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LETTER OF TRANSMITTAL

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| DATE November 5, 2002 | BEI Job No. 94015       |
| ATTENTION:            | John Kawahara           |
| SUBJECT:              | Kawahara Nursery        |
|                       | 16550 Ashland Avenue    |
|                       | San Lorenzo, California |
|                       | Site # 4403             |

Kawahara Nursery  
698 Burnett Avenue  
Morgan Hill, CA 95037

Alameda County  
NOV 07 2002  
Environmental Health

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SIGNED: Mark Detterman

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Alameda County  
NOV 07 2002  
Environmental Health

**ASTM RBCA Health Risk Assessment**

Kawahara Nursery  
16550 Ashland Avenue  
San Lorenzo, California  
Site # 4403

October 11, 2002 BEI Job No. 94015

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Prepared by:

Blymyer Engineers, Inc.  
1829 Clement Avenue  
Alameda, CA 94501

Client:

Kawahara Nursery, Inc.  
16550 Ashland Avenue  
San Lorenzo, CA 94508

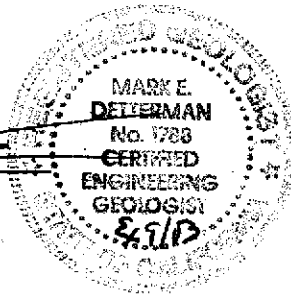
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Blymyer Engineers, Inc.

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## **1.0 Introduction**

### **1.1 Previous Work**

#### **1.1.1 Underground Storage Tank Removal**

On December 1, 1992, one steel 5,000-gallon underground storage tank (UST) was removed from the property owned by Kawahara Nursery, located at 16550 Ashland Avenue, San Lorenzo, California, (Figures 1 and 2). The UST, used to store diesel, was reported to be in good condition at the time of removal with no visible evidence of holes. However, soil samples collected from the UST excavation contained Total Petroleum Hydrocarbons (TPH) as diesel, suggesting that a release had occurred. The results of the UST closure were described in the *Underground Storage Tank Closure Report*, (December 12, 1993) prepared by Tank Protect Engineering.

According to information obtained from Kawahara Nursery, a 1,000-gallon gasoline UST was previously located in the vicinity of the lath house on the north side of the property (Figure 3). The UST was reportedly removed from the site shortly after Kawahara Nursery occupied the property in 1954.

#### **1.1.2 Phase I Site Investigation**

In a letter dated January 27, 1993, the Alameda County Health Care Services Agency (ACHCSA) requested that a preliminary subsurface investigation be completed to ascertain the extent of soil and groundwater contamination at the site. On June 10, 1993, Blymyer Engineers supervised the installation of three groundwater monitoring wells (MW-1, MW-2, and MW-3) and one soil bore (SB-1). Minor concentrations of petroleum hydrocarbons were detected in the soil samples collected from soil bores MW-1 and MW-2, and higher concentrations were detected in the samples collected near the water-bearing zone in soil bore MW-3. The groundwater sample collected from monitoring well MW-3, located adjacent to an on-site irrigation well, contained TPH as gasoline and benzene, toluene, ethylbenzene, and xylenes (BTEX).

### 1.1.3 Phase II Site Investigation

In response to Blymyer Engineers' *Preliminary Site Assessment, Phase I Subsurface Investigation* (June 28, 1993) report and *Subsurface Investigation Status Report* (April 29, 1994), the ACHCSA requested full delineation of the extent of petroleum hydrocarbons in groundwater at the site and in the soil adjacent to the diesel UST excavation. In 1994, Blymyer Engineers conducted a second phase of investigation at the site consisting of:

- A review of records at the ACHCSA and the Regional Water Quality Control Board to determine if any toxic chemical or fuel leaks reported within a ¼-mile radius may have impacted the site
- A review of historical aerial photographs
- Field tests to assess whether pumping of the on-site irrigation well would influence the shallow water-bearing zone
- A 16-point soil gas survey
- Installation of two additional groundwater monitoring wells (MW-4 and MW-5)
- Collection of groundwater samples from all five monitoring wells during the first three quarters of 1995

Results of the second phase of investigation were presented in Blymyer Engineers' *Subsurface Investigation Letter Report*, dated December 16, 1994, and in quarterly groundwater monitoring reports submitted in 1995.

No potential upgradient sources of contamination were identified during the review of the local regulatory agency records and aerial photographs. On the basis of the limited field tests, pumping of the irrigation well did not have a significant influence on shallow groundwater beneath the site. Furthermore, petroleum hydrocarbons were not detected in the groundwater samples collected from the irrigation well, which is apparently screened from 45 to 60 feet below ground surface (bgs).

Slightly elevated concentrations of petroleum hydrocarbons were detected in the soil gas samples collected from the northeastern corner of the barn and near the northernmost lath house. Groundwater samples from MW-3, located between the lath house and the barn, contained up to 120,000 micrograms per liter ( $\mu\text{g/L}$ ) TPH as gasoline, 4,800  $\mu\text{g/L}$  of benzene, 8,400  $\mu\text{g/L}$  of toluene, 3,000  $\mu\text{g/L}$  of ethylbenzene, and 27,000  $\mu\text{g/L}$  of total xylenes. The presence of TPH as gasoline in groundwater samples from MW-3 suggested that there was another source of petroleum hydrocarbons at the site, in addition to the diesel UST that was removed in 1992.

TPH as diesel was detected in the MW-5 groundwater sample only during the March 1995 sampling event. TPH as gasoline, TPH as diesel, and BTEX were not detected in groundwater samples collected from monitoring wells MW-1, MW-2, or MW-4. The direction of groundwater flow in September 1995 was estimated to be northwest with an average gradient of 0.004 feet/foot.

On the basis of the *Subsurface Investigation Letter Report* and quarterly groundwater monitoring reports, the ACHCSA requested (in a letter dated May 31, 1995) that Kawahara Nursery conduct additional work at the site. Specifically, they requested submittal of a workplan to identify the source and extent of contamination in soil and groundwater in the vicinity of monitoring well MW-3.

On June 3, 1997, Blymyer Engineers submitted the *Workplan for Additional Site Characterization and Site Risk Classification* (Workplan) to the ACHCSA. In a letter dated June 6, 1997, the ACHCSA requested that several additional tasks be included in the Workplan. On June 12, 1997, Blymyer Engineers submitted the *Revised Workplan for Additional Site Characterization* (Revised Workplan), which addressed the additional ACHCSA requirements.



The Revised Workplan included the following tasks:

- Resume quarterly groundwater monitoring and sampling of MW-3, MW-4, and MW-5
- Generate a geophysical survey in an attempt to locate the gasoline UST or its former basin in the vicinity of the lath house on the north side of the site
- Perform an additional investigation in the vicinity of the former gasoline UST by advancing approximately 6 direct-push soil bores
- Decommission monitoring wells MW-1 and MW-2, as approved by the ACHCSA
- Analyze soil and groundwater samples to evaluate the potential for natural attenuation (aerobic and anaerobic biodegradation)
- Determine if the site can be classified in the "low risk groundwater" category as defined by the San Francisco Bay Regional Water Quality Control Board (SF-RWQCB)
- If appropriate, evaluate the risk to human health and the environment

On March 4, 1999, Blymyer Engineers resumed quarterly groundwater monitoring and sampling of MW-3, MW-4, and MW-5, and submitted the *Quarterly Groundwater Monitoring Report, First Quarter 1999 (January through March)*, dated April 13, 1999.

In June 1999, prior to implementation of the Revised Workplan, the ACHCSA requested (June 2, 1999) the addition of the following tasks to the above scope of work (see Blymyer Engineers' *Proposed Soil Bore Locations*, dated June 21, 1999):

- Drill two additional soil bores on the west side and east side of monitoring well MW-3

- Drill additional soil bores around the perimeter of the former diesel UST and in the vicinity of geophysical anomalies
- Collect soil samples at 5-foot intervals and collect one grab groundwater sample from each soil bore

#### **1.1.4 Additional Subsurface Investigation**

On September 2, 1999, Blymyer Engineers submitted the *Results of Additional Subsurface Investigation and Quarterly Groundwater Monitoring, Second Quarter 1999*. This report presented the results the geophysical survey, additional soil bore sampling, well decommissioning, and groundwater monitoring for the second quarter, 1999. In addition to decommissioning monitoring wells MW-1 and MW-2, as approved by the ACHCSA, the following conclusions were made:

- The direction of groundwater flow is toward the northwest
- On the basis of the geophysical survey, buried metal objects appear to be present in two locations near the west end of the lath house
- Soil and grab groundwater samples collected from SB-4 and SB-5, located downgradient of one magnetic anomaly, contained very high concentrations of petroleum hydrocarbons
- A petroleum sheen was observed on SB-4 and SB-5 water samples, and free product was observed in the soil samples
- Groundwater samples from MW-3, located between the barn and the northernmost lath house, contained significant concentrations of TPH as gasoline and benzene

- The soil samples and grab groundwater sample collected downgradient of the former diesel UST (removed in 1992) indicated that this area is not a significant source of groundwater contamination

On the basis of the investigation, it appears that there may be free product present in soil and groundwater in the vicinity of the lath house (downgradient of one magnetic anomaly). The site could not, therefore, be classified as "low risk groundwater".

Furthermore, the concentrations of benzene were compared to the Tier 1 table of Risk-Based Screening Levels (RBSLs) as described in the ASTM E 1739-95 *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (RBCA). A California-modified toxicity and exposure table was used. Benzene concentrations in groundwater samples from SB-4, SB-5, and MW-3 exceed the target levels for an exposure pathway of groundwater volatilization to indoor residential air. Because there is a residence immediately downgradient of the apparent gasoline source, closure of this site could not be recommended on the basis of a low risk to human health.

Blymyer Engineers recommended that a Tier 2 RBCA evaluation be generated to evaluate site-specific target levels (SSTLs) for both soil and groundwater. After the SSTLs are generated, it was recommended that the remaining petroleum hydrocarbon sources be removed from the site, using the SSTLs as cleanup goals. Blymyer Engineers submitted the *Health Risk Assessment Workplan*, dated January 20, 2000, to the ACHCSA. The workplan was approved by the ACHCSA in a December 14, 2000 letter.

Due to the relative stability of the groundwater analytical data over an extended period of time, Blymyer Engineers recommended, and the ACHCSA approved, that the site move to semi-annual groundwater monitoring. Three semi-annual sampling events have taken place at the site.

A *Remedial Action Plan*, dated September 10, 2001, was forwarded to the ACHCSA. In a letter dated September 18, 2001, the ACHCSA accepted the proposed remedial actions.

Copies of all available laboratory analytical data for Chemicals of Concern (COC) in soil and groundwater, as well as geotechnical soil data, can be found in the attached Tables I through III.

## **1.2 Proposed Scope of Work**

The following proposed scope of work was contained in the health-risk workplan:

- Perform a Tier 2 risk assessment using the data collected in the subsurface investigation to determine site-specific target levels (SSTLs) to be used as cleanup levels for soil and groundwater at the site.
- Prepare a final report to document the results of the risk assessment modeling.

## 2.0 Risk Evaluation Using the RWQCB Risk-Based Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SF-RWQCB) issued a risk-based decision making document (*Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater*, revised December 2001) which provided conservative risk-based, screening-level (Tier 1), contaminant concentration remedial goals. The document was reviewed for appropriateness of use at the subject site. One of the principal assumptions for use of the Tier 1 Lookup Tables is that the number of COC is limited to five. With TPH defined as a single compound, as indicated by the analytical report notes from the laboratory, use of the document at this site would be appropriate. Because the document provides only a Tier 1 screening-level evaluation of risk, the remedial goal for each COC will necessarily be very conservative. Thus these values would be useful for defining the most stringent remedial clean-up goal. The remedial goals for residential land use as contained in Table A [*Surface Soil (< 3M BGS) and Groundwater Risk-Based Screening Levels (RBSLs), (Groundwater is a Current or Potential Source of Drinking Water)*], of the referenced document are tabulated in Table IV.

### 3.0 ASTM RBCA Health Risk Assessment

In order to conduct the risk assessment at the site, Blymyer Engineers proposed to use the model entitled *RBCA Tool Kit* by Groundwater Sciences, Inc (GSI), of Houston, Texas. This model utilizes equations directly out of the American Society for Testing and Materials (ASTM) 1739-95 document entitled *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* and dated November 1995. However, as changes and refinements in ASTM risk-based documents have been made, changes and additions have been made to the programs generated by GSI. As a result of the issuing of the ASTM document *Standard Provisional Guide for Risk-Based Corrective Action* (PS-104; ASTM, 1998), which incorporates a larger number of contaminants in the risk-based decision universe, GSI generated the *RBCA Tool Kit for Chemical Releases*. As a consequence, the more recent modeling program was utilized to generate this risk assessment. Blymyer Engineers has used the most recent update (January 23, 2001) of the model to complete all calculations required in the ASTM standard PS-104.

#### 3.1 Overview

This health risk assessment (HRA) has been conducted to evaluate the potential of soil and groundwater contamination to adversely impact the health of the current onsite residential occupants, commercial workers, and potential construction workers. As a consequence of the current residential occupancy, the risk assessment has utilized conservative residential standards rather than less conservative commercial standards. Blymyer Engineers has utilized existing data from the site in an attempt to determine the SSTL for contaminants that may be over acceptable health-risk goals. It is also the understanding of Blymyer Engineers that a potential reuse of the site may include residential redevelopment at some point in the future.

Existing soil and groundwater sample analytical results were utilized as input parameters for the risk assessment. However, when required input parameter data was not collected (i.e. site-specific rainfall data, vertical hydraulic conductivity, etc.), published but conservative parameter data were assumed for the modeling program. These areas are discussed below.

Essentially five chemicals of concern were identified at the subject site. This included BTEX and TPH. In this risk assessment, TPH as gasoline and TPH as diesel have been added together cumulatively as a conservative measure. Analytical laboratories have consistently noted that TPH as diesel range hydrocarbon compounds in groundwater and soil exhibit a fuel pattern that does not resemble the TPH as diesel standard. A review of the chromatograms for TPH as gasoline and TPH as diesel (see for example *Semiannual Groundwater Monitoring Report, Spring 2002*, Blymyer Engineers, June 24, 2002, Appendix C) therein finds that the hydrocarbon compound detected in both chromatograms is a single group of hydrocarbons that range from C6 to C14.

Blymyer Engineers assumed risk to a number of potential receptors. These include the current residential occupants at the northwest corner of the site at outside and inside locations, a groundwater degradation risk over MCLs assigned at the downgradient property line, current residential occupants across Ano Street north of the site, and a construction worker potentially exposed to contaminants during underground work such as utility repair, installation or modification. Contaminant pathways which were identified as complete in the risk analysis included a residential occupant exposed to indoor and outdoor vapor emissions from soil and groundwater, exposure to dust from impacted surface soil (conservatively defined to be 10 feet bgs), an offsite residential occupant exposed to vapor emissions from soil and groundwater, and groundwater ingestion (highly unlikely). Completed pathways were identified and modeled for commercial workers exposed to dust and vapor emissions from soil and groundwater. Onsite residential or commercial worker groundwater ingestion was not assumed (see section 2.4.2.1). Utility workers were assumed to be exposed to dermal contact with impacted soil, inhalation and ingestion of impacted soil dust and vapors, and groundwater vapors. Onsite incidental ingestion of groundwater by construction workers was also not assumed, nor modeled, as it is considered to be an unlikely occurrence.

Blymyer Engineers used a Hazard Quotient (HQ) of 1.0 for individual health risks related to non-carcinogenic chemicals, a Hazard Index (HI) of 1.0 for cumulative health risks related to non-carcinogenic chemicals, an individual health risk of  $10^{-6}$  for individual carcinogenic chemicals, and a total health risk of  $10^{-5}$  for carcinogenic chemicals for potential receptors, consistent with current industry practice and ACHCSA standards.

### **3.2 Overview of Subsurface Geology**

Soils encountered at the site generally consisted of brown silty clay from the surface to a depth of approximately 12 feet bgs. In most soil bores, a sand and gravel stringer 1 to 3 inches thick was noted at a depth of approximately 8 feet bgs. The stringer was generally moist and did not appear to be saturated with groundwater. The silty clay is underlain by a brown to gray silty sand to sandy gravel encountered at approximately 12 feet bgs in the north-central area where the magnetic anomalies are located. To the south, in the vicinity of well MW-1, the granular unit was encountered at a depth of 15 feet bgs, rather than 12 feet bgs. The sand unit ranges from 0.5 to 3 feet in thickness across the site. The silty sand to sandy gravel unit is underlain by a brown silty clay unit to a depth of approximately 18 feet bgs. At that depth a 1.5 to 2.5 foot thick silty sand unit was encountered, and is in turn underlain in one bore by a gray silty clay to the total explored depth of 20.5 feet bgs.

Groundwater was initially encountered at 12 to 13 feet bgs in the silty sand, but often stabilized a few feet higher. This suggests that the groundwater beneath the site is confined. Based on the rate at which groundwater recharged into the borehole, the sandy water-bearing zone at 12 feet bgs appears to be relatively permeable.

### **3.3 Overview of Contaminant Distribution**

In general lateral contaminant distribution in soil appears to be relatively restricted to the area around groundwater monitoring well MW-3, the southern magnetic anomaly, and soil bores SB-4 and SB-5. Relatively low soil contaminant concentrations were present in other wells and soil bores in the



northern area of investigation (ranging up to 1.4 milligrams per kilogram [mg/Kg] TPH as gasoline, 7.4 mg/Kg TPH as diesel, and 11 micrograms per kilogram [ $\mu\text{g}/\text{Kg}$ ] toluene). No other contaminants were detected in soil samples collected at the site. Additionally, up to 130 mg/Kg TPH as gasoline, and 4.1 mg/Kg of TPH as diesel were present in soil collected in soil bore SB-1, installed to investigate the extent of lateral contamination about the diesel UST in the southern area of investigation adjacent to the site business office. This data was not utilized in this analysis due to the distance from the principal area of concern.

In bores MW-3, SB-4, and SB-5 the vertical extent of contamination appears to be largely restricted to the approximate depths of 5 to 15 or 16 feet bgs. This suggests lateral transport by gravity or groundwater to these bore locations, likely from the base of a small diameter UST, but also perhaps along the more granular units found at that those depths. If the magnetic anomaly represents a UST system, or the remnants of a UST system, it is possible that impacted soil may be found at shallower depths in closer proximity to the anomalies.

### **3.4 Risk Assessment Data Input and Output Screens**

The *RBCA Tool Kit for Chemical Releases* consists of a series of screens that facilitate the input of site-related data, and subsequent data output. These are discussed in some detail below in order to document site-specific inputs, modifications, and outputs of standard modeling assumptions employed in the program.

#### **3.4.1 Main Screen**

Site location, name, and other relevant data is input on the Main Screen. Selection of Tier 1 or Tier 2 analysis is made. The subject site required a Tier 2 analysis. Calculation options are also selected in this screen. Calculation of the Baseline Risk can be selected if source zone concentrations are known. Calculation of Cleanup Standards (SSTL) can also be selected based on selected target risks (i.e. individual health risk of 1 in a million [ $10^{-6}$ ]). For this site, the determination of the Baseline

Risk was not critical for the project; however, determination of the SSTL for each COC is required in order to determine remedial goals for soil and groundwater. Consequently, only the determination of the Cleanup Standard was selected for this modeling effort. In this mode, if the representative concentrations of the various COC are below the calculated SSTL, the SSTL is automatically set at the lowest calculated pathway-specific SSTL and remedial action is only required to that limiting concentration for each COC.

A series of data entry and review screens is accessed from the Main Screen. As a consequence of the selection of both modes of risk calculation, input was required in each of the data input screens. A printout of the Main Screen is enclosed in Appendix A.

### **3.4.2 Exposure Pathway Input**

In the *Exposure Pathway Identification* screen, health risk exposures with documented or potentially complete pathways are identified, classified as to onsite or offsite location, and the distance to the receptors is input. There are essentially three main exposure pathways; groundwater, surface soil, and air exposure. Copies of the input screen for these pathways are included in Appendix A and the resultant output *Exposure Pathway Flowchart* is also attached in Appendix A. It should be noted that input boxes which printout with a black background are locked by the program based on other input criteria, either program-specified or user-specified.

#### **3.4.2.1 Groundwater Exposure**

The existing residential dwelling is supplied by city water. Horticultural business water demand is supplied by a deep groundwater supply well located approximately 20 feet southeast of groundwater monitoring well MW-3. Previous studies have shown that it is not screened in the shallow groundwater zone, and is thus not connected with the impacted groundwater zone (*Subsurface Investigation Letter Report*, Blymyer Engineers, December 16, 1994). Consequently, onsite exposure to groundwater is considered an incomplete pathway.

In order to provide protection to groundwater resources and to attempt to preclude degradation of groundwater beneath adjacent properties, an offsite exposure at the Maximum Contaminant Level (MCL), set at appropriate state levels, was identified to be coincident with the nearest assumed downgradient property boundary. This was defined to be at a distance of 75 feet northwest from the source. For the purposes of the risk assessment, it was assumed that the southern magnetic anomaly is the dominant or sole source of groundwater contaminants at the site. This is based on the near lack of detectable concentrations around the northern anomaly. Thus all distances were measured from the approximate center of the southern anomaly. Additionally, a second offsite receptor was assumed to be present. Offsite groundwater ingestion was assumed as a conservative measure. For the purposes of the modeling program, it was assumed that the nearest downgradient residential dwelling from the source is directly across Ano Street along the northern property line, at an approximate distance of 110 feet. Groundwater exposure modeling evaluated both impacted groundwater, and leaching from impacted soil to groundwater for the completed pathways.

#### **3.4.2.2 Surface Soil Exposure**

Onsite commercial ingestion and dermal contact to surface soil is considered a complete pathway for the purpose of modeling risk to a construction worker excavating soil in the vicinity of the release. It is assumed that the construction worker will be exposed at the time of remedial actions at the site, or in the event that residual contamination can be allowed to remain onsite. Residential exposure is unlikely, due to either remediation, or through a partial capping of residual-impacted soil by permanent structures such as a building, and other improvements such as driveways, sidewalks, or roadways. However, as a conservative measure a residential receptor was allowed in the modeling effort as a worst-case scenario.

#### **3.4.2.3 Air Exposure**

Multiple air exposure pathways were evaluated as a part of the modeling effort. The onsite residential receptor pathway was modeled as the worst-case scenario. This is defined by the program

to be at a distance of 0 feet from the source. The receptor was evaluated for air pathways including volatilization to ambient indoor and outdoor air from all soil sources, from groundwater, and from particulate emissions from surface soils. The risk associated with a completed indoor air pathway is typically the limiting factor in available remedial options.

### **3.4.3 Exposure Factors and Target Risk Limits**

This screen, attached in Appendix B, accessed through the Exposure Pathway Identification screen, allows modification of standard ASTM exposure parameters, risk goal calculation options, and target health risk limits. The ASTM parameters correspond to the Reasonable Maximum Exposure (RME) values specified in EPA guidance (EPA, 1991). These parameters include the averaging time for carcinogens and non-carcinogens, body weight, exposure durations, exposure frequency, dermal exposure frequency, skin surface area (assuming 70 year life span; skin surface of an infant, child, and adult), ingestion rate of water, ingestion rate of soil, age adjustment of these two items, and soil-to-skin adherence factor. Site-specific modifications were not made to the exposure parameters. Risk goal calculations were requested for both individual and cumulative risk goals.

Site-specific modifications were not made to the target health risk limits. Blymyer Engineers used the standard Hazard Quotient (HQ) of 1.0 for individual health risks related to non-carcinogenic chemicals, a Hazard Index (HI) of 1.0 for cumulative health risks related to non-carcinogenic chemicals, an individual health risk of  $10^{-6}$  for individual Class A and B carcinogenic chemicals, a cumulative health risk of  $10^{-5}$  for Class A and B carcinogenic chemicals, and an individual health risk for  $10^{-5}$  for Class C carcinogenic chemicals for potential receptors (Classes A and B refer to known or probable carcinogens, whereas Class C refers to possible carcinogens). This is consistent with current industry practice and ACHCSA standards. A printout of these data is included in Appendix B.

### **3.4.4 Source Media Chemicals of Concern**

This screen allows selection of site-specific COC, leads to a screen that allows modification or input of additional COC relevant to the site, and leads to two additional screens that allow input of site-specific concentrations of the COC in groundwater and soil.

#### **3.4.4.1 Selection and Modeling of Site-Specific COC**

The program contains a database of over 100 chemicals from which to draw. The chemical database was modified in order to include California-specific chemical parameters for benzene. This specifically included the California Environmental Protection Agency (CalEPA) cancer potency factor (slope factor) of 0.1 kg-day/mg, in comparison to the EPA slope factor of 0.029 kg-day/mg, and the lower limit of detection for benzene required by CalEPA. User-specified custom chemical database output files are included in Appendix B, as is a copy of the chemical data output files for all selected COC (physical property data, toxicity data, and miscellaneous data files used in the risk assessment).

#### **3.4.4.2 Site-Specific Analytical Data Sets**

There are two methods for entering representative media concentrations for COC at a site. A user can directly enter the representative concentration for each chemical, or a user can enter all appropriate site analytical data and allow the program to calculate the maximum concentration, the statistical mean (arithmetic or geometric; industry standard or more conservative, respectively), or the Upper Confidence Level (UCL) on the mean. The UCL percentile can also be modified by the user. The user can then select which of these calculations is most representative of the source zone concentrations or residual source zone concentrations as need be.

For the purposes of this modeling effort, the southern magnetic anomaly and vicinity was considered as the likely source zone for soil and groundwater contamination as only in the vicinity of the anomaly was extensive contamination encountered. In both cases, the representative concentrations for both soil and groundwater were modeled with the arithmetic mean. Copies of the groundwater analytical data inputs are attached in Appendix C. To make the risk model reflective of current contaminant risk, only the last three years of groundwater analytical data from the source zone were utilized. Groundwater data from wells MW-4 and MW-5 were also not utilized as the low to non-detect concentrations in these wells are not reflective of source zone concentrations and these concentrations would dilute the program-calculated values. Attached in Appendix C are copies of the data output files with the program-calculated maximum, mean, and UCL on mean concentrations for groundwater. Copies of the soil analytical data inputs are attached as Appendix D. Copies of the soil analytical output files, with program-calculated maximum, mean, and UCL on mean concentrations for soil, are also attached in Appendix D. It is assumed that exploration and removal of the magnetic anomalies will likely remove elevated concentrations of the COC, and that perimeter residual concentrations (i.e. outboard of MW-3, SB-4, and SB-5) will be lower than the likely source zone. However, to conservatively model risk presently at the site, the UCL of the calculated source zone mean concentration was used as the representative concentration for each COC.

### **3.4.5 Transport Modeling Options**

This screen allows site-specific modeling options to be input. These modeling options include vertical transport in the surface soil column, lateral air dispersion, and groundwater dilution attenuation factors. Factors included in the soil column vertical transport subset are outdoor air volatilization factors, indoor air volatilization factors, and soil-to-groundwater leaching factors. ASTM default models were utilized for vertical transport in the soil column and in the lateral air dispersion sections; however, because it is reasonable to anticipate the absorption of a contaminant leachate by clean soil the Soil Attenuation Model (SAM) was allowed in the Soil-to-Groundwater Leaching Factor subsection of the vertical transport, surface soil column. Additionally, as it is also reasonable to anticipate biodegradation of the organic COC, first-order biodegradation decay was allowed in the groundwater dilution attenuation section, rather than only groundwater dispersion (no biodegradation). The surface soil zone was set at a thickness of 10 feet, an ASTM default thickness.

This default thickness was also utilized in the SF-RWQCB RBSL document. This was judged to be conservative due to the predominance of silty clay in the upper 12 feet at the site as it allows volatilization and particle emission from a depth of approximately 10 feet bgs. ASTM default half-lives (Decay Rates) were utilized for the organic chemicals encountered at the site. However, there are no default half-life values for TPH COC. Consequently, as a conservative measure, the half life of TPH was assumed to be 100 years. A printout of these screens is attached as Appendix E, as is a copy of the output file screen for the COC half-lives.

