

Meeting with Sybase, EKI, AMP

regarding 64<sup>th</sup> & 65<sup>th</sup> St. properties, Emeryville.  
at RWQCB, Oakland 8/29/95

<u>Name</u>	<u>Organization</u>	<u>phone number</u>
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\* Excavations will be going minimal / utility trench

**Erler & Kalinowski, Inc.**  
S. Lowenberg  
Ted  
Bill Wick  
Tom Sullivan

AGENDA

Meeting with RWQCB and ACDEH Staff  
29 August 1995

Sybase, Inc., Emeryville, California  
(EKI 940018.03)

- A. Comments on Draft Final Site Investigation Report for the 64th and 65th Street Properties, dated 8/21/95
- B. Approval Letter for Sybase, Inc. Planned Development of the 64th and 65th Street Properties ("the Site")

Letter approval 1-2 wks after final report back (mid Sept)

- Characterization of the Site is adequate and complete
- Outlined approach of the risk management plan is appropriate to manage residual chemicals on the Site

C. Risk Management Plan for Site Development

H&SP approve by ACDEH

- Health and safety trained earthwork construction personnel <sup>by mid Sept</sup> OSHA requirements
- Soil management procedure during and after construction
  - segregation of soil areas (visible contamination, OVA readings, BTEX in former Lowenberg tank area)
  - abandoned subsurface structures
  - clean fill in landscaped areas (1.5 feet) <sup>3ft to grade</sup>
- Minimization of risks to deeper aquifer when piles are driven through soil and groundwater containing chemicals of concern

D. Post-Construction Risk Management Plan

- Risk to future office personnel due to volatilization of VOCs from groundwater ( $4 \times 10^{-8}$ )
- Health and safety trained future on-site maintenance personnel for subsurface activities below clean fill
- Groundwater Monitoring Plan
  - 2 downgradient, off-site wells
  - analyze for TEPH
  - monitoring frequency
    - Year 1: quarterly
    - Year 2: semi-annually
    - Year 3: annually, and thereafter
- Restricted vertical migration of chemicals from shallow aquifer zone to deeper aquifer zone

\* Keep collected soil underneath the bldgs.      \* all wells on site will be abandoned.  
 \* Lead notification      \* 2 off site wells sufficient?  
 \* Indemnification

Table 1  
 Maximum Concentration and Chemical Properties of VOCs Detected in Groundwater  
 Sybase, Inc.  
 64th and 65th Street Properties, Emeryville, California  
 (EKI 940018.03)

Compound Detected in Groundwater	Maximum Concentration Detected (ug/L)	Chemical Properties			
		Henry's Constant (Hc) (-) (a)	Organic Carbon Partition Coeff. (Koc) (mL/g) (b)	Solubility in Water (Cmax) (mg/L) (c)	Diffusion Coefficient in Air (Dair) (m <sup>2</sup> /d) (d)
Acetone	23	0.0016 (e)	0.37	totally miscible	0.95
Benzene	4.8	0.22 (e)	81	1,800	0.78
Chloroethane	34	0.46 (f)	3.2	4,700	0.93
1,1-Dichloroethane	44	0.23 (f)	30	5,100	0.81
1,2-Dichloroethane	1.4	0.044 (e)	17	8,300	0.81
1,1-Dichloroethene	42	1.07 (f)	65	2,800	0.71
c-1,2-Dichloroethene	60	0.17 (f)	59 (g)	6,300 (g)	0.71
t-1,2-Dichloroethene	41	0.38 (f)	59	6,300	0.71
Ethylbenzene	21	0.29 (e)	180	170	0.60
Freon 113	9	13.6 (e)	390	200	0.64 (h)
1,1,1-Trichloroethane	7.4	0.70 (f)	130	830	0.71
Trichloroethene	170	0.39 (f)	99	1,300	0.71
Vinyl Chloride	10	1.14 (f)	2.5	4,200	0.95
Total Xylenes	44	0.25 (e)	640	180	0.64

Notes:

- (a) Dimensionless Henry's constant at 25 degrees Celsius obtained from reference indicated.
- (b) Organic carbon partition coefficients (Koc) obtained from Montgomery and Welkom (1991). Where multiple Koc's were available, the Koc's were averaged.
- (c) Solubility in water (Cmax) at 25 degrees Celsius obtained from Montgomery and Welkom (1991). Where multiple Cmax's were available, the Cmax's were averaged.
- (d) Except where indicated, diffusion coefficients obtained from U.S. EPA Superfund Exposure Assessment Manual (SEAM, April 1988). Values were interpolated to 25 degrees Celsius.

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Table 1  
Maximum Concentration and Chemical Properties of VOCs Detected in Groundwater  
Sybase, Inc.  
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- (e) Henry's constant obtained from Montgomery and Welkom (1991). Where multiple Henry's constants were available, the average value was calculated.
- (f) Henry's constant obtained from Gossett (1987).
- (g) Because Koc and Cmax values for c-1,2-dichloroethene are not available, the Koc and Cmax values for t-1,2-dichloroethene were used.
- (h) Diffusion coefficient not available in SEAM. Diffusion coefficient was calculated using Fuller's method recommended in SEAM (U.S. EPA, April 1988).

Table 2  
 Summary of Inhalation Toxicity Information for VOCs Detected in Groundwater  
 Sybase, Inc.  
 64th and 65th Street Properties, Emeryville, California  
 (EKI 940018.03)

Compound Detected in Groundwater	Non-Carcinogenic Toxicity Information			Carcinogenic Toxicity Information		
	Chronic Reference Dose (RfDi) (mg/kg-day)	Effect of Concern	Source (a)	Slope Factor (SF) (mg/kg-day) <sup>-1</sup>	Weight-of-Evidence Classification (b)	Source (c)
Acetone	0.1 (d)	Incr. Liver & Kidney Wt.	IRIS	-	D	IRIS
Benzene	-	-	-	0.1	A	Cal Potency
Chloroethane	2.9	Delayed Fetal Ossification	IRIS	-	-	-
1,1-Dichloroethane	0.1	Kidney Damage	HEAST	0.0057	C	Cal Potency
1,2-Dichloroethane	-	-	-	0.07	B2	Cal Potency
1,1-Dichloroethene	0.009 (d)	Hepatic Lesions	IRIS	1.2 (d)	C	HEAST
c-1,2-Dichloroethene	0.01 (d)	Decr. Hematocrit	HEAST	-	D	IRIS
t-1,2-Dichloroethene	0.02 (d)	Incr. Serum Alkaline Phosphatase	IRIS	-	-	-
Ethylbenzene	0.29	Liver & Kidney Toxicity	IRIS	-	D	IRIS
Freon 113	30 (d)	Psychomotor Impairment	IRIS	-	-	-
1,1,1-Trichloroethane	0.29	Reduced body Wt. Gain	ECAO	-	D	IRIS
Trichloroethene	-	-	-	0.01	under review	Cal Potency
Vinyl Chloride	-	-	-	0.27	A	Cal Potency
Total Xylenes	2	Hyperactivity, Decr. Body Wt.	IRIS	-	D	IRIS

