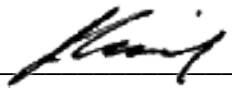
January 30, 2015

Mr. Keith Nowell
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

I, Larry David hereby authorize ERAS Environmental, Inc. to submit the BSK P-2 report dated for 106-110 Hegenberger Rd., Oakland in Oakland, California, dated October 30, 1997 to the Alameda County Health Care Services Agency.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Signature: 

Printed Name: Larry David

Mr. Larry David
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REPORT
SUPPLEMENTAL INVESTIGATION AND HEALTH RISK ASSESSMENT FORMER CLARIFIER SUMP

106-110 Hegenberger Road
Oakland, California
STID No. 4240 10/47

October 30, 1997

Prepared for:

Ms. Deborah David
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October 30, 1997

BSK Job No. 04-40-0127

Ms. Deborah David
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2049 Century Park East, Suite 3100
Los Angeles, California 90067

Subject: Report
Supplemental Investigation and Health Risk Assessment
Former Clarifier Sump
106-110 Hegenberger Road
Oakland, California
STID No. 4240

Dear Ms. David:

BSK & Associates is pleased to present this Report for the Supplemental Investigation and Former Clarifier Sump Health Risk Assessment Report (Risk Assessment) for the property located at 106-110 Hegenberger Road in Oakland, California.

SITE DESCRIPTION

The site is located on Hegenberger Road near the intersection with Pardee Drive, in a commercial/industrial area between Oakland International Airport and Interstate 880 (see Figure 1). The site consists of two properties: 106 Hegenberger Road, which is currently operated by RBJ Parking and RB Copies, and 110 Hegenberger Road, which is currently operated by Cellular Solutions, Inc. (see Figure 2). The site surfacing consists of asphalt and concrete surfacing, and two buildings along with minor landscaping. An offsite building (100 Hegenberger Road) is located immediately adjacent to the western property boundary (see Figure 2).

The site is located at an elevation of approximately 10 feet above mean sea level. Average annual rainfall is approximately 19 inches (Alameda County Flood Control and Water Conservation District [ACWCD], 1988). Nearby water bodies include San Leandro Creek, located 750 feet east of the site, Airport Channel, located 2,400 feet northwest of the site, and San Francisco Bay located 6,000 feet southwest of the site (see Figure 1). Groundwater within the first water-bearing zone flows to the southwest at a gradient of approximately 0.008. The first water-bearing zone, located within the Bay Muds, is not known to be used as a drinking water source due to generally low yield and high total dissolved solid content. Based on an ACWCD well database (revised April 1991), there are no known wells located within 2,000 feet downgradient of the site (see Figure 1).

BACKGROUND

The site is located on Hegenberger Road near the intersection with Pardee Drive, in a commercial/industrial area between Oakland International Airport and Interstate 880 (see Figure 1). The site was previously occupied by a gasoline service station and carwash facility. In 1990, three 10,000-gallon gasoline underground storage tanks and one 2-stage clarifier sump were removed, and soil samples were collected from the excavation sidewalls and associated piping trenches. Groundwater was not encountered to depths of 10 feet below ground surface (BGS) (West Coast Environmental, 1991), and the soils encountered consisted of silts and clays with minor sands (Harding Lawson Associates, 1990). Based on the petroleum hydrocarbon and soluble lead concentrations detected, ACEHS requested additional investigation of the site.

In April 1991, additional soil samples were collected near the former clarifier sump (see Figure 2). West Coast Environmental (WCE) indicated that the clarifier sump excavation remained open during the rainy season, which caused local water mounding. The depth to groundwater was approximately 0.5 feet BGS near the clarifier sump excavation, and 5 feet BGS at distances of 15 feet from the clarifier sump excavation. Soil analytical results for samples collected southeast (HA-4 and HA-7) of the clarifier sump contained relatively high total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations, and low metals concentrations (see Table 2). Soil sample HA-6-5, collected between the former clarifier sump and the offsite building did not contain detectable concentrations of TPHg or BTEX constituents, and contained background concentrations of total lead (see Table 2).

