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6 July 2001

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Mr. Mark Johnson
California Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Subject: Comments Regarding the Draft Remedial Investigation Report for the
Sherwin Williams Site, Emeryville
California, dated 2 May 2001
(EKI 970001.85)

Dear Mr. Johnson:

This letter has been prepared by Erler & Kalinowski, Inc. on behalf of Chiron Corporation ("Chiron") and comments on the *Draft Remedial Investigation Report for the Sherwin-Williams Site in Emeryville, California*, dated 2 May 2001 ("SW RI"). The SW RI was prepared by Entrix, Inc. on behalf of The Sherwin-Williams Company ("SW") in response to Task 3 Section B of the RWQCB site Cleanup Requirements Order 98-009 ("Order"). The Order addresses chemical impacts to soil and groundwater that have resulted from releases that have occurred at the property located at 1450 Sherwin Avenue ("SW Property"). Based upon data available at the time, the Order defined the Site to include "the 1450 Sherwin Avenue Property and a portion of the adjacent former Rifkin Property, located at 4525-4563 Horton Street, to which hazardous materials have migrated from the above identified Sherwin-Williams property". The Order states, however, that the boundaries of the "Site" may be modified in the future based upon the extent of pollutants defined during additional investigations. A primary objective of the SW RI, as identified in the Order, is to "define the vertical and lateral extent of soil and groundwater pollution emanating from the site down to concentrations at or below the Preliminary Remediation Goals set forth in the Order or as deemed acceptable by the Executive Officer." The Preliminary Remediation Goals for groundwater on the Site set forth in the Order are maximum contaminant levels ("MCL") or in the absence of a chemical-specific objective, risk-based levels (e.g., drinking water equivalent levels).

The comments identified herein focus on this objective and specifically identify areas of concern where the vertical and lateral extent of chemicals migrating from the SW Property have not been clearly define or identified. Two such areas include:



- (a) the lateral extent of arsenic in A zone groundwater along Horton Street and on the central and northern portions of former Rifkin Property resulting from releases on the SW Property; and
- (b) the lateral extent of aromatic volatile organic compounds (“aromatic VOCs”) and ketones in A zone groundwater on the SW and former Rifkin Properties resulting from releases on the SW Property.

A. LATERAL EXTENT OF ARSENIC IMPACTS TO GROUNDWATER ALONG HORTON STREET AND THE CENTRAL AND NORTHERN PORTIONS OF THE FORMER RIFKIN PROPERTY

As indicated on Figure 5-19 (i.e., Arsenic Concentrations in Groundwater A zone) and discussed in Section 5.2.2.1 of the SW RI, elevated concentrations of arsenic (i.e., up to 660 ug/l) have been detected in A zone groundwater at SW well LF-28. This well is located east of the former Rifkin property on Horton Street, adjacent to the Horton Street sewer line. The Horton Street sewer line is designated as SS-5 and is shown on Figure 2-4 of the SW RI. The Horton Street sewer line runs south to north along Horton Street toward Temescal Creek where it connects to a east-west sewer line which runs below Temescal Creek. It is a 10 inch diameter line made of vitrified clay which is located approximately 9 feet below ground surface (“bgs”). The sewer line was installed between 1929 and 1937 and currently discharges to the POTW (see SWRI).

Data presented in the SW RI indicate that:

- (a) elevated concentrations of arsenic are present in A zone groundwater near the Horton Street sewer line at well LF-28 (i.e., ranging from 660 ug/l to 120 ug/l with an average detected concentration of 303 ug/l since the well was first sampled in 1997), and
- (b) arsenic from this area appears to be migrating through A zone channel deposits onto the central and northern portion of the former Rifkin property where arsenic concentrations have been detected in grab groundwater samples above MCLs (i.e., 120 ug/l at RP-BH-12, 65 ug/l at RP-BH-15, and 89 ug/l at RP-BH-017).