Notes:

- (a) Chronic reference doses obtained from U.S. EPA's Integrated Risk Information System (IRIS), U.S. EPA's Health Effects Assessment Summary Tables (HEAST), dated March 1994, or U.S. EPA's Environmental Criteria and Assessment Office (ECAO).
- (b) U.S. EPA weight-of-evidence classification is as follows:
  - A = Human Carcinogen
  - B1 or B2 = Probable Human Carcinogen; B1 indicates that limited human data are available; B2 indicates that there is sufficient evidence in animals and inadequate or no evidence in humans.
  - C = Possible Human Carcinogen

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Table 2  
Summary of Inhalation Toxicity Information for VOCs Detected in Groundwater  
Sybase, Inc.  
64th and 65th Street Properties, Emeryville, California  
(EKI 940018.03)

D = Not Classifiable as to Human Carcinogenicity

E = Evidence of Non-Carcinogenicity for Humans

Weight-of-evidence information obtained from IRIS or HEAST.

- (c) Cancer slope factors obtained from California Cancer Potency Factors Updated Memorandum for the Office of Environmental Health Hazard Assessment (1 November 1994), IRIS, or HEAST, in this order of priority.
- (d) In the absence of an inhalation chronic reference dose or an inhalation carcinogenic slope factor, the respective oral value was used.
- (e) Hyphen ("-") symbol indicates a respective reference dose or cancer slope factor is not available for this compound.

Table 3  
 Summary of Soil Properties Measured in Shallow Samples  
 Sybase, Inc.  
 64th and 65th Street Properties, Emeryville, California  
 (EKI 940018.03)

Property	Symbol (a) (units)	Number of Analyses	Range of Measured Values (b)	Average Value
Organic Carbon Fraction	foc (-)	4	0.000086 - 0.00044	0.00028
Dry Bulk Density	rhob (g/cm <sup>3</sup> )	3	1.62 - 1.75	1.68
Porosity (c)	por (-)	3	0.34 - 0.39	0.37
Water Content (dry weight) (d)	(-)	3	0.186 - 0.243	0.215
Water Content (volumetric)	theta (-)	3	0.32 - 0.39 (e)	0.36

Notes:

- (a) Symbol represents the nomenclature used in the text and in the applicable equations. A hyphen ("-") indicates that the units are dimensionless.
- (b) Organic carbon fraction obtained from EKI draft report dated 21 August 1995. Dry bulk density and water content obtained from Treadwell & Rollo draft report dated 4 May 1995.
- (c) Because porosity was not measured, porosity ("n") was calculated using the equation:  $n = 1 - (rb/rs)$ , where rb is dry bulk density and rs is the density of the soil particles (assumed to equal 2.65 g/cm<sup>3</sup>).
- (d) Water content is measured in accordance with ASTM Method D2216, which is relative to the dry weight of solids. For VLEACH modeling, the volumetric water content (volume of water divided by total volume of soil) is used, which is calculated as the dry weight water content multiplied by the dry bulk density.
- (e) Because the soil samples collected from 3 feet below ground surface were 95 to 100 percent saturated, it is assumed that vadose zone soils are at a residual saturation of 50 percent, or theta = 0.18.

**Table 4**  
**Assumptions for Modeling Emission Fluxes Using VLEACH and**  
**Calculating Indoor Air Concentrations for VOCs Volatilizing from Groundwater**  
**Sybase, Inc.**  
**64th and 65th Street Properties, Emeryville, California**  
**(EKI 940018.03)**

Parameter	Volatilization from Groundwater
<b>Emission Flux Model Assumptions</b>	
Vadose Zone Thickness	3 feet (a)
Clean Soil Cover	3 feet
VOC Concentration in Groundwater	See Table 1
Cell Thickness (b)	0.1 foot
Timestep	0.1 year
Simulation Duration (c)	30 years
<b>Indoor Box Model Assumptions</b>	
Emission Flux	VLEACH
Air Exchange Velocity	0.84 cfm/sq.ft. (d)
Fraction of Cracks to Total Floor Area	0.001 (e)

Notes:

- (a) The vadose zone is conservatively assumed to be 3 feet thick. Vadose zone soils were nearly saturated at 3 feet. At least 1 foot of foundation material will be added to the site. Site-specific soil properties used in VLEACH simulations were as follows: porosity=0.37, volumetric water content=0.18, organic carbon content=0.00028, and bulk density=1.68 g/mL.
- (b) In VLEACH, the vadose zone is assumed to be composed of a vertical stack of cells with finite thickness. Equilibrium partitioning is assumed within each cell. Because the cell thickness is used to calculate the emission flux to the atmosphere, it is similar to the boundary layer thickness in Jury et al., 1983, 1990.
- (c) For volatilization from groundwater, simulations were performed for 30 years to achieve a maximum steady-state flux.
- (d) Indoor air exchange velocity represents the minimum value planned for the office buildings (personal communication with Flack + Kurtz, mechanical/electrical engineers for site).
- (e) Fraction of cracks in the ground floor relative to the total ground floor area represents the most conservative value presented in Daugherty, 1991. This term is also known as the infiltration ratio.