In 1994, four groundwater monitoring wells (MW-1 to MW-4) were installed and five soil borings (B-3, 4, 5, 8, and MW-4A) were sampled. Soils typically consisted of up to 3 feet of fill material underlain by 13 to 15 feet of silts and clays, which were in turn underlain by silty sands and sands. A one foot thick silty or clayey sand was locally encountered at approximately 10 feet BGS within the silt/clay interval. Groundwater was typically encountered at depths of over 17 feet BGS. Perched groundwater was locally encountered at approximately 5 feet BGS within backfill material at borings MW-4A and MW-4B. Except for the trace BTEX and/or TPHg concentrations detected in one shallow soil sample (S-6-B3), and one sample of perched groundwater (W-MW-4), soil and groundwater samples did not contain detectable concentrations of petroleum hydrocarbons or soluble lead, and contained background concentrations of selected metals (Dugan & Associates, 1994). Based on these results, ACEHS, in a January 19, 1996 correspondence, indicated that the site qualified as a "low risk groundwater case", except for the former clarifier sump area.

In the *Former Clarifier Sump Health Risk Assessment Report* (Risk Assessment) dated November 21, 1996, BSK presented the findings of a Tier 2 risk assessment for the former clarifier sump area based on exposure to petroleum hydrocarbon vapors from soil via outdoor air inhalation under two scenarios for impacted soil thickness. The results indicated that under the more conservative scenario, which assumed 14 feet of impacted soil (4.5 to 18.5 feet BGS), adult commercial/industrial exposure via volatilization of the maximum concentrations of benzene, ethylbenzene, naphthalene, toluene, and xylenes detected at the site to outdoor air did not represent

a human health risk above 1 x 10^{-5} excess cancer risk or 1.0 chronic hazard quotient. The Risk Assessment also indicated that the maximum concentration of total lead detected at the site did not exceed Region 9 Preliminary Remediation Goals or result in blood lead levels above 10 micrograms per deciliter, the concentration of concern, based on the California Environmental Protection Agency - Department of Toxic Substances Control Lead Risk Assessment Spreadsheet. In correspondence dated February 10, 1997, ACEHS requested (1) evaluation of the indoor air exposure pathway to address potential future development at the site, (2) clarification of the depth to water at the site, and (3) modification of the porosity value used in the risk calculations.

On July 22, 1997, BSK & Associates submitted a Preliminary Tier 2 Indoor Air Evaluation Supplemental Investigation And Risk Assessment Addendum Work Plan to ACEHS for approval. ACEHS issued an approval letter on August 18, 1997, with conditions that soil samples will be collected at 5-foot intervals until groundwater is encountered and that the soils samples will be analyzed for TPH-g and BTEX.

SCOPE OF SERVICES

The scope of this investigation included 1) Preparation and submittal of a work plan and health and safety plan to ACEHS; 2) Drilling two soil borings; 3) Analytical testing of soil samples; 4) adjustments to the risk assessment; and 5) Preparation of this report.

Permits - Prior to commencement of drilling, a drilling permit application, work plan and health and safety plan were submitted to Alameda County Public Works Agency.

Underground Utilities - Underground Service Alert (USA) was notified 48 hours prior to our subsurface exploration. In addition, a geophysical services subcontractor surveyed the locations for underground obstructions.

SOIL BORING DRILLING AND SAMPLING

During the drilling and soil sampling Mr. Barney Chan of ACEHS was present to observe the field activities.

The locations of the soil borings are indicated on Figure 2, Site Plan. Drilling was conducted with a Mobile Drill B-53 truck-mounted rig with 8-inch diameter hollow stem auger. Soil samples were collected at 5-foot intervals by driving a 2.0-inch I.D. California sampler 18 inches into relatively undisturbed soil. Soil samples were sealed in the brass sleeves using Teflon™ tape, plastic end caps, and tape, and stored on ice or Blue Ice™ (ice) pending transportation to a certified hazardous materials testing laboratory for analysis.

The materials encountered in the well borings were visually classified in general accordance with the Unified Soil Classification System (ASTM D 2487). A key for classification of the soils is

presented on the Unified Soil Classification Chart, Figure 3. The logs of the borings are presented on Figures 4 and 5.

Augers and drill rods were cleaned with a high-pressure, high-temperature cleaner before, between and after each bore hole. Soil cuttings and rinsate from the auger wash were placed into 55-gallon DOT 17 E/H drums and labeled. The drums are currently stored on-site pending the results of the analytical tests. It is the responsibility of the property owner to dispose of the material in the drums according to the appropriate environmental regulations.

