding each former underground fuel tank to remove the hydrocarbon source in the vadose zone. Vadose zone soil was removed from near the northern and southern underground fuel tank (USTs #1 and #2), respectively, and the soil was disposed offsite (Figures 3 and 4). Confirmation soil samples from the former northern tank (UST #1) excavation indicated that most of the soil containing hydrocarbons was removed, except for residual hydrocarbons in soil that was inaccessible due to the presence of the adjacent, former building (Appendix A). After conducting some excavation near the former UST #2, WA determined that it would be cost-effective to cease the excavation and further characterize the soil around this source area.
Soil Characterization November 1995	WA drilled soil borings B-50 through B-63 to further characterize soil around the former southern fuel tank UST #2. The analytic results for the borings indicate that over 100 ppm TPH-D remains in soil north and west of the final excavation limit. Almost no BETX were detected in soil samples from the 14 borings.
Ground Water Sampling March 1996	First quarter 1996 ground water monitoring was calculated in March. The ground water sample from well MW-14 was reanalyzed to correct for laboratory analysis errors in May 1996. MW-5, MW-6, MW-12, and MW-13 were also resampled.
Facility Closing April 1996	New Century closed the facility for the upcoming demolition of the site structures.

Table 1. Summary of Environmental Activities - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California (Continued)

Activity Date Completed	Result
Site Demolition Sampling May 1996	Prior to demolition, WA collected soil samples from borings B-64 through B-95 at selected locations to characterize soil for the demolition contractor. Samples were analyzed for petroleum hydrocarbons, HVOCs, metals and PAHs.
PAH Sampling June-July 1996	In addition to the routine quarterly monitoring of the site wells, water samples from wells MW-5, MW-6, and MW-13 were analyzed for PAHs. Low concentrations of non-carcinogenic PAHs were detected. Upgradient wells MW-1 and MW-2 were sampled for PAHs to determine if onsite PAHs in ground water were from an offsite source. No PAHs were detected in ground water. Borings B-96 and B-97 were drilled near former UST #2 to analyze surface and subsurface soil for PAHs and VOCs. None were detected.

Table 2. Proposed Cleanup Goals - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

Chemical of Concern	Proposed Cleanup Goal Soil (mg/kg)	Ground Water (mg/L)
Benzene	1.7	2.53
Ethylbenzene	575[1]	3.65
Toluene	54.5	7.3
Xylenes	208,000[1]	73
Naphthalene	22.9	0.146
Fluorene	NC	1.46
Fluoranthene	NC	1.46
Pyrene	NC	1.10
Benzo(a)Pyrene	0.26[2]	NC

Notes:

NC = Not Calculated, contaminant not present in this media

1 = These values exceed the saturation levels (C_{sat}) in soil as calculated using ASTM 1995 Table x2.5. Practically, the cleanup goal is therefore $<C_{sat}$

2 = Compound not detected in soil, but presumed present at 0.07 mg BaP/kg diesel in soil and using actual soil data for maximum detected diesel concentration.