Table 5  
 Summary of Specific Exposure Parameters Used to Characterize Risks  
 to Future Office Building Tenants via Inhalation of VOCs from Groundwater  
 Sybase, Inc.  
 64th and 65th Street Properties, Emeryville, California  
 (EKI 940018.03)

Exposure Parameter	Parameter Assumption (a)	Reference
Exposure Frequency (EF)	250 days/year	U.S. EPA (1991); Cal-EPA (1992)
Exposure Duration (ED)	25 years	U.S. EPA (1991); Cal-EPA (1992)
Averaging Time (AT)	6250 days; 25,550 days (b)	U.S. EPA (1989a, 1991); Cal-EPA (1992)
Body Weight (BW)	70 kg	U.S. EPA (1989a, 1991); Cal-EPA (1992)
Inhalation Rate (IR)	20 m <sup>3</sup> /day	U.S. EPA (1989a, 1991); Cal-EPA (1992)

Notes:

(a) Exposure assumptions are compiled from:

- Cal-EPA, July 1992, *Supplemental Guidance for Human Health Multimedia Risk Assessments for Hazardous Waste Sites and Permitted Facilities*, DTSC, The Office of the Science Advisor.
- U.S. EPA, March 1991, *Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors"*, Interim Final, OSWER Directive: 9285.6-03.
- U.S. EPA, December 1989a, *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A)*, OERR, EPA/540/12-89/002.

(b) Averaging time for non-carcinogenic effects, which equals the period of exposure in units of days, is listed first. Averaging time for carcinogenic effects, which equals a 70 year lifetime in units of days, is listed second.

Table 6  
 Characterization of Risks to Future Office Building Tenants Resulting from Inhalation of VOCs from Groundwater  
 Sybase, Inc.  
 64th and 65th Street Properties, Emeryville, California  
 (EKI 940018.03)

VOCs Detected in Groundwater	Maximum Concentration of Compound in Groundwater (ug/L) (a)	Modeled Chemical Emission Flux from Groundwater (g/m <sup>2</sup> -day) (b)	Indoor Ambient Air Exposure Point Concentration (ug/m <sup>3</sup> ) (c)	Non-Carcinogen Chronic Daily Intake (mg/kg-day) (d)	Carcinogen Chronic Daily Intake (mg/kg-day) (d)	Non-Carcinogenic Inhalation RfD (mg/kg-day) (e)	Carcinogenic Inhalation Slope Factor (mg/kg-day) <sup>-1</sup> (f)	Non-Carcinogenic Hazard Index (g)	Estimated Lifetime Incremental Cancer Risk (h)
Acetone	23	1.2E-04	3.13E-04	8.9E-08	2.2E-08	0.1	-	8.9E-07	-
Benzene	4.8	2.2E-05	5.87E-05	1.7E-08	4.1E-09	-	0.1	-	4.1E-10
Chloroethane	34	1.8E-04	4.96E-04	1.4E-07	3.5E-08	2.9	-	4.9E-08	-
1,1-Dichloroethane	44	2.1E-04	5.59E-04	1.6E-07	3.9E-08	0.1	0.0057	1.6E-06	2.2E-10
1,2-Dichloroethane	1.4	6.5E-06	1.77E-05	5.1E-09	1.2E-09	-	0.07	-	8.7E-11
1,1-Dichloroethene	42	1.7E-04	4.68E-04	1.3E-07	3.3E-08	0.009	1.2	1.5E-05	3.9E-08
c-1,2-Dichloroethene	60	2.5E-04	6.71E-04	1.9E-07	4.7E-08	0.01	-	1.9E-05	-
t-1,2-Dichloroethene	41	1.7E-04	4.57E-04	1.3E-07	3.2E-08	0.02	-	6.5E-06	-
Ethylbenzene	21	7.3E-05	1.97E-04	5.6E-08	1.4E-08	0.29	-	1.9E-07	-
Freon 113	9	3.3E-05	9.02E-05	2.6E-08	6.3E-09	30	-	8.6E-10	-
1,1,1-Trichloroethane	7.4	3.0E-05	8.22E-05	2.3E-08	5.7E-09	0.29	-	8.1E-08	-
Trichloroethene	170	7.0E-05	1.89E-04	5.4E-08	1.3E-08	-	0.01	-	1.3E-10
Vinyl Chloride	10	5.5E-05	1.49E-04	4.3E-08	1.0E-08	-	0.27	-	2.8E-09
Total Xylenes	44	1.6E-04	4.41E-04	1.3E-07	3.1E-08	2	-	6.3E-08	-
<b>Total Risk to Future Office Building Tenants Resulting from Inhalation of Volatile Organic Chemicals of Potential Concern from Groundwater:</b>								<b>4.2E-05</b>	<b>4.2E-08</b>