ANALYTICAL TESTING

Two soil samples from each boring were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using United States Environmental Protection Agency (EPA) Method modified 8015, and benzene, toluene, ethylbenzene and xylene (BTEX) using EPA Method 8020. Samples were submitted to BSK's California-certified hazardous materials testing laboratory in Fresno, California using chain-of-custody protocol. The results of the analysis of the soil samples are provided on Table 1, Soil Analytical Results below and on Table 2, Summary of Soil Analytical Results. The laboratory data sheets and chain-of-custody document are provided in Appendix A.

TABLE 1
ANALYTICAL RESULTS - SOIL SAMPLES
Results in milligrams per kilogram (mg/kg)

Sample Location	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-Benzene	Total Lead
B-101	5	900	1.1	19	39	19	41
B-101	10	ND	ND	ND	ND	ND	--
B-102	5	2000	16	3.2	57	120	
B-102	10	ND	ND	ND	ND	ND	--
Detection Limit	--	1	0.005	0.005	0.005	0.005	--

ND - None detected
-- - Not tested

HEALTH RISK ASSESSMENT

This amended risk assessment includes an evaluation of potential exposure via "indoor air", as well a modification of porosity, as presented in the Risk Assessment dated November 21, 1996, and a re-evaluation of outdoor air exposure. The Tier 2 evaluation was conducted using the RBCA Toolkit© prepared by Groundwater Services Inc., of Houston, Texas, which is based on ASTM guidance document *E 1739-95*. Health risk was evaluated for commercial/industrial exposure to BTEX constituents in soil via indoor and outdoor air inhalation with an excess cancer risk target levels of 1×10^{-5} and a hazard quotient of 1. As requested in the February 10, 1997 ACEHS correspondence, the porosity value was modified to 0.38 as suggested in ASTM guidance document *E 1739-95*. No further evaluation of health risks associated with semi-volatile organic compounds, metals, or BTEX constituents via other exposure pathways was performed.

Amended Tier 2 Evaluation

Inhalation transport mechanisms evaluated in the analysis included volatilization and atmospheric dispersion of benzene from impacted subsurface soil. Biodegradation effects were not calculated in the model.

The Tier 2 health risk assessment was based on commercial/industrial inhalation exposures with target levels of less than 1×10^{-5} for carcinogens and chronic hazard quotient of less than 1.0 for noncarcinogens. In order to reflect State of California cancer slope criteria for benzene, a cancer slope factor (SFo) of 0.10 /mg/kg-d was utilized in the model as opposed to the default value of 0.029 /mg/kg-d.

Site-Specific Parameters

Soil analytical results and the soil types encountered during this and previous investigations were used to model the areal extent of the impacted soil, and the contaminant transport characteristics. The input data was used to calculate site specific target levels (SSTLs) for benzene, toluene, ethylbenzene and xylene in subsurface soil (refer to Table 3). Default values used in this Amended Tier 2 risk assessment were modified, as follows:

- Impacted soil area of 1,050 square feet (9.8×10^5 square centimeters) and 55 foot (1.7×10^3 cm) length of impacted soil parallel to wind based on interpretation of extent of petroleum hydrocarbons encountered during previous sampling events.

- Impacted soil thicknesses of 5 feet (3 to 8 feet BGS) was modeled.

Tier 2 Evaluation Results

The maximum benzene concentration detected in soil at the site during this investigation was 16 mg/kg. The benzene SSTLs calculated in the Tier 2 evaluation are 0.28 mg/kg for the volatilization to indoor air pathway and 110 mg/kg for the volatilization to outdoor air pathway (refer to Table 5). The results of other chemicals of concern (toluene, ethylbenzene and xylene), indicate that these compounds are not at levels which exceed their respective SSTLs.

CONCLUSIONS AND RECOMMENDATIONS

Based on the concentrations of benzene in the soil samples collected from borings B-101 and B-102 at depths of 5 feet below the ground surface, the risk from volatilization to indoor air pathway exceeds a health risk of 1.0×10^{-5} excess cancer risk.

The following recommendations are presented as potential options:

Option 1 — Conduct soil vapor flux measurements at the site which would provide an estimation of the actual rate of benzene migration through the subsurface soils to air within the atmosphere mixing zone. Revaluate the potential risk using a Tier 3 assessment.

Option 2 — Remediate the subsurface soils such that the benzene levels are below the 0.28 mg/kg SSTL.

Option 3 — Establish a deed restriction such that buildings would be excluded from the area of the former clarifier sump or require special construction techniques which would prevent vapor intrusion into the buildings.