Although the current extent of arsenic in groundwater in this area appears to have been investigated, the SW RI does not define these impacts as part of the lateral extent of arsenic migrating from the SW Property, and makes several statements which imply that any discharges by SW to this line are unlikely and/or minor. Therefore future

responsibility for monitoring and/or addressing these impacts, if necessary, remains in question.

A.1 Conclusions Made In Sherwin Williams Remedial Investigation Report Regarding Potential Sources of Arsenic Along Horton Street

On page 5-27, the SW RI makes the following conclusion regarding potential source(s) of arsenic on Horton Street:

“the source of arsenic in A zone groundwater beneath Horton Street (at well LF-28) and at the central portion of the former Rifkin property is not known, arsenic contamination may have either been released from a break in the sanitary sewer line beneath Horton Street or have been released from sources on the south BGR property. In either case contaminants migrated with A-zone groundwater onto the central portion of the former Rifkin property”

The SW RI also makes the following other statements and conclusions regarding potential discharges by SW to the Horton Street sewer line and the likelihood that such impacts could lead to soil/groundwater contamination:

On Page 2-9 the SW-RI States: Available engineering drawings for this time period indicate the sewer line along Horton Street was not in-place during much of the lead arsenate production period (through 1948). Since the sewer line was installed toward the end of the lead arsenate production period, the line would have been new and presumably in good condition.

On Page 5-19 the SW RI states: The only sanitary sewer line which could have historically acted as a minor (but unlikely) source of chemicals to off-site sediment is SS-5 (Horton Street main sewer). The only possible minor source of offsite chemicals to this in Horton Street pipe would be from site sewer line SS-6... the historic release of any significant mass of site chemicals from SS-5 seems unlikely when considering the episodic timing necessary for contaminated groundwater to inflow at SS-6 under high groundwater conditions, flow to SS-5 and then immediately seep from SS-5 under low water table conditions to surrounding soils.

On Page 2-7 the SW RI states: (the 1929 Factory Insurance map indicated a possible outside drain to the sewer from the steel tanks area of Yard B.) Sewer lines are intended to be predominantly watertight; however, leakage may occur as the pipes age. Because suspended solids in sewage lines tend to clog sew cracks and if leakage occurs the

surrounding soil tends to be come clogged due to anaerobic conditions, leakage from minor sewer openings is often small (Todd 1980).

Many of these conclusions are imprecise, inaccurate, and/or do not consider conditions at the Site. We believe that available information strongly support the conclusion that elevated levels of arsenic present in groundwater along Horton Street and the central and northern portions of the former Rifkin property are the result of historic releases by SW into the Horton Street sewer line.

A.2 Available Information Regarding the Likely Source of Arsenic in Groundwater along Horton Street and the Central and Northern portions of the Former Rifkin Property

Available information relating to arsenic impacts to groundwater along Horton Street and the central and northern portions of the former Rifkin Property, and evidence that these impacts are likely the result of releases by SW into the Horton Street sewer line are presented below. This information/evidence has been grouped into the following subcategories:

- (a) information/evidence that elevated arsenic concentrations along Horton Street are not the result of other sources/releases on the South BGR Property or along Horton Street;
- (b) information/evidence that discharges by SW likely occurred to the Horton Street Sewer Line, and
- (c) information/evidence that that leakage likely occurred along the Horton Street Sewer line.

A.2.1 Information/Evidence that Elevated Arsenic Concentrations along Horton Street are Not the Result of other Sources/Releases on the South BGR Property or along Horton Street

With the exception of potential releases from the SW Facility into the Horton Street Sewer Line, no other likely sources of arsenic have been identified at or upgradient of well LF-28 where elevated concentrations of arsenic have been detected. This conclusion is supported by the following data:



- Horton Street has been in place since approximately 1915, prior to which the area was occupied by a Oakland Trotting Park Jockey Club (1871 through 1915). Therefore, releases of arsenic to surface soils at this location are unlikely.
- Eight grab groundwater samples were collected from the A zone in 1993 on the South BGR property upgradient (i.e., southwest) of well LF-29. Concentrations of arsenic in these samples were less than 32 ug/l, an order of magnitude below average arsenic concentrations of 303 ug/l detected at well LF-28 on Horton Street.
- No arsenic was detected (at a detection limit 0.005 ug/l) in the grab groundwater sample SP-AH-21 recently collected on the South BGR property immediately upgradient of well LF-28 by SW. This sample was specifically collected by Sherwin Williams pursuant to the 2 June 1997 Work plan to evaluate potential arsenic impacts from the south BGR property on to Horton Street.