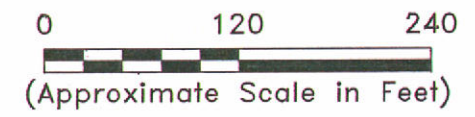
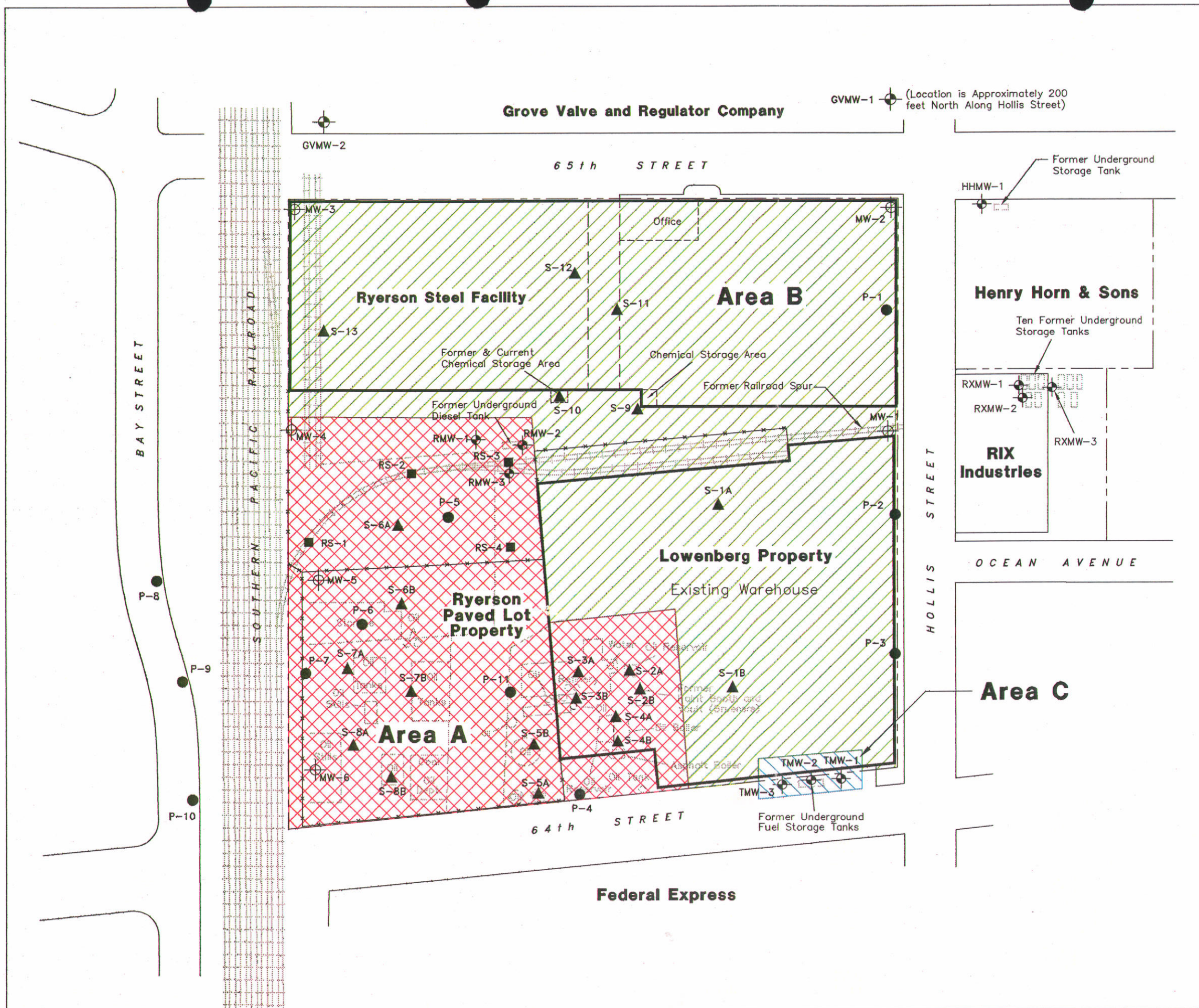
Notes:

- (a) Refer to Table 1 for compilation of maximum concentrations detected in groundwater.
- (b) Modeled baseline chemical emission fluxes were obtained by use of the VLEACH (CH2M-Hill, August 1990). To calculate baseline flux, chemical fate and transport parameters were obtained from Table 1. Site-specific soil assumptions were as follows: 3 feet clean cover (depth to groundwater), porosity=0.37, water content=0.18, bulk density=1.68 g/cm<sup>3</sup>, and organic carbon fraction=0.00028 (Table 3). Refer to Table 4 for additional assumptions regarding the VLEACH.
- (c) Exposure point concentrations (EPCs) were obtained by converting modeled chemical emission fluxes into EPCs via a box model (Daugherty, 1991). Mixing assumptions for the box model were as follows: air exchange velocity=0.084 cfm/sq. ft. (site-specific data), and estimated fraction of cracks relative to ground floor area=0.001 (Daugherty, 1991) (Table 4).
- (d) Chronic daily intakes (CDIs) of non-carcinogens and carcinogens were estimated using methodologies recommended by U.S. EPA or Cal-EPA. Refer to text and Table 5 for assumptions to calculate CDIs.
- (e) Chronic reference doses (RfDs) for non-carcinogenic effects obtained from U.S. EPA's Integrated Risk Information System (IRIS) computer database in July 1994, U.S. EPA's Health Effects Assessment Summary Table (HEAST), March 1994, or U.S. EPA's Environmental Criteria and Assessment Office (ECAO). Origin of respective RfDs included in Table 2. Hyphen indicates that an RfD is not available for this compound.

Table 6  
Characterization of Risks to Future Office Building Tenants Resulting from Inhalation of VOCs from Groundwater  
Sybase, Inc.  
64th and 65th Street Properties, Emeryville, California  
(EKI 940018.03)

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- (f) Slope factors (SFs) for carcinogenic effects obtained from Cal-EPA's Cancer Potency Factor Memorandum (June 1992), IRIS, or HEAST, in this order of priority. Origin of respective SFs included in Table 2. Hyphen indicates that an SF is not available for this compound.
- (g) Non-carcinogenic hazard index (HI) for compound *i* is defined as the  $CDI_i/RfD_i$ . The non-carcinogenic HI, summed for all compounds and exposure pathways, assumes that there is a level of exposure (i.e., RfD) below which it is unlikely even for sensitive populations to experience adverse health effects (U.S. EPA, 1989a). If the chronic daily intake (i.e., CDI) exceeds this RfD threshold (i.e., HI greater than 1), there may be concern for potential non-carcinogenic effects.
- (h) Estimated lifetime incremental cancer risk for chemical *i* is defined as  $CDI_i \times SFI_i$ . The estimated incremental lifetime cancer risk to an individual developing cancer due to VOCs on the North of 53rd Street Properties is given by the sum of incremental cancer risks for all chemicals and exposure pathways.



**LEGEND**

- Railroad Tracks
- Approximate Property Boundary
- Historical Site Features (1911 Sanborn Map)
- Monitoring Well Installed by EKI
- Shallow Soil Boring Installed by EKI
- Monitoring Well Installed by Others
- Soil and Grab Groundwater Sampling Location Collected by Others
- Soil/Grab Groundwater Sampling Location Collected by EKI, July 1995
- Area A**
- Area B**
- Area C**

- Notes:**
1. All locations are approximate.
  2. Basemap taken from Sanborn maps dated 1911 and 1967.