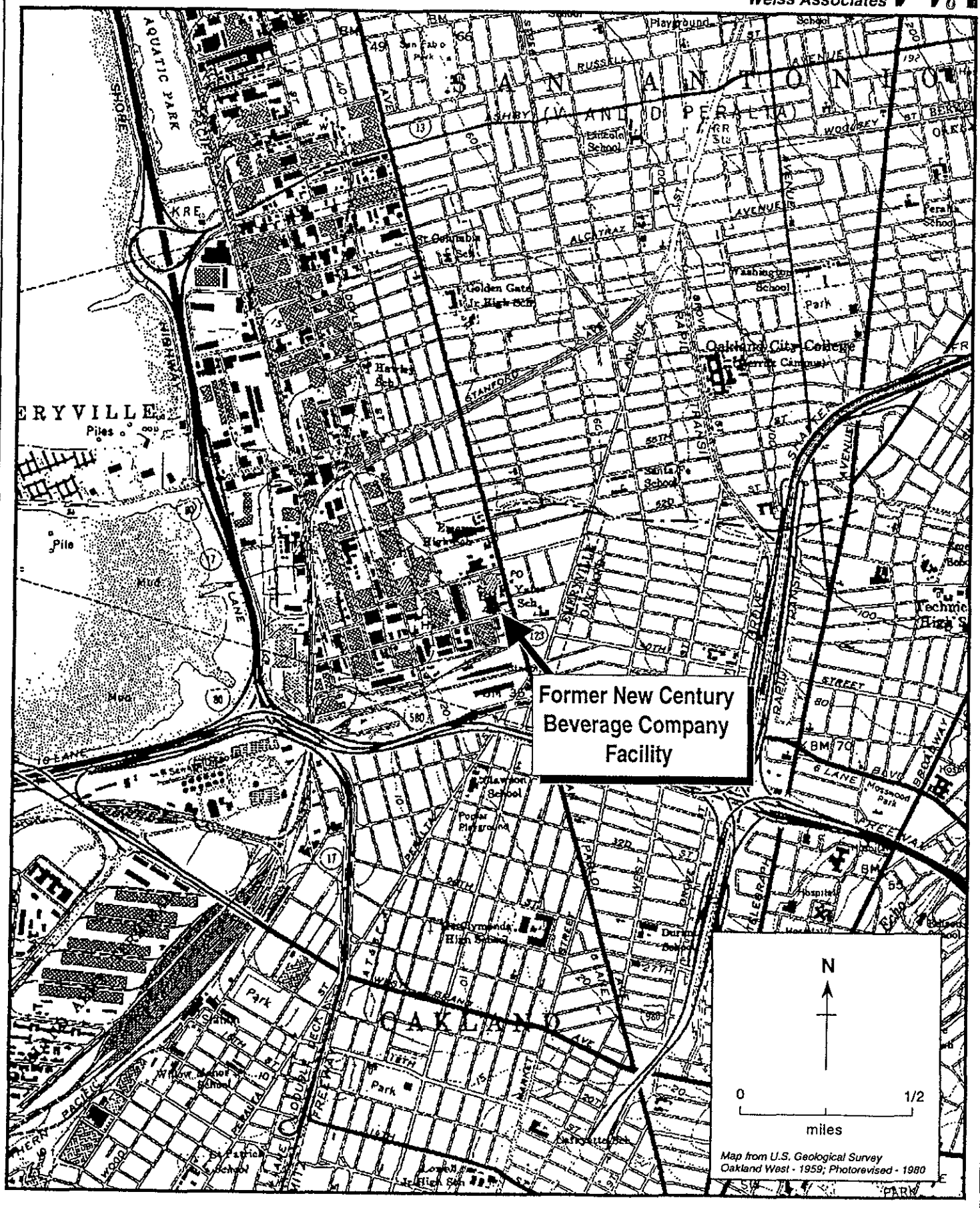


Figure 1. Site Vicinity Map - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

Table 3. Subslab and Initial Investigation Soil Sampling Results Compared to USEPA Region IX Industrial PRGs, RBSL, or SSTL - Former New Century Beverage Facility, 1150 Park Avenue, Emeryville, California