#### **3.4.6 Site-Specific Soil Parameters**

This screen allows site-specific soil parameters to be input. These parameters include soil source zone and surface soil column characteristics. The depth to the water-bearing unit was input as 12 feet bgs. The depth to the top and to the base of the affected soil was input as 5 and 16 feet, respectively, and is based on available analytical data and field observations noted on the bore logs. It is likely that impacted soil is present above five feet bgs in the area of the magnetic anomaly; however, it is assumed that residual soil contamination within the upper 10 feet bgs will be largely removed as impacted soil in this depth range is generally driven by nuisance factors such as odor and color, rather than health risk. The SF-RWQCB RBSL document defines 100 mg/Kg as the nuisance threshold for TPH as gasoline and TPH as diesel. An average length and width of 40 feet by 25 feet, respectively, was utilized to calculate the affected soil area. The dominant wind flow direction was assumed to be southeast, parallel to the assumed groundwater gradient, and thus across the long dimension of impacted soil at the site. Because analysis was not conducted for all soil parameters for which direct entry is possible in the program, it was elected to select a conservative soil type for the site within the program. Silty Clay was identified as the most appropriate vadose zone soil encountered at the site based on the bore logs and available site-specific laboratory geotechnical data (Table III); however, to conservatively account for the presence of the more granular unit at an approximate depth of 8 feet bgs, sandy clay was selected for use in the modeling program. Rainfall was directly input based on the average rainfall for the Upper San Leandro Reservoir climate station over the period of October 1970 to December 2000. This is available under the Western U.S.

Climate Historical Summaries section of the Western Region Climate Center website (<http://www.wrcc.dri.edu/index.html>). This is judged to be conservative as the reservoir is at a higher elevation, and there is a direct correlation of increased elevation to increased precipitation (the orographic effect). A printout of the parameters used in this project is included in Appendix F. All user specified inputs appear with a white background; however, the Partitioning Parameters are based on the average of available Fraction Organic Carbon (FOC) and soil pH analysis values. These parameters were used as a conservative measure.

#### **3.4.7 Site-Specific Groundwater Parameters**

This screen allows site-specific groundwater parameters to be input. These parameters include water-bearing unit data, groundwater plume source zone, dispersion, and discharge to surface water input parameters. The hydraulic conductivity and gradient correspond to the predominant site-specific soil type and the average gradient over the last 1.5 years. The effective porosity is very conservative, as it has been set equal to the total porosity. This is essentially impossible for any soil type. Sorption parameters are based on site-specific data previously generated. Slightly acidic pH values are conservative as they lead to a higher leaching of contaminants. Although the source is assumed to be removed at a point in the future, residual effects such as the groundwater source width will remain. A 2.5-foot-thick mixing zone was calculated by the program based on the inputted average saturated thickness, a conservative assumed source width, and length of the source zone parallel to the groundwater flow direction. The ASTM default was used to calculate groundwater dispersion. Groundwater discharge to surface water was not an identified complete pathway, and thus was not calculated. A printout of this screen is attached in Appendix F.

#### **3.4.8 Site-Specific Air Parameters**

This screen allows site-specific air parameters to be input. These parameters include outdoor and indoor air pathway parameters. All outdoor air pathway parameters are ASTM default, or user-specified in a previous screen, and thus are locked on this screen. Only residential indoor pathways



were calculated by the program as a worst-case scenario. All building parameters are also conservative ASTM default parameters. Although there is currently a residential dwelling onsite, it may not be representative of potential additional dwellings, should there be eventual residential redevelopment at this site. Parameters for future dwellings are obviously not now known, and thus the site was modeled with the conservative ASTM values. The remainder of the building parameters are locked parameters based on input in another screen. A printout of the screen is also attached in Appendix F.

A complete summary of input parameters discussed above (competed exposure pathways, exposure parameters, target risks, modeling options, and surface, subsurface soil column, building, groundwater, and transport parameters) is included in Appendix F (Input Parameter Summary).

### **3.5 Modeling Results; Site Specific Target Levels**

Based on the data inputs as outlined above, the modeling program calculated the SSTL for surface soil, subsurface soil, and groundwater for all allowed pathways.

#### **3.5.1 Tier 2 Transient Domenico Analysis**

As discussed above, first-order biodegradation was allowed in the modeling effort. As a result, the program generated a series of printouts that graphed the impact to groundwater from contaminant concentrations in soil and also in groundwater vs. both distance and time from the source (via groundwater transport). This effort found that the point of exposure (POE) concentration limits (set previously at a property line MCL maximum contaminant exposure at 75 feet, and the conservative residential groundwater exposure at a distance of 110 feet) were not exceeded from contaminants leaching from soil or migrating in groundwater. The *Tier 2 Domenico Groundwater Modeling Summary* table and the 12 data sheets with the referenced graphs are attached as Appendix G.

### 3.5.2 Site-Specific Target Level Summary

SSTL calculations were completed by the program and are included in Appendix H and are tabulated in Table V. For each COC the SSTL calculations are generated in order that the defined health risks ( $10^{-6}$  for individual health risks related to carcinogenic COC,  $10^{-5}$  for cumulative health risks related to carcinogenic COC, a HQ of 1.0 for individual health risks related to non-carcinogenic chemicals, and a HI of 1.0 for cumulative health risks related to non-carcinogenic chemicals) will not be exceeded. Three summary tables are included in Appendix H. A careful review of the calculations indicate that except for benzene all calculated representative concentrations present in onsite soil are below the program generated SSTL for soil. Thus only benzene requires mitigation in onsite soil. The limiting pathway is soil volatilization to indoor air. The SSTL for benzene was calculated to be 0.14 mg/Kg. Review of the summary table for SSTL values for groundwater indicates that for each COC in all allowed pathways the SSTL was not exceeded. A review of the summary table for SSTL values for TPH for soil indicates that the appropriate target level for TPH as gasoline (TPH - Arom.) is 920 mg/Kg and for TPH as diesel (TPH - Aliph.) it is 2,200 mg/Kg. The combined TPH SSTL for soil is 1,100 mg/Kg. A review of the summary table for SSTL values for TPH for groundwater indicates that the appropriate target levels for TPH as gasoline (TPH - Arom.) and TPH as diesel (TPH - Aliph.) are above the residual saturation values. The combined TPH SSTL for each media was calculated by the inverse weighted average of the individual fraction-specific SSTLs.

In support of the summary tables discussed above, and located behind them in Appendix H, are six pages of Chemical-Specific Tier 2 Cleanup Summaries, containing further detail relevant to the data summarized in the three summary tables.

## 4.0 Conclusions

### 4.1 ASTM RBCA Health Risk Assessment Conclusions

The following conclusions can be made from the data generated from the health risk evaluation of the contaminants at the site:

- A review of the SF-RWQCB RBSL document indicated that the document may be useful to define and generate the most conservative SSTL for remedial goals at the site.
- In the *RBCA Tool Kit for Chemical Releases* modeling program, SSTL were calculated for benzene, toluene, ethylbenzene, total xylenes, TPH Aliph. (TPH as diesel), and TPH Arom. (TPH as gasoline) in soil and groundwater for the site. These conservative SSTL can be used to define the extent of the remedial excavation at the site. The SSTL were calculated in order that health-based risks including carcinogenic target risks and the non-carcinogenic HQ and HI values would not be exceeded on- or off-site.
- Based on the site-specific data, only the documented analytical concentrations in soil at the site for benzene exceed the calculated representative concentration and exceed the calculated SSTL for benzene. The limiting pathway is soil volatilization to indoor air.
- In groundwater, for each COC, the respective SSTL does not exceed the calculated representative concentrations, nor have the actual analytical concentrations in groundwater exceeded the respective SSTL.
- Although the modeling effort has documented that TPH is not a health risk to current (worst-case scenario) or future residential occupants at the site, a nuisance threshold (odor and color) as defined by the SF-RWQCB may necessitate additional excavation beyond that required based on human health risks. The SF-RWQCB RBSL nuisance threshold is defined to be 100 mg/Kg for TPH as gasoline and TPH as diesel in soil (to any depth), and 100  $\mu\text{g/L}$  for groundwater.

## 5.0 Recommendations

Based on the data, Blymyer Engineers recommends the following actions be taken:

- Remedial excavations should be planned in accordance with the previously approved *Remedial Action Plan*. The excavations should assume an initial excavation area as shown on Figure 3 of the Remedial Action Plan.
- Except for TPH, the SSTLs for each COC in soil and groundwater, contained in Table V, should be used as remedial goals for soil and groundwater. The SF-RWQCB Nuisance Threshold concentration of 100 mg/Kg and 0.10 mg/L for soil and groundwater, respectively, should be used as appropriate remedial goals.
- To help preclude further remedial actions for groundwater, the addition of an Oxygen Releasing Compound (ORC) slurry should be evaluated for application to the open excavation(s).
- A copy of this report should be forwarded to the following agency for review:

Alameda County Health Care Services Agency  
Department of Environmental Health  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, CA 94502-6577  
Attention: Mr. Amir Gholami

## 6.0 References

Environmental Protection Agency, *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual Supplemental Guidance: Standard Default Exposure Factors*, Interim Final, OSWER Directive 9285.6-03, NTIS No. PB91-921314, 1991

SF-RWQCB, *Application of Risk-Based Screening Levels and Decision Making To Sites With Impacted Soil and Groundwater*, Interim Final, December 2001

*Tables*

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**Table I, Results of Soil Sample Analysis**  
**BEI Job No. 94015, Kawahara Nursery, Inc.**  
**16550 Ashland Avenue, San Lorenzo, California**

| Sample ID  | Sample Date | Modified EPA Method 8015 (mg/kg) |               | EPA Method 8020 (µg/kg) |            |               |               |               |
|------------|-------------|----------------------------------|---------------|-------------------------|------------|---------------|---------------|---------------|
|            |             | TPH as Gas                       | TPH as Diesel | MTBE                    | Benzene    | Toluene       | Ethylbenzene  | Total Xylenes |
| MW-1 5'    | 6/10/93     | <1                               | <1            | NA                      | <5         | <5            | <5            | <5            |
| MW-1 16'   | 6/10/93     | <1                               | <1            | NA                      | <5         | <5            | <5            | <5            |
| MW-2 2.5'  | 6/10/93     | <1                               | <b>1.9</b>    | NA                      | <5         | <5            | <5            | <5            |
| MW-2 11.5  | 6/10/93     | <1                               | <1            | NA                      | <5         | <5            | <5            | <5            |
| MW-3 6'    | 6/10/93     | <1                               | <1            | NA                      | <5         | <5            | <5            | <5            |
| MW-3 15'   | 6/10/93     | <1                               | <1            | NA                      | <b>200</b> | <b>980</b>    | <b>680</b>    | <b>4,000</b>  |
| MW-4 12'   | 10/31/94    | <1                               | <1            | NA                      | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-4 17'   | 10/31/94    | <1                               | <1            | NA                      | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-5 12.5' | 10/31/94    | <1                               | <1            | NA                      | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-5 17'   | 10/31/94    | <1                               | <1            | NA                      | <2.5       | <b>11</b>     | <2.5          | <b>27</b>     |
| SB-1 7.5'  | 10/31/94    | <1                               | <1            | NA                      | <2.5       | <2.5          | <2.5          | <2.5          |
| SB-1 17'   | 10/31/94    | <b>130</b>                       | <b>4.1</b>    | NA                      | <2.5       | <2.5          | <2.5          | <2.5          |
| SB-2 5'    | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <5            |
| SB-2 10'   | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <5            |
| SB-2 12.5' | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <5            |
| SB-3 10'   | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <5            |
| SB-3 15'   | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <5            |
| SB-4 5'    | 8/9/99      | <1                               | <1            | <50                     | <5         | <5            | <5            | <b>9</b>      |
| SB-4 10'   | 8/9/99      | <b>1.4</b>                       | <b>1.6</b>    | <50                     | <5         | <b>33</b>     | <5            | <5            |
| SB-4 15'   | 8/9/99      | <b>910</b>                       | <b>360</b>    | <2,000                  | <b>870</b> | <b>10,000</b> | <b>14,000</b> | <b>92,000</b> |
| SB-5 10'   | 8/9/99      | <b>1.2</b>                       | <1            | <50                     | <5         | <b>26</b>     | <5            | <5            |
| SB-5 12'   | 8/9/99      | <b>250</b>                       | <b>100</b>    | <200                    | <10        | <b>1,300</b>  | <b>1,400</b>  | <b>13,000</b> |

**Table I, Results of Soil Sample Analysis**  
**BEI Job No. 94015, Kawahara Nursery, Inc.**  
**16550 Ashland Avenue, San Lorenzo, California**

| Sample ID  | Sample Date | Modified EPA Method 8015 (mg/kg) |               | EPA Method 8020 ( $\mu\text{g}/\text{kg}$ ) |            |               |               |               |
|------------|-------------|----------------------------------|---------------|---|------------|---------------|---------------|---------------|
|            |             | TPH as Gas                       | TPH as Diesel | MTBE  | Benzene    | Toluene       | Ethylbenzene  | Total Xylenes |
| MW-1 5'    | 6/10/93     | <1                               | <1            | NA  | <5         | <5            | <5            | <5            |
| MW-1 16'   | 6/10/93     | <1                               | <1            | NA  | <5         | <5            | <5            | <5            |
| MW-2 2.5'  | 6/10/93     | <1                               | <b>1.9</b>    | NA  | <5         | <5            | <5            | <5            |
| MW-2 11.5' | 6/10/93     | <1                               | <1            | NA  | <5         | <5            | <5            | <5            |
| MW-3 6'    | 6/10/93     | <1                               | <1            | NA  | <5         | <5            | <5            | <5            |
| MW-3 15'   | 6/10/93     | <1                               | <1            | NA  | <b>200</b> | <b>980</b>    | <b>680</b>    | <b>4,000</b>  |
| MW-4 12'   | 10/31/94    | <1                               | <1            | NA  | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-4 17'   | 10/31/94    | <1                               | <1            | NA  | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-5 12.5' | 10/31/94    | <1                               | <1            | NA  | <2.5       | <2.5          | <2.5          | <2.5          |
| MW-5 17'   | 10/31/94    | <1                               | <1            | NA  | <2.5       | <b>11</b>     | <2.5          | <b>27</b>     |
| SB-1 7.5'  | 10/31/94    | <1                               | <1            | NA  | <2.5       | <2.5          | <2.5          | <2.5          |
| SB-1 17'   | 10/31/94    | <b>130</b>                       | <b>4.1</b>    | NA  | <2.5       | <2.5          | <2.5          | <2.5          |
| SB-2 5'    | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <5            |
| SB-2 10'   | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <5            |
| SB-2 12.5' | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <5            |
| SB-3 10'   | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <5            |
| SB-3 15'   | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <5            |
| SB-4 5'    | 8/9/99      | <1                               | <1            | <50   | <5         | <5            | <5            | <b>9</b>      |
| SB-4 10'   | 8/9/99      | <b>1.4</b>                       | <b>1.6</b>    | <50   | <5         | <b>33</b>     | <5            | <5            |
| SB-4 15'   | 8/9/99      | <b>910</b>                       | <b>360</b>    | <2,000                                      | <b>870</b> | <b>10,000</b> | <b>14,000</b> | <b>92,000</b> |
| SB-5 10'   | 8/9/99      | <b>1.2</b>                       | <1            | <50   | <5         | <b>26</b>     | <5            | <5            |
| SB-5 12'   | 8/9/99      | <b>250</b>                       | <b>100</b>    | <200  | <10        | <b>1,300</b>  | <b>1,400</b>  | <b>13,000</b> |



**Table I, Results of Soil Sample Analysis  
BEI Job No. 94015, Kawahara Nursery, Inc.  
16550 Ashland Avenue, San Lorenzo, California**

| Sample ID | Sample Date | Modified EPA Method 8015 (mg/kg) |               | EPA Method 8020 ( $\mu\text{g}/\text{kg}$ ) |         |         |              |               |
|-----------|-------------|----------------------------------|---------------|---|---------|---------|--------------|---------------|
|           |             | TPH as Gas                       | TPH as Diesel | MTBE  | Benzene | Toluene | Ethylbenzene | Total Xylenes |
| SB-6 5'   | 8/9/99      | <1                               | <b>5.7</b>    | <50   | <5      | <5      | <5           | <b>98</b>     |
| SB-6 10'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-6 16'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-7 5'   | 8/9/99      | <1                               | <b>7.4</b>    | <50   | <5      | <5      | <5           | <b>36</b>     |
| SB-7 10'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-8 5'   | 8/9/99      | <1                               | <b>3.8</b>    | <50   | <5      | <5      | <5           | <5            |
| SB-8 10'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-8 15'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-9 5'   | 8/9/99      | <1                               | <b>1.8</b>    | <50   | <5      | <5      | <5           | <5            |
| SB-9 10'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-9 16'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-10 5'  | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |
| SB-10 10' | 8/9/99      | <1                               | <1            | <50   | <5      | <5      | <5           | <5            |

Notes:

- TPH = Total petroleum hydrocarbons
- EPA = Environmental Protection Agency
- <x = Not detected above the analytical method reporting limit of x
- mg/kg = Milligrams per kilogram
- $\mu\text{g}/\text{kg}$  = Micrograms per kilogram
- NA = Not analyzed

Results in **bold** indicate detectable concentrations.





**Table II, Results of Groundwater Sample Hydrocarbon Analysis**  
**BEI Job No. 94015, Kawahara Nursery**  
**16550 Ashland Avenue, San Lorenzo, California**

| Sample ID | Date     | Modified EPA Method 8015 ( $\mu\text{g/L}$ ) |                      | EPA Method 8020 or 8021B ( $\mu\text{g/L}$ ) |                  |              |                  |                   | EPA Method 8260 ( $\mu\text{g/L}$ ) |
|-----------|----------|--|----------------------|--|------------------|--------------|------------------|-------------------|-------------------------------------|
|           |          | TPH as Gas                                   | TPH as Diesel        | Benzene                                      | Toluene          | Ethylbenzene | Total Xylenes    | MTBE              | MTBE                                |
| MW-3      | 6/16/93  | 120,000                                      | 170,000              | 4,600  | 8,400            | 2,100        | 27,000           | NS                | NS                                  |
|           | 3/28/94  | 23,000                                       | 94,000               | 4,800  | 6,500            | 3,000        | 15,000           | NS                | NS                                  |
|           | 11/8/94  | 35,000                                       | 27,000               | 3,600  | 4,100            | 2,700        | 18,000           | NS                | NS                                  |
|           | 3/29/95  | 18,000                                       | <50*                 | 1,600  | 1,400            | 780          | 6,200            | NS                | NS                                  |
|           | 6/7/95   | 20,000                                       | <50                  | 1,700  | 1,400            | 750          | 6,800            | NS                | NS                                  |
|           | 9/7/95   | 17,000                                       | <50                  | 1,100  | 800              | 570          | 4,800            | NS                | NS                                  |
|           | 3/4/99   | 1,300  | <50                  | 33   | <0.5             | 1.2          | 17               | 5.3 <sup>e</sup>  | NS                                  |
|           | 6/29/99  | 8,000  | <1,000               | 98   | 34               | 3.7          | 1,200            | 37 <sup>e</sup>   | NS                                  |
|           | 11/15/99 | 4,200  | 2,000 <sup>a</sup>   | 63   | 25               | 65           | 590              | 33 <sup>e</sup>   | NS                                  |
|           | 5/22/00  | 5,800  | 1,480                | 53   | 29               | 58           | 490              | 4.9 <sup>e</sup>  | NS                                  |
|           | 8/16/00  | 2,400  | 530 <sup>c,*</sup>   | 18   | 5.8 <sup>b</sup> | 18           | 182              | 12 <sup>b,e</sup> | ND <sup>e</sup>                     |
|           | 11/16/00 | 9,000  | 3,700 <sup>c,*</sup> | 35   | 27               | 88           | 719              | <10 <sup>e</sup>  | NS                                  |
|           | 2/21/01  | 2,400  | 880 <sup>c,*</sup>   | 28   | 12               | 46           | 276              | <2.0              | NS                                  |
|           | 5/31/01  | 2,900  | 680 <sup>c,*</sup>   | 5.3  | 33 <sup>b</sup>  | 17           | 144              | <2.0              | NS                                  |
|           | 11/28/01 | 1,700  | 430 <sup>c,*</sup>   | 23   | 3.0              | 37           | 184              | 4.2 <sup>e</sup>  | NS                                  |
| 5/28/02   | 870      | 570 <sup>c,*</sup>                           | 6.3                  | 2.2  | 12               | 70           | 2.3 <sup>e</sup> | NS                |                                     |

**Table II, Results of Groundwater Sample Hydrocarbon Analysis  
BEI Job No. 94015, Kawahara Nursery  
16550 Ashland Avenue, San Lorenzo, California**

| Sample ID | Date     | Modified EPA Method 8015 ( $\mu\text{g/L}$ ) |                         | EPA Method 8020 or 8021B ( $\mu\text{g/L}$ ) |         |              |                   |                        | EPA Method 8260 ( $\mu\text{g/L}$ ) |
|-----------|----------|--|-------------------------|--|---------|--------------|-------------------|------------------------|-------------------------------------|
|           |          | TPH as Gas                                   | TPH as Diesel           | Benzene                                      | Toluene | Ethylbenzene | Total Xylenes     | MTBE                   | MTBE                                |
| MW-4      | 6/16/93  | NS   | NS                      | NS   | NS      | NS           | NS                | NS                     | NS                                  |
|           | 3/28/94  | NS   | NS                      | NS   | NS      | NS           | NS                | NS                     | NS                                  |
|           | 11/8/94  | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 3/29/95  | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 6/7/95   | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 9/7/95   | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 3/4/99   | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 6/29/99  | <b>130</b>                                   | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 11/15/99 | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 5/22/00  | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 8/16/00  | <50  | <b>56<sup>*,d</sup></b> | <0.5   | <0.5    | <0.5         | <b>0.51</b>       | <b>2.3<sup>e</sup></b> | NS                                  |
|           | 11/16/00 | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 2/21/01  | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <b>2.6<sup>e</sup></b> | NS                                  |
|           | 5/31/01  | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 11/28/01 | <50  | <50                     | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
| 5/28/02   | <50      | <50  | <0.5                    | <0.5   | <0.5    | <0.5         | <2.0 <sup>e</sup> | NS                     |                                     |

**Table II, Results of Groundwater Sample Hydrocarbon Analysis**  
**BEI Job No. 94015, Kawahara Nursery**  
**16550 Ashland Avenue, San Lorenzo, California**

| Sample ID | Date     | Modified EPA Method 8015 ( $\mu\text{g/L}$ ) |               | EPA Method 8020 or 8021B ( $\mu\text{g/L}$ ) |         |              |                   |                        | EPA Method 8260 ( $\mu\text{g/L}$ ) |
|-----------|----------|--|---------------|--|---------|--------------|-------------------|------------------------|-------------------------------------|
|           |          | TPH as Gas                                   | TPH as Diesel | Benzene                                      | Toluene | Ethylbenzene | Total Xylenes     | MTBE                   | MTBE                                |
| MW-5      | 6/16/93  | NS   | NS            | NS   | NS      | NS           | NS                | NS                     | NS                                  |
|           | 3/28/94  | NS   | NS            | NS   | NS      | NS           | NS                | NS                     | NS                                  |
|           | 11/8/94  | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 3/29/95  | <50  | <b>64</b>     | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 6/7/95   | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 9/7/95   | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | NS                     | NS                                  |
|           | 3/4/99   | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 6/29/99  | <b>160</b>                                   | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 11/15/99 | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <5.0 <sup>e</sup>      | NS                                  |
|           | 5/22/00  | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 8/16/00  | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <b>3.5<sup>e</sup></b> | NS                                  |
|           | 11/16/00 | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 2/21/01  | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <2.0 <sup>e</sup>      | NS                                  |
|           | 5/31/01  | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <b>2.8<sup>e</sup></b> | NS                                  |
|           | 11/28/01 | <50  | <50           | <0.5   | <0.5    | <0.5         | <0.5              | <b>4.2<sup>e</sup></b> | NS                                  |
| 5/28/02   | <50      | <50  | <0.5          | <0.5   | <0.5    | <0.5         | <2.0 <sup>e</sup> | NS                     |                                     |

Table II continued, Summary of Groundwater Sample Hydrocarbon Analytical Results

|                        |   |   |
|------------------------|---|---|
| Notes: $\mu\text{g/L}$ | = | Micrograms per liter  |
| TPH                    | = | Total Petroleum Hydrocarbons  |
| MTBE                   | = | Methyl <i>tert</i> -butyl ether   |
| NS                     | = | Not Sampled   |
| <x                     | = | Less than the analytical detection limit (x)  |
| EPA                    | = | Environmental Protection Agency   |
| *                      | = | Laboratory reported the presence of petroleum hydrocarbons with a chromatograph pattern uncharacteristic of diesel fuel.            |
| a                      | = | Laboratory note indicates the result is within the quantitation range, but that the chromatographic pattern is not typical of fuel. |
| b                      | = | Laboratory note indicates that confirmation of the result differed by more than a factor of two.                                    |
| c                      | = | Laboratory note indicates lighter hydrocarbons contributed to the quantification.   |
| d                      | = | Laboratory note indicates the sample has an unknown single peak or peaks.   |
| e                      | = | Detection of MTBE by EPA Method 8021B is regarded as erroneous; likely chemical detected is 3-methyl-pentane.                       |

Results in **bold** indicate detectable concentrations.

**Table III, Summary of Soil Sample Physical Parameters  
BEI Job No. 94015, Kawahara Nursery  
16550 Ashland Avenue, San Lorenzo, California**

| Sample ID     | Date   | ASTM E3173            |                     |                  | ASTM 2974c  | EPA 150.1 | EPA 351.3   | EPA 9060    |
|---------------|--------|-----------------------|---------------------|------------------|-------------|-----------|-------------|-------------|
|               |        | Weight % Moisture (%) | Bulk Density (g/cc) | Porosity (vol %) | FOC (wet %) | pH        | TKN (mg/kg) | TOC (mg/kg) |
| SB-2<br>5'    | 8/9/99 | NA                    | NA                  | NA               | NA          | 7.73      | 258         | 6,910       |
| SB-2<br>12.5' | 8/9/99 | 21                    | 2.0                 | 40               | 2.8         | NA        | NA          | NA          |
| SB-5<br>12'   | 8/9/99 | 20                    | 1.9                 | 41               | 3.8         | NA        | NA          | NA          |
| SB-4<br>15'   | 8/9/99 | NA                    | NA                  | NA               | NA          | 8.04      | 190         | 849         |

Notes:

- ASTM = American Society for Testing and Materials
- EPA = Environmental Protection Agency
- FOC = Fractional organic content
- TKN = Total Kjeldahl nitrogen
- TOC = Total organic carbon
- g/cc = Grams per cubic centimeter
- wet % = Wet weight percent
- NA = Not analyzed



**Table IV, Summary of SF-RWQCB RBSL Goals  
BEI Job No. 94015, Kawahara Nursery  
16550 Ashland Avenue, San Lorenzo, California**

| COC             | Surface Soil<br>RBSL<br>(mg/Kg) | Subsurface<br>Soil RBSL<br>(mg/Kg) | Groundwater RBSL<br>( $\mu$ g/L) |
|-----------------|---------------------------------|------------------------------------|----------------------------------|
| Benzene         | 0.045                           | 0.045                              | 1.0                              |
| Toluene         | 2.6                             | 2.6                                | 40                               |
| Ethylbenzene    | 2.5                             | 2.5                                | 30                               |
| Total Xylenes   | 1.0                             | 1.0                                | 13                               |
| TPH as gasoline | 100                             | 100                                | 100                              |
| TPH as diesel   | 100                             | 100                                | 100                              |

Notes:

- SF-RWQCB = San Francisco Bay Regional Water Quality Control Board
- COC = Chemical of Concern
- RBSL = Risk-Based Screening Level
- mg/Kg = Milligrams per kilogram
- $\mu$ g/L = Micrograms per liter

Assumes that groundwater is a current or potential source of drinking water (Tables A and C of the SF -RWQCB RBSL document).