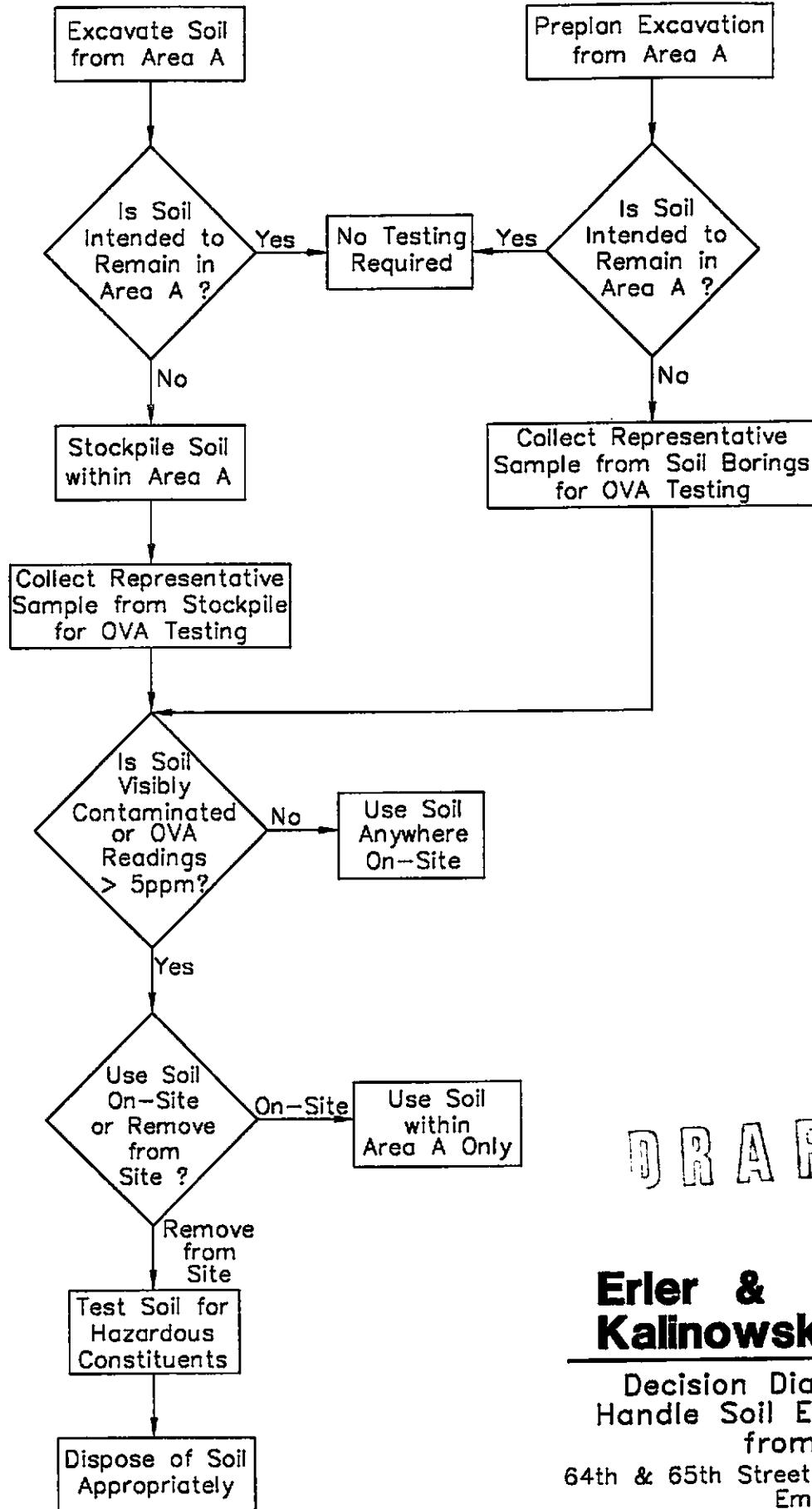
**Erler & Kalinowski, Inc.**

Soil Management Areas for Earthwork Activities

64th & 65th Street Properties  
Emeryville, CA  
August 1995  
EKI 940018.03

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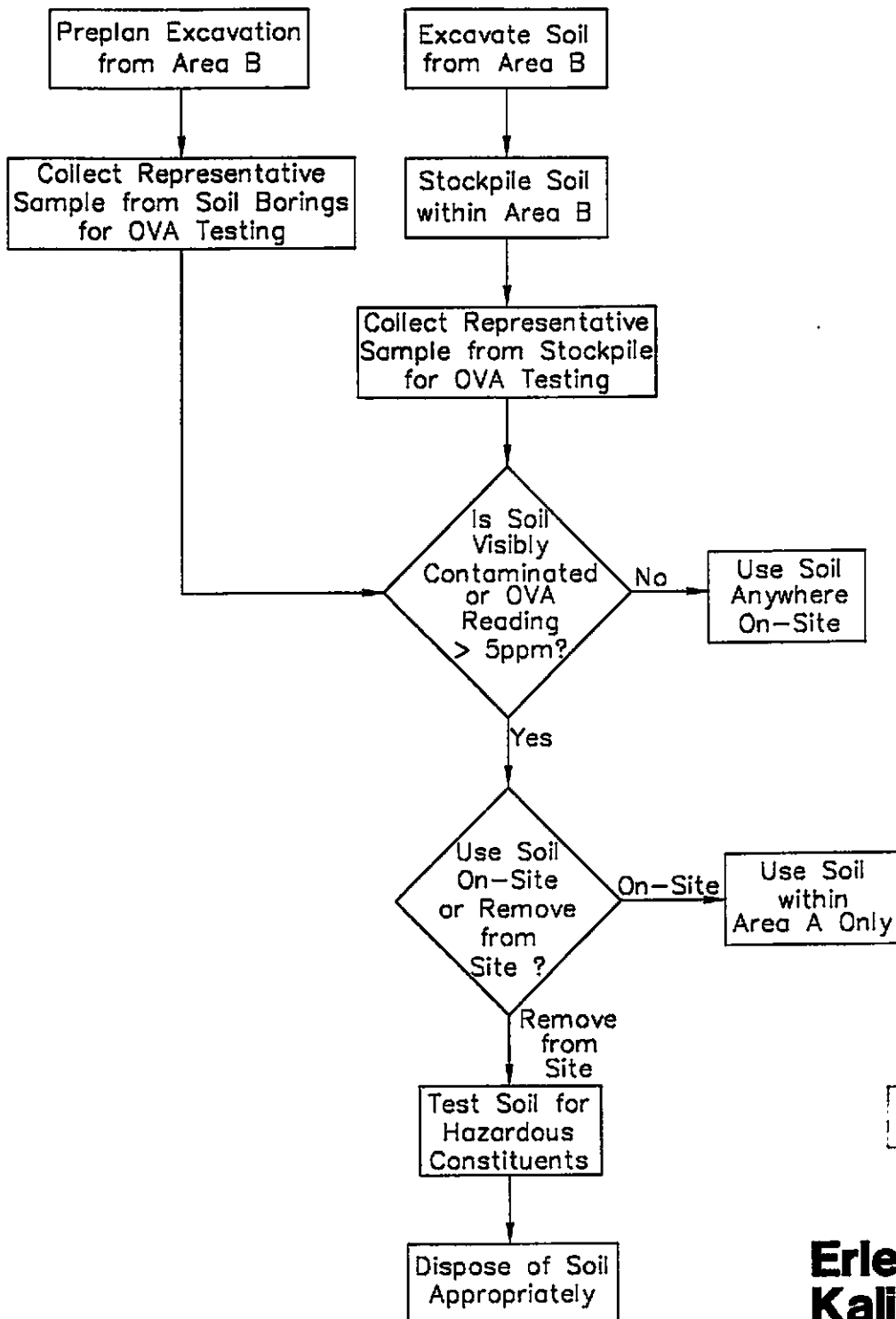
Figure 1