Compounds Detected	Maximum Concentration Detected (ppm)	Sample ID	RBSL, SSTL or PRG (1) (ppm)	Carcinogen (CA) or Non-Carcinogen (NC)
Metals				
Antimony	<25	-	680	NC
Arsenic	7	B81-5.0	22 (2)	NC
Arsenic	7	B81-5.0	24 (3)	CA
Barium	300	B78-3.5	100,000	NC (MAX)
Beryllium	0.62	B81-5.0	11	CA
Cadmium	1.7	B78-3.5	850	NC
Chromium VI	41	B74-1.5	640	CA
Cobalt	27	B78-3.5	97,000	NC
Copper	30	B78-3.5	63,000	NC
Lead	640	B64-1.5	1,000	NC
Mercury	0.32	B72-1.5	68 (4)	NC
Molybdenum	1.4	B64-1.5	8,500	NC
Nickel	64	B74-1.5	34,000	NC
Selenium	6.5	B70-1.5	8,500	NC
Silver	<5.0	-	8,500	NC
Thallium	<50	-	NONE	NC
Vanadium	43	B80-5.0	12,000	NC
Zinc	230	B78-3.5	100,000	NC (MAX)
Volatile Organic Compounds				
Benzene	0.007	B48-5.0	1.7 (5)	CA
Toluene	<0.005	-	54.5 (6)	NC (SAT)
Ethylbenzene	0.980	B65-1.5	575 (6)	NC (SAT)
Xylenes	1.100	B65-1.5	208,000 (6)	NC (SAT)
1,1-Dichloroethane	0.013	B86-1.5	1,700	NC
1,2-Dichloroethane	<0.005	-	5.5	CA
1,1-Dichloroethene	<0.005	-	0.8	CA
Cis-1,2-Dichloroethene	<0.005	-	100	NC
Trans-1,2-Dichloroethene	0.120	B86-1.5	270	NC
1,2-Dichloropropane	<0.005	-	6.8	CA
Methylene chloride	0.067	B71-1.5	180	CA
Tetrachloroethene (PCE)	0.320	B86-1.5	170	CA
1,1,1-Trichloroethane	0.036	B86-1.5	3,000	NC (SAT)
Trichloroethene (TCE)	0.120	B86-1.5	70	CA
Trichlorofluoromethane (Freon 11)	<0.005	-	1,300	NC
Vinyl chloride	<0.005	-	0.35	CA

(1) PRGs for Carcinogens at Cancer Risk = 1E-5, PRGs for Non-Carcinogens at Hazard Quotient = 1

(2) Non-carcinogenic endpoint

(3) Carcinogenic endpoint applies to As(III)

(4) PRG for mercury reported as methyl mercury.

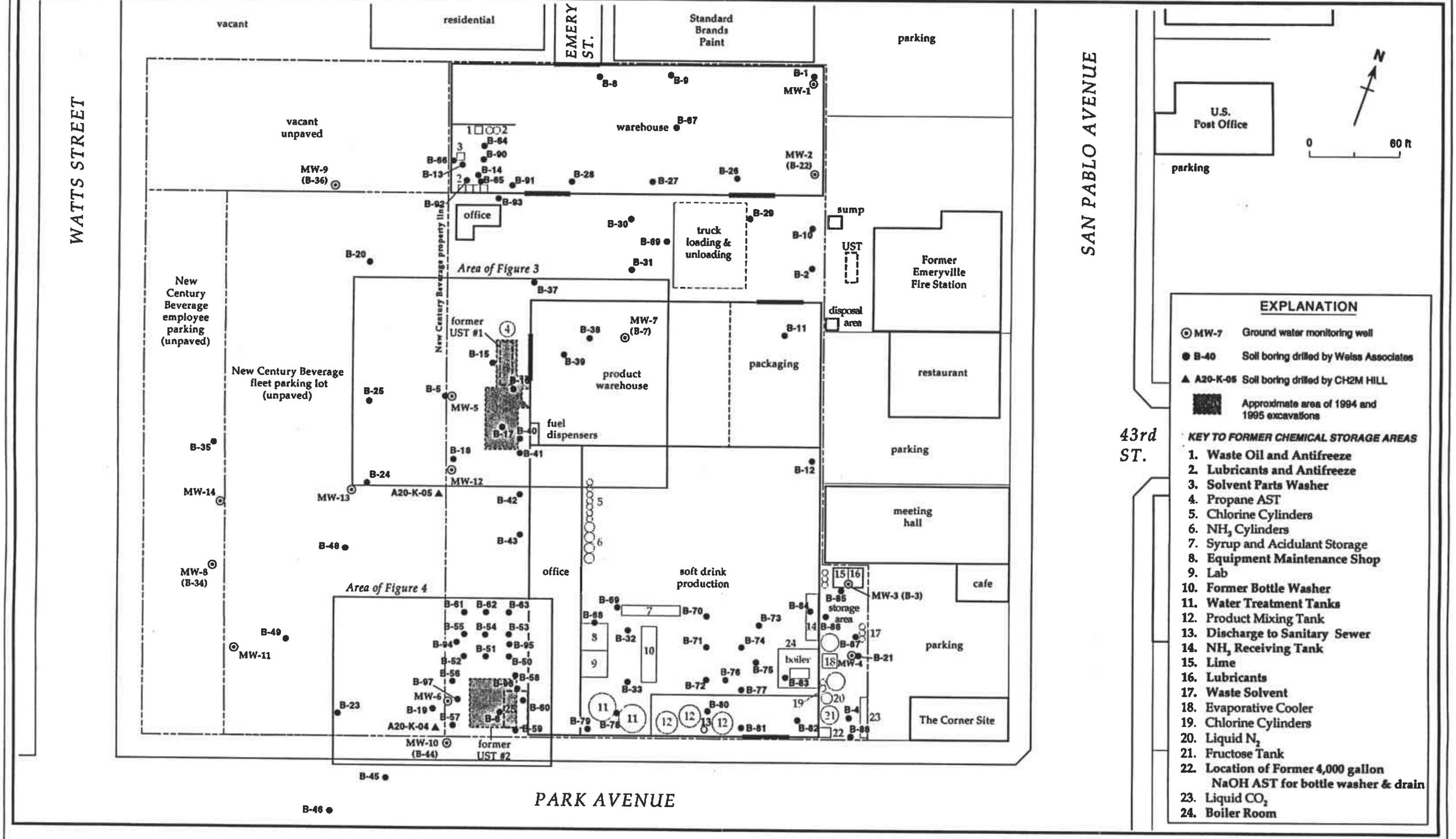
(5) For Benzene, value is SSTL from Risk-Based Corrective Action analysis.