**Table V, Summary of Site Specific Target Levels  
BEI Job No. 94015, Kawahara Nursery  
16550 Ashland Avenue, San Lorenzo, California**

| Media   | Benzene     | Toluene | Ethylbenzene | Total Xylenes | TPH Aliph. (TPH as diesel) | TPH Arom. (TPH as gasoline) |
|---|-------------|---------|--------------|---------------|----------------------------|-----------------------------|
| Soil SSTL (mg/Kg)                               | 0.140       | 400     | 2,100        | 34,000        | 2,200                      | 920                         |
| Calculated Representative Concentration (mg/Kg) | <b>0.39</b> | 4.5     | 6.1          | 41            | 170                        | 420                         |
| SF- RWQCB Nuisance Threshold (mg/Kg)            | NA          | NA      | NA           | NA            | 100                        | 100                         |
|   |             |         |              |               |                            |                             |
| Groundwater SSTL (mg/L)                         | 0.180       | 240     | >170         | >200          | >0.034                     | >25                         |
| Calculated Representative Concentration (mg/L)  | 0.053       | 0.025   | 0.051        | 0.60          | 1.7                        | 5.5                         |
| SF- RWQCB Nuisance Threshold (mg/L)             | NA          | NA      | NA           | NA            | 0.10                       | 0.10                        |

Notes:

- > = Indicates Site Specific Target Level (SSTL) is greater than constituent residual saturation value.
- SSTL = Site Specific Target Level
- SF - RWQCB = San Francisco Regional Water Quality Control Board
- mg/Kg = Milligrams per kilogram
- mg/L = Milligrams per liter

Results in **bold** indicate calculated representative concentration of analyte is over SSTL.

*Figures*

---



UNITED STATES GEOLOGICAL SURVEY 7.5' QUADS, "SAN LEANDRO, CA" AND "HAYWARD, CA" BOTH ED. 1959, PHOTOREVISED 1980.



**BLMYER**  
ENGINEERS, INC.

BE JOB NO. 94015      DATE 4-9-99



**SITE LOCATION MAP**

KAWAHARA NURSERY  
16550 ASHLAND AVE.  
SAN LORENZO, CA

FIGURE

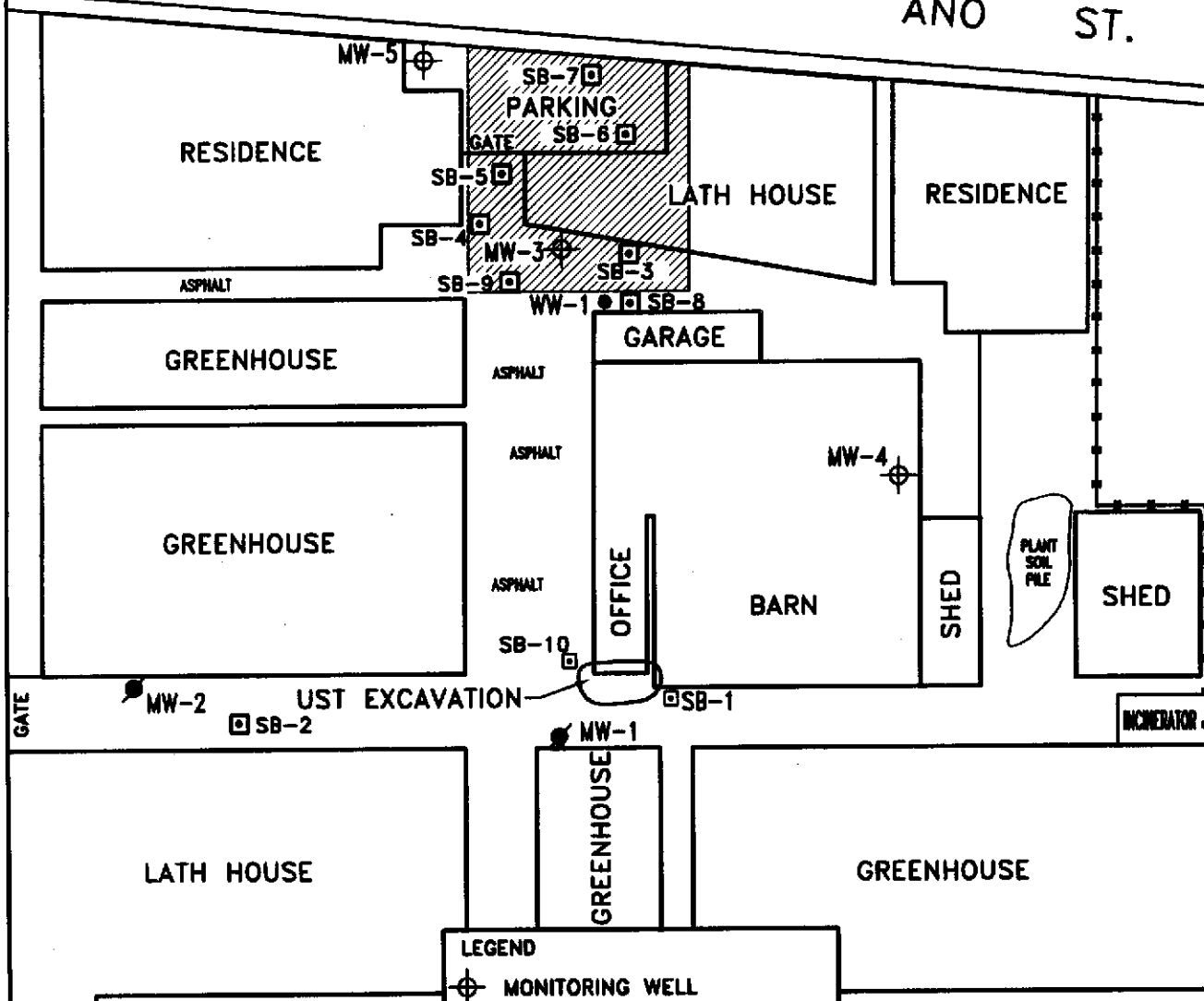
1

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ASHLAND AVENUE

ANO ST.









0 25 50  
SCALE IN FEET

 **BLYMYER**  
ENGINEERS, INC.

|                      |                 |
|----------------------|-----------------|
| BEI JOB NO.<br>94015 | DATE<br>1-21-00 |
|----------------------|-----------------|

**LEGEND**

-  MONITORING WELL
-  ABANDONED MONITORING WELL
-  WATER WELL
-  UST UNDERGROUND STORAGE TANK
-  SOIL BORE
-  APPROXIMATE AREA OF GEOPHYSICAL SURVEY

**SITE PLAN**  
KAWAHARA NURSERY  
SAN LORENZO, CA

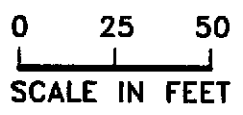
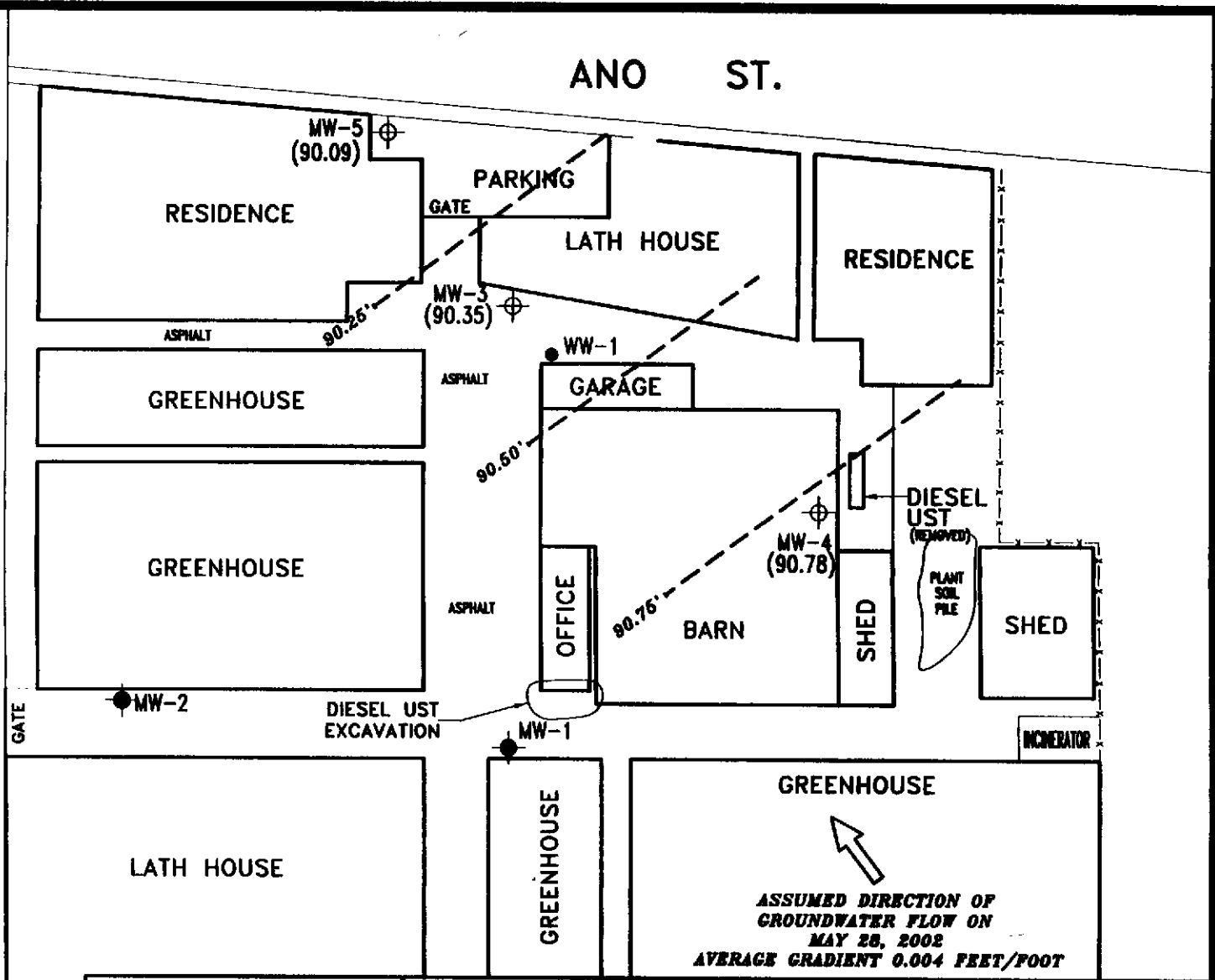
FIGURE  
**2**

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ASHLAND AVENUE

ANO ST.



**BLYMYER ENGINEERS, INC.**

|                      |                 |
|----------------------|-----------------|
| BEI JOB NO.<br>94015 | DATE<br>6-26-02 |
|----------------------|-----------------|

**LEGEND**

- ⊕ MONITORING WELL
- ABANDONED MONITORING WELL
- WATER WELL
- UST UNDERGROUND STORAGE TANK (91.46)
- GROUNDWATER ELEVATION
- GROUNDWATER CONTOUR

**GROUNDWATER GRADIENT**  
MAY 28, 2002  
KAWAHARA NURSERY  
SAN LORENZO, CA

FIGURE  
**3**

*Appendix A*

---

*Printouts: Main Screen, Exposure Pathway Identification, and  
Exposure Pathway Flowchart*


# Main Screen

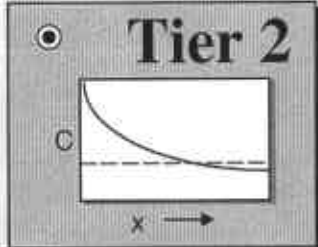
RBCA Tool Kit for Chemical Releases  
Version 1.3a © 2000

### 1. Project Information

Site Name: Kawahara Nursery  
 Location: 16550 Ashland Avenue, San Lorenzo, CA  
 Compl. By: Mark Detterman  
 Date: Sept. 2002 Job ID: 94015

### 2. Which Type of RBCA Analysis?

**Tier 1**  
  
 Generic Values  
 On-Site  
 Exposure

**Tier 2**  
  
 Site-Specific Values  
 On- or Off-Site Exposure

### 3. Calculation Options

*Affects which input data are required*

**Baseline Risks (Forward mode)**

**RBCA Cleanup Standards (Backward mode)**

### 4. RBCA Evaluation Process

#### Prepare Input Data

Data Complete? (  = yes,  = no)

- Exposure Pathways
- ↓
- Constituents of Concern (COCs)
- ↓
- Transport Models
- ↓
- Soil Parameters
- ↓
- GW Parameters
- ↓
- Air Parameters

#### Review Output

- Exposure Flowchart
- COC Chem. Parameters
- Input Data Summary
- User-Spec. COC Data...
- Transient Domenico Analysis...
- Baseline Risks...**
- Cleanup Standards...

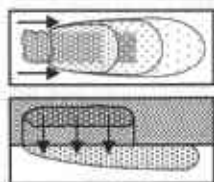
### 5. Commands and Options

|  |   |   |                                     |
|--|---|---|-------------------------------------|
| <input type="button" value="New Site"/>    | <input type="button" value="Load Data..."/> | <input type="button" value="Save Data As..."/>      | <input type="button" value="Quit"/> |
| <input type="button" value="Print Sheet"/> | <input type="button" value="Set Units"/>    | <input type="button" value="Custom Chem. Data..."/> | <input type="button" value="Help"/> |



## Exposure Pathway Identification

### 1. Groundwater Exposure ?



**Groundwater Ingestion/  
Surface Water Impact**

Receptor: None ▼ MCL ▼ Res. ▼  
 Type: On-site Off-site1 Off-site2

Source Media:

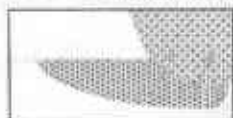
Affected Groundwater

Affected Soils Leaching to Groundwater

Distance to GW receptors

|         |           |           |      |
|---------|-----------|-----------|------|
| 0       | 75        | 110       | (ft) |
| On-site | Off-site1 | Off-site2 |      |
| 0       | 75        | 110       | (ft) |

**GW Discharge to Surface Water Exposure**

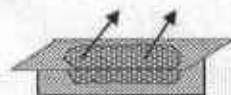


- Swimming  
 Fish Consumption  
 Aquatic Life Protection

Enter ALP Criteria

### 2. Surface Soil Exposure ?

**Direct Ingestion  
and Dermal Contact**



Receptor: Res. ▼  
 Type: On-site

No off-site receptors

Construction Worker

Site Name: Kawahara Nursery

Location: 16550 Ashland Avenue, San Lorenzo, CA

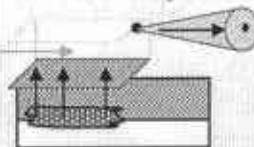
Compl. By: Mark Detterman

Job ID: 94015

Date: Sept. 2002

### 3. Air Exposure ?

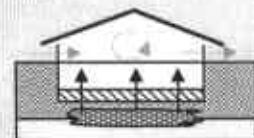
**Volatilization and Particulates  
to Outdoor Air Inhalation**



Receptor: Res. ▼ Res. ▼ None ▼  
 Type: On-site Off-site1 Off-site2  
 0 110 0 (ft)

Construction worker

- Affected Soils--Volatilization to Ambient Outdoor Air  
 Affected Groundwater--Volatilization to Ambient Outdoor Air  
 Affected Surface Soils--Particulates to Ambient Outdoor Air



**Volatilization to  
Indoor Air Inhalation**

Receptor: Res. ▼  
 Type: On-site

No off-site receptors

- Affected Soils--Volatilization to Enclosed Space  
 Affected Groundwater--Volatilization to Enclosed Space

### 4. Commands and Options

Main Screen

Print Sheet

Set Units

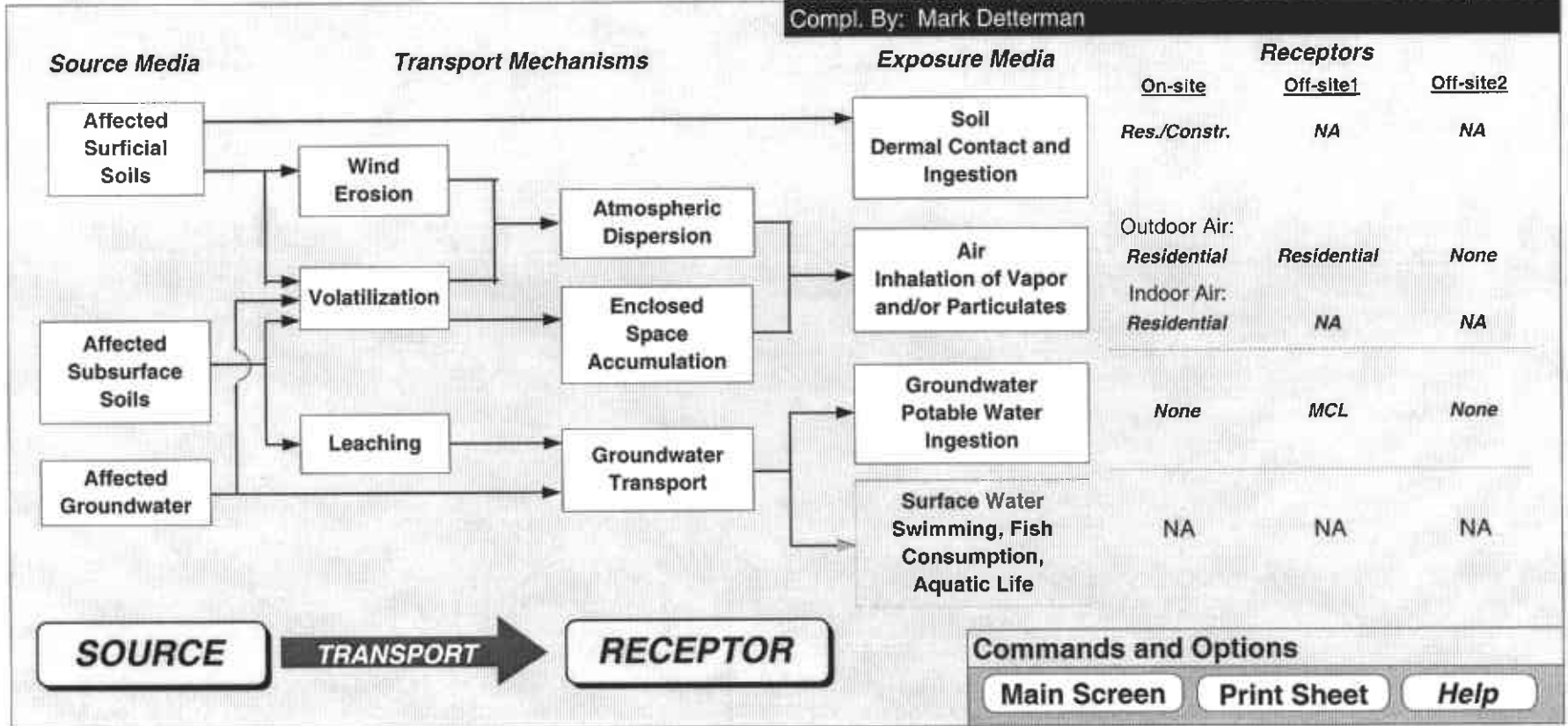
Help

Exposure Factors & Target Risks

Exposure Flowchart

# Exposure Pathway Flowchart

Site Name: Kawahara Nursery Job ID: 94015  
 Location: 16550 Ashland Avenue, San Lorenzo, CA Date: Sept. 2002  
 Compl. By: Mark Detterman



*Appendix B*

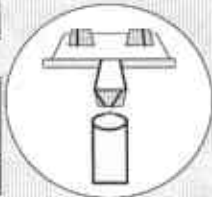
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*Printouts: Exposure Factors and Target Risk Limits, User-Specified  
Custom Chemical Database, and Chemical data for Selected COCs*

# Exposure Factors and Target Risk Limits

## 1. Exposure Parameters

| Age Adjustment?  | Residential                    |                      | Commercial |           |
|--|--------------------------------|----------------------|------------|-----------|
|  | Adult                          | (Age 0-6) (Age 0-16) | Chronic    | Construc. |
| Averaging time, carcinogens (yr)                       | 70                             |                      |            |           |
| Averaging time, non-carcinogens (yr)                   | 30                             |                      | 25         | 1         |
| Body weight (kg)                                       | 70                             | 15 35                | 70         |           |
| Exposure duration (yr)                                 | 30                             | 6 16                 | 25         | 1         |
| Exposure frequency (days/yr)                           | 350                            |                      | 250        | 180       |
| Dermal exposure frequency (days/yr)                    | 350                            |                      | 250        |           |
| Skin surface area, soil contact (cm <sup>2</sup> )     | <input type="checkbox"/> 5800  | 2023                 | 5800       | 5800      |
| Soil dermal adherence factor (mg/cm <sup>2</sup> /day) | 1                              |                      |            |           |
| Water ingestion rate (L/day)                           | 2                              |                      | 1          |           |
| Soil ingestion rate (mg/day)                           | <input type="checkbox"/> 100   | 200                  | 50         | 100       |
| Swimming exposure time (hr/event)                      | 3                              |                      |            |           |
| Swimming event frequency (events/yr)                   | 12                             | 12 12                |            |           |
| Swimming water ingestion rate (L/hr)                   | <input type="checkbox"/> 0.05  | 0.5                  |            |           |
| Skin surface area, swimming (cm <sup>2</sup> )         | <input type="checkbox"/> 23000 | 8100                 |            |           |
| Fish consumption rate (kg/day)                         | 0.025                          |                      |            |           |
| Contaminated fish fraction (unitless)                  | 1                              |                      |            |           |



Site Name: Kawahara Nursery  
 Location: 16550 Ashland Avenue, San Lorenzo, CA  
 Compl. By: Mark Detterman  
 Job ID: 94015 Date: Sept. 2002

## 2. Risk Goal Calculation Options

- Individual Constituent Risk Goals Only
- Individual and Cumulative Risk Goals

## 3. Target Health Risk Limits

|                                   | Individual | Cumulative |
|-----------------------------------|------------|------------|
| Target Risk (Class A/B carcin.)   | 1.0E-6     | 1.0E-5     |
| Target Risk (Class C carcinogens) | 1.0E-5     |            |
| Target Hazard Quotient            | 1.0E+0     |            |
| Target Hazard Index               |            | 1.0E+0     |

## 4. Commands and Options

Return to Exposure Pathways

Use Default Values      Print Sheet

Help

## User-Specified Custom Chemical Database

**Chemical Name** BenzeneCA  
**CAS No.** 71-43-2 **Type** A

### Physical Properties

|  | Value      | Reference |
|--|------------|-----------|
| Molecular weight (g/mol)   | 78.1       | PS        |
| Solubility @ 20-25°C (mg/L)  | 1750       | PS        |
| Vapor pressure @ 20-25°C (mmHg)  | 95.2       | PS        |
| Henry's Law constant @ 20°C<br><input type="radio"/> (atm·m <sup>3</sup> /mol)<br><input checked="" type="radio"/> unitless (-)  | 0.22888633 | PS        |
| Ionization/dissociation constants (pH units):<br>acid pKa <input type="text" value="-"/> base pKb <input type="text" value="-"/> |            |           |
| Sorption coefficient (log L/kg)<br><input checked="" type="radio"/> log Koc<br><input type="radio"/> log Kd                      | 1.77       | PS        |
| Diffusion coefficient in air (cm <sup>2</sup> /s)  | 0.088      | PS        |
| Diffusion coefficient in water (cm <sup>2</sup> /s)  | 0.0000098  | PS        |

### Miscellaneous Parameters

|   |   |  |
|---|---|--|
| Analytical Detection Limits:                            | 6   |  |
| Groundwater (mg/L) <input type="text" value="0.001"/> S | Soil (mg/kg) <input type="text" value="0.005"/> S |  |
| First-Order Decay Half Lives (days):                    |   |  |
| Saturated <input type="text" value="720"/>              | Unsaturated <input type="text" value="720"/> H    |  |
| Bioconcentration Factor (-)                             | <input type="text" value="12.6"/>                 |  |

### Toxicity Data

|   | Value      | Reference |
|---|------------|-----------|
| EPA weight of evidence <input checked="" type="checkbox"/> Carcinogen | A          |           |
| Oral slope factor (1/(mg/kg/day))                                     | 0.1        | PS        |
| Dermal slope factor (1/(mg/kg/day))                                   | 0.02989691 | TX        |
| Inhalation unit risk factor (1/(μg/m <sup>3</sup> ))                  | 8.2857E-06 | PS        |
| Oral reference dose (mg/kg/day)                                       | 0.003      | R         |
| Dermal reference dose (mg/kg/day)                                     | -          |           |
| Inhalation reference conc. (mg/m <sup>3</sup> )                       | 0.00595    | R         |

### Dermal Exposure

|   |       |   |
|---|-------|---|
| Dermal relative adsorption factor (-)     | 0.5   | D |
| Dermal permeability coefficient (cm/hr)   | 0.021 |   |
| Lag time for dermal exposure (hr)         | 0.26  |   |
| Critical dermal exposure time (hr)        | 0.63  |   |
| Relative contribution of perm. coeff. (-) | 0.013 |   |

### Regulatory Standards

|                                     |       |   |
|-------------------------------------|-------|---|
| Groundwater MCL (mg/L)              | 0.001 | - |
| Air PEL/TWA (mg/m <sup>3</sup> )    | 3.25  |   |
| Aquatic life prot. criterion (mg/L) | -     |   |

### Commands and Options

**CHEMICAL DATA FOR SELECTED COCs**

**Physical Property Data**

| Constituent            | CAS Number | type | Molecular Weight (g/mole) |     | Diffusion Coefficients |     |              |     | log (Koc) or log(Kd) (@ 20 - 25 C) |     |              | Henry's Law Constant (@ 20 - 25 C) |          |         | Vapor Pressure (@ 20 - 25 C) |        | Solubility (@ 20 - 25 C) |    | acid pKa | base pKb | ref |
|------------------------|------------|------|---------------------------|-----|------------------------|-----|--------------|-----|------------------------------------|-----|--------------|------------------------------------|----------|---------|------------------------------|--------|--------------------------|----|----------|----------|-----|
|                        |            |      | MW                        | ref | Dair (cm2/s)           | ref | Dwat (cm2/s) | ref | log(L/kg) partition                | ref | mol (atm-m3) | (unitless)                         | ref      | (mm Hg) | ref                          | (mg/L) | ref                      |    |          |          |     |
| BenzeneCA*             | 71-43-2    | A    | 78.1                      | PS  | 8.80E-02               | PS  | 9.80E-06     | PS  | 1.77                               | Koc | PS           | 5.55E-03                           | 2.29E-01 | PS      | 9.52E+01                     | PS     | 1.75E+03                 | PS | -        | -        | -   |
| Toluene                | 108-88-3   | A    | 92.4                      | 5   | 8.50E-02               | A   | 9.40E-06     | A   | 2.13                               | Koc | A            | 6.30E-03                           | 2.60E-01 | A       | 3.00E+01                     | 4      | 5.15E+02                 | 29 | -        | -        | -   |
| Ethylbenzene           | 100-41-4   | A    | 106.2                     | PS  | 7.50E-02               | PS  | 7.80E-06     | PS  | 2.56                               | Koc | PS           | 7.88E-03                           | 3.25E-01 | PS      | 1.00E+01                     | PS     | 1.69E+02                 | PS | -        | -        | -   |
| Xylene (mixed isomers) | 1330-20-7  | A    | 106.2                     | 5   | 7.20E-02               | A   | 8.50E-06     | A   | 2.38                               | Koc | A            | 7.03E-03                           | 2.90E-01 | A       | 7.00E+00                     | 4      | 1.98E+02                 | 5  | -        | -        | -   |
| TPH - Aliph >C10-C12   | 0-00-0     | T    | 160                       | T   | 1.00E-01               | T   | 1.00E-05     | T   | 5.40                               | Koc | T            | 2.96E+00                           | 1.22E+02 | T       | 4.79E-01                     | -      | 3.40E-02                 | T  | -        | -        | -   |
| TPH - Arom >C10-C12    | 0-00-0     | T    | 130                       | T   | 1.00E-01               | T   | 1.00E-05     | T   | 3.40                               | Koc | T            | 3.28E-03                           | 1.35E-01 | T       | 4.79E-01                     | -      | 2.50E+01                 | T  | -        | -        | -   |