A.2.2 Information/Evidence that Discharges by Sherwin Williams Likely Occurred to the Horton Street Sewer Line

With the exception of releases of arsenic to the Horton Street Sewer line, which were likely the result of inflow of arsenic impacted groundwater at side sewer SS-6 on the SW Property (i.e., documented by East Bay Municipal Utility District in 1995) no other actual releases of arsenic to the Horton Street line have been documented based upon available data. However, it is likely that such releases would have occurred during lead arsenate manufacturing at the SW Property which occurred prior to 1948 and during which limited records exist. The following information strongly supports the conclusion that discharges to the Horton Street sewer line likely occurred during this early operational period:

- Data included in the SW RI report indicate that the Horton Street sewer line was constructed sometime after 1929 and before 1937. It is likely that this sewer line was constructed to replace the shallow (i.e., 1 to 2 foot deep) east/west sewer lines identified on 1929 SW facility drawings when filling of the San Francisco Bay occurred in the vicinity of the outfall of these lines at the Barbary Coast Steal Property (i.e., available aerial photographs indicate that this likely occurred sometime between 1931 and 1939). Therefore, **the SW facility would likely have been connected to the Horton Street Line for as many as 11 to 17 years of the period during which SW produced lead-arsenate at its facility and during which significant releases arsenic occurred to soil and groundwater at the site (i.e., between the 1931 and 1948).**



- Information presented on the 1956 SW facility drawings indicates that lateral sewer connections to the Horton Street sewer line existed from the former arsenic acid building (i.e., Building 25) in the vicinity of which arsenic concentrations of up 52,000 mg/kg and 450,000 ug/l have been detected in soil and groundwater, respectively. In addition, potential historic drains to the sewer were identified in the vicinity of the arsenic acid building on early facility maps (see 1929 facility map), which may also have been connected to the Horton Street sewer line when this line replaced east/west sewer lines.
- Prior to the 1950's there were no "storm-drain lines" identified at the SW facility and treatment of sewage was not conducted in Emeryville (verbal communication with EBMUD). Therefore, it is likely that the Horton Street sewer line would also have been used for discharge of some stormwater and potentially other liquid wastes during the early periods of operation when lead arsenate was being produced at the SW facility.

A.2.3 Information/Evidence that Leakage Likely Occurred Along the Horton Street Sewer Line

The following information relates to the likelihood that leakage occurred along the Horton Street Sewer line:

- The Horton Street sewer line is constructed of vitrified clay. This material was historically used for sewage lines due to its resistance to corrosion. Discussions with sanitary engineers familiar with the use of these pipes indicate, however, that this material is relatively brittle material and that such lines often break at the bell joints when they are installed or post installation if any settling occurs, which is common in near bay environments such as those found at the site.
- results of infiltration and inflow sanitary sewer studies conducted in California in the 1970's indicated that significant leakage into/out of old sanitary sewer lines occurs and has increased sanitary sewer discharge rates by as much as 10 fold during wet verses dry weather.
- The likelihood of leakage to and from historic sewer lines constructed at and in the vicinity of the SW facility is demonstrated by:
 - Leakage of arsenic impacted groundwater into the historic lateral sanitary sewer line SS-6 which connects to the Horton Street Line, as documented by East Bay Mud in 1995.

- Leakage of arsenic impacted groundwater to storm drain system at the SW Property which resulted in discharges to Temescal creek in 1997.