(6) For Toluene, Ethylbenzene, and Xylenes, values are RBSLs from Risk-Based Corrrective Action analysis.

Abbreviations:

USEPA = Unites States Environmental Protection Agency
PRG = Preliminary Remediation Goal (for Industrial Soil), from August 1, 1996 EPA Region IX version
ppm = Parts per million
- = Sample ID not given because compound was not detected in any samples.
NC = Non-Carcinogen
CA = Carcinogen
SAT = Value for PRG is based on the soil saturation equation.
MAX = Value for PRG is a non-risk based "ceiling limit" concentration = 100,000 mg/kg.

WEISS ASSOCIATES



EXPLANATION

- ⊙ MW-7 — Ground water monitoring well
- ● B-40 — Soil boring drilled by Weiss Associates
- ▲ A20-K-05 — Soil boring drilled by CH2M HILL
- Approximate area of 1994 and 1995 excavations

KEY TO FORMER CHEMICAL STORAGE AREAS

1. Waste Oil and Antifreeze
2. Lubricants and Antifreeze
3. Solvent Parts Washer
4. Propane AST
5. Chlorine Cylinders
6. NH_3 Cylinders
7. Syrup and Acidulant Storage
8. Equipment Maintenance Shop
9. Lab
10. Former Bottle Washer
11. Water Treatment Tanks
12. Product Mixing Tank
13. Discharge to Sanitary Sewer
14. NH_3 Receiving Tank
15. Lime
16. Lubricants
17. Waste Solvent
18. Evaporative Cooler
19. Chlorine Cylinders
20. Liquid N_2
21. Fructose Tank
22. Location of Former 4,000 gallon NaOH AST for bottle washer & drain
23. Liquid CO_2
24. Boiler Room

Figure 2. Ground Water Monitoring Well and Soil Boring Locations - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