\* = Chemical with user-specified data

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

|  |                      |
|--|----------------------|
| <b>CHEMICAL DATA FOR SELECTED COCs</b> | <b>Toxicity Data</b> |
|--|----------------------|

| Constituent            | Reference Dose<br>(mg/kg/day) |     |            |     | Reference Conc.<br>(mg/m3) |     |          |     | Slope Factors<br>1/(mg/kg/day) |     |            |     | Unit Risk Factor<br>1/(µg/m3) |       | EPA Weight<br>of<br>Evidence | Is<br>Constituent<br>Carcinogenic ? |
|------------------------|-------------------------------|-----|------------|-----|----------------------------|-----|----------|-----|--------------------------------|-----|------------|-----|-------------------------------|-------|------------------------------|-------------------------------------|
|                        | Oral                          |     | Dermal     |     | Inhalation                 |     | Oral     |     | Dermal                         |     | Inhalation |     | URF_inhal                     | ref   |                              |                                     |
|                        | RfD_oral                      | ref | RfD_dermal | ref | RfC_inhal                  | ref | SF_oral  | ref | SF_dermal                      | ref | SF_inhal   | ref |                               |       |                              |                                     |
|                        |                               |     |            |     |                            |     |          |     |                                |     |            |     |                               |       |                              |                                     |
| BenzeneCA*             | 3.00E-03                      | R   | -          | -   | 5.95E-03                   | R   | 1.00E-01 | PS  | 2.99E-02                       | TX  | 8.29E-06   | PS  | A                             | TRUE  |                              |                                     |
| Toluene                | 2.00E-01                      | A,R | 1.60E-01   | TX  | 4.00E-01                   | A,R | -        | -   | -                              | -   | -          | -   | D                             | FALSE |                              |                                     |
| Ethylbenzene           | 1.00E-01                      | PS  | 9.70E-02   | TX  | 1.00E+00                   | PS  | -        | -   | -                              | -   | -          | -   | D                             | FALSE |                              |                                     |
| Xylene (mixed isomers) | 2.00E+00                      | A,R | 1.84E+00   | TX  | 7.00E+00                   | A   | -        | -   | -                              | -   | -          | -   | D                             | FALSE |                              |                                     |
| TPH - Aliph >C10-C12   | 1.00E-01                      | T   | -          | -   | 1.00E+00                   | T   | -        | -   | -                              | -   | -          | -   | D                             | FALSE |                              |                                     |
| TPH - Arom >C10-C12    | 4.00E-02                      | T   | -          | -   | 2.00E-01                   | T   | -        | -   | -                              | -   | -          | -   | D                             | FALSE |                              |                                     |

\* = Chemical with user-specific

Site Name: Kawahara Nursery

Site Location: 16550 Ashlanc

**Miscellaneous Chemical Data**

| Constituent            | Maximum Contaminant Level |                        | Time-Weighted Average Workplace Criteria |       | Aquatic Life Prot. Criteria |     | Bioconcentration Factor (L-wat/kg-fish) |
|------------------------|---------------------------|------------------------|--|-------|-----------------------------|-----|---|
|                        | MCL (mg/L)                | ref                    | TWA (mg/m3)                              | ref   | AQL (mg/L)                  | ref |   |
| BenzeneCA*             | 1.00E-03                  | -                      | 3.25E+00                                 | -     | -                           | -   | 12.6                                    |
| Toluene                | 1.00E+00                  | 56 FR 3526 (30 Jan 91) | 1.47E+02                                 | ACGIH | -                           | -   | 70                                      |
| Ethylbenzene           | 7.00E-01                  | 56 FR 3526 (30 Jan 91) | 4.35E+02                                 | PS    | -                           | -   | 1                                       |
| Xylene (mixed isomers) | 1.00E+01                  | 56 FR 3526 (30 Jan 91) | 4.34E+02                                 | ACGIH | -                           | -   | 1                                       |
| TPH - Aliph >C10-C12   | -                         | -                      | -  | -     | -                           | -   | 1                                       |
| TPH - Arom >C10-C12    | -                         | -                      | -  | -     | -                           | -   | 1                                       |

\* = Chemical with user-specific

Site Name: Kawahara Nursery

Site Location: 16550 Ashlanc



|  |                                    |
|--|------------------------------------|
| <b>CHEMICAL DATA FOR SELECTED COCs</b> | <b>Miscellaneous Chemical Data</b> |
|--|------------------------------------|

| Constituent            | Dermal                             |                                    | Water Dermal Permeability Data    |                             |  |  |        | Detection Limits   |       |              |       | Half Life<br>(First-Order Decay) |             |     |
|------------------------|------------------------------------|------------------------------------|-----------------------------------|-----------------------------|--|--|--------|--------------------|-------|--------------|-------|----------------------------------|-------------|-----|
|                        | Relative Absorp. Factor (unitless) | Dermal Permeability Coeff. (cm/hr) | Lag time for Dermal Exposure (hr) | Critical Exposure Time (hr) | Relative Contr of Derm Perm Coeff (unitless) | Water/Skin Derm Adsorp Factor (cm/event) | ref    | Groundwater (mg/L) | ref   | Soil (mg/kg) | ref   | Saturated                        | Unsaturated | ref |
|                        | BenzeneCA*                         | 0.5                                | 0.021                             | 0.26                        | 0.63   | 0.013                                    | 7.3E-2 | D                  | 0.001 | S            | 0.005 | S                                | 720         | 720 |
| Toluene                | 0.5                                | 0.045                              | 0.32                              | 0.77                        | 0.054  | 1.6E-1                                   | D      | 0.002              | S     | 0.005        | S     | 28                               | 28          | H   |
| Ethylbenzene           | 0.5                                | 0.074                              | 0.39                              | 1.3                         | 0.14   | 2.7E-1                                   | D      | 0.002              | S     | 0.005        | S     | 228                              | 228         | H   |
| Xylene (mixed isomers) | 0.5                                | 0.08                               | 0.39                              | 1.4                         | 0.16   | 2.9E-1                                   | D      | 0.005              | S     | 0.005        | S     | 360                              | 360         | H   |
| TPH - Aliph >C10-C12   | 0.5                                | -                                  | -                                 | -                           | -  | -  | -      | -                  | -     | -            | -     | -                                | -           | -   |
| TPH - Arom >C10-C12    | 0.5                                | -                                  | -                                 | -                           | -  | -  | -      | -                  | -     | -            | -     | -                                | -           | -   |

\* = Chemical with user-specific

Site Name: Kawahara Nursery

Site Location: 16550 Ashlanc

*Appendix C*

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*Printouts: Representative COC Concentrations in Source Media*

*(Groundwater)*

**RBCA SITE ASSESSMENT**

**User-Specified COC Data**

**REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA**

| CONSTITUENT            | Representative COC Concentration |                 |                   |                 |
|------------------------|----------------------------------|-----------------|-------------------|-----------------|
|                        | Groundwater                      |                 | Soils (5 - 16 ft) |                 |
|                        | value (mg/L)                     | note            | value (mg/kg)     | note            |
| BenzeneCA*             | 5.3E-2                           |                 | 3.9E-1            |                 |
| Toluene                | 2.5E-2                           |                 | 4.5E+0            |                 |
| Ethylbenzene           | 5.1E-2                           |                 | 6.1E+0            |                 |
| Xylene (mixed isomers) | 6.0E-1                           |                 | 4.1E+1            |                 |
| TPH - Aliph >C10-C12   | 1.7E+0                           | TPH as diesel   | 1.7E+2            | TPH as diesel   |
| TPH - Arom >C10-C12    | 5.5E+0                           | TPH as gasoline | 4.2E+2            | TPH as gasoline |

\* = Chemical with user-specified data

Site Name: Kawahara Nursery

Date Completed: Sept. 2002

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Job ID: 94015

Completed By: Mark Detterman

**RBCA SITE ASSESSMENT**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Site Location: 16550 Ashland Avenue, San Loren; Date Completed: Sept. 2002

1 of 1

**TIER 2 GROUNDWATER CONCENTRATION DATA SUMMARY**

| CONSTITUENTS DETECTED |                        | Analytical Method | Detected Concentrations        |                |                |                      |                   |
|-----------------------|------------------------|-------------------|--------------------------------|----------------|----------------|----------------------|-------------------|
|                       |                        |                   | Typical Detection Limit (mg/L) | No. of Samples | No. of Detects | Maximum Conc. (mg/L) | Mean Conc. (mg/L) |
| CAS No.               | Name                   |                   |                                |                |                |                      |                   |
| 71-43-2               | BenzeneCA*             | 5.0E-04           | 10                             | 10             | 9.8E-02        | 3.6E-02              | 5.3E-02           |
| 108-88-3              | Toluene                | 5.0E-04           | 10                             | 9              | 3.4E-02        | 1.7E-02              | 2.5E-02           |
| 100-41-4              | Ethylbenzene           | 5.0E-04           | 10                             | 10             | 8.8E-02        | 3.5E-02              | 5.1E-02           |
| 1330-20-7             | Xylene (mixed isomers) | 5.0E-04           | 10                             | 10             | 1.2E+00        | 3.9E-01              | 6.0E-01           |
| 0-00-0                | TPH - Aliph >C10-C12   | 5.0E-02           | 10                             | 8              | 3.7E+00        | 1.0E+00              | 1.7E+00           |
| 0-00-0                | TPH - Arom >C10-C12    | 5.0E-02           | 10                             | 10             | 9.0E+00        | 3.9E+00              | 5.5E+00           |

\* = Chemical with user-specified data



| <b>Commands and Options</b>                             |  |                                     |  | Site Name: Kawahara Nursery                   | Job ID: 94015                              |                      |                       |
|---|--|-------------------------------------|--|---|--|----------------------|-----------------------|
| <input type="button" value="Return"/>                   | <input type="button" value="Print Sheet"/> | <input type="button" value="Help"/> | Location: 16550 Ashland Avenue, San Lorenzo, CA Sept. 2002 |   |  |                      |                       |
|   |  |                                     | Compl. By: Mark Detterman                                  |   |  |                      |                       |
| <b>Groundwater Source Zone Concentration Calculator</b> |  |                                     |  |   | UCL Percentile                             |                      |                       |
|   |  |                                     |  |   | <input type="text" value="95%"/>           |                      |                       |
|   |  |                                     |  | <input type="button" value="Paste Defaults"/> | <input type="button" value="Mean Option"/> |                      |                       |
| <i>Constituent</i>                                      | Detection Limit<br>(mg/L)                  | No. of Samples                      | No. of Detects   | Estimated Distribution of Data                | Max. Conc.<br>(mg/L)                       | Mean Conc.<br>(mg/L) | UCL on Mean<br>(mg/L) |
| BenzeneCA*  | 5.0E-4                                     | 10                                  | 10   | Normal  | 9.8E-2                                     | 3.6E-2               | 5.3E-2                |
| Toluene   | 5.0E-4                                     | 10                                  | 9  | Normal  | 3.4E-2                                     | 1.7E-2               | 2.5E-2                |
| Ethylbenzene  | 5.0E-4                                     | 10                                  | 10   | Normal  | 8.8E-2                                     | 3.5E-2               | 5.1E-2                |
| Xylene (mixed isomers)                                  | 5.0E-4                                     | 10                                  | 10   | Normal  | 1.2E+0                                     | 3.9E-1               | 6.0E-1                |
| TPH - Aliph >C10-C12                                    | 5.0E-2                                     | 10                                  | 8  | Lognormal                                     | 3.7E+0                                     | 1.0E+0               | 1.7E+0                |
| TPH - Arom >C10-C12                                     | 5.0E-2                                     | 10                                  | 10   | Normal  | 9.0E+0                                     | 3.9E+0               | 5.5E+0                |

\* = Chemical with user-specified data

RBCA Tool Kit for Chemical Releases, Version 1.3a

Enter Analytical Data from  
Groundwater Source Zone  
(up to 50 Data Points)

Analytical Data

|      | 1        | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        | 11     | 12     | 13     |
|------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|--------|--------|
| ID   | MW-3     | MW-3      | MW-3      | MW-3      | MW-3      | MW-3      | MW-3      | MW-3      | MW-3      | MW-3      |        |        |        |
| Date | 4-Mar-99 | 29-Jun-99 | 15-Nov-99 | 22-May-00 | 16-Aug-00 | 16-Nov-00 | 21-Feb-01 | 31-May-01 | 28-Nov-01 | 28-May-02 |        |        |        |
|      | (mg/L)   | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L)    | (mg/L) | (mg/L) | (mg/L) |
|      | 3.30E-2  | 9.80E-2   | 6.30E-2   | 5.30E-2   | 1.80E-2   | 3.50E-2   | 2.80E-2   | 5.30E-3   | 2.30E-2   | 6.30E-3   |        |        |        |
|      | <0.0005  | 3.40E-2   | 2.50E-2   | 2.90E-2   | 5.80E-3   | 2.70E-2   | 1.20E-2   | 3.30E-2   | 3.00E-3   | 2.20E-3   |        |        |        |
|      | 1.20E-3  | 3.70E-3   | 6.50E-2   | 5.80E-2   | 1.80E-2   | 8.80E-2   | 4.60E-2   | 1.70E-2   | 3.70E-2   | 1.20E-2   |        |        |        |
|      | 1.70E-2  | 1.20E+0   | 5.90E-1   | 4.90E-1   | 1.82E-1   | 7.19E-1   | 2.76E-1   | 1.44E-1   | 1.84E-1   | 7.00E-2   |        |        |        |
|      | <0.050   | <1        | 2.00E+0   | 1.48E+0   | 5.30E-1   | 3.70E+0   | 8.80E-1   | 6.80E-1   | 4.30E-1   | 5.70E-1   |        |        |        |
|      | 1.30E+0  | 8.00E+0   | 4.20E+0   | 5.80E+0   | 2.40E+0   | 9.00E+0   | 2.40E+0   | 2.90E+0   | 1.70E+0   | 8.70E-1   |        |        |        |

RBCA Tool Kit for Chemical Releases, Version 1.3a

|               |               |               |               |               |               |               |               |               |               |               | Analytical Data |               |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|---------------|
| 14            | 15            | 16            | 17            | 18            | 19            | 20            | 21            | 22            | 23            | 24            | 25              | 26            |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |
| <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i>   | <i>(mg/L)</i> |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |
|               |               |               |               |               |               |               |               |               |               |               |                 |               |



RBCA Tool Kit for Chemical Releases, Version 1.3a

|        |        |        |        |        |        |        |        |        |        | Analytical Data |        |        |  |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|--------|--------|--|
| 27     | 28     | 29     | 30     | 31     | 32     | 33     | 34     | 35     | 36     | 37              | 38     | 39     |  |
|        |        |        |        |        |        |        |        |        |        |                 |        |        |  |
| (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L)          | (mg/L) | (mg/L) |  |
|        |        |        |        |        |        |        |        |        |        |                 |        |        |  |
|        |        |        |        |        |        |        |        |        |        |                 |        |        |  |
|        |        |        |        |        |        |        |        |        |        |                 |        |        |  |
|        |        |        |        |        |        |        |        |        |        |                 |        |        |  |

RBCA Tool Kit for Chemical Releases, Version 1.3a

| 40            | 41            | 42            | 43            | 44            | 45            | 46            | 47            | 48            | 49            | 50            |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|               |               |               |               |               |               |               |               |               |               |               |
| <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> | <i>(mg/L)</i> |
|               |               |               |               |               |               |               |               |               |               |               |
|               |               |               |               |               |               |               |               |               |               |               |
|               |               |               |               |               |               |               |               |               |               |               |
|               |               |               |               |               |               |               |               |               |               |               |

*Appendix D*

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*Printouts: Representative COC Concentrations in Source Media*

*(Soil)*

**RBCA SITE ASSESSMENT**

**User-Specified COC Data**

**REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA**

| CONSTITUENT            | Representative COC Concentration |                 |                   |                 |
|------------------------|----------------------------------|-----------------|-------------------|-----------------|
|                        | Groundwater                      |                 | Soils (5 - 16 ft) |                 |
|                        | value (mg/L)                     | note            | value (mg/kg)     | note            |
| BenzeneCA*             | 5.3E-2                           |                 | 3.9E-1            |                 |
| Toluene                | 2.5E-2                           |                 | 4.5E+0            |                 |
| Ethylbenzene           | 5.1E-2                           |                 | 6.1E+0            |                 |
| Xylene (mixed isomers) | 6.0E-1                           |                 | 4.1E+1            |                 |
| TPH - Aliph >C10-C12   | 1.7E+0                           | TPH as diesel   | 1.7E+2            | TPH as diesel   |
| TPH - Arom >C10-C12    | 5.5E+0                           | TPH as gasoline | 4.2E+2            | TPH as gasoline |

\* = Chemical with user-specified data

Site Name: Kawahara Nursery

Date Completed: Sept. 2002

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Job ID: 94015

Completed By: Mark Detterman

**RBCA SITE ASSESSMENT**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Site Location: 16550 Ashland Avenue, San Loren; Date Completed: Sept. 2002

1 of 1

**TIER 2 SOIL CONCENTRATION DATA SUMMARY**

| CONSTITUENTS DETECTED<br>CAS No.      Name |                        | Analytical Method<br>Typical Detection<br>Limit (mg/kg) |   |   | Detected Concentrations |                   |                          |
|--|------------------------|---|---|---|-------------------------|-------------------|--------------------------|
|  |                        |   |   |   | No. of<br>Samples       | No. of<br>Detects | Maximum<br>Conc. (mg/kg) |
| 71-43-2                                    | BenzeneCA*             | 5.0E-03   | 7 | 2 | 8.7E-01                 | 1.5E-01           | 3.9E-01                  |
| 108-88-3                                   | Toluene                | 5.0E-03   | 7 | 5 | 1.0E+01                 | 1.8E+00           | 4.5E+00                  |
| 100-41-4                                   | Ethylbenzene           | 5.0E-03   | 7 | 3 | 1.4E+01                 | 2.3E+00           | 6.1E+00                  |
| 1330-20-7                                  | Xylene (mixed isomers) | 5.0E-03   | 7 | 4 | 9.2E+01                 | 1.6E+01           | 4.1E+01                  |
| 0-00-0                                     | TPH - Aliph >C10-C12   | 1.0E+00   | 7 | 3 | 3.6E+02                 | 6.6E+01           | 1.7E+02                  |
| 0-00-0                                     | TPH - Arom >C10-C12    | 1.0E+00   | 7 | 4 | 9.1E+02                 | 1.7E+02           | 4.2E+02                  |

\* = Chemical with user-specified data

|   |                                   |  |
|---|-----------------------------------|--|
| Site Name: Kawahara Nursery<br>Location: 16550 Ashland Avenue, San Lorenzo, CA<br>Compl. By: Mark Detterman | Job ID: 94015<br>Date: Sept. 2002 | <b>Commands and Options</b><br><input type="button" value="Main Screen"/> <input type="button" value="Print Sheet"/> <input type="button" value="Help"/> |
|---|-----------------------------------|--|

## Source Media Constituents of Concern (COCs)

**Selected COCs**

COC Select:

|                        |
|------------------------|
| BenzeneCA*             |
| Toluene                |
| Ethylbenzene           |
| Xylene (mixed isomers) |
| TPH - Aliph >C10-C12   |
| TPH - Arom >C10-C12    |

**Representative COC Concentration**

| Groundwater Source Zone  | Soil Source Zone   |
|--|--|
| <input type="button" value="Enter Directly"/> <input type="button" value="Enter Site Data"/> | <input type="button" value="Enter Directly"/> <input type="button" value="Enter Site Data"/> |
| (mg/L)   | (mg/kg)  |
| note   | note   |
| 5.3E-2   | 3.9E-1   |
| 2.5E-2   | 4.5E+0   |
| 5.1E-2   | 6.1E+0   |
| 6.0E-1   | 4.1E+1   |
| 1.7E+0   | 1.7E+2   |
| TPH as diesel  | TPH as diesel  |
| 5.5E+0   | 4.2E+2   |
| TPH as gasoline  | TPH as gasoline  |

Apply Raoult's Law

Mole Fraction in Source Material

|     |
|-----|
| (-) |
|     |
|     |
|     |
|     |
|     |
|     |
|     |

\* = Chemical with user-specified data



| Commands and Options |  |             |  | Site Name: Kawahara Nursery |  | Job ID: 94015                                   |  |
|----------------------|--|-------------|--|-----------------------------|--|---|--|
| Return               |  | Print Sheet |  | Help                        |  | Location: 16550 Ashland Avenue, San Lorenzo, CA |  |
|                      |  |             |  |                             |  | Date: Sept. 2002                                |  |
|                      |  |             |  |                             |  | Compl. By: Mark Detterman                       |  |

## Soil Source Zone Concentration Calculator

UCL Percentile

| Constituent            | Detection Limit | No. of Samples | No. of Detects | Estimated Distribution of Data | Max. Conc. | Mean Conc. | UCL on Mean |
|------------------------|-----------------|----------------|----------------|--------------------------------|------------|------------|-------------|
|                        | (mg/kg)         |                |                |                                | (mg/kg)    | (mg/kg)    | (mg/kg)     |
| BenzeneCA*             | 5.0E-3          | 7              | 2              | Lognormal                      | 8.7E-1     | 1.5E-1     | 3.9E-1      |
| Toluene                | 5.0E-3          | 7              | 5              | Lognormal                      | 1.0E+1     | 1.8E+0     | 4.5E+0      |
| Ethylbenzene           | 5.0E-3          | 7              | 3              | Lognormal                      | 1.4E+1     | 2.3E+0     | 6.1E+0      |
| Xylene (mixed isomers) | 5.0E-3          | 7              | 4              | Lognormal                      | 9.2E+1     | 1.6E+1     | 4.1E+1      |
| TPH - Aliph >C10-C12   | 1.0E+0          | 7              | 3              | Lognormal                      | 3.6E+2     | 6.6E+1     | 1.7E+2      |
| TPH - Arom >C10-C12    | 1.0E+0          | 7              | 4              | Lognormal                      | 9.1E+2     | 1.7E+2     | 4.2E+2      |

\* = Chemical with user-specified data

RBCA Tool Kit for Chemical Releases, Version 1.3a

Enter Analytical Data from  
Soil Source Zone  
(up to 50 Data Points)

|      |           | Analytical Data |         |         |         |         |         |          |          |          |          |          |         |         |
|------|-----------|-----------------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|---------|---------|
|      |           | 1               | 2       | 3       | 4       | 5       | 6       | 7        | 8        | 9        | 10       | 11       | 12      | 13      |
| ID   | MW-3-6    | MW-3-15         |         |         |         |         |         | SB4-5    | SB4-10   | SB4-15   | SB5-10   | SB5-12   |         |         |
| Date | 10-Jun-93 | 10-Jun-93       |         |         |         |         |         | 8-Aug-99 | 8-Aug-99 | 8-Aug-99 | 8-Aug-99 | 8-Aug-99 |         |         |
|      | (mg/kg)   | (mg/kg)         | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg)  | (mg/kg)  | (mg/kg)  | (mg/kg)  | (mg/kg)  | (mg/kg) | (mg/kg) |
|      | <0.005    | 2.00E-1         |         |         |         |         |         | <0.005   | <0.005   | 8.70E-1  | <0.005   | <0.010   |         |         |
|      | <0.005    | 9.80E-1         |         |         |         |         |         | <0.005   | 3.30E-2  | 1.00E+1  | 2.60E-2  | 1.30E+0  |         |         |
|      | <0.005    | 6.80E-1         |         |         |         |         |         | <0.005   | <0.005   | 1.40E+1  | <0.005   | 1.40E+0  |         |         |
|      | <0.005    | 4.00E+0         |         |         |         |         |         | 9.00E-3  | <0.005   | 9.20E+1  | <0.005   | 1.30E+1  |         |         |
|      | <1        | <1              |         |         |         |         |         | <1       | 1.60E+0  | 3.60E+2  | <1       | 1.00E+2  |         |         |
|      | <1        | <1              |         |         |         |         |         | <1       | 1.40E+0  | 9.10E+2  | 1.20E+0  | 2.50E+2  |         |         |



RBCA Tool Kit for Chemical Releases, Version 1.3a

|                |                |                |                |                |                |                |                |                |                |                | Analytical Data |                |  |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|--|
| 14             | 15             | 16             | 17             | 18             | 19             | 20             | 21             | 22             | 23             | 24             | 25              | 26             |  |
|                |                |                |                |                |                |                |                |                |                |                |                 |                |  |
| <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i>  | <i>(mg/kg)</i> |  |
|                |                |                |                |                |                |                |                |                |                |                |                 |                |  |
|                |                |                |                |                |                |                |                |                |                |                |                 |                |  |
|                |                |                |                |                |                |                |                |                |                |                |                 |                |  |
|                |                |                |                |                |                |                |                |                |                |                |                 |                |  |

RBCA Tool Kit for Chemical Releases, Version 1.3a

|                |                |                |                |                |                |                |                |                |                | Analytical Data |                |                |  |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|--|
| 27             | 28             | 29             | 30             | 31             | 32             | 33             | 34             | 35             | 36             | 37              | 38             | 39             |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |
| <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i>  | <i>(mg/kg)</i> | <i>(mg/kg)</i> |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |
|                |                |                |                |                |                |                |                |                |                |                 |                |                |  |

RBCA Tool Kit for Chemical Releases, Version 1.3a

| 40             | 41             | 42             | 43             | 44             | 45             | 46             | 47             | 48             | 49             | 50             |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                |                |                |                |                |                |                |                |                |                |                |
| <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> | <i>(mg/kg)</i> |
|                |                |                |                |                |                |                |                |                |                |                |
|                |                |                |                |                |                |                |                |                |                |                |
|                |                |                |                |                |                |                |                |                |                |                |
|                |                |                |                |                |                |                |                |                |                |                |
|                |                |                |                |                |                |                |                |                |                |                |

*Appendix E*

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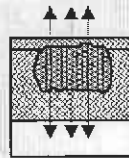
*Printouts: Transport Modeling Options*

## Transport Modeling Options

### 1. Vertical Transport, Surface Soil Column

#### Outdoor Air Volatilization Factors ?

- Surface soil volatilization model only
  - Combination surface soil/Johnson & Ettinger models
- Thickness of surface soil zone  (ft)
- User-specified VF from other model Enter VF Values



#### Indoor Air Volatilization Factors ?

- Johnson & Ettinger model
- User-specified VF from other model Enter VF Values

#### Soil-to-Groundwater Leaching Factor ?

- ASTM Model ?
  - Apply Soil Attenuation Model (SAM)
  - Allow first-order biodecay Enter Decay Rates
- User-specified LF from other model Enter LF Values

### 2. Lateral Air Dispersion Factor



- 3-D Gaussian dispersion model Off-site 1 Off-site 2
- User-Specified ADF 1.00E+0 1.00E+0 (-)