A.3 Summary and Recommendations

Although no data documenting actual releases of arsenic into the Horton Street Sewer Line have been identified (i.e., with the exception of releases that occurred during high water periods in 1995), the available data clearly support the conclusion that concentrations present along this line are likely the result of releases on the SW Property during the lead-arsenate manufacturing period. The degree of evidence and basis for this conclusion is consistent with the degree of evidence and basis for the conclusion that operations at the SW facility resulted in arsenic impacts to soil and groundwater on the SW and former Rifkin Properties given that no actual releases of arsenic have been documented at the facility and according to the SW RI "wastes generated at the SW facility were likely transported off-site according to the general protocol of that time period and that long-term storage of waste materials on-site was unlikely due to the concern for fire and the lack of available open space".

Therefore, we recommend that (a) the RI be modified to conclude that arsenic impacts to A zone groundwater at well LF-28 and on the central and northern portions of the former Rifkin property are within the lateral extent of arsenic migration from the SW Property, and (b) SW take responsibility for any monitoring or remedial measures that may be required to address arsenic impacts detected in these areas.

B. LATERAL EXTENT OF AROMATIC VOLATILE ORGANIC COMPOUNDS AND KETONES IN A-ZONE GROUNDWATER ON THE SHERWIN WILLIAMS AND FORMER RIFKIN PROPERTIES

the SW RI does not adequately define the extent of ketones and aromatic volatile organic compounds ("VOCs") in groundwater on the SW and former Rifkin Properties resulting from releases at the SW property. Available data indicate that releases of these compounds occurred in the vicinity of the former SW Lacquer Plant/Tank Area (i.e., Building 32). The former Lacquer Plant/Tank Area is located immediately adjacent to the southwestern corner of the former Rifkin property. Available groundwater data indicate that (a) concentrations of these compounds exceed their respective Preliminary Remedial Goals by as much as three orders of magnitude in the vicinity of the former Lacquer Plant/Tank Area and (b) these compounds have migrated onto and impacted groundwater on the former Rifkin Property.



B.1 Definition of Extent of Impacts to Groundwater from Former Lacquer Plant/Tank Area

Compounds of concern and concentrations of these compounds detected in groundwater at the former Lacquer Plant/Tank Area are as follows:

Ketones

Acetone (2,500,000 ug/l)
2 Butanone ("MEK") (1,300,000 ug/l)
4-Methyl-2-Pentanone ("MIBK") (320,000 ug/l)

Aromatic VOCs

Toluene (260,000 ug/l)
Total Xylenes (20,000 ug/l)
Ethyl Benzene (1,600 ug/l)

The lateral distribution of these compounds in A zone groundwater is discussed in Section 5.2.2.2 of the SW RI. However, no figures have been included which adequately depict the lateral extent of these compounds in groundwater. One figure depicting benzene concentrations in groundwater is included in the SW RI (i.e., Figure 5-21), which according to the SW RI "represents the distribution of aromatic VOC concentrations in groundwater". However, review of available data indicates that this figure does not accurately depict lateral extent of other aromatic VOCs in groundwater. For example, benzene is not detected in the vicinity of the former Lacquer Plant/Tank Area above its limits of detection, which are significantly elevated (i.e., as high as 10,000 ug/l) due to the presence of other VOCs. However, concentrations of toluene and xylenes exceed their respective preliminary remedial goals by one to three orders of magnitude in this area. In addition, the lateral extent of benzene detected in groundwater on the former Rifkin property does not accurately represent the lateral extent of other aromatic VOCs, nor does it address the lateral extent of ketones present in groundwater in this area. Figures depicting the lateral extent of these compounds in A zone groundwater were historically prepared by EKI on behalf of Chiron; however, these figures, are based on data collected prior to 1995 and do not include data recently obtained by SW. A copy of these figures has been included in Attachment A hereto for reference. These figures depict (a) total detected BETX concentrations in A zone groundwater in the vicinity of the SW Property and (b) total detected MEK, MIBK, and Acetone concentrations in A-zone groundwater in the vicinity of the SW Property. As indicated on these figures, impacts to groundwater from the former Lacquer Plant/Tank Area extend south onto the former Rifkin Property, and are not adequately defined by the extent of benzene detected in groundwater in this area.