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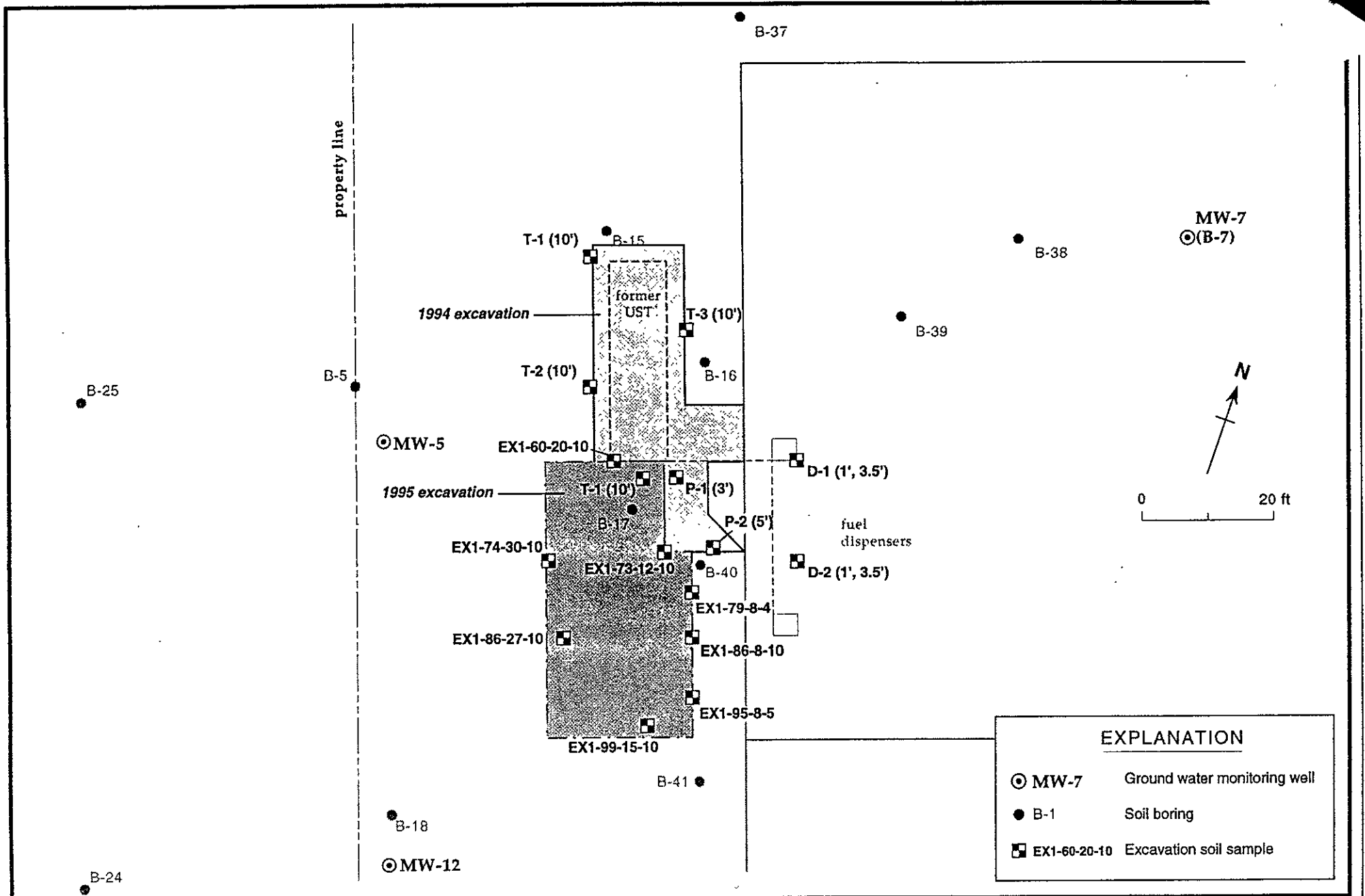

Figure 3. Soil Sample Locations - Former Northern Underground Fuel Tank (UST #1) - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