Site Name: Kawahara Nursery

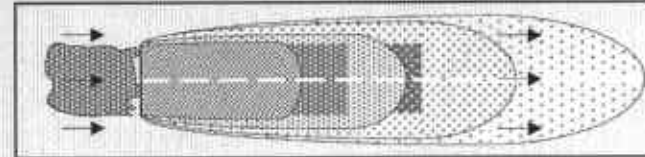
Job ID: 94015

Location: 16550 Ashland Avenue, San Lorenzo, CA

Date: Sept. 2002

Compl. By: Mark Detterman

### 3. Groundwater Dilution Attenuation Factor



#### Calculate DAF using Domenico Model ?

- Domenico equation with dispersion only (no biodegradation)
  - Domenico equation first-order decay Enter Decay Rates
  - Modified Domenico equation using electron acceptor superposition Enter Site Data
- Enter Directly Biodegradation Capacity  (mg/L)

— or —

#### User-Specified DAF Values

- DAF values from other model or site data Enter DAF Values

*n*

*o*

### 4. Commands and Options

Main Screen

Print Sheet

Help

|                             |                                |
|-----------------------------|--------------------------------|
| <b>RBCA SITE ASSESSMENT</b> | <b>User-Specified COC Data</b> |
|-----------------------------|--------------------------------|

**CONSTITUENT HALF-LIFE VALUES**

| CONSTITUENT            | Saturated Zone<br>Half-Life<br>(days) | Unsaturated Zone<br>Half-Life<br>(days) |
|------------------------|---------------------------------------|---|
| BenzeneCA*             | 720                                   | 720                                     |
| Toluene                | 28                                    | 28                                      |
| Ethylbenzene           | 228                                   | 228                                     |
| Xylene (mixed isomers) | 360                                   | 360                                     |
| TPH - Aliph >C10-C12   | 36500                                 | 36500                                   |
| TPH - Arom >C10-C12    | 36500                                 | 36500                                   |

\* = Chemical with user-specified data

Site Name: Kawahara Nursery

Date Completed: Sept. 2002

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Job ID: 94015

Completed By: Mark Detterman

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Site Name: Kawahara Nursery  
 Location: 16550 Ashland Avenue, San Lorenzo, CA  
 Compl. By: Mark Detterman

Job ID: 94015

Date: Sept. 2002

**Commands and Options**

Return

Print Sheet

Paste Default Values

Help

**Constituent Half-Life Values**

| <i>Constituent</i>     | <b>Saturated Zone</b>     |                               | <b>Unsaturated Zone</b>   |                               |
|------------------------|---------------------------|-------------------------------|---------------------------|-------------------------------|
|                        | First-Order Decay         |                               | First-Order Decay         |                               |
|                        | Half-Life<br><i>(day)</i> | Coeffecient<br><i>(1/day)</i> | Half-Life<br><i>(day)</i> | Coeffecient<br><i>(1/day)</i> |
| BenzeneCA*             | 7.2E+2                    | 9.6E-4                        | 7.2E+2                    | 9.6E-4                        |
| Toluene                | 2.8E+1                    | 2.5E-2                        | 2.8E+1                    | 2.5E-2                        |
| Ethylbenzene           | 2.3E+2                    | 3.0E-3                        | 2.3E+2                    | 3.0E-3                        |
| Xylene (mixed isomers) | 3.6E+2                    | 1.9E-3                        | 3.6E+2                    | 1.9E-3                        |
| TPH - Aliph >C10-C12   | 3.7E+4                    | 1.9E-5                        | 3.7E+4                    | 1.9E-5                        |
| TPH - Arom >C10-C12    | 3.7E+4                    | 1.9E-5                        | 3.7E+4                    | 1.9E-5                        |

*Appendix F*

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*Printouts: Site-Specific Soil Parameters, Site-Specific Groundwater  
Parameters, Site-Specific Air Parameters, and  
Input Parameter Summary Sheet*



# Site-Specific Soil Parameters

**1. Soil Source Zone Characteristics** (?)

**Hydrogeology** General Case Construction

Depth to water-bearing unit  (ft)

Capillary zone thickness  (ft)

Soil column thickness  (ft)

**Affected Soil Zone**

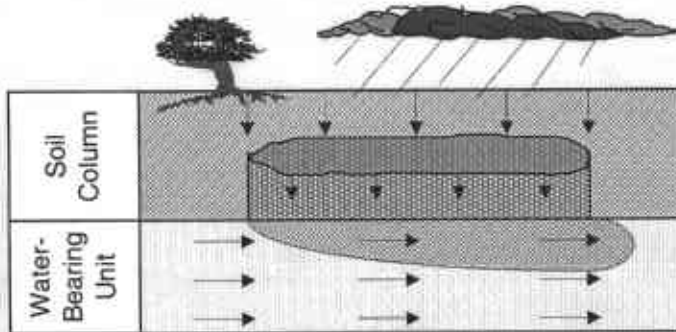
Depth to top of affected soils  (ft)

Depth to base of affected soils  (ft)

Affected soil area   (ft<sup>2</sup>)

Length of affected soil parallel to assumed wind direction   (ft)

Length of affected soil parallel to assumed GW flow direction  (ft)



Site Name: Kawahara Nursery Job ID: 94015  
 Location: 16550 Ashland Avenue, San Lorenzo, CA Date: Sept. 2002  
 Compl. By: Mark Detterman

**2. Surface Soil Column** Vadose Zone Capillary Fringe

**Predominant USCS Soil Type**  (?)

or

Total porosity  (-)

Volumetric water content   (-)

Volumetric air content   (-)

Dry bulk density  (kg/L)

Vertical hydraulic conductivity  (ft/d)

Vapor permeability  (ft<sup>2</sup>)

Capillary zone thickness  (ft)

**Net Rainfall Infiltration**

Net infiltration estimate  (mm/yr)

or

Average annual precipitation  (mm/yr)

**Partitioning Parameters**

Fraction organic carbon  (-)

Soil/water pH  (-)

**3. Commands and Options**

## Site-Specific Groundwater Parameters

### 1. Water-Bearing Unit (?)

**Hydrogeology**

|  |                                     |               |
|--|-------------------------------------|---------------|
| Groundwater Darcy velocity                       | <input type="text" value="8.5E-4"/> | <i>(ft/d)</i> |
| Groundwater seepage velocity                     | <input type="text" value="2.2E-3"/> | <i>(ft/d)</i> |
| or <input type="button" value="Enter Directly"/> | <input type="text" value="↑"/>      | or            |
| Hydraulic conductivity                           | <input type="text" value="2.8E-1"/> | <i>(ft/d)</i> |
| Hydraulic gradient                               | <input type="text" value="3.0E-3"/> | <i>(-)</i>    |
| Effective porosity                               | <input type="text" value="0.38"/>   | <i>(-)</i>    |

**Sorption**

|   |                                    |            |
|---|------------------------------------|------------|
| Fraction organic carbon--saturated zone | <input type="text" value="0.038"/> | <i>(-)</i> |
| Groundwater pH                          | <input type="text" value="7.50"/>  | <i>(-)</i> |

### 2. Groundwater Source Zone (?)

|  |                                  |             |
|--|----------------------------------|-------------|
| Groundwater plume width at source                | <input type="text" value="15"/>  | <i>(ft)</i> |
| Plume (mixing zone) thickness at source          | <input type="text" value="2.5"/> | <i>(ft)</i> |
| or <input type="button" value="Enter Directly"/> | <input type="text" value="↑"/>   | or          |
| Saturated thickness                              | <input type="text" value="2.5"/> | <i>(ft)</i> |
| Length of source zone                            | <input type="text" value="30"/>  | <i>(ft)</i> |

Site Name: Kawahara Nursery Job ID: 94015  
 Location: 16550 Ashland Avenue, San Lorenzo, CA Date: Sept. 2002  
 Compl. By: Mark Detterman

### 3. Groundwater Dispersion (?)

Model:

|  | GW Ingestion                       |                                   | Soil Leaching to GW                |                                   |
|--|------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
|  | Off-site 1                         | Off-site 2                        | Off-site 1                         | Off-site 2                        |
| Distance to GW receptors                         | <input type="text" value="75"/>    | <input type="text" value="110"/>  | <input type="text" value="75"/>    | <input type="text" value="110"/>  |
| or <input type="button" value="Enter Directly"/> | <input type="text" value="↓"/>     | or <input type="text" value="↓"/> | <input type="text" value="↓"/>     | or <input type="text" value="↓"/> |
| Longitudinal dispersivity                        | <input type="text" value="7.5"/>   | <input type="text" value="11"/>   | <input type="text" value="7.5"/>   | <input type="text" value="11"/>   |
| Transverse dispersivity                          | <input type="text" value="2.475"/> | <input type="text" value="3.63"/> | <input type="text" value="2.475"/> | <input type="text" value="3.63"/> |
| Vertical dispersivity                            | <input type="text" value="0.375"/> | <input type="text" value="0.55"/> | <input type="text" value="0.375"/> | <input type="text" value="0.55"/> |

### 4. Groundwater Discharge to Surface Water (?)

|   |                                     |                           |
|---|-------------------------------------|---------------------------|
| Distance to GW/SW discharge point         | <input type="text" value="NA"/>     | <i>(ft)</i>               |
| Plume width at GW/SW discharge            | <input type="text" value="0"/>      | <i>(ft)</i>               |
| Plume thickness at GW/SW discharge        | <input type="text" value="0"/>      | <i>(ft)</i>               |
| Surface water flowrate at GW/SW discharge | <input type="text" value="0.0E+0"/> | <i>(ft<sup>3</sup>/d)</i> |

### 5. Commands and Options

|  |   |  |
|--|---|--|
| <input type="button" value="Main Screen"/> | <input type="button" value="Use Default Values"/> | <input type="button" value="Print Sheet"/> |
| <input type="button" value="Set Units"/>   |   | <input type="button" value="Help"/>        |

## Site-Specific Air Parameters

Site Name: Kawahara Nursery Job ID: 94015  
 Location: 16550 Ashland Avenue, San Lorenzo, CA Date: Sept. 2002  
 Compl. By: Mark Detterman

### 1. Outdoor Air Pathway

#### Dispersion in Air

Distance to offsite air receptor

| Off-site 1 | Off-site 2 |      |
|------------|------------|------|
| 110        | 0          | (ft) |

or

Enter Directly

Horizontal dispersivity

|       |   |      |
|-------|---|------|
| 12.31 | 0 | (ft) |
|-------|---|------|

Vertical dispersivity

|      |   |      |
|------|---|------|
| 8.32 | 0 | (ft) |
|------|---|------|

#### Air Source Zone

Air mixing zone height

|            |      |
|------------|------|
| 6.56167979 | (ft) |
|------------|------|

Ambient air velocity in mixing zone

|             |        |
|-------------|--------|
| 637795.2756 | (ft/d) |
|-------------|--------|

Areal particulate emission flux

|         |                        |
|---------|------------------------|
| 6.9E-14 | (g/cm <sup>2</sup> /s) |
|---------|------------------------|

### 2. Indoor Air Pathway

#### Building Parameters

Building volume/area ratio

| Residential | Commercial |      |
|-------------|------------|------|
| 6.56168     | 9.84252    | (ft) |

Foundation area

|         |         |                    |
|---------|---------|--------------------|
| 753.474 | 753.474 | (ft <sup>2</sup> ) |
|---------|---------|--------------------|

Foundation perimeter

|         |         |      |
|---------|---------|------|
| 111.549 | 111.549 | (ft) |
|---------|---------|------|

Building air exchange rate

|        |        |       |
|--------|--------|-------|
| 1.2E+1 | 2.0E+1 | (1/d) |
|--------|--------|-------|

Depth to bottom of foundation slab

|         |         |      |
|---------|---------|------|
| 0.49213 | 0.49213 | (ft) |
|---------|---------|------|

Convective air flow through cracks

|        |        |                      |
|--------|--------|----------------------|
| 0.0E+0 | 0.0E+0 | (ft <sup>3</sup> /d) |
|--------|--------|----------------------|

Foundation thickness

|             |      |
|-------------|------|
| 0.492125984 | (ft) |
|-------------|------|

Foundation crack fraction

|      |     |
|------|-----|
| 0.01 | (-) |
|------|-----|

Volumetric water content of cracks

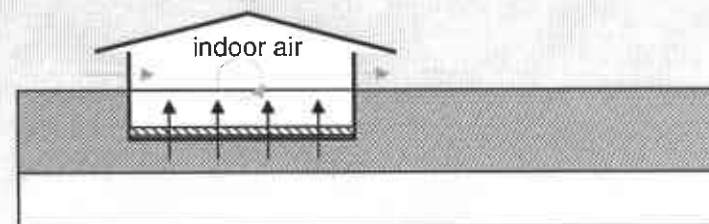
|      |     |
|------|-----|
| 0.12 | (-) |
|------|-----|

Volumetric air content of cracks

|      |     |
|------|-----|
| 0.26 | (-) |
|------|-----|

Indoor/Outdoor differential pressure

|   |       |
|---|-------|
| 0 | (psi) |
|---|-------|



### 3. Commands and Options

Main Screen

Use Default Values

Print Sheet

Set Units

Help

### RBCA SITE ASSESSMENT

### Input Parameter Summary

Site Name: Kawahara Nursery  
 Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Completed By: Mark Detterman  
 Date Completed: Sept. 2002

Job ID: 94016

1 OF 1

| Exposure Parameters | Residential                                       |          | Commercial/Industrial |         |           |
|---------------------|---|----------|-----------------------|---------|-----------|
|                     | Adult   | (1-8yrs) | (1-18 yrs)            | Chronic | Construc. |
| AT <sub>c</sub>     | Averaging time for carcinogens (yr)               | 70       |                       | 25      | 1         |
| AT <sub>n</sub>     | Averaging time for non-carcinogens (yr)           | 30       |                       | 25      |           |
| BW                  | Body weight (kg)                                  | 70       | 15                    | 35      | 70        |
| ED                  | Exposure duration (yr)                            | 30       | 6                     | 18      | 25        |
| τ                   | Averaging time for vapor flux (yr)                | 30       |                       | 25      | 1         |
| EF                  | Exposure frequency (days/yr)                      | 350      |                       | 250     | 180       |
| EF <sub>D</sub>     | Exposure frequency for dermal exposure            | 350      |                       | 250     |           |
| IR <sub>w</sub>     | Ingestion rate of water (L/day)                   | 2        |                       | 1       |           |
| IR <sub>s</sub>     | Ingestion rate of soil (mg/day)                   | 100      | 200                   |         | 50        |
| SA                  | Skin surface area (dermal) (cm <sup>2</sup> )     | 5800     |                       | 2023    | 5800      |
| M                   | Soil to skin adherence factor                     | 1        |                       |         |           |
| ET <sub>swim</sub>  | Swimming exposure time (revent)                   | 3        |                       |         |           |
| EV <sub>swim</sub>  | Swimming event frequency (events/yr)              | 12       | 12                    | 12      |           |
| IR <sub>swim</sub>  | Water ingestion while swimming (L/hr)             | 0.05     | 0.5                   |         |           |
| SA <sub>swim</sub>  | Skin surface area for swimming (cm <sup>2</sup> ) | 23000    |                       | 8100    |           |
| IR <sub>fish</sub>  | Ingestion rate of fish (kg/yr)                    | 0.025    |                       |         |           |
| F <sub>fish</sub>   | Contaminated fish fraction (unitless)             | 1        |                       |         |           |

| Complete Exposure Pathways and Receptors         | On-site     | Off-site 1  | Off-site 2  |
|--|-------------|-------------|-------------|
| <b>Groundwater:</b>                              |             |             |             |
| Groundwater Ingestion                            | None        | MCL         | Residential |
| Soil Leaching to Groundwater Ingestion           | None        | MCL         | Residential |
| <b>Applicable Surface Water Exposure Routes:</b> |             |             |             |
| Swimming   |             |             | NA          |
| Fish Consumption                                 |             |             | NA          |
| Aquatic Life Protection                          |             |             | NA          |
| <b>Soil:</b>                                     |             |             |             |
| Direct Ingestion and Dermal Contact              | Res/Constr. |             |             |
| <b>Outdoor Air:</b>                              |             |             |             |
| Particulates from Surface Soils                  | Residential | Residential | None        |
| Volatilization from Soils                        | Residential | Residential | None        |
| Volatilization from Groundwater                  | Residential | Residential | None        |
| <b>Indoor Air:</b>                               |             |             |             |
| Volatilization from Subsurface Soils             | Residential | NA          | NA          |
| Volatilization from Groundwater                  | Residential | NA          | NA          |

| Receptor Distance from Source Media   | On-site | Off-site 1 | Off-site 2 | (Units) |
|---------------------------------------|---------|------------|------------|---------|
| Groundwater receptor                  | NA      | 75         | 110        | (ft)    |
| Soil leaching to groundwater receptor | NA      | 75         | 110        | (ft)    |
| Outdoor air inhalation receptor       | 0       | 110        | NA         | (ft)    |

| Target Health Risk Values                           | Individual | Cumulative |
|---|------------|------------|
| TR <sub>h</sub> Target Risk (class A&B carcinogens) | 1.0E-6     | 1.0E-5     |
| TR <sub>n</sub> Target Risk (class C carcinogens)   | 1.0E-5     |            |
| THQ Target Hazard Quotient (non-carcinogenic risk)  | 1.0E+0     | 1.0E+0     |

| Modeling Options                               |                             |
|--|-----------------------------|
| RBCA tier                                      | Tier 2                      |
| Outdoor air volatilization model               | Surface & subsurface models |
| Indoor air volatilization model                | Johnson & Ettinger model    |
| Soil leaching model                            | ASTM leaching model         |
| Use soil attenuation model (SAM) for leachate? | Yes                         |
| Air dilution factor                            | 3-D Gaussian dispersion     |
| Groundwater dilution-attenuation factor        | Domenico model w/ biodeg.   |

NOTE: NA = Not applicable

| Surface Parameters | General  | Construction | (Units)                |
|--------------------|--|--------------|------------------------|
| A                  | Source zone area                               | 1.0E+3       | NA                     |
| W                  | Length of source-zone area parallel to wind    | 1.0E+3       | NA                     |
| W <sub>GW</sub>    | Length of source-zone area parallel to GW flow | 3.0E+1       | (ft)                   |
| U <sub>av</sub>    | Ambient air velocity in mixing zone            | 6.4E+5       | (ft/s)                 |
| δ <sub>gw</sub>    | Air mixing zone height                         | 6.6E+0       | (ft)                   |
| P <sub>a</sub>     | Areal particulate emission rate                | 6.9E-14      | (g/cm <sup>2</sup> /s) |
| L <sub>soil</sub>  | Thickness of affected surface soils            | 1.0E+1       | (ft)                   |

| Surface Soil Column Parameters | Value                           | (Units)  |
|--------------------------------|---------------------------------|--|
| h <sub>cap</sub>               | Capillary zone thickness        | 7.9E-1   |
| h <sub>v</sub>                 | Vadose zone thickness           | 1.1E+1   |
| ρ <sub>s</sub>                 | Soil bulk density               | 1.7E+0   |
| f <sub>oc</sub>                | Fraction organic carbon         | 3.3E-2   |
| θ <sub>t</sub>                 | Soil total porosity             | 3.8E-1   |
| K <sub>vs</sub>                | Vertical hydraulic conductivity | 2.8E-3   |
| k <sub>v</sub>                 | Vapor permeability              | 1.1E-15  |
| L <sub>gw</sub>                | Depth to groundwater            | 1.2E+1   |
| L <sub>s</sub>                 | Depth to top of affected soils  | 5.0E+0   |
| L <sub>base</sub>              | Depth to base of affected soils | 1.6E+1   |
| L <sub>soil</sub>              | Thickness of affected soils     | 1.1E+1   |
| pH                             | Soil/groundwater pH             | 7.9E+0   |
|                                |                                 | <u>capillary</u> <u>vadose</u> <u>foundation</u> |
| ω <sub>v</sub>                 | Volumetric water content        | 0.342  |
| ω <sub>a</sub>                 | Volumetric air content          | 0.038  |
|                                |                                 | 0.07      0.26                                   |

| Building Parameters | Residential                          | Commercial | (Units) |
|---------------------|--------------------------------------|------------|---------|
| L <sub>b</sub>      | Building volume/area ratio           | 6.56E+0    | NA      |
| A <sub>b</sub>      | Foundation area                      | 7.53E+2    | NA      |
| X <sub>ock</sub>    | Foundation perimeter                 | 1.12E+2    | NA      |
| ER                  | Building air exchange rate           | 1.21E+1    | NA      |
| L <sub>ock</sub>    | Foundation thickness                 | 4.92E-1    | NA      |
| Z <sub>ars</sub>    | Depth to bottom of foundation slab   | 4.92E-1    | NA      |
| η                   | Foundation crack fraction            | 1.00E-2    | NA      |
| dP                  | Indoor/outdoor differential pressure | 0.00E+0    | NA      |
| C <sub>b</sub>      | Convective air flow through slab     | 0.00E+0    | NA      |

| Groundwater Parameters | Value   | (Units)   |
|------------------------|---|-----------|
| h <sub>gw</sub>        | Groundwater mixing zone depth                 | 2.5E+0    |
| I <sub>i</sub>         | Net groundwater infiltration rate             | 2.5E+1    |
| U <sub>gw</sub>        | Groundwater Darcy velocity                    | 8.8E-4    |
| V <sub>gw</sub>        | Groundwater seepage velocity                  | 2.2E-3    |
| K <sub>s</sub>         | Saturated hydraulic conductivity              | 2.8E-1    |
| i                      | Groundwater gradient                          | 3.0E-3    |
| S <sub>w</sub>         | Width of groundwater source zone              | 1.5E+1    |
| S <sub>d</sub>         | Depth of groundwater source zone              | 2.5E+0    |
| U <sub>eff</sub>       | Effective porosity in water-bearing unit      | 3.8E-1    |
| f <sub>oc-sat</sub>    | Fraction organic carbon in water-bearing unit | 3.8E-2    |
| pH <sub>gw</sub>       | Groundwater pH                                | 7.5E+0    |
|                        | Biodegradation considered?                    | 1st Order |

| Transport Parameters                 | Off-site 1                        | Off-site 2 | Off-site 1                        | Off-site 2                      | (Units) |
|--------------------------------------|-----------------------------------|------------|-----------------------------------|---------------------------------|---------|
| <b>Lateral Groundwater Transport</b> |                                   |            | <b>Groundwater Ingestion</b>      | <b>Soil Leaching to GW</b>      |         |
| α <sub>l</sub>                       | Longitudinal dispersivity         | 1.1E+1     | 7.5E+0                            | 1.1E+1                          | (ft)    |
| α <sub>t</sub>                       | Transverse dispersivity           | 2.5E+0     | 3.6E+0                            | 3.6E+0                          | (ft)    |
| α <sub>v</sub>                       | Vertical dispersivity             | 3.8E-1     | 5.5E-1                            | 3.8E-1                          | (ft)    |
| <b>Lateral Outdoor Air Transport</b> |                                   |            | <b>Soil to Outdoor Air Inhal.</b> | <b>GW to Outdoor Air Inhal.</b> |         |
| σ <sub>y</sub>                       | Transverse dispersion coefficient | 1.2E+1     | NA                                | 1.2E+1                          | (ft)    |
| σ <sub>z</sub>                       | Vertical dispersion coefficient   | 8.3E+0     | NA                                | 8.3E+0                          | (ft)    |
| ADF                                  | Air dispersion factor             | 7.8E+1     | NA                                | 8.1E+0                          | (-)     |

| Surface Water Parameters | Off-site 2                                   | (Units) |
|--------------------------|--|---------|
| Q <sub>sw</sub>          | Surface water flowrate                       | NA      |
| W <sub>pl</sub>          | Width of GW plume at SW discharge            | NA      |
| h <sub>pl</sub>          | Thickness of GW plume at SW discharge        | NA      |
| DF <sub>sw</sub>         | Groundwater-to-surface water dilution factor | NA      |

*Appendix G*

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*Printouts: Domenico Groundwater Modeling Summary*

**RBCA SITE ASSESSMENT**

**Tier 2 Domenico Groundwater Modeling Summary**

Site Name: Kawahara Nursery

Site Location: 16550 Ashland Avenue, San Lc Completed By: Mark Detterman

Date Completed: Sept. 2002

1 OF 2

**DOMENICO GROUNDWATER MODELING SUMMARY**

**OFF-SITE GROUNDWATER EXPOSURE PATHWAYS**  (CHECKED IF PATHWAY IS ACTIVE)

SOILS LEACHING TO GROUNDWATER:

INGESTION

| Constituents of Concern | 1) Source Medium      | 2) Steady-state Exposure Concentration<br>Groundwater: POE Conc. (mg/L) |                                       | 3) POE Concentration Limit<br>Groundwater: POE Conc. (mg/L) |                                       | 4) Time to Reach POE Conc. Limit<br>Conc. limit reached? (* if yes); Time (yr) |                                       |
|-------------------------|-----------------------|---|---------------------------------------|---|---------------------------------------|--|---------------------------------------|
|                         | Soil Conc.<br>(mg/kg) | Off-site 1<br>(75 ft)<br>MCL  | Off-site 2<br>(110 ft)<br>Residential | Off-site 1<br>(75 ft)<br>MCL                                | Off-site 2<br>(110 ft)<br>Residential | Off-site 1<br>(75 ft)<br>MCL   | Off-site 2<br>(110 ft)<br>Residential |
| BenzeneCA*              | 3.9E-1                | 1.3E-100  | 2.2E-106                              | 1.0E-3  | 8.5E-4                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Toluene                 | 4.5E+0                |   |                                       |   |                                       | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Ethylbenzene            | 6.1E+0                |   |                                       |   |                                       | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Xylene (mixed isomers)  | 4.1E+1                |   |                                       |   |                                       | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| TPH - Aliph >C10-C12    | 1.7E+2                |   |                                       |   |                                       | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| TPH - Arom >C10-C12     | 4.2E+2                | 1.0E-78   | 8.5E-84                               | NC  | 1.5E+0                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |

NOTE: POE = Point of exposure

**RBCA SITE ASSESSMENT**

**Tier 2 Domenico Groundwater Modeling Summary**

Site Name: Kawahara Nursery

Site Location: 16550 Ashland Avenue, San Lc Completed By: Mark Detterman

Date Completed: Sept. 2002

2 OF 2

**DOMENICO GROUNDWATER MODELING SUMMARY**

**OFF-SITE GROUNDWATER EXPOSURE PATHWAYS**

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:

INGESTION

| Constituents of Concern | 1) Source Medium            | 2) Steady-state Exposure Concentration<br>Groundwater: POE Conc. (mg/L) |                                       | 3) POE Concentration Limit<br>Groundwater: POE Conc. (mg/L) |                                       | 4) Time to Reach POE Conc. Limit<br>Conc reaches limit? ("■" If yes) ; Time (yr) |                                       |
|-------------------------|-----------------------------|---|---------------------------------------|---|---------------------------------------|--|---------------------------------------|
|                         | Groundwater<br>Conc. (mg/L) | Off-site 1<br>(75 ft)<br>MCL  | Off-site 2<br>(110 ft)<br>Residential | Off-site 1<br>(75 ft)<br>MCL                                | Off-site 2<br>(110 ft)<br>Residential | Off-site 1<br>(75 ft)<br>MCL   | Off-site 2<br>(110 ft)<br>Residential |
| BenzeneCA*              | 5.3E-2                      | 6.5E-27   | 1.1E-32                               | 1.0E-3  | 8.5E-4                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Toluene                 | 2.5E-2                      | 2.5E-102  | 2.5E-102                              | 1.0E+0  | 7.3E+0                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Ethylbenzene            | 5.1E-2                      | 5.2E-102  | 5.2E-102                              | 7.0E-1  | 3.7E+0                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| Xylene (mixed isomers)  | 6.0E-1                      | 3.2E-71   | 1.4E-86                               | 1.0E+1  | 7.3E+1                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| TPH - Aliph >C10-C12    | 1.7E+0                      | 1.7E-100  | 1.7E-100                              | NC  | 3.7E+0                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |
| TPH - Arom >C10-C12     | 5.5E+0                      | 1.1E-21   | 8.9E-27                               | NC  | 1.5E+0                                | <input type="checkbox"/> NA  | <input type="checkbox"/> NA           |