B.2 Recommendations

We recommend that Figures depicting total detected BETX concentrations and ketone concentrations be added to the SW RI. We also recommend that results of historic grab groundwater samples SW-1 through SW-4 and SB-8 collected on the SW property in 1994 in the immediate vicinity of the former Lacquer Plant/Tank Area be added to figures prepared by SW for reference. These data are needed to adequately define the lateral extent of these compounds in groundwater, given that recent groundwater data locations included on other SW RI figures are limited in this area. Locations of these samples are shown on EKI Figures included in Attachment A. Results of these samples are also included in the SW RI database.

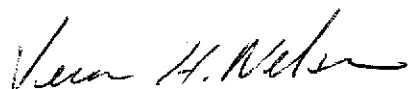
Understanding the lateral extent of these compounds in groundwater will also aid in evaluating the potential for arsenic migration in soil and groundwater at the site. These compounds are generally good sources of food for reducing microbacteria and; therefore, generally lead to reducing conditions in groundwater. As discussed in the SW RI, reducing conditions impact the speciation of arsenic and increase the quantity of arsenic 3+ which tends to be present in the subsurface. This arsenic species tends to dissolve more readily in groundwater and is more mobile.

Therefore, information regarding the distribution of these compounds should also be used to (a) evaluate the potential variability and distribution of arsenic sorption coefficients (K_d values) which have been used to calculate preliminary soil cleanup goals for the protection of groundwater, and (b) evaluate the likelihood of future arsenic migration in groundwater in various areas of the site.

If you have any questions, please do not hesitate to call.

Very truly yours,

ERLER & KALINOWSKI, INC.



Vera H. Nelson
Project Manager, P.E.



Attachment A:

Figure 2: South BGR, Rifkin, and Sherwin Williams Properties: BTEX
Concentrations Detected in Shallow Groundwater (<25 feet bgs)

Figure 4: South BGR, Rifkin, and Sherwin Williams Properties: Acetone, MEK,
MIBK Concentrations Detected in Shallow Groundwater (<25 feet bgs)