LIMITATIONS

This risk assessment has been prepared for the exclusive use of the Ms. Deborah David. The information and recommendations presented herein are based on BSK & Associates' evaluation of subsurface conditions interpreted from data obtained from previous investigations, and application of the site data to the ASTM guidance. Data complied from previous investigations were based on analytical results of discrete soil and groundwater samples collected from a limited number of subsurface sampling locations at the site and may not be entirely representative of conditions existing at other locations on the site.

This report has been prepared in accordance with generally accepted methodologies and standards of practice for the area. No other warranty, either expressed or implied, is made as to the findings or conclusions included in this report.

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

A copy of this Report should be forwarded to Barny Chan of ACEHS. Extra copies of this report have been provided for this purpose.

BSK & Associates appreciates the opportunity to provide you with environmental services. If you have any questions, please don't hesitate to call us at (510) 462-4000.

Respectfully submitted,
BSK & Associates

Martin B. Cline
Project Geologist
R.G. 6244

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

Attachments:

Table 2 - Summary of Soil Analytical Results
Table 3 - RBCA Tier 2 Output Table 1
Table 4 - RBCA Tier 2 Worksheet
Table 5 - RBSL and SSTL Summary

Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Unified Soil Classification Chart
Figure 4 - Boring Log, B-101
Figure 5 - Boring Log, B-102

Appendix A - Laboratory Data Sheets and Chain-of-Custody Document

Distribution: Ms. Deborah David (4 copies)

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS
Former Clarifier Sump Location
106-110 Hegenberger Road
Oakland, California

Sample No.	Date	Sample Depth (ft-BGS)	TPHg (mg/kg)	TPHd (mg/kg)	TOG (mg/kg)	TOG (mg/kg)	TRPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	2-Methyl-Naphthalene (mg/kg)	VOCs (mg/kg)	Total Cadmium (mg/kg)	Total Chromium (mg/kg)	Total Lead (mg/kg)	STLC Lead (mg/L)	Nickel (mg/kg)	Total Zinc (mg/kg)
EPA Analytical Method:			8015m	8015m	503A	5520B(503D)	418.1	8020	8020	8020	8020	8010	8010	8010	7130	7190	7420	WET/7420	7520	7950
Harding-Lawson Associates, 1990																				
SS-22-4.5	09/07/90	4.5	570	420	780	2,400	-	0.15	0.062	1.7	13	6.0	7.9	-	1.0	62	80	8.0	-	69
West Coast Environmental, 1991																				
HA-4-5	04/03/91	5	3,340	ND(<10)	-	-	4,000	39.9	177	93.3	281	-	-	-	10	41.1	59.3	0.98	-	60.8
HA-6-5	04/03/91	5	ND(<1.0)	ND(<10)	-	-	160	ND(<0.05)	ND(<0.07)	ND(<0.07)	ND(<0.14)	-	-	-	0.80	45.6	46.2	-	-	52.3
HA-7-5	04/03/91	5	1,160	ND(<10)	-	-	1,700	16.1	29.2	41	115	-	-	-	0.90	52.3	109	0.41	-	38.1
BG-1-3	04/03/91	3	-	-	-	-	56	-	-	-	-	-	-	-	0.80	41.5	10	-	-	19.9
BG-2-3	04/03/91	3	-	-	-	-	114	-	-	-	-	-	-	-	0.90	47.9	47.8	-	-	43
BG-3-3	04/03/91	3	-	-	-	-	82	-	-	-	-	-	-	-	0.74	49.8	30.5	-	-	39.4
Dugan Associates, 1994																				
S-6-B3	02/28/94	6	30	-	-	-	-	0.76	0.07	0.17	0.97	-	-	-	-	-	-	-	-	-
S-10-B3	02/28/94	10	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-11-B3	02/28/94	11	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-16-B3	02/28/94	16	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-18.5-B3	02/28/94	18.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-5.5-B4	02/28/94	5.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-10.5-B4	02/28/94	10.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-15.5-B4	02/28/94	15.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-18-B4	02/28/94	18	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-5.5-B5	02/28/94	5.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-10.5-B5	02/28/94	10.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-15.5-B5	02/28/94	15.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-9-MW1	02/11/94	9	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-16.5-MW1	02/11/94	16.5	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	ND(<4.0)	-	-	-
S-21-MW1	02/11/94	21	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	4.1	-	-	-
S-10.5-MW2	02/11/94	10.5	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	ND(<4.0)	-	-	-
S-15.5-MW2	02/11/94	15.5	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-17-MW2	02/11/94	17	ND(<1.0)	-	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-10.5-B8	02/11/94	10.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	5.3	ND(<0.2)	-	-
S-15.5-B8	02/11/94	15.5	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-5.5-MW3	02/15/94	5.5	ND(<1.0)	ND(<10)	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-10.5-MW3	02/15/94	10.5	ND(<1.0)	ND(<10)	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
S-15.5-MW3	02/15/94	15.5	ND(<1.0)	ND(<10)	-	ND(<50)	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.05)	ND(<0.05)	(<varies)	ND(<1.0)	36	4.1	ND(<0.2)	36	28
												ND(<0.05)	ND(<0.05)	(<varies)	ND(<1.0)	53	4.7	ND(<0.2)	56	53
BSK & Associates, 1997																				
B-101	09/08/97	5	900	-	-	-	-	1.1	5.6	19	39	-	-	-	-	-	41	-	-	-
B-101	09/08/97	10	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-
B-102	09/08/97	5	2000	-	-	-	-	16	3.2	120	57	-	-	-	-	-	-	-	-	-
B-102	09/08/97	10	ND(<1.0)	-	-	-	-	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	-	-	-	-	-	-	-	-	-