NOTE: POE = Point of exposure

**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

1 of 6

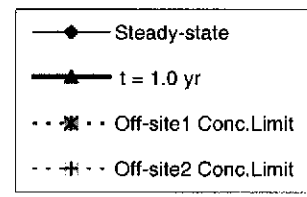
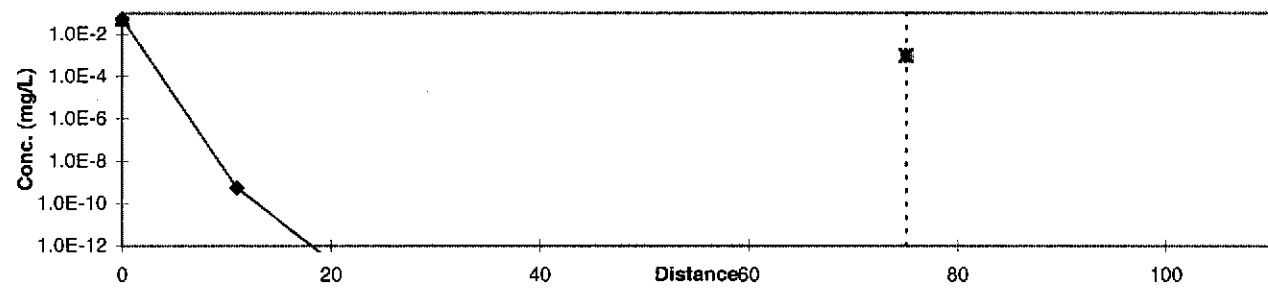
**Constituent:** BenzeneCA\*  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source**  
 (for given time)

Time (yr)

| Distance (ft) |              | 0      | 11      | 22      | 33      | 44      | 55      | 66      | 77      | 88      | 99      | 110     |
|---------------|--------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| t = 1.0 yr    | Conc. (mg/L) | 5.3E-2 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  |
| Steady-state  | Conc. (mg/L) | 5.3E-2 | 5.4E-10 | 3.1E-14 | 1.3E-17 | 1.9E-20 | 5.9E-23 | 3.3E-25 | 2.8E-27 | 3.4E-29 | 5.5E-31 | 1.1E-32 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 6.5E-27   | NA        |
| 1.0E-3    | NA        |



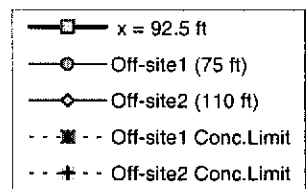
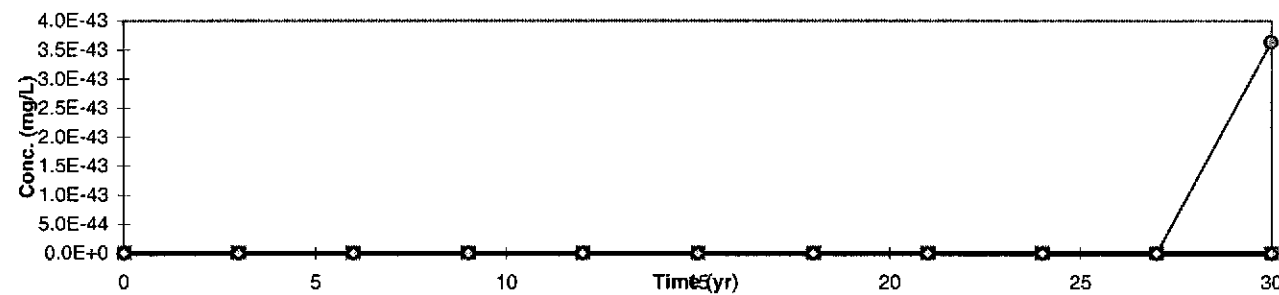
**Concentration vs. Time**  
 (for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30      |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0  |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 3.6E-43 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0  |

**Time to Reach Conc. Limit (yr)**

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |





**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA Date Completed: Sept. 2002

2 of 6

**Constituent:** Toluene  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

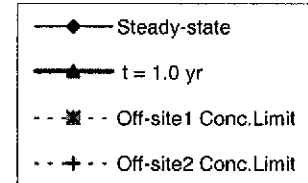
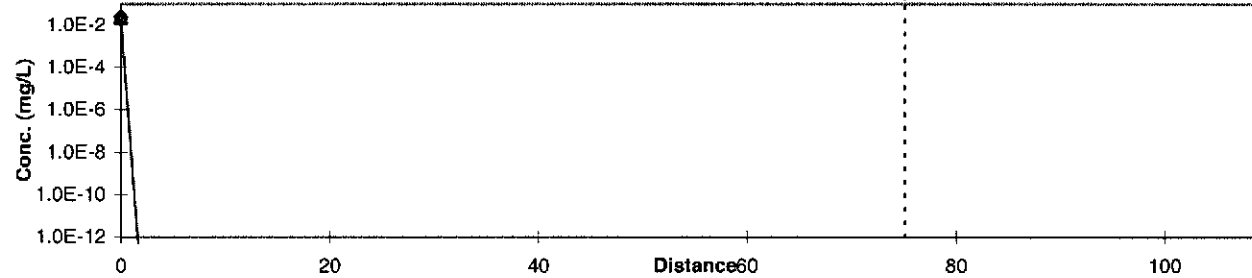
**Concentration vs. Distance from Source (for given time)**

Time (yr)

| Distance (ft) |              | 0      | 11      | 22       | 33       | 44       | 55       | 66       | 77       | 88       | 99       | 110      |
|---------------|--------------|--------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| t = 1.0 yr    | Conc. (mg/L) | 2.5E-2 | 0.0E+0  | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   |
| Steady-state  | Conc. (mg/L) | 2.5E-2 | 2.6E-74 | 1.5E-101 | 8.6E-102 | 5.3E-102 | 3.6E-102 | 2.5E-102 | 1.9E-102 | 1.5E-102 | 1.2E-102 | 9.4E-103 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 2.0E-102  | NA        |
| 1.0E+0    | NA        |

POE Concentration Limit (mg/L)



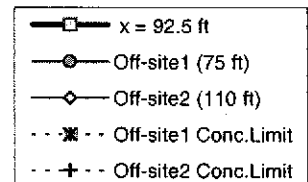
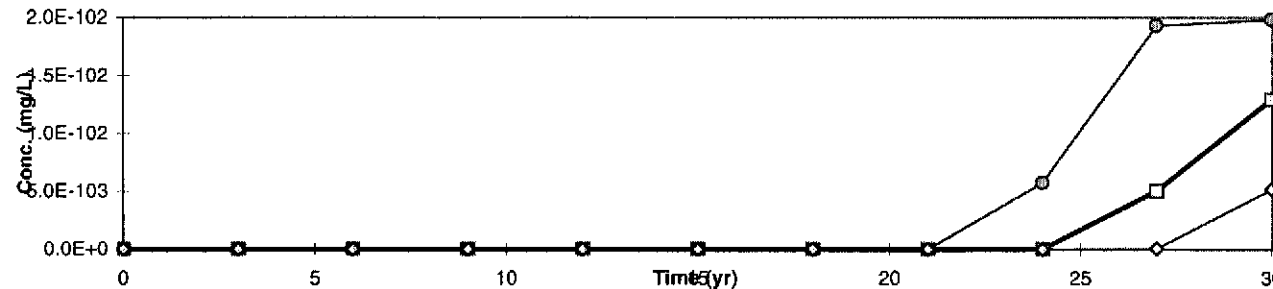
**Concentration vs. Time (for given distance from source)**

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18       | 21       | 24       | 27       | 30       |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0   | 2.3E-111 | 2.3E-105 | 5.1E-103 | 1.3E-102 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 2.8E-113 | 7.3E-106 | 5.7E-103 | 1.9E-102 | 2.0E-102 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0   | 1.0E-118 | 1.9E-109 | 9.5E-105 | 5.2E-103 |

Time to Reach Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

3 of 6

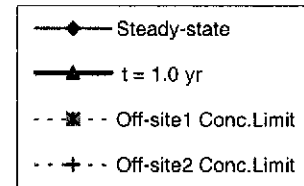
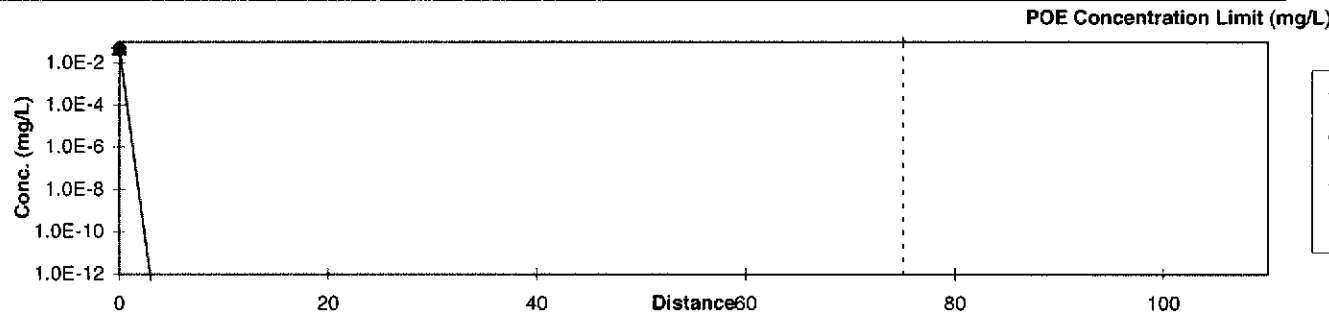
**Constituent:** Ethylbenzene  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source**  
(for given time)

Time (yr)

| Distance (ft) |              | 0      | 11      | 22      | 33      | 44      | 55      | 66       | 77       | 88       | 99       | 110      |
|---------------|--------------|--------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| t = 1.0 yr    | Conc. (mg/L) | 5.1E-2 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   |
| Steady-state  | Conc. (mg/L) | 5.1E-2 | 5.9E-42 | 1.5E-59 | 3.6E-73 | 1.2E-84 | 9.8E-95 | 5.2E-102 | 3.9E-102 | 3.0E-102 | 2.4E-102 | 1.9E-102 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 4.1E-102  | NA        |
| 7.0E-1    | NA        |



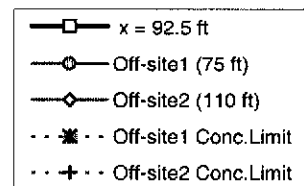
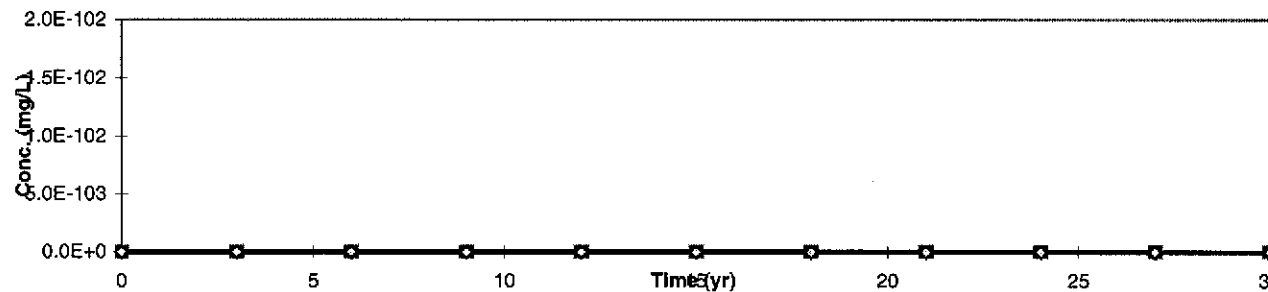
**Concentration vs. Time**  
(for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

**Time to Reach Conc. Limit (yr)**

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

4 of 6

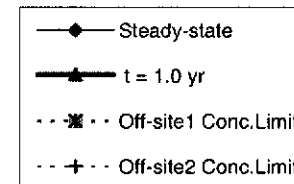
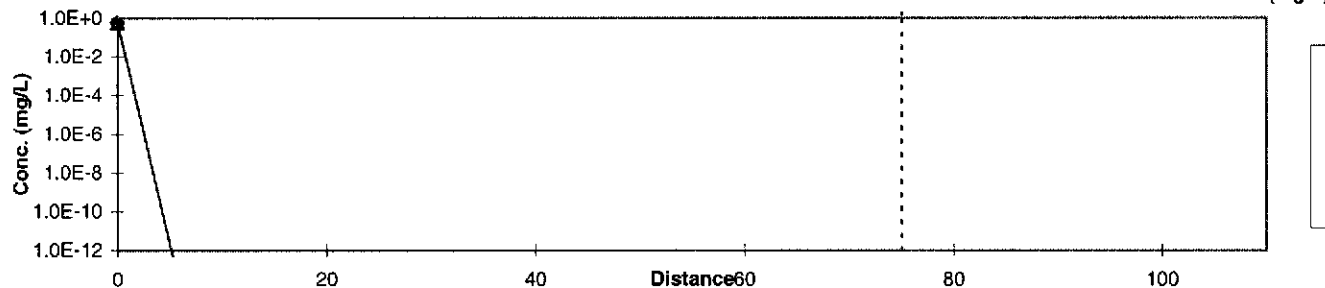
**Constituent:** Xylene (mixed isomers)  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source  
(for given time)**

Time (yr)

| Distance (ft) |              | 0      | 11      | 22      | 33      | 44      | 55      | 66      | 77      | 88      | 99      | 110     |
|---------------|--------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| t = 1.0 yr    | Conc. (mg/L) | 6.0E-1 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  |
| Steady-state  | Conc. (mg/L) | 6.0E-1 | 3.5E-26 | 1.1E-37 | 1.4E-46 | 4.1E-54 | 9.9E-61 | 1.1E-66 | 3.5E-72 | 2.8E-77 | 4.6E-82 | 1.4E-86 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 3.2E-71   | NA        |
| 1.0E+1    | NA        |



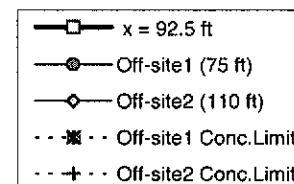
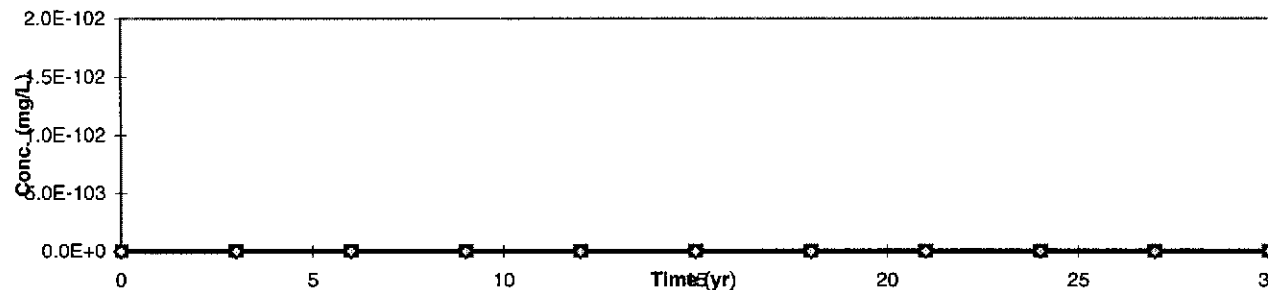
**Concentration vs. Time  
(for given distance from source)**

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

**Time to Reach  
Conc. Limit (yr)**

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

5 of 6

**Constituent:** TPH - Aliph >C10-C12  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

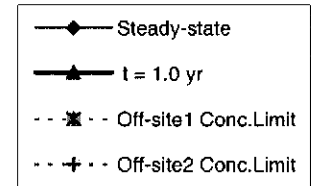
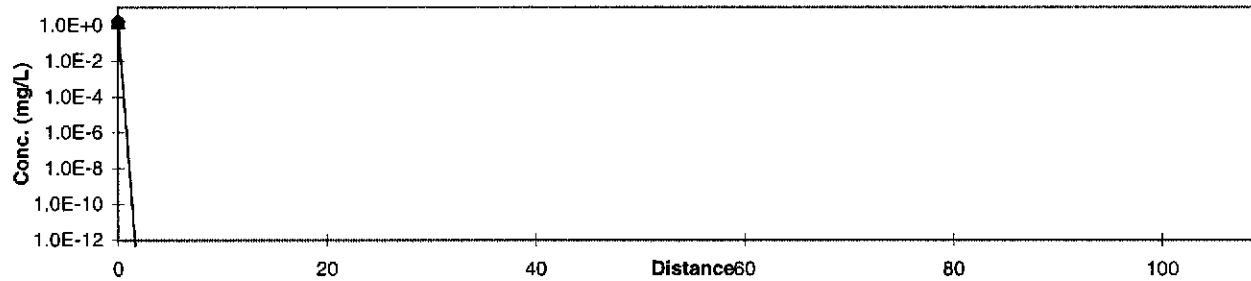
**Concentration vs. Distance from Source**  
(for given time)

Time (yr)

| Distance (ft) |              | 0      | 11      | 22      | 33       | 44       | 55       | 66       | 77       | 88       | 99       | 110      |
|---------------|--------------|--------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| t = 1.0 yr    | Conc. (mg/L) | 1.7E+0 | 0.0E+0  | 0.0E+0  | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   |
| Steady-state  | Conc. (mg/L) | 1.7E+0 | 4.4E-85 | 1.0E-99 | 5.8E-100 | 3.6E-100 | 2.4E-100 | 1.7E-100 | 1.3E-100 | 9.8E-101 | 7.8E-101 | 6.3E-101 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 1.3E-100  | NA        |
| noMCL     | NA        |

POE Concentration Limit (mg/L)



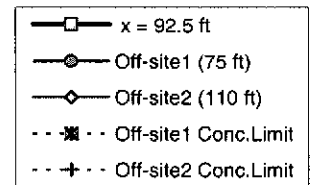
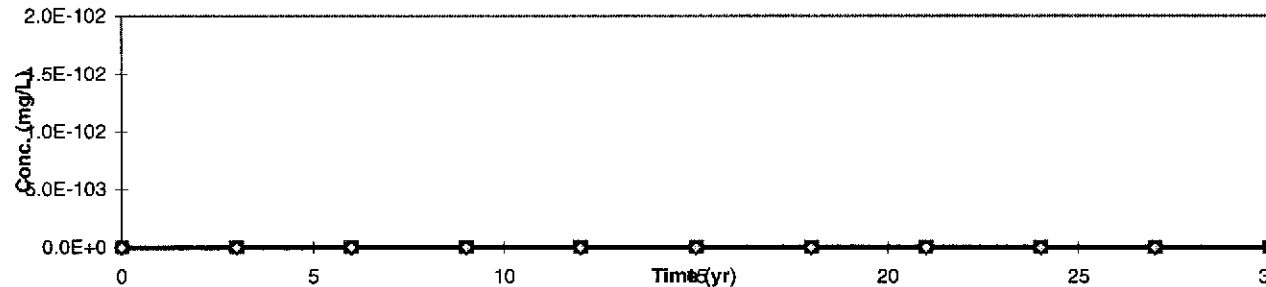
**Concentration vs. Time**  
(for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

6 of 6

**Constituent:** TPH - Arom >C10-C12  
**Source Medium:** Affected Groundwater  
**Biodegradation:** 1st Order

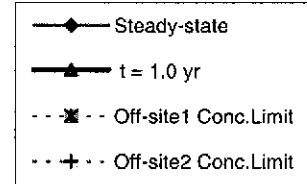
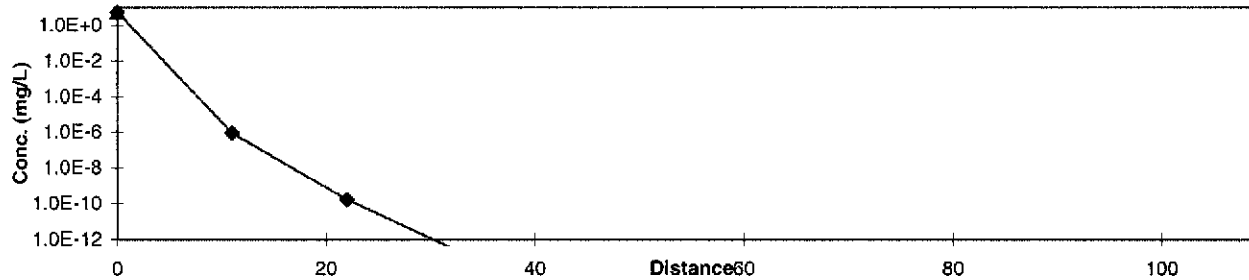
**Concentration vs. Distance from Source**  
 (for given time)

Time (yr) **1.0**

| Distance (ft) |              | 0      | 11     | 22      | 33      | 44      | 55      | 66      | 77      | 88      | 99      | 110     |
|---------------|--------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| t = 1.0 yr    | Conc. (mg/L) | 5.5E+0 | 0.0E+0 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  |
| Steady-state  | Conc. (mg/L) | 5.5E+0 | 8.9E-7 | 1.7E-10 | 1.8E-13 | 5.5E-16 | 3.4E-18 | 3.5E-20 | 5.2E-22 | 1.1E-23 | 2.8E-25 | 8.9E-27 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 1.1E-21   | NA        |
| noMCL     | NA        |

POE Concentration Limit (mg/L)



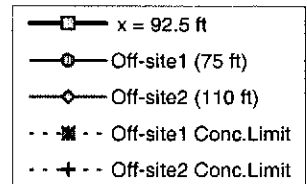
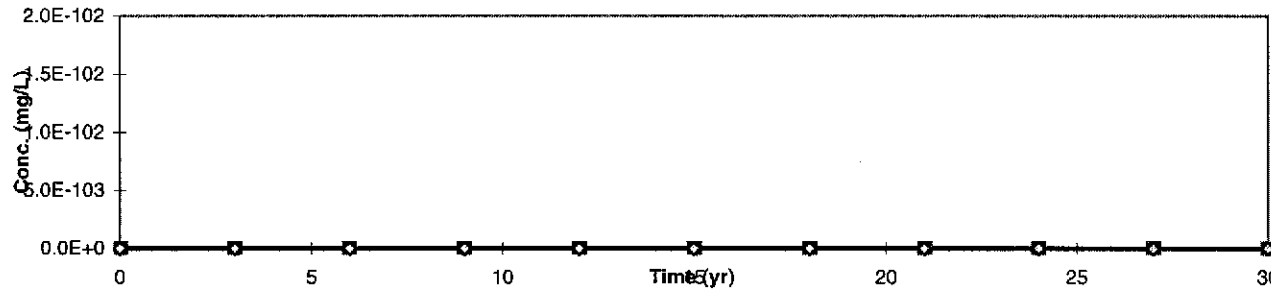
**Concentration vs. Time**  
 (for given distance from source)

Distance (ft) **92.5**

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach  
 Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

1 of 6

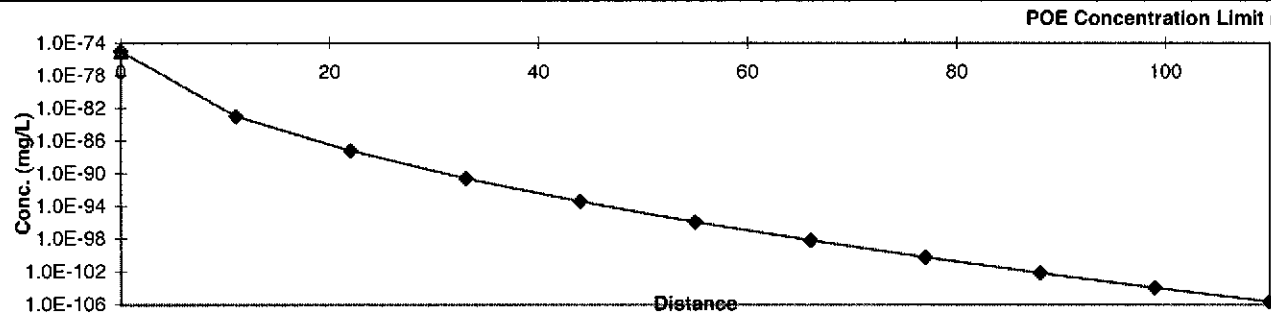
**Constituent:** BenzeneCA\*  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source**  
(for given time)

Time (yr)

| Distance (ft) |              | 0       | 11      | 22      | 33      | 44      | 55      | 66      | 77       | 88       | 99       | 110      |
|---------------|--------------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
| t = 1.0 yr    | Conc. (mg/L) | 1.0E-75 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0   | 0.0E+0   | 0.0E+0   | 0.0E+0   |
| Steady-state  | Conc. (mg/L) | 1.0E-75 | 1.0E-83 | 6.0E-88 | 2.6E-91 | 3.7E-94 | 1.1E-96 | 6.4E-99 | 5.5E-101 | 6.7E-103 | 1.1E-104 | 2.2E-106 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 1.3E-100  | NA        |
| 1.0E-3    | NA        |



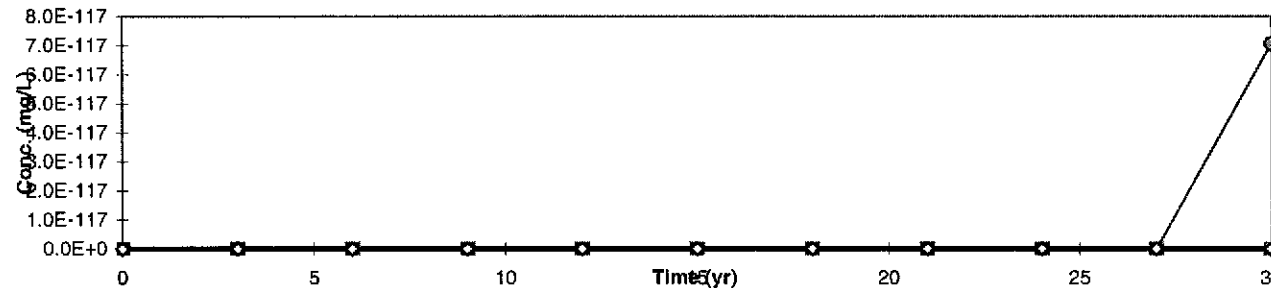
**Concentration vs. Time**  
(for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30       |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0   |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 7.1E-117 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0   |

**Time to Reach Conc. Limit (yr)**

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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**Constituent:** Toluene  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

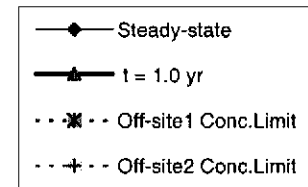
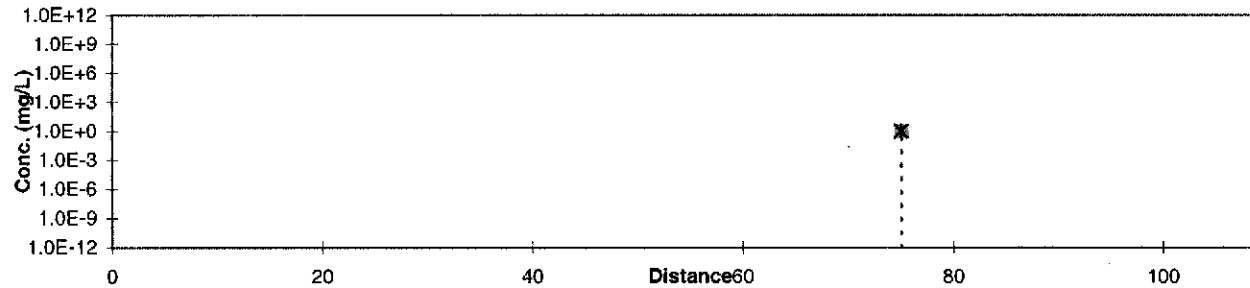
**Concentration vs. Distance from Source  
(for given time)**

Time (yr)

| Distance (ft) |              | 0      | 11     | 22     | 33     | 44     | 55     | 66     | 77     | 88     | 99     | 110    |
|---------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| t = 1.0 yr    | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Steady-state  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 0.0E+0    | NA        |
| 1.0E+0    | NA        |