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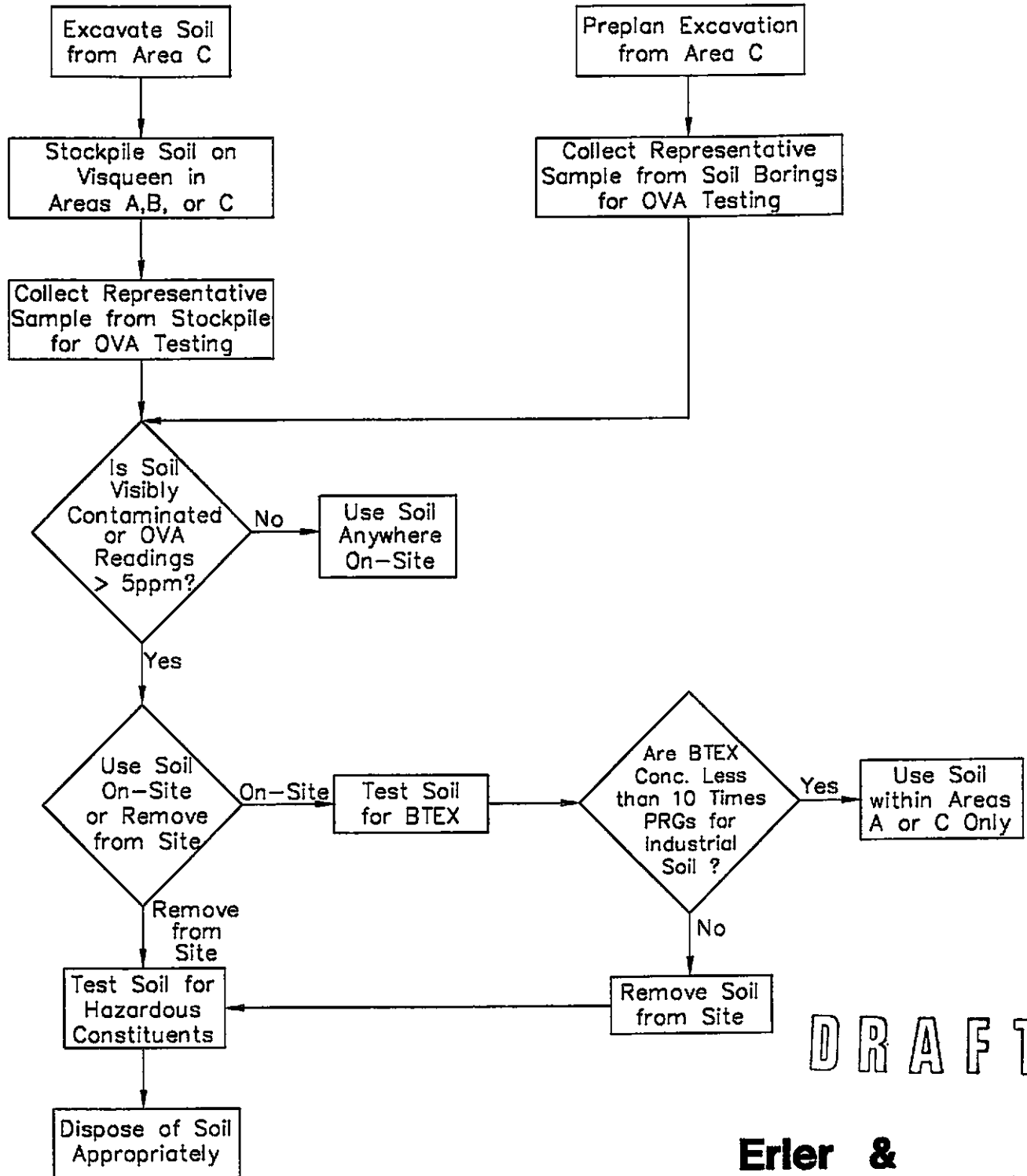
Decision Diagram to Handle Soil Excavated from Area A  
 64th & 65th Street Properties  
 Emeryville, CA  
 August 1995  
 EKI 940018.03  
 Figure 2



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**Erler & Kalinowski, Inc.**