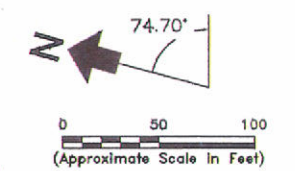
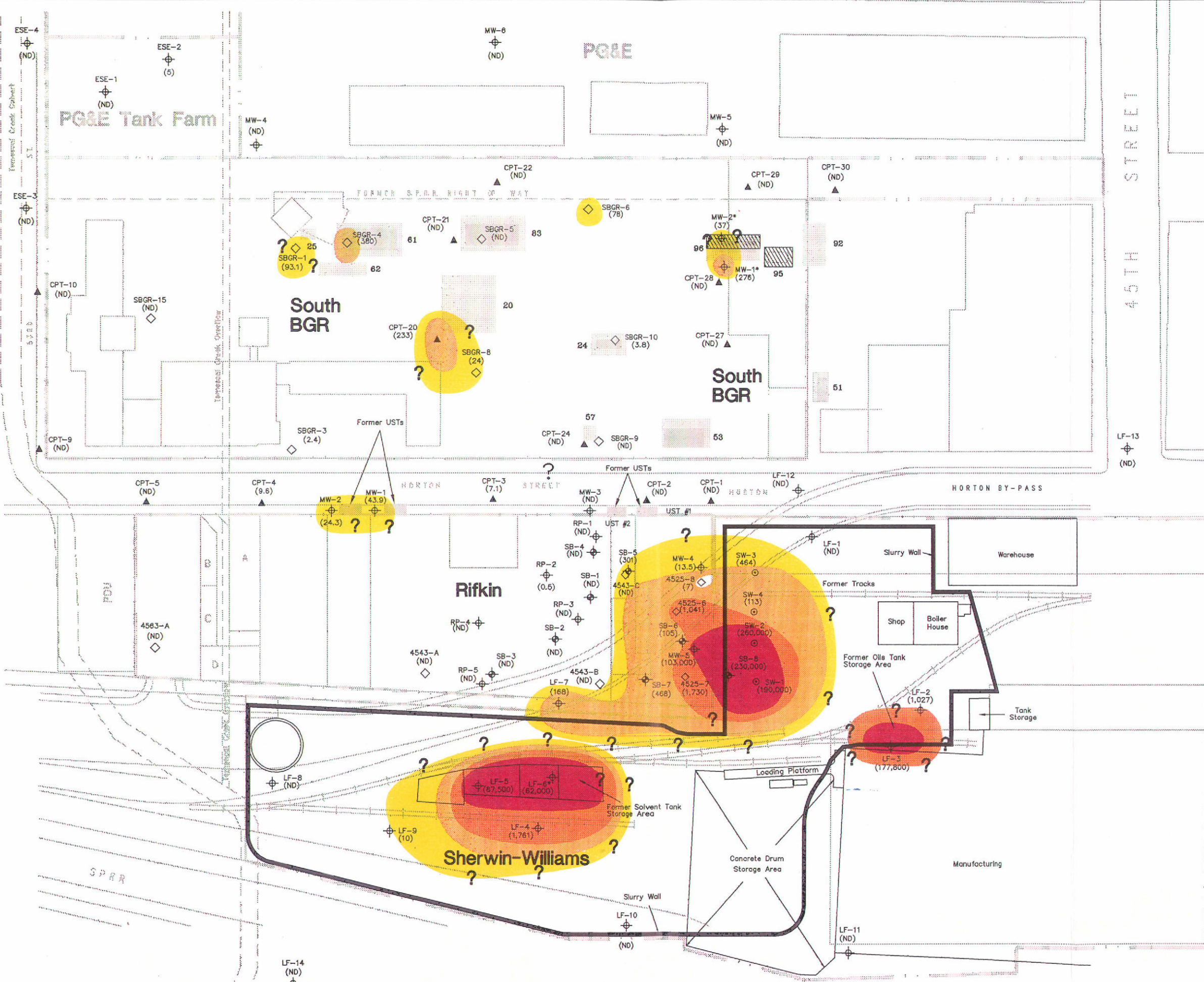
Source: EKI's letter, dated 5 September 1995, to Alameda County Health Care Service Agency and the RWQCB entitled "*South BGR, Rifkin and Sherwin Williams Properties: Chemical Concentrations in Groundwater*"

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ATTACHMENT A

- Figure 2: South BGR, Rifkin, and Sherwin Williams Properties: BTEX Concentrations Detected in Shallow Groundwater (<25 feet bgs)
- Figure 4: South BGR, Rifkin, and Sherwin Williams Properties: Acetone, MEK, MIBK Concentrations Detected in Shallow Groundwater (<25 feet bgs)

Source: EKI's letter, dated 5 September 1995, to Alameda County Health Care Service Agency and the RWQCB entitled "*South BGR, Rifkin and Sherwin Williams Properties: Chemical Concentrations in Groundwater*"