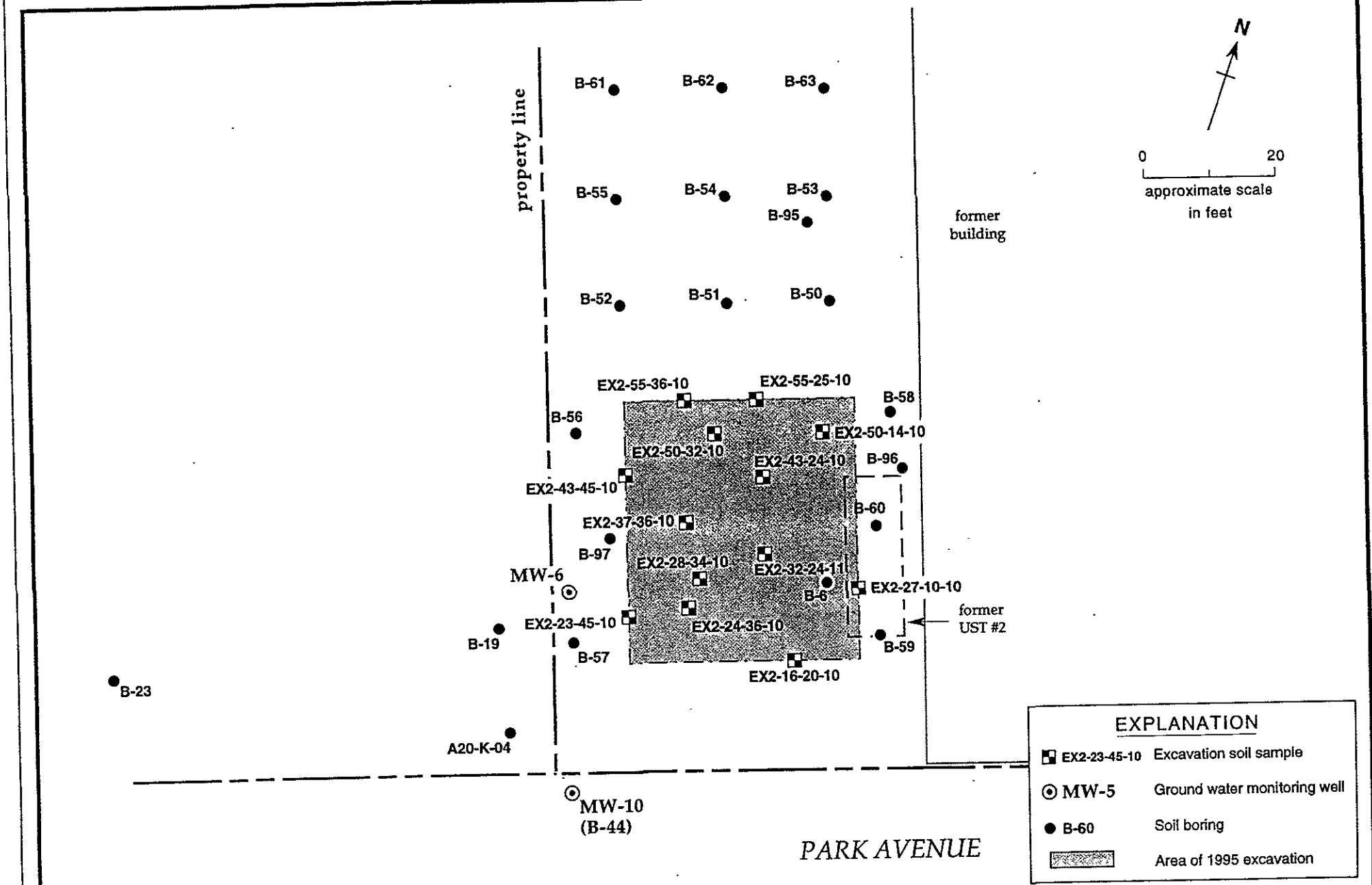

Figure 4. Soil Sample Locations - Former Southern Underground Storage Tank (UST #2) - Former New Century Beverage Company Facility, 1150 Park Avenue, Emeryville, California