Soil analytical results presented in milligrams per kilogram.
Emboldened data for comparison with Risk Based Screening Levels and Site Specific Target Levels.

EPA	Environmental Protection Agency
ft-BGS	Feet below ground surface
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
ND	Concentration below detection limit presented in parentheses
STLC	Soluble Threshold Limit Concentration
TOG	Total Oil and Grease
TPHg	Total Petroleum Hydrocarbons as Gasoline
TPHd	Total Petroleum Hydrocarbons as Diesel
TRPH	Total Recoverable Petroleum Hydrocarbons
VOCs	Volatile organic compounds
WET	Waste Extraction Test

TABLE 3

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: David Property — Job Identification: 04-40-0127
Site Location: 106-110 Hegenberger Road, Oakland — Date Completed: 10/24/97
Completed By: MBC/Pleasanton

Software: GSI RBCA Spreadsheet
Version: v 1.0

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
GW.v	Volatilization to Outdoor Air	FALSE	FALSE	
GW.b	Vapor Intrusion to Buildings	FALSE	FALSE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	TRUE	
SS.v	Volatiles and Particulate Inhalation	FALSE	TRUE	TRUE
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	TRUE
S.l	Leaching to Groundwater from all Soils	FALSE	FALSE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	TRUE	

Matrix of Receptor Distance and Location on- or off-site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		FALSE		FALSE
S	Inhalation receptor (cm)		FALSE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	***1.0E-05***	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	2	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	***9.8E+05***		***9.8E+05***
W	Length of affected soil parallel to wind (cm)	***1.7E+03***		***1.7E+03***
W.gw	Length of affected soil parallel to groundwater (c	***1.7E+03***		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	***9.1E+01***		
Pe	Particulate areal emission rate (g/cm^2/s)	2.2E-10		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	***2.4E+00***
Ugw	Groundwater Darcy velocity (cm/yr)	***3.9E+03***
Ugw.tr	Groundwater Transport velocity (cm/yr)	***9.6E+03***
Ks	Saturated Hydraulic Conductivity(cm/s)	1.6E-02
grad	Groundwater Gradient (cm/cm)	8.0E-03
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
phi.eff	Effective Porosity in Water-Bearing Unit	4.1E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03

Soil	Definition (Units)	Value	capillary	vadose	foundation
hc	Capillary zone thickness (cm)	***4.6E+01***			
hv	Vadose zone thickness (cm)	***2.6E+02***			
rho	Soil density (g/cm^3)	1.7			
foc	Fraction of organic carbon in vadose zone	0.01			
phi	Soil porosity in vadose zone	0.38	0.342	0.12	0.12
Lgw	Depth to groundwater (cm)	***3.0E+02***			
Ls	Depth to top of affected soil (cm)	***9.1E+01***			
Lsubs	Thickness of affected subsurface soils (cm)	***1.6E+02***			
pH	Soil/groundwater pH	6.5			
phi.w	Volumetric water content		0.342	0.12	0.12
phi.a	Volumetric air content		0.038	0.26	0.26

300/2.54x12 = 9.8'

5'x12x2.54

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)		
ay	Transverse dispersion coefficient (cm)		
az	Vertical dispersion coefficient (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		