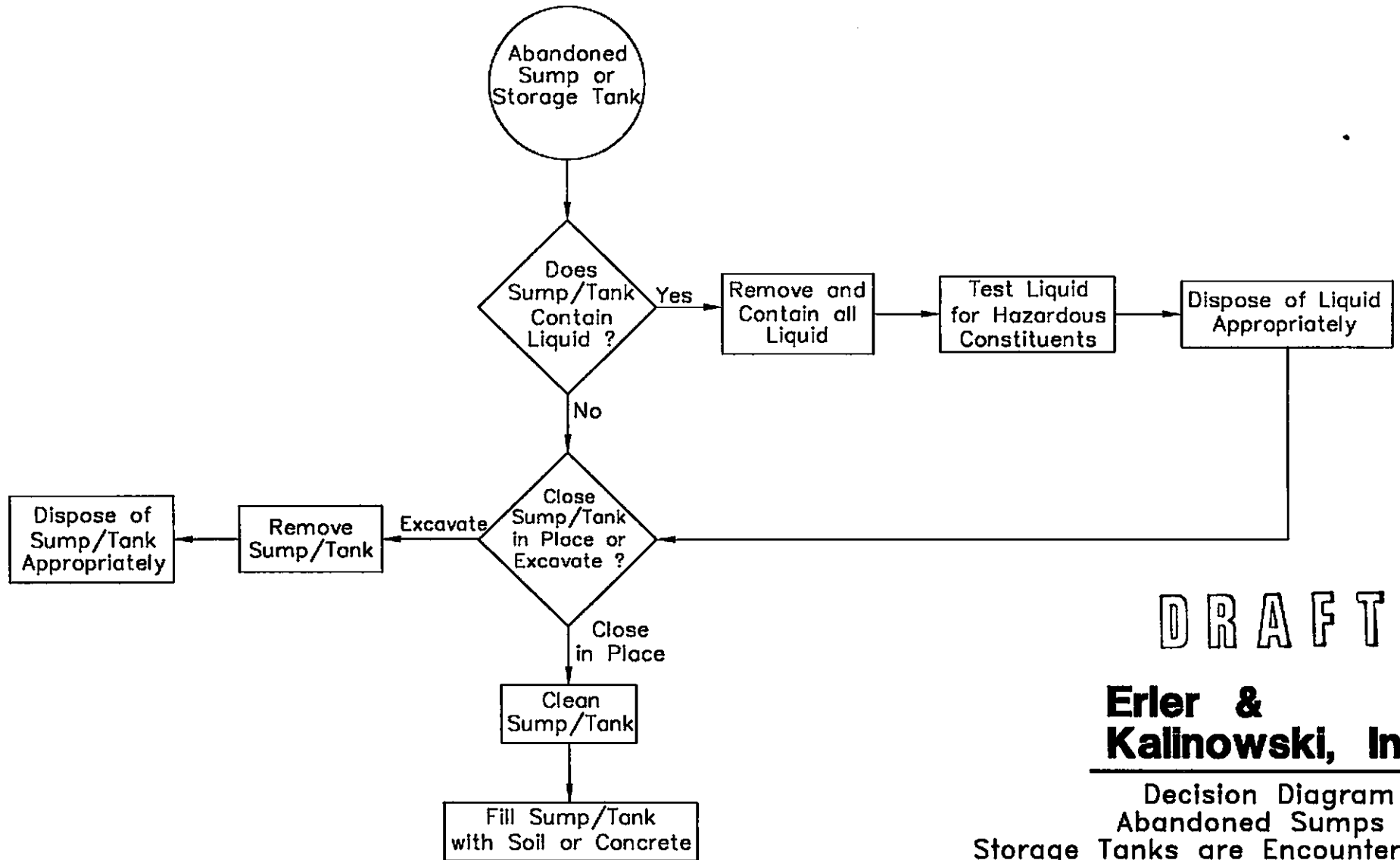
Decision Diagram to Handle Soil Excavated from Area B  
 64th & 65th Street Properties  
 Emeryville, CA  
 August 1995  
 EKI 940018.03  
 Figure 3



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**Erler & Kalinowski, Inc.**

Decision Diagram to Handle Soil Excavated from Area C  
 64th & 65th Street Properties  
 Emeryville, CA  
 August 1995  
 EKI 940018.03  
 Figure 4



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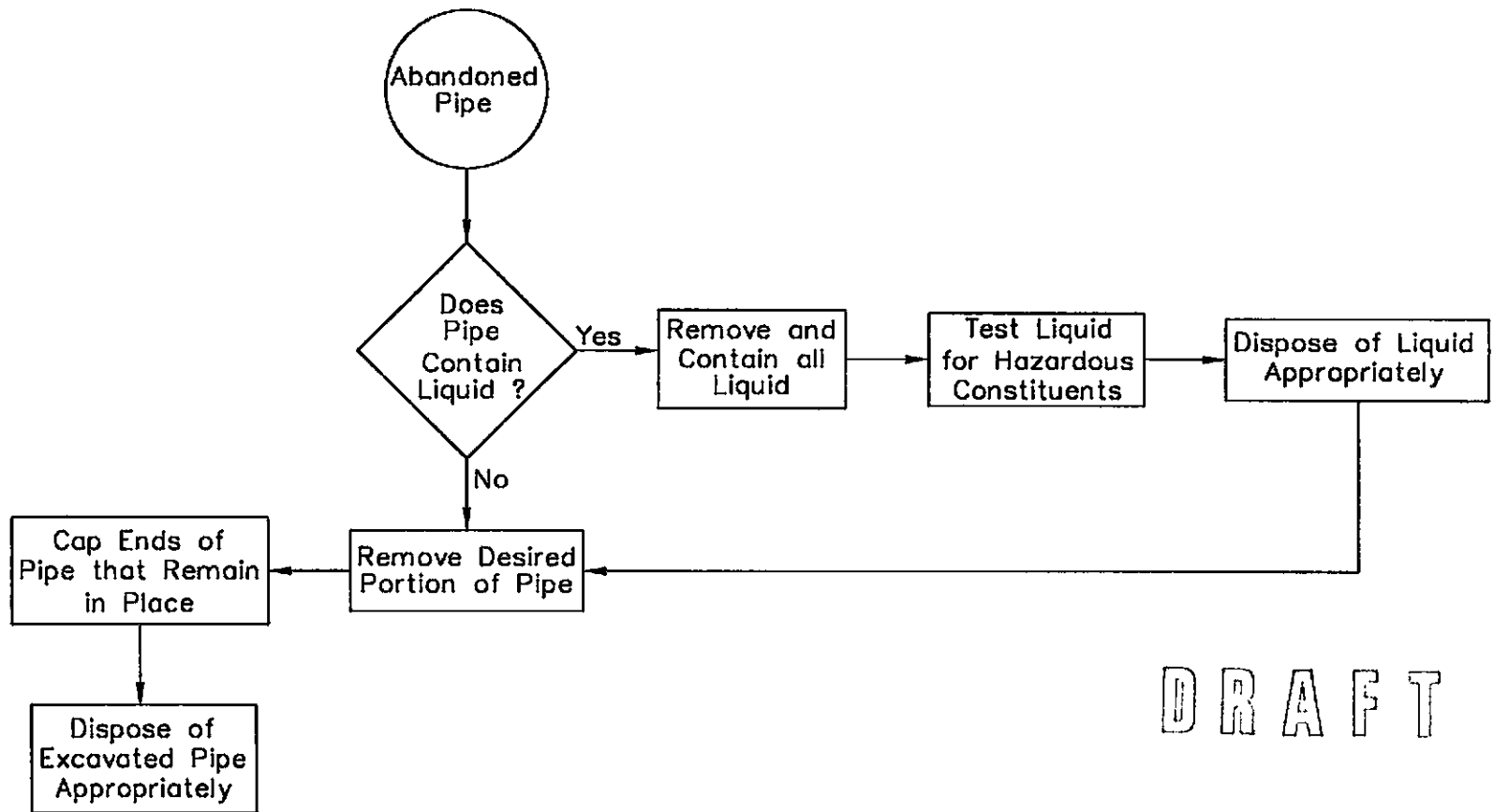
**Erler & Kalinowski, Inc.**