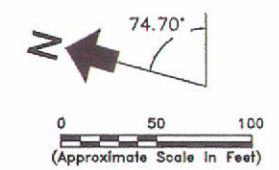
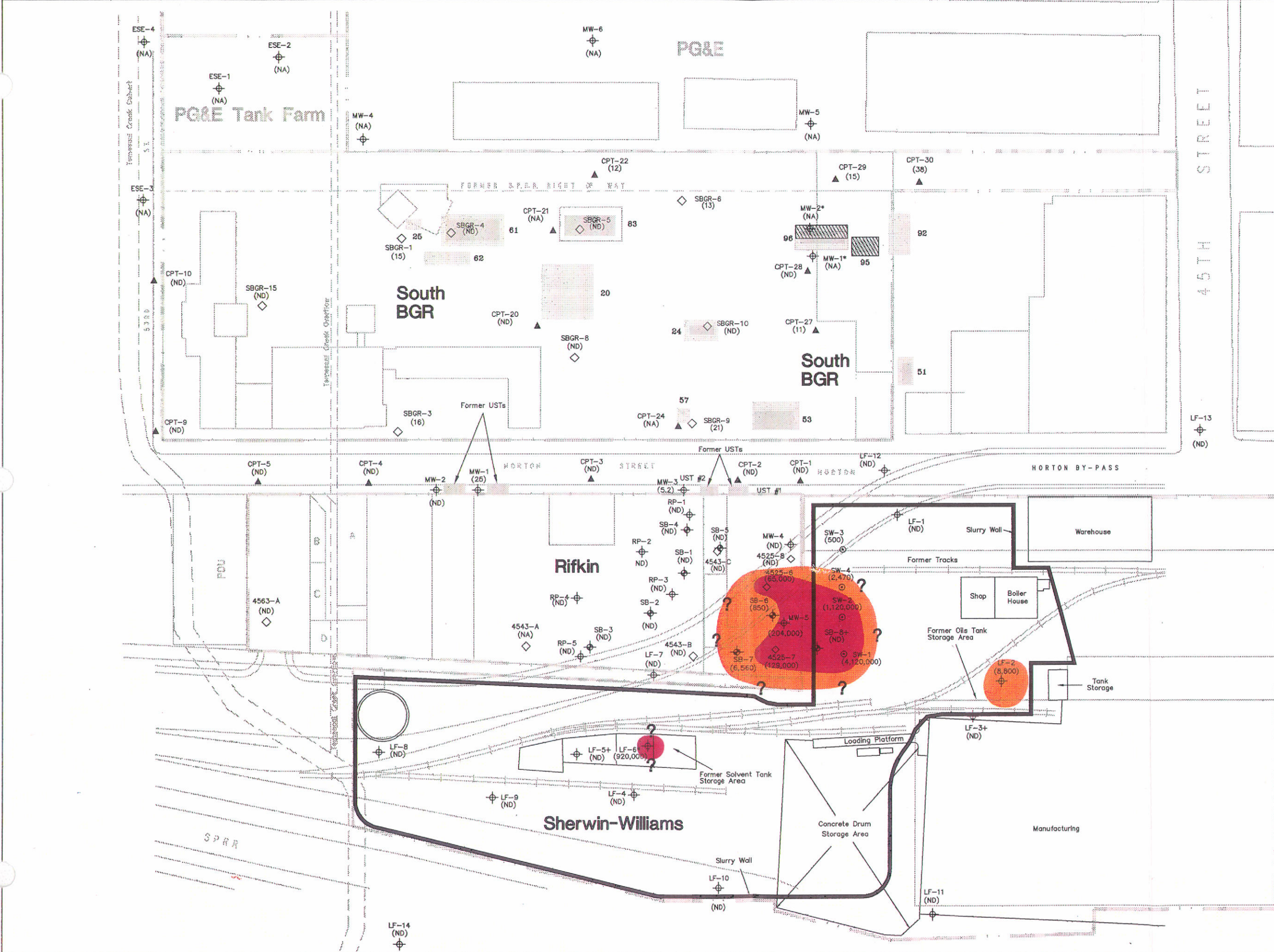
- LEGEND**
- ⊕ Existing Monitoring Well Location
 - ◇ Grab Groundwater Location by EKI
 - ▲ CPT/Hydropunch Location by EKI
 - Potential Tank Location
 - ▨ Potential Source Area Location
 - ▩ Area of Excavation
 - ⊕ Grab Groundwater Location by Levine-Fricke
 - ⊙ Grab Groundwater Location by TMC
 - * Well Abandoned
 - (11) Total BTEX Concentration Detected in Groundwater (ug/L)
 - (ND) Not Detected
 - (NA) Not Analyzed
 - Yellow 10-100 ug/L
 - Orange 100-1,000 ug/L
 - Red 1,000-10,000 ug/L
 - Dark Red >10,000 ug/L