POE Concentration Limit (mg/L)



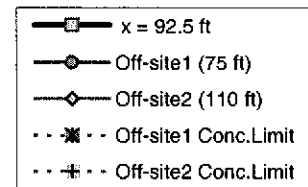
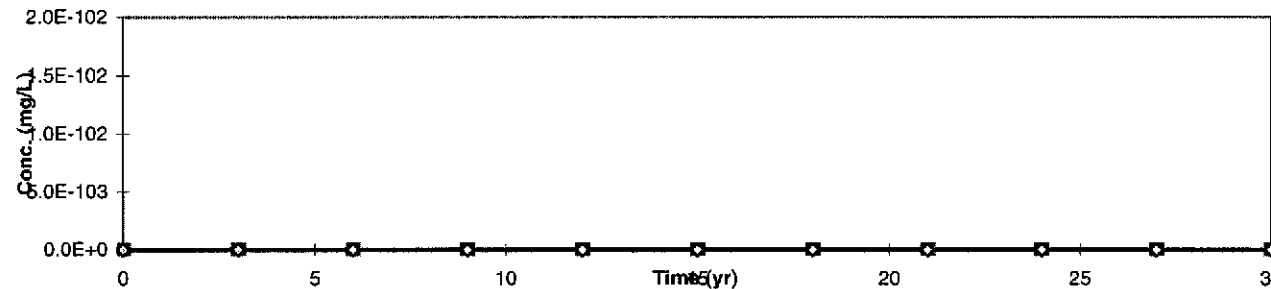
**Concentration vs. Time  
(for given distance from source)**

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach  
Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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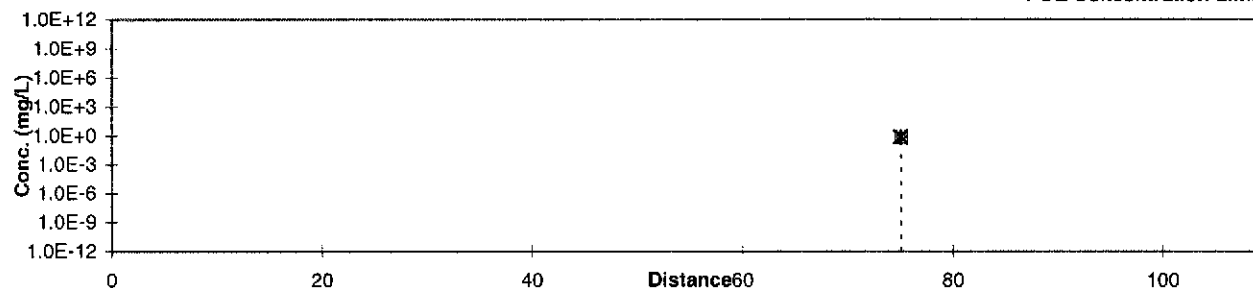
**Constituent:** Ethylbenzene  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source  
(for given time)**

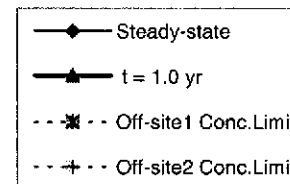
Time (yr)

| Distance (ft) |              | 0      | 11     | 22     | 33     | 44     | 55     | 66     | 77     | 88     | 99     | 110    |
|---------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| t = 1.0 yr    | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Steady-state  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 0.0E+0    | NA        |
| 7.0E-1    | NA        |



POE Concentration Limit (mg/L)



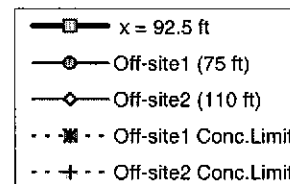
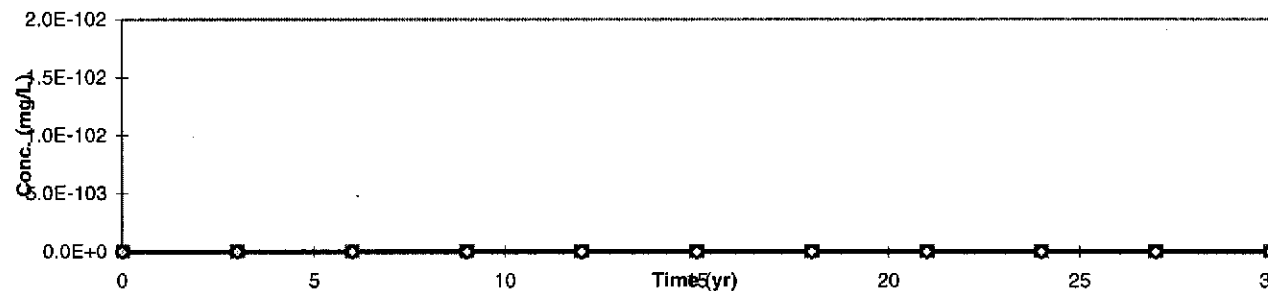
**Concentration vs. Time  
(for given distance from source)**

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach  
Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |





**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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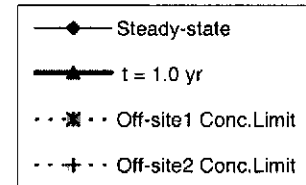
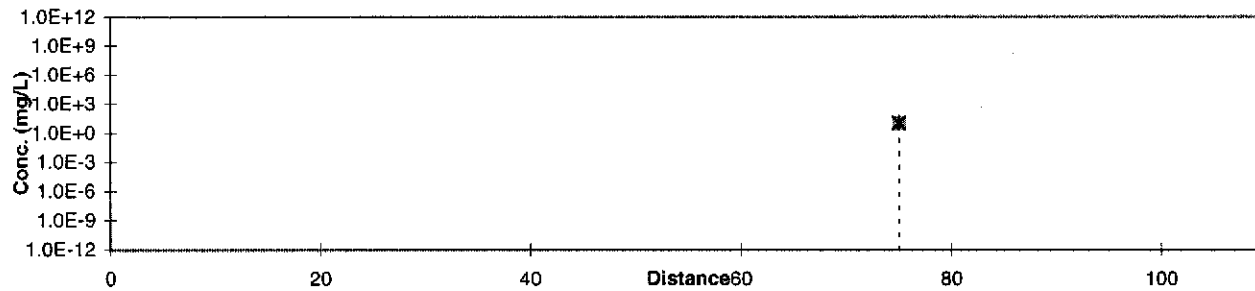
**Constituent:** Xylene (mixed isomers)  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source**  
(for given time)

Time (yr)

| Distance (ft) |              | 0      | 11     | 22     | 33     | 44     | 55     | 66     | 77     | 88     | 99     | 110    |
|---------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| t = 1.0 yr    | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Steady-state  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 0.0E+0    | NA        |
| 1.0E+1    | NA        |



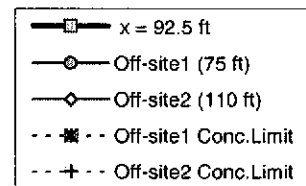
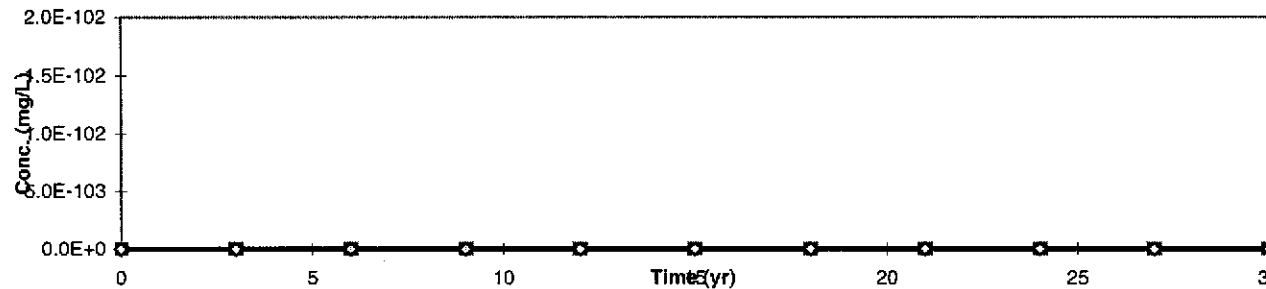
**Concentration vs. Time**  
(for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

**Time to Reach Conc. Limit (yr)**

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA Date Completed: Sept. 2002

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**Constituent:** TPH - Aliph >C10-C12  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

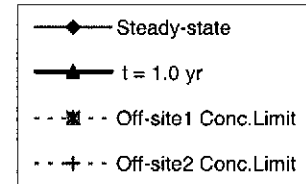
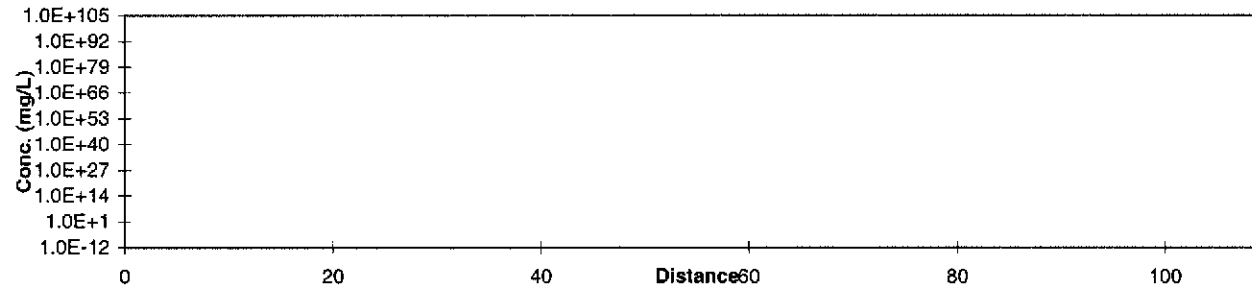
**Concentration vs. Distance from Source  
(for given time)**

Time (yr)

| Distance (ft) |              | 0      | 11     | 22     | 33     | 44     | 55     | 66     | 77     | 88     | 99     | 110    |
|---------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| t = 1.0 yr    | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Steady-state  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 0.0E+0    | NA        |
| noMCL     | NA        |

POE Concentration Limit (mg/L)



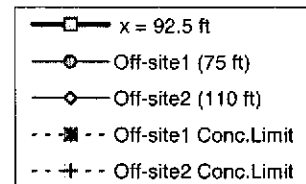
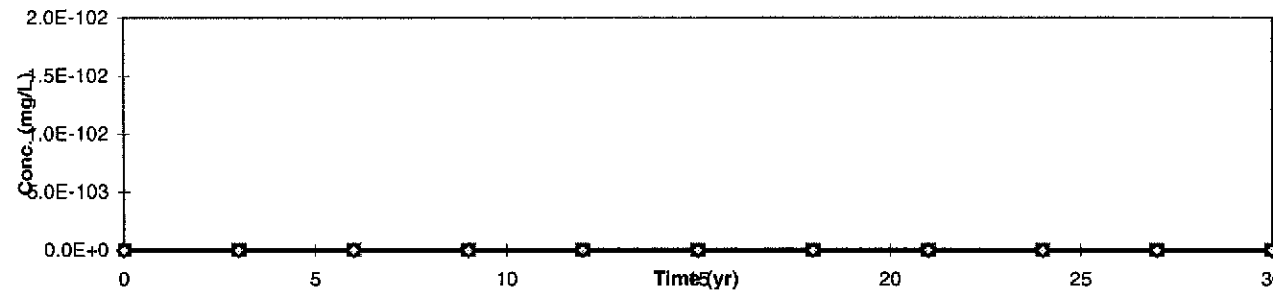
**Concentration vs. Time  
(for given distance from source)**

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach  
Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



**RBCA SITE ASSESSMENT**

**TIER 2 TRANSIENT DOMENICO ANALYSIS**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA Date Completed: Sept. 2002

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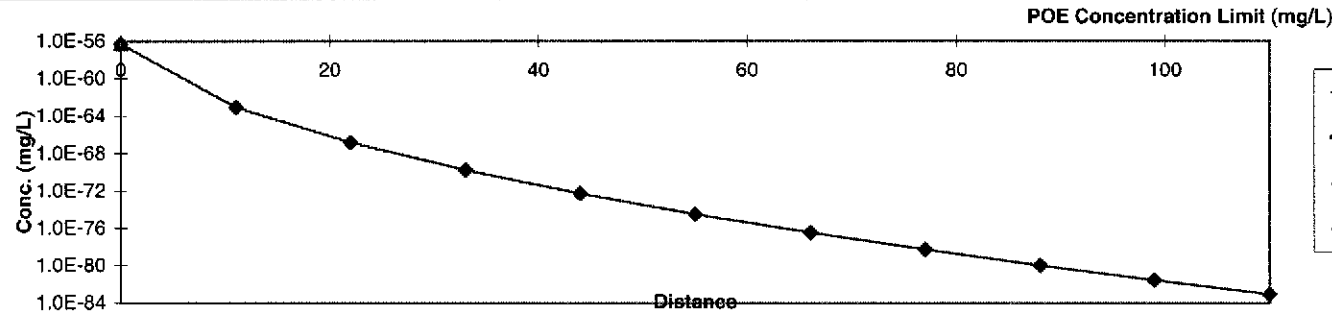
**Constituent:** TPH - Arom >C10-C12  
**Source Medium:** Affected Soils Leaching to Groundwater  
**Biodegradation:** 1st Order

**Concentration vs. Distance from Source**  
(for given time)

Time (yr)

| Distance (ft) |              | 0       | 11      | 22      | 33      | 44      | 55      | 66      | 77      | 88      | 99      | 110     |
|---------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| t = 1.0 yr    | Conc. (mg/L) | 5.2E-57 | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  | 0.0E+0  |
| Steady-state  | Conc. (mg/L) | 5.2E-57 | 8.5E-64 | 1.6E-67 | 1.7E-70 | 5.2E-73 | 3.2E-75 | 3.3E-77 | 5.0E-79 | 1.0E-80 | 2.6E-82 | 8.5E-84 |

| Off-site1 | Off-site2 |
|-----------|-----------|
| MCL       | None      |
| 75        | NA        |
| 0.0E+0    | NA        |
| 1.0E-78   | NA        |
| noMCL     | NA        |



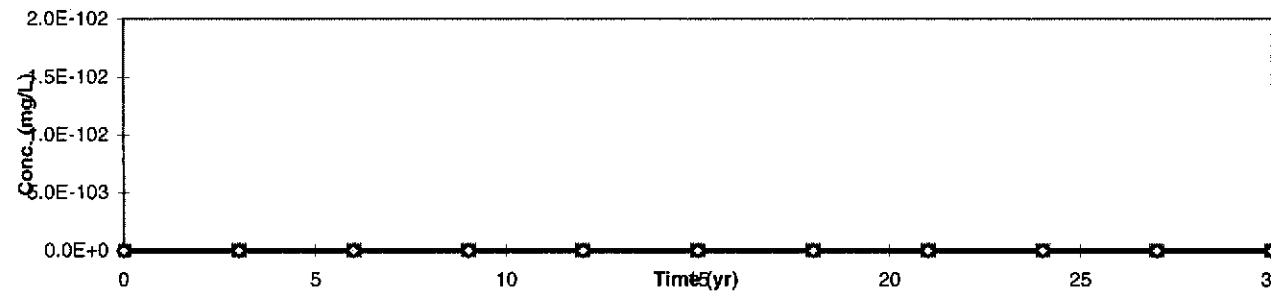
**Concentration vs. Time**  
(for given distance from source)

Distance (ft)

| Time (yr)          |              | 0      | 3      | 6      | 9      | 12     | 15     | 18     | 21     | 24     | 27     | 30     |
|--------------------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| x = 92.5 ft        | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site1 (75 ft)  | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| Off-site2 (110 ft) | Conc. (mg/L) | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

Time to Reach  
Conc. Limit (yr)

|           |    |
|-----------|----|
| Off-site1 | NA |
| Off-site2 | NA |



*Appendix H*

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*Printouts: Soil SSTL Values, Groundwater SSTL Values, Calculation  
of SSTL Values for TPH, Chemical-Specific Tier 2 Cleanup  
Summary (5 chemicals)*

**RBCA SITE ASSESSMENT**

Site Name: Kawahara Nursery  
 Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Completed By: Mark Dettlerman  
 Date Completed: Sept, 2002

Job ID: 94015

**SOIL (5 - 16 ft) SSTL VALUES**

Target Risk (Class A & B) 1.0E-6  
 Target Risk (Class C) 1.0E-5  
 Target Hazard Quotient 1.0E+0

Groundwater DAF Option: Domenico - First Order  
 (One-directional vert. dispersion)

**SSTL Results For Complete Exposure Pathways ("X" if Complete)**

| CONSTITUENTS OF CONCERN |                        | Representative Concentration (mg/kg) | Soil Leaching to Groundwater Ingestion |                    |                     | Soil Vol. to Indoor Air | Soil Volatilization and Surface Soil Particulates to Outdoor Air |                     |                     |                   | Surface Soil Inhalation, Ingestion, Dermal Contact |                     | Applicable SSTL (mg/kg) | SSTL Exceeded?<br>*■* if yes | Required CRF<br>Only if "yes" left |
|-------------------------|------------------------|--------------------------------------|--|--------------------|---------------------|-------------------------|--|---------------------|---------------------|-------------------|--|---------------------|-------------------------|------------------------------|------------------------------------|
|                         |                        |                                      | On-site (0 ft)                         | Off-site 1 (75 ft) | Off-site 2 (110 ft) | On-site (0 ft)          | On-site (0 ft)   |                     | Off-site 1 (110 ft) | Off-site 2 (0 ft) | On-site (0 ft)                                     |                     |                         |                              |                                    |
| CAS No.                 | Name                   | (mg/kg)                              | None                                   | MCL                | Residential         | Residential             | Residential  | Construction Worker | Residential         | None              | Residential  | Construction Worker | (mg/kg)                 |                              |                                    |
| 71-43-2                 | BenzeneCA*             | 3.9E-1                               | NA                                     | >3.7E+3            | >3.7E+3             | 1.4E-1                  | 2.9E+0   | NA                  | 2.2E+2              | NA                | 1.1E+0   | 7.6E+1              | 1.4E-1                  | ■                            | 2.8E+0                             |
| 108-88-3                | Toluene                | 4.5E+0                               | NA                                     | >2.4E+3            | >2.4E+3             | 4.0E+2                  | >2.4E+3  | NA                  | >2.4E+3             | NA                | 2.3E+3   | 5.5E+3              | 4.0E+2                  | □                            | <1                                 |
| 100-41-4                | Ethylbenzene           | 6.1E+0                               | NA                                     | >2.1E+3            | >2.1E+3             | >2.1E+3                 | >2.1E+3  | NA                  | >2.1E+3             | NA                | 2.1E+3   | 3.3E+3              | 2.1E+3                  | □                            | <1                                 |
| 1330-20-7               | Xylene (mixed isomers) | 4.1E+1                               | NA                                     | >1.6E+3            | >1.6E+3             | >1.6E+3                 | >1.6E+3  | NA                  | >1.6E+3             | NA                | 3.4E+4   | 6.3E+4              | 3.4E+4                  | □                            | <1                                 |
| 0-00-0                  | TPH - Aliph >C10-C12   | 1.7E+2                               | NA                                     | noMCL              | >2.8E+2             | >2.8E+2                 | >2.8E+2  | NA                  | >2.8E+2             | NA                | 2.2E+3   | 3.4E+3              | 2.2E+3                  | □                            | <1                                 |
| 0-00-0                  | TPH - Arom >C10-C12    | 4.2E+2                               | NA                                     | noMCL              | >2.1E+3             | >2.1E+3                 | >2.1E+3  | NA                  | >2.1E+3             | NA                | 9.2E+2   | 1.4E+3              | 9.2E+2                  | □                            | <1                                 |

\* = Chemical with user-specified data

> indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

**RBCA SITE ASSESSMENT**

Site Name: Kawahara Nursery

Completed By: Mark Dettmerman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

1 OF 1

**GROUNDWATER SSTL VALUES**

Target Risk (Class A & B) 1.0E-6

Target Risk (Class C) 1.0E-5

Target Hazard Quotient 1.0E+0

Groundwater DAF Option: Domenico - First Order

(One-directional vert. dispersion)

**SSTL Results For Complete Exposure Pathways ("X" If Complete)**

| CONSTITUENTS OF CONCERN |                        | Representative Concentration (mg/L) | X Groundwater Ingestion |                    |                     | X GW Vol. to Indoor Air | X Groundwater Volatilization to Outdoor Air |                     |                   | Applicable SSTL (mg/L) | SSTL Exceeded?<br>"■" if yes | Required CRF<br>Only if "yes" left |
|-------------------------|------------------------|-------------------------------------|-------------------------|--------------------|---------------------|-------------------------|---|---------------------|-------------------|------------------------|------------------------------|------------------------------------|
|                         |                        |                                     | On-site (0 ft)          | Off-site 1 (75 ft) | Off-site 2 (110 ft) | On-site (0 ft)          | On-site (0 ft)                              | Off-site 1 (110 ft) | Off-site 2 (0 ft) |                        |                              |                                    |
| 71-43-2                 | BenzeneCA*             | 5.3E-2                              | NA                      | >1.8E+3            | >1.8E+3             | 1.8E-1                  | 6.2E+2                                      | >1.8E+3             | NA                | 1.8E-1                 | <input type="checkbox"/>     | <1                                 |
| 108-88-3                | Toluene                | 2.5E-2                              | NA                      | >5.2E+2            | >5.2E+2             | 2.4E+2                  | >5.2E+2                                     | >5.2E+2             | NA                | 2.4E+2                 | <input type="checkbox"/>     | <1                                 |
| 100-41-4                | Ethylbenzene           | 5.1E-2                              | NA                      | >1.7E+2            | >1.7E+2             | >1.7E+2                 | >1.7E+2                                     | >1.7E+2             | NA                | >1.7E+2                | <input type="checkbox"/>     | NA                                 |
| 1330-20-7               | Xylene (mixed isomers) | 6.0E-1                              | NA                      | >2.0E+2            | >2.0E+2             | >2.0E+2                 | >2.0E+2                                     | >2.0E+2             | NA                | >2.0E+2                | <input type="checkbox"/>     | NA                                 |
| 0-00-0                  | TPH - Aliph >C10-C12   | 1.7E+0                              | NA                      | noMCL              | >3.4E-2             | >3.4E-2                 | >3.4E-2                                     | >3.4E-2             | NA                | >3.4E-2                | <input type="checkbox"/>     | NA                                 |
| 0-00-0                  | TPH - Arom >C10-C12    | 5.5E+0                              | NA                      | noMCL              | >2.5E+1             | >2.5E+1                 | >2.5E+1                                     | >2.5E+1             | NA                | >2.5E+1                | <input type="checkbox"/>     | NA                                 |

\* = Chemical with user-specified data

">" indicates risk-based target concentration greater than constituent solubility value.

NA = Not applicable.

NC = Not calculated.

**RBCA SITE ASSESSMENT**

**TPH Criteria SSTL Worksheet**

Site Name: Kawahara Nursery  
 Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Completed By: Mark Dettlerman  
 Date Completed: Sept. 2002

Job ID: 94015

**CALCULATION OF SSTL VALUES FOR TPH**

| CONSTITUENTS OF CONCERN               |                      | Mass Fractions |             | Representative Concentrations |             | Calculated Concentration Limits |            | Applicable SSTL Values |             |
|---------------------------------------|----------------------|----------------|-------------|-------------------------------|-------------|---------------------------------|------------|------------------------|-------------|
|                                       |                      | Soil           | Groundwater | Soil                          | Groundwater | Residual Soil Concentration     | Solubility | Soils (5 - 16 ft)      | Groundwater |
| CAS No.                               | Name                 | (-)            | (-)         | (mg/kg)                       | (mg/L)      | (mg/kg)                         | (mg/L)     | (mg/kg)                | (mg/L)      |
| 0-00-0                                | TPH - Aliph >C10-C12 | 2.8E-1         | 2.3E-1      | 1.7E+2                        | 1.7E+0      | 2.8E+2                          | 3.4E-2     | 2.2E+3                 | >3.4E-2     |
| 0-00-0                                | TPH - Arom >C10-C12  | 7.2E-1         | 7.7E-1      | 4.2E+2                        | 5.5E+0      | 2.1E+3                          | 2.5E+1     | 9.2E+2                 | >2.5E+1     |
| * = Chemical with user-specified data |                      |                |             |                               |             |                                 |            |                        |             |
| <b>Total</b>                          |                      | 1.0E+0         | 1.0E+0      | 5.8E+2                        | 7.2E+0      | <b>Total TPH SSTL value</b>     |            | 1.1E+3                 | >Sol        |

">" indicates risk-based target concentration greater than constituent residual saturation value. NC = Not calculated.