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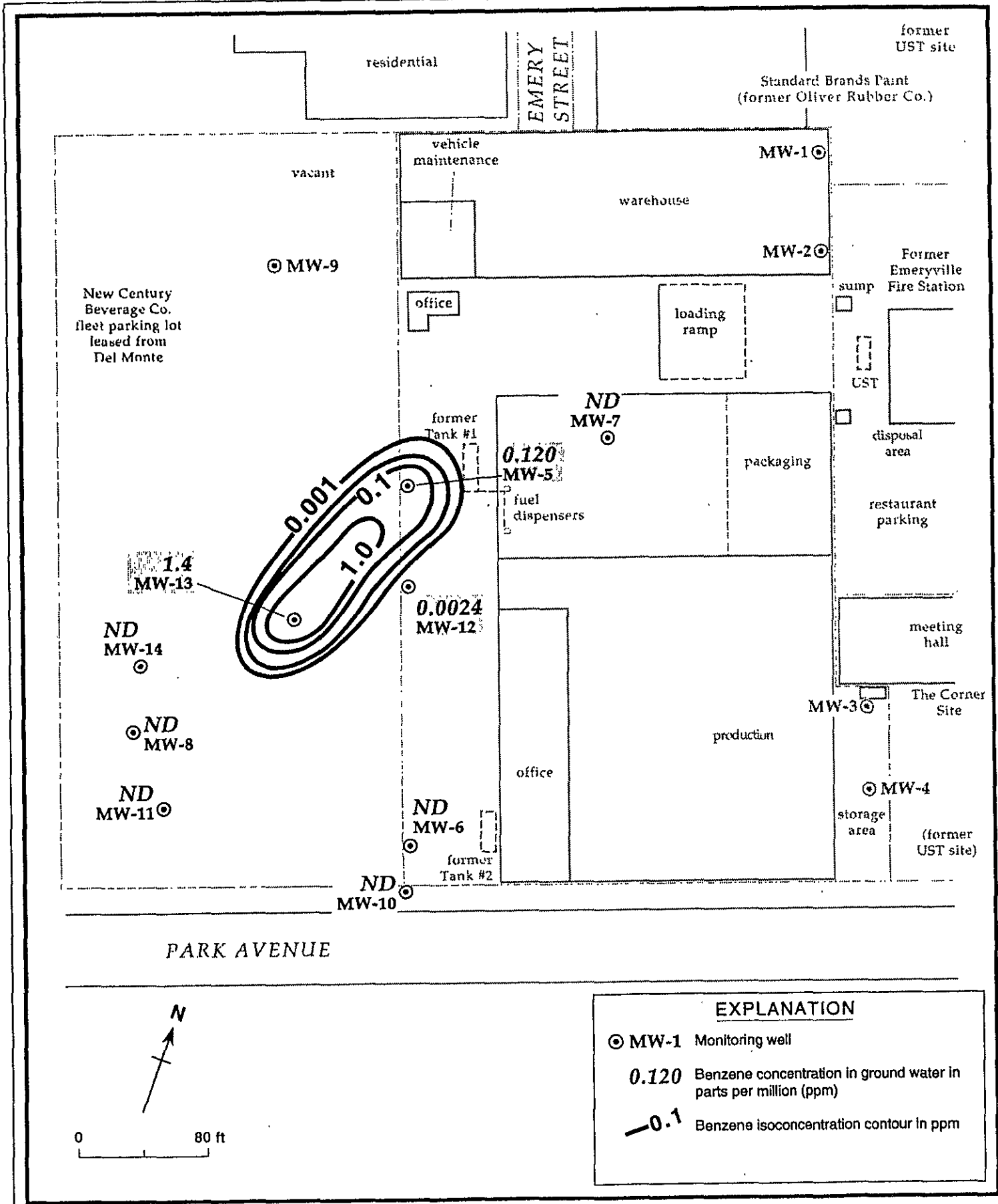

Figure 5. Benzene Isoconcentration Contours in Ground Water - September 26, 1996 - New Century Beverage Company, 1150 Park Avenue, Emeryville, California