- Potential Source Area and Tank Locations Identified on Shell Development Company Property Map (24 May 1982)**
- 20 Chemical Products Bldg
 - 24 Fuel Tank (Abandoned)
 - 25 Chemical Processing
 - 51 Boilers Fuel Tank (15,000 gal.)
 - 53 Tank Farm No. 4
 - 57 Waste Hydrocarbon Disposal Unit
 - 61 Tank Farm No. 1
 - 62 Pump Shelter Tank Farm No. 1
 - 68 Tank Farm No. 2
 - 92 Solvent Storage Bldg.
 - 95 Tank Farm No. 5
 - Tanks Removed 9/87
 - 96 Tank Farm No. 3
 - Tanks Removed 7/87

- Notes:**
1. All locations are approximate.
 2. Data from wells MW-4, MW-5, and MW-6 on PG&E are from 1984. Data from MW-1, MW-2, MW-3, MW-4 and MW-5 on Rifkin collected by TMC on 8 June 1995. All other data are from 1990 through 1994.
 3. Concentrations shown indicate Total Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) concentrations detected in groundwater.

Erlar & Kalinowski, Inc.

SOUTH BGR, RIFKIN, and SHERWIN-WILLIAMS PROPERTIES: BTEX Concentration Detected in Shallow Groundwater (<25 feet bgs)
 Chiron
 Emeryville, CA
 August 1995
 EKI 930028.00
 Figure 2



LEGEND

- ⊕ Existing Monitoring Well Location
- ◇ Grab Groundwater Location by EKI
- ▲ CPT/Hydropunch Location by EKI
- ▭ Potential Tank Location
- ▨ Potential Source Area Location
- ▩ Area of Excavation
- ⊕ Grab Groundwater Location by Levine-Fricke
- ⊙ Grab Groundwater Location by TMC
- * Well Abandoned
- + Detection Limits Were 10,000 to 200,000 ug/L
- (13) Total Acetone, MEK, and MIBK Concentration Detected in Groundwater (ug/L)
- (ND) Not Detected
- (NA) Not Analyzed
- Orange square: 1,000-10,000 ug/L
- Red square: >10,000 ug/L

Potential Source Area and Tank Locations Identified on Shell Development Company Property Map (24 May 1962)

- 20 Chemical Products Bldg
- 24 Fuel Tank (Abandoned)
- 26 Chemical Processing
- 51 Boilers Fuel Tank (15,000 gal.)
- 53 Tank Farm No. 4
- 57 Waste Hydrocarbon Disposal Unit
- 61 Tank Farm No. 1
- 62 Pump Shelter Tank Farm No. 1
- 83 Tank Farm No. 2
- 92 Solvent Storage Bldg.
- 95 Tank Farm No. 5
- 96 Tanks Removed 9/87
- 96 Tank Farm No. 3
- 96 Tanks Removed 7/87

Notes:

1. All locations are approximate.
2. Data are from 1990 through 1994. Data from MW-1, MW-2, MW-3, MW-4 and MW-5 on Rifkin collected by TMC on 8 June 1995.
3. Concentrations shown indicate Total Acetone, Methyl Ethyl Ketone and 4-Methyl-2-pentanone (MIBK) concentrations detected in groundwater.

Erler & Kalinowski, Inc.

SOUTH BGR, RIFKIN, and SHERWIN-WILLIAMS PROPERTIES: Acetone, MEK, MIBK Concentrations Detected in Shallow Groundwater (<25 feet bgs)
 Chiron
 Emeryville, CA
 August 1995
 EKI 93002B.00
 Figure 4