Decision Diagram if Abandoned Sumps or Storage Tanks are Encountered  
 64th & 65th Street Properties  
 Emeryville, CA

August  
 EKI 940018.03

Figure 5

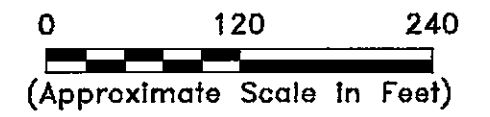
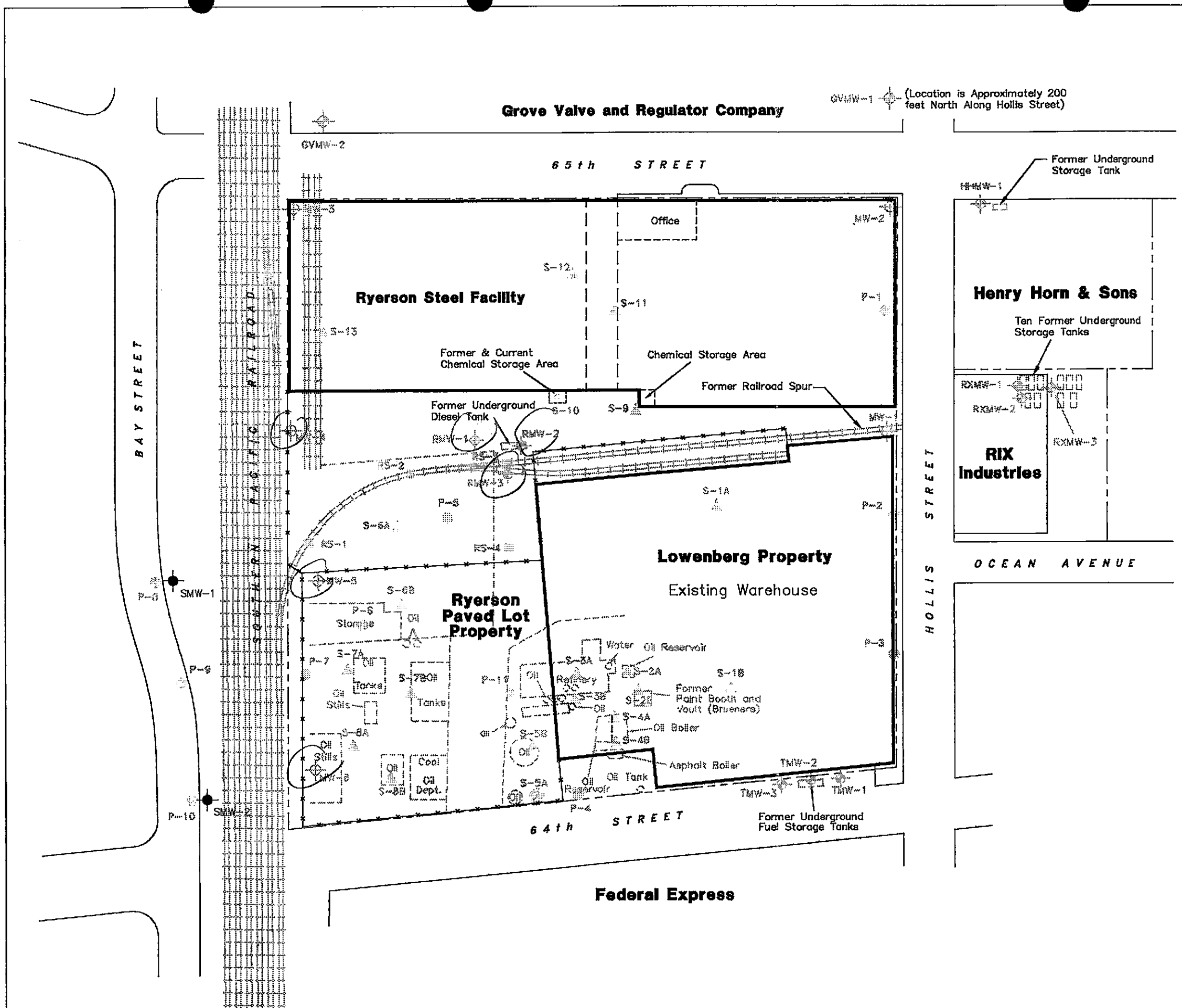




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Decision Diagram If  
Abandoned Pipes  
are Encountered  
64th & 65th Street Properties  
Emeryville, CA  
August  
EKI 940018.03  
Figure 6



**LEGEND**

- Railroad Tracks
- Approximate Property Boundary
- Historical Site Features (1911 Sanborn Map)
- Monitoring Well Installed by EKI
- Shallow Soil Boring Installed by EKI
- Monitoring Well Installed by Others
- Soil and Grab Groundwater Sampling Location Collected by Others
- Soil/Grab Groundwater Sampling Location Collected by EKI, July 1995
- Proposed Location of Perimeter Monitoring Well

**Notes:**

1. All locations are approximate.
2. Basemap taken from Sanborn maps dated 1911 and 1967.

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Proposed Locations of Perimeter Monitoring Wells

64th & 65th Street Properties  
Emeryville, CA  
August 1995  
EKI 940018.03

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Figure 7