**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

1 of 7

**Constituent: BenzeneCA\*** CAS No.: 71-43-2

**Site-Specific Target Level (SSTL) Concentrations**

|   |                  | On-site               | Off-site1 | Off-site2         |
|---|------------------|-----------------------|-----------|-------------------|
| <b>Groundwater Ingestion</b>                                      |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None                  | MCL / 75  | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     |                  | NA                    | >1.8E+3   | >1.8E+3           |
| (mg/L) TR = 1e-6  |                  | NA                    | >1.8E+3   | >1.8E+3           |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None                  | MCL / 75  | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      |                  | NA                    | >3.7E+3   | NC                |
| (mg/kg) TR = 1e-6   |                  | NA                    | >3.7E+3   | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0 | No Off-site Receptors |           |                   |
| SSTL <sub>ss</sub> THQ = 1e+0                                     | 3.3E+1           |                       |           |                   |
| (mg/kg) TR = 1e-6   | 1.1E+0           |                       |           |                   |
| <b>Outdoor Air Inhalation</b>                                     |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 6.2E+0           | 6.2E+0                | NA        |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | 2.9E-1           | 2.9E-1                | NA        |                   |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | 6.1E+1           | >3.7E+3               | NA        |                   |
| (mg/kg) TR = 1e-6   | 2.9E+0           | 2.2E+2                | NA        |                   |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >1.8E+3          | >1.8E+3               | NA        |                   |
| (mg/L) TR = 1e-6  | 6.2E+2           | >1.8E+3               | NA        |                   |
| <b>Indoor Air Inhalation</b>                                      |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 6.2E+0           |                       |           |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | 2.9E-1           |                       |           |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | 3.0E+0           |                       |           |                   |
| (mg/kg) TR = 1e-6   | 1.4E-1           |                       |           |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | 3.9E+0           |                       |           |                   |
| (mg/L) TR = 1e-6  | 1.8E-1           |                       |           |                   |

**Chemical Parameters**

|                                   | Units                     | Value  | Reference |
|-----------------------------------|---------------------------|--------|-----------|
| <b>Physical Properties</b>        |                           |        |           |
| MW                                | (g/mol)                   | 7.8E+1 | PS        |
| Sol                               | (mg/L)                    | 1.8E+3 | PS        |
| P <sub>vap</sub>                  | (mmHg)                    | 9.5E+1 | PS        |
| H <sub>a,im</sub>                 | (atm·m <sup>3</sup> /mol) | 5.6E-3 | PS        |
| pK <sub>a</sub>                   | (log[mol/mol])            | -      | -         |
| pK <sub>b</sub>                   | (log[mol/mol])            | -      | -         |
| log(K <sub>ow</sub> )             | (log[L/kg])               | 1.8E+0 | PS        |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)    | 8.8E-2 | PS        |
| D <sub>wat</sub>                  | (cm <sup>2</sup> /sec)    | 9.8E-6 | PS        |
| <b>Toxicity Data</b>              |                           |        |           |
| Wt of Evd.                        |                           | A      |           |
| SF <sub>o</sub>                   | (1/[mg/kg/day])           | 1.0E-1 | PS        |
| SF <sub>d</sub>                   | (1/[mg/kg/day])           | 3.0E-2 | TX        |
| URF <sub>i</sub>                  | (1/[µg/m <sup>3</sup> ])  | 8.3E-6 | PS        |
| RfD <sub>o</sub>                  | (mg/kg/day)               | 3.0E-3 | R         |
| RfD <sub>d</sub>                  | (mg/kg/day)               | -      | -         |
| RfC <sub>i</sub>                  | (mg/m <sup>3</sup> )      | 6.0E-3 | R         |
| <b>Dermal Exposure Parameters</b> |                           |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                   | 5.0E-1 | D         |
| K <sub>p</sub>                    | (cm/hr)                   | 2.1E-2 |           |
| tau <sub>d</sub>                  | (hr/event)                | 2.6E-1 |           |
| t <sub>crit</sub>                 | (hr)                      | 6.3E-1 |           |
| B                                 | (-)                       | 1.3E-2 |           |
| <b>Regulatory Standards</b>       |                           |        |           |
| MCL                               | (mg/L)                    | 1.0E-3 | *         |
| TWA                               | (mg/m <sup>3</sup> )      | 3.3E+0 | -         |
| AQL                               | (mg/L)                    | -      | -         |
| <b>Miscellaneous Parameters</b>   |                           |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                    | 1.0E-3 | S         |
| ADL <sub>s</sub>                  | (mg/kg)                   | 5.0E-3 | S         |
| t <sub>1/2,sat</sub>              | (d)                       | 7.2E+2 | H         |
| t <sub>1/2,unsat</sub>            | (d)                       | 7.2E+2 | H         |

\* MCL ref = -

Units Residential Commercial Construction

|                                     |   | Residential            | Commercial | Construction |
|-------------------------------------|---|------------------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b> |   |                        |            |              |
| VF <sub>ss</sub>                    | (kg-soil/m <sup>3</sup> -air)             | 1.0E-4                 | NA         | NA           |
| VF <sub>samb</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 4.4E-5                 | NA         | NA           |
| VF <sub>wamb</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 4.7E-7                 | NA         | NA           |
| VF <sub>seasp</sub>                 | (kg-soil/m <sup>3</sup> -air)             | 2.1E-3                 | NA         | NA           |
| VF <sub>wesep</sub>                 | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 1.6E-3                 | NA         | NA           |
| LF                                  | (kg-soil/L-wat)                           | All exposures: 2.6E-75 |            | NA           |

Units On-Site Off-Site1 Off-Site2

|                                  |     | On-Site | Off-Site1 | Off-Site2 |
|----------------------------------|-----|---------|-----------|-----------|
| <b>Lateral Transport Factors</b> |     |         |           |           |
| DAF <sub>gw</sub>                | (-) | NA      | 8.1E+24   | 4.7E+30   |
| DAF <sub>s/gw</sub>              | (-) | NA      | 8.1E+24   | 4.7E+30   |

Units Value

|                           |                          | Value  |
|---------------------------|--------------------------|--------|
| <b>Derived Parameters</b> |                          |        |
| H                         | (L-wat/L-air)            | 2.3E-1 |
| K <sub>sw</sub>           | (L-wat/kg-soil)          | 4.7E-1 |
| C <sub>sat</sub>          | (mg/kg-soil)             | 3.7E+3 |
| C <sub>sat,vap</sub>      | (µg/m <sup>3</sup> -air) | 4.0E+8 |
| D <sub>off,s</sub>        | (cm <sup>2</sup> /sec)   | 9.3E-5 |
| D <sub>off,crk</sub>      | (cm <sup>2</sup> /sec)   | 6.9E-3 |
| D <sub>off,cap</sub>      | (cm <sup>2</sup> /sec)   | 2.0E-5 |
| D <sub>off,ws</sub>       | (cm <sup>2</sup> /sec)   | 7.5E-5 |
| R <sub>sat</sub>          | (-)                      | 1.1E+1 |
| R <sub>unsat</sub>        | (-)                      | 1.2E+1 |
| Z                         | (cm/event)               | 7.3E-2 |

Notes: 1) NA = Not applicable; NC = Not calculated.

2) Definitions and references presented on page 7 of 7.



**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery  
 Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Completed By: Mark Determan  
 Date Completed: Sept. 2002

Job ID: 94015

2 of 7

| Constituent: Toluene  |                              | CAS No.: 108-88-3     |                       |                   |
|---|------------------------------|-----------------------|-----------------------|-------------------|
| Site-Specific Target Level (SSTL) Concentrations                  |                              |                       |                       |                   |
|   |                              | On-site               | Off-site1             | Off-site2         |
| <b>Groundwater Ingestion</b>                                      |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | None                  | MCL / 75              | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | (mg/L)                       | NA                    | NC                    | NC                |
| TR = 1e-6   |                              | NA                    | NC                    | NC                |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | None                  | MCL / 75              | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      | (mg/kg)                      | NA                    | NC                    | NC                |
| TR = 1e-6   |                              | NA                    | NC                    | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0             | No Off-site Receptors |                       |                   |
| SSTL <sub>ss</sub> THQ = 1e+0                                     | (mg/kg)                      | 2.3E+3                | NC                    |                   |
| TR = 1e-6   |                              | NC                    |                       |                   |
| <b>Outdoor Air Inhalation</b>                                     |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | Residential / 110     | None              |
| RBEL <sub>air</sub> THQ = 1e+0                                    | ( $\mu\text{g}/\text{m}^3$ ) | 4.2E+2                | 4.2E+2                | NA                |
| TR = 1e-6   |                              | NC                    | NC                    | NA                |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | Residential / 110     | None              |
| SSTL <sub>s</sub> THQ = 1e+0                                      | (mg/kg)                      | >2.4E+3               | >2.4E+3               | NA                |
| TR = 1e-6   |                              | NC                    | NC                    | NA                |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | Residential / 110     | None              |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | (mg/L)                       | >5.2E+2               | >5.2E+2               | NA                |
| TR = 1e-6   |                              | NC                    | NC                    | NA                |
| <b>Indoor Air Inhalation</b>                                      |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | No Off-site Receptors |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | ( $\mu\text{g}/\text{m}^3$ ) | 4.2E+2                | NC                    |                   |
| TR = 1e-6   |                              | NC                    |                       |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | No Off-site Receptors |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | (mg/kg)                      | 4.0E+2                | NC                    |                   |
| TR = 1e-6   |                              | NC                    |                       |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                              |                       |                       |                   |
| Receptor Type / Distance (ft)                                     |                              | Residential / 0       | No Off-site Receptors |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | (mg/L)                       | 2.4E+2                | NC                    |                   |
| TR = 1e-6   |                              | NC                    |                       |                   |

| Chemical Parameters               |                                |        |           |
|-----------------------------------|--------------------------------|--------|-----------|
|                                   | Units                          | Value  | Reference |
| <b>Physical Properties</b>        |                                |        |           |
| MW                                | (g/mol)                        | 9.2E+1 | 5         |
| Sol                               | (mg/L)                         | 5.2E+2 | 29        |
| P <sub>vap</sub>                  | (mmHg)                         | 3.0E+1 | 4         |
| H <sub>atm</sub>                  | (atm·m <sup>3</sup> /mol)      | 6.3E-3 | A         |
| pK <sub>a</sub>                   | (log(mol/mol))                 | -      | -         |
| pK <sub>b</sub>                   | (log(mol/mol))                 | -      | -         |
| log(K <sub>oc</sub> )             | (log(L/kg))                    | 2.1E+0 | A         |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)         | 8.5E-2 | A         |
| D <sub>sat</sub>                  | (cm <sup>2</sup> /sec)         | 9.4E-6 | A         |
| <b>Toxicity Data</b>              |                                |        |           |
| Wt of Evid.                       |                                | D      |           |
| SF <sub>o</sub>                   | (1/(mg/kg/day))                | -      | -         |
| SF <sub>d</sub>                   | (1/(mg/kg/day))                | -      | -         |
| URF <sub>i</sub>                  | (1/ $\mu\text{g}/\text{m}^3$ ) | -      | -         |
| RfD <sub>o</sub>                  | (mg/kg/day)                    | 2.0E-1 | A,R       |
| RfD <sub>d</sub>                  | (mg/kg/day)                    | 1.6E-1 | TX        |
| RfC <sub>i</sub>                  | (mg/m <sup>3</sup> )           | 4.0E-1 | A,R       |
| <b>Dermal Exposure Parameters</b> |                                |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                        | 5.0E-1 | D         |
| K <sub>p</sub>                    | (cm/hr)                        | 4.5E-2 |           |
| tau <sub>d</sub>                  | (hr/event)                     | 3.2E-1 |           |
| t <sub>crit</sub>                 | (hr)                           | 7.7E-1 |           |
| B                                 | (-)                            | 5.4E-2 |           |
| <b>Regulatory Standards</b>       |                                |        |           |
| MCL                               | (mg/L)                         | 1.0E+0 | *         |
| TWA                               | (mg/m <sup>3</sup> )           | 1.5E+2 | ACGIH     |
| AQL                               | (mg/L)                         | -      | -         |
| <b>Miscellaneous Parameters</b>   |                                |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                         | 2.0E-3 | S         |
| ADL <sub>s</sub>                  | (mg/kg)                        | 5.0E-3 | S         |
| t <sub>1/2,sat</sub>              | (d)                            | 2.8E+1 | H         |
| t <sub>1/2,unsat</sub>            | (d)                            | 2.8E+1 | H         |

\* MCL ref = 56 FR 3526 (30 Jan 91)

|                                     | Units                                     | Residential | Commercial | Construction |
|-------------------------------------|---|-------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b> |   |             |            |              |
| VF <sub>ss</sub>                    | (kg-soil/m <sup>3</sup> -air)             | 7.2E-5      | NA         | NA           |
| VF <sub>samb</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 2.2E-5      | NA         | NA           |
| VF <sub>wamb</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 5.1E-7      | NA         | NA           |
| VF <sub>sesp</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 1.0E-3      | NA         | NA           |
| VF <sub>wosp</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 1.7E-3      | NA         | NA           |
| LF                                  | (kg-soil/L-wat)                           | NC          |            | NA           |

|                                  | Units | On-Site | Off-Site1 | Off-Site2 |
|----------------------------------|-------|---------|-----------|-----------|
| <b>Lateral Transport Factors</b> |       |         |           |           |
| DAF <sub>gw</sub>                | (-)   | NA      | 1.0E+100  | 1.0E+100  |
| DAF <sub>s/gw</sub>              | (-)   | NA      | 1.0E+100  | 1.0E+100  |

|                           | Units                            | Value  |
|---------------------------|----------------------------------|--------|
| <b>Derived Parameters</b> |                                  |        |
| H                         | (L-wat/L-air)                    | 2.6E-1 |
| K <sub>gw</sub>           | (L-wat/kg-soil)                  | 2.2E-1 |
| C <sub>sat</sub>          | (mg/kg-soil)                     | 2.4E+3 |
| C <sub>sat,vsp</sub>      | ( $\mu\text{g}/\text{m}^3$ -air) | 1.5E+8 |
| D <sub>eff,a</sub>        | (cm <sup>2</sup> /sec)           | 8.9E-5 |
| D <sub>eff,o/rk</sub>     | (cm <sup>2</sup> /sec)           | 6.6E-3 |
| D <sub>eff,cap</sub>      | (cm <sup>2</sup> /sec)           | 1.8E-5 |
| D <sub>all,ws</sub>       | (cm <sup>2</sup> /sec)           | 7.1E-5 |
| R <sub>sat</sub>          | (-)                              | 2.4E+1 |
| R <sub>unsat</sub>        | (-)                              | 2.5E+1 |
| Z                         | (cm/event)                       | 1.6E-1 |

Notes: 1) NA = Not applicable; NC = Not calculated.  
 2) Definitions and references presented on page 7 of 7.

**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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**Constituent: Ethylbenzene CAS No.: 100-41-4**

|   |                  | Site-Specific Target Level (SSTL) Concentrations |           |                   |
|---|------------------|--|-----------|-------------------|
|   |                  | On-site  | Off-site1 | Off-site2         |
| <b>Groundwater Ingestion</b>                                      |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None   | MCL / 75  | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     |                  | NA   | >1.7E+2   | NC                |
| (mg/L) TR = 1e-6  |                  | NA   | NC        | NC                |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None   | MCL / 75  | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      |                  | NA   | NC        | NC                |
| (mg/kg) TR = 1e-6   |                  | NA   | NC        | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0 | No Off-site Receptors                            |           |                   |
| SSTL <sub>sa</sub> THQ = 1e+0                                     | 2.1E+3           |  |           |                   |
| (mg/kg) TR = 1e-6   | NC               |  |           |                   |
| <b>Outdoor Air Inhalation</b>                                     |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110                                | None      |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 1.0E+3           | 1.0E+3   | NA        |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               | NC   | NA        |                   |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110                                | None      |                   |
| SSTL <sub>a</sub> THQ = 1e+0                                      | >2.1E+3          | >2.1E+3  | NA        |                   |
| (mg/kg) TR = 1e-6   | NC               | NC   | NA        |                   |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110                                | None      |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >1.7E+2          | >1.7E+2  | NA        |                   |
| (mg/L) TR = 1e-6  | NC               | NC   | NA        |                   |
| <b>Indoor Air Inhalation</b>                                      |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors                            |           |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 1.0E+3           |  |           |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               |  |           |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors                            |           |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >2.1E+3          |  |           |                   |
| (mg/kg) TR = 1e-6   | NC               |  |           |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                  |  |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors                            |           |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >1.7E+2          |  |           |                   |
| (mg/L) TR = 1e-6  | NC               |  |           |                   |

| Chemical Parameters               |                           |        |           |
|-----------------------------------|---------------------------|--------|-----------|
|                                   | Units                     | Value  | Reference |
| <b>Physical Properties</b>        |                           |        |           |
| MW                                | (g/mol)                   | 1.1E+2 | PS        |
| Sol                               | (mg/L)                    | 1.7E+2 | PS        |
| P <sub>vap</sub>                  | (mmHg)                    | 1.0E+1 | PS        |
| H <sub>aim</sub>                  | (atm·m <sup>3</sup> /mol) | 7.9E-3 | PS        |
| pK <sub>a</sub>                   | (log[mol/mol])            | -      | -         |
| pK <sub>b</sub>                   | (log[mol/mol])            | -      | -         |
| log(K <sub>oc</sub> )             | (log[L/kg])               | 2.6E+0 | PS        |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)    | 7.5E-2 | PS        |
| D <sub>wat</sub>                  | (cm <sup>2</sup> /sec)    | 7.8E-6 | PS        |
| <b>Toxicity Data</b>              |                           |        |           |
| Wt of Evd.                        |                           | D      |           |
| SF <sub>o</sub>                   | (1/[mg/kg/day])           | -      | -         |
| SF <sub>d</sub>                   | (1/[mg/kg/day])           | -      | -         |
| URF <sub>i</sub>                  | (1/[µg/m <sup>3</sup> ])  | -      | -         |
| RfD <sub>o</sub>                  | (mg/kg/day)               | 1.0E-1 | PS        |
| RfD <sub>d</sub>                  | (mg/kg/day)               | 9.7E-2 | TX        |
| RfC <sub>i</sub>                  | (mg/m <sup>3</sup> )      | 1.0E+0 | PS        |
| <b>Dermal Exposure Parameters</b> |                           |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                   | 5.0E-1 | D         |
| K <sub>p</sub>                    | (cm/hr)                   | 7.4E-2 |           |
| tau <sub>d</sub>                  | (hr/event)                | 3.9E-1 |           |
| t <sub>cont</sub>                 | (hr)                      | 1.3E+0 |           |
| B                                 | (-)                       | 1.4E-1 |           |
| <b>Regulatory Standards</b>       |                           |        |           |
| MCL                               | (mg/L)                    | 7.0E-1 | *         |
| TWA                               | (mg/m <sup>3</sup> )      | 4.4E+2 | PS        |
| AQL                               | (mg/L)                    | -      | -         |
| <b>Miscellaneous Parameters</b>   |                           |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                    | 2.0E-3 | S         |
| ADL <sub>s</sub>                  | (mg/kg)                   | 5.0E-3 | S         |
| t <sub>1/2,sat</sub>              | (d)                       | 2.3E+2 | H         |
| t <sub>1/2,unsat</sub>            | (d)                       | 2.3E+2 | H         |

\* MCL ref = 56 FR 3526 (30 Jan 91)

|                                     |   | Residential | Commercial | Construction |
|-------------------------------------|---|-------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b> |   |             |            |              |
| VF <sub>ss</sub>                    | (kg-soil/m <sup>3</sup> -air)             | 4.7E-5      | NA         | NA           |
| VF <sub>samb</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 9.2E-6      | NA         | NA           |
| VF <sub>wamb</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 5.4E-7      | NA         | NA           |
| VF <sub>seep</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 4.3E-4      | NA         | NA           |
| VF <sub>wosp</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 1.8E-3      | NA         | NA           |
| LF                                  | (kg-soil/L-wat)                           | NC          |            | NA           |
| <b>Lateral Transport Factors</b>    |   |             |            |              |
| DAF <sub>gw</sub>                   | (-)                                       | NA          | 1.0E+100   | 1.0E+100     |
| DAF <sub>s/gw</sub>                 | (-)                                       | NA          | 1.0E+100   | 1.0E+100     |

|                           | Units                    | Value  |
|---------------------------|--------------------------|--------|
| <b>Derived Parameters</b> |                          |        |
| H                         | (L-wat/L-air)            | 3.2E-1 |
| K <sub>gw</sub>           | (L-wat/kg-soil)          | 8.2E-2 |
| C <sub>soil</sub>         | (mg/kg-soil)             | 2.1E+3 |
| C <sub>soil,vap</sub>     | (µg/m <sup>3</sup> -air) | 5.8E+7 |
| D <sub>off,s</sub>        | (cm <sup>2</sup> /sec)   | 7.7E-5 |
| D <sub>off,crk</sub>      | (cm <sup>2</sup> /sec)   | 5.9E-3 |
| D <sub>off,cap</sub>      | (cm <sup>2</sup> /sec)   | 1.4E-5 |
| D <sub>off,ws</sub>       | (cm <sup>2</sup> /sec)   | 6.0E-5 |
| R <sub>sat</sub>          | (-)                      | 6.3E+1 |
| R <sub>unsat</sub>        | (-)                      | 6.7E+1 |
| Z                         | (cm/event)               | 2.7E-1 |

- Notes: 1) NA = Not applicable; NC = Not calculated.  
 2) Definitions and references presented on page 7 of 7.

**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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**Constituent: Xylene (mixed isomers) CAS No.: 1330-20-7**

|   |                  | On-site               | Off-site1 | Off-site2         |
|---|------------------|-----------------------|-----------|-------------------|
| <b>Site-Specific Target Level (SSTL) Concentrations</b>           |                  |                       |           |                   |
| <b>Groundwater Ingestion</b>                                      |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None                  | MCL / 75  | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     |                  | NA                    | >2.0E+2   | >2.0E+2           |
| (mg/L) TR = 1e-6  |                  | NA                    | NC        | NC                |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     |                  | None                  | MCL / 75  | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      |                  | NA                    | NC        | NC                |
| (mg/kg) TR = 1e-6   |                  | NA                    | NC        | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0 | No Off-site Receptors |           |                   |
| SSTL <sub>ss</sub> THQ = 1e+0                                     | 3.4E+4           |                       |           |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |           |                   |
| <b>Outdoor Air Inhalation</b>                                     |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 7.3E+3           | 7.3E+3                | NA        |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               | NC                    | NA        |                   |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >1.6E+3          | >1.6E+3               | NA        |                   |
| (mg/kg) TR = 1e-6   | NC               | NC                    | NA        |                   |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None      |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >2.0E+2          | >2.0E+2               | NA        |                   |
| (mg/L) TR = 1e-6  | NC               | NC                    | NA        |                   |
| <b>Indoor Air Inhalation</b>                                      |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 7.3E+3           |                       |           |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               |                       |           |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >1.6E+3          |                       |           |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |           |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                  |                       |           |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |           |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >2.0E+2          |                       |           |                   |
| (mg/L) TR = 1e-6  | NC               |                       |           |                   |

|                                   |                           | Units | Value  | Reference |
|-----------------------------------|---------------------------|-------|--------|-----------|
| <b>Physical Properties</b>        |                           |       |        |           |
| MW                                | (g/mol)                   |       | 1.1E+2 | 5         |
| Sol                               | (mg/L)                    |       | 2.0E+2 | 5         |
| P <sub>vap</sub>                  | (mmHg)                    |       | 7.0E+0 | 4         |
| H <sub>airm</sub>                 | (atm-m <sup>3</sup> /mol) |       | 7.0E-3 | A         |
| pK <sub>a</sub>                   | (log(mol/mol))            |       | -      | -         |
| pK <sub>b</sub>                   | (log(mol/mol))            |       | -      | -         |
| log(K <sub>oc</sub> )             | (log(L/kg))               |       | 2.4E+0 | A         |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)    |       | 7.2E-2 | A         |
| D <sub>wat</sub>                  | (cm <sup>2</sup> /sec)    |       | 8.5E-6 | A         |
| <b>Toxicity Data</b>              |                           |       |        |           |
| Wt of Evd.                        |                           |       | D      |           |
| SF <sub>o</sub>                   | (1/[mg/kg/day])           |       | -      | -         |
| SF <sub>d</sub>                   | (1/[mg/kg/day])           |       | -      | -         |
| URF <sub>i</sub>                  | (1/[µg/m <sup>3</sup> ])  |       | -      | -         |
| RfD <sub>o</sub>                  | (mg/kg/day)               |       | 2.0E+0 | A,R       |
| RfD <sub>d</sub>                  | (mg/kg/day)               |       | 1.8E+0 | TX        |
| RfC <sub>i</sub>                  | (mg/m <sup>3</sup> )      |       | 7.0E+0 | A         |
| <b>Dermal Exposure Parameters</b> |                           |       |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                   |       | 5.0E-1 | D         |
| K <sub>p</sub>                    | (cm/hr)                   |       | 8.0E-2 |           |
| tau <sub>d</sub>                  | (hr/event)                |       | 3.9E-1 |           |
| t <sub>cut</sub>                  | (hr)                      |       | 1.4E+0 |           |
| B                                 | (-)                       |       | 1.6E-1 |           |
| <b>Regulatory Standards</b>       |                           |       |        |           |
| MCL                               | (mg/L)                    |       | 1.0E+1 | -         |
| TWA                               | (mg/m <sup>3</sup> )      |       | 4.3E+2 | ACGIH     |
| AQL                               | (mg/L)                    |       | -      | -         |
| <b>Miscellaneous Parameters</b>   |                           |       |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                    |       | 5.0E-3 | S         |
| ADL <sub>s</sub>                  | (mg/kg)                   |       | 5.0E-3 | S         |
| t <sub>1/2, sat</sub>             | (d)                       |       | 3.6E+2 | H         |
| t <sub>1/2, unsat</sub>           | (d)                       |       | 3.6E+2 | H         |

\* MCL ref = 56 FR 3526 (30 Jan 91)

| Units  | Residential | Commercial | Construction |
|--|-------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b>                          |             |            |              |
| VF <sub>ss</sub> (kg-soil/m <sup>3</sup> -air)               | 5.3E-5      | NA         | NA           |
| VF <sub>3amb</sub> (kg-soil/m <sup>3</sup> -air)             | 1.2E-5      | NA         | NA           |
| VF <sub>wamb</sub> (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 4.8E-7      | NA         | NA           |
| VF <sub>seep</sub> (kg-soil/m <sup>3</sup> -air)             | 5.6E-4      | NA         | NA           |
| VF <sub>wesp</sub> (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 1.6E-3      | NA         | NA           |
| LF (kg-soil/L-wat)   | NC          |            | NA           |

| Units                            | On-Site | Off-Site1 | Off-Site2 |
|----------------------------------|---------|-----------|-----------|
| <b>Lateral Transport Factors</b> |         |           |           |
| DAF <sub>gw</sub> (-)            | NA      | 1.9E+70   | 4.4E+85   |
| DAFs/gw (-)                      | NA      | 1.9E+70   | 4.4E+85   |

|                           | Units                    | Value  |
|---------------------------|--------------------------|--------|
| <b>Derived Parameters</b> |                          |        |
| H                         | (L-wat/L-air)            | 2.9E-1 |
| K <sub>sw</sub>           | (L-wat/kg-soil)          | 1.2E-1 |
| C <sub>sat</sub>          | (mg/kg-soil)             | 1.6E+3 |
| C <sub>sat, vap</sub>     | (µg/m <sup>3</sup> -air) | 4.0E+7 |
| D <sub>off, s</sub>       | (cm <sup>2</sup> /sec)   | 7.5E-5 |
| D <sub>eff, ck</sub>      | (cm <sup>2</sup> /sec)   | 5.6E-3 |
| D <sub>eff, cap</sub>     | (cm <sup>2</sup> /sec)   | 1.5E-5 |
| D <sub>eff, ws</sub>      | (cm <sup>2</sup> /sec)   | 6.0E-5 |
| R <sub>sat</sub>          | (-)                      | 4.2E+1 |
| R <sub>unsat</sub>        | (-)                      | 4.4E+1 |
| Z                         | (cm/event)               | 2.9E-1 |

- Notes: 1) NA = Not applicable; NC = Not calculated.  
 2) Definitions and references presented on page 7 of 7.

**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery

Completed By: Mark Detterman

Job ID: 94015

Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Date Completed: Sept. 2002

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**Constituent: TPH - Aliph >C10-C12 CAS No.: 0-00-0**

| Site-Specific Target Level (SSTL) Concentrations                  |                  |                       |                   |
|---|------------------|-----------------------|-------------------|
|   | On-site          | Off-site1             | Off-site2         |
| <b>Groundwater Ingestion</b>                                      |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | None             | MCL / 75              | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | NA               | noMCL                 | NC                |
| (mg/L) TR = 1e-6  | NA               | noMCL                 | NC                |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | None             | MCL / 75              | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      | NA               | noMCL                 | NC                |
| (mg/kg) TR = 1e-6   | NA               | noMCL                 | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0 | No Off-site Receptors |                   |
| SSTL <sub>ss</sub> THQ = 1e+0                                     | 2.2E+3           |                       |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |                   |
| <b>Outdoor Air Inhalation</b>                                     |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 1.0E+3           | 1.0E+3                | NA                |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               | NC                    | NA                |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >2.8E+2          | >2.8E+2               | NA                |
| (mg/kg) TR = 1e-6   | NC               | NC                    | NA                |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >3.4E-2          | >3.4E-2               | NA                |
| (mg/L) TR = 1e-6  | NC               | NC                    | NA                |
| <b>Indoor Air Inhalation</b>                                      |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 1.0E+3           |                       |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               |                       |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >2.8E+2          |                       |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >3.4E-2          |                       |                   |
| (mg/L) TR = 1e-6  | NC               |                       |                   |

| Chemical Parameters               |                           |        |           |
|-----------------------------------|---------------------------|--------|-----------|
|                                   | Units                     | Value  | Reference |
| <b>Physical Properties</b>        |                           |        |           |
| MW                                | (g/mol)                   | 1.6E+2 | T         |
| Sol                               | (mg/L)                    | 3.4E-2 | T         |
| P <sub>vap</sub>                  | (mmHg)                    | 4.8E-1 | -         |
| H <sub>atm</sub>                  | (atm-m <sup>3</sup> /mol) | 3.0E+0 | T         |
| pK <sub>a</sub>                   | (log[mol/mol])            | -      | -         |
| pK <sub>b</sub>                   | (log[mol/mol])            | -      | -         |
| log(K <sub>oc</sub> )             | (log[L/kg])               | 5.4E+0 | T         |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)    | 1.0E-1 | T         |
| D <sub>wat</sub>                  | (cm <sup>2</sup> /sec)    | 1.0E-5 | T         |
| <b>Toxicity Data</b>              |                           |        |           |
| Wt of Evd.                        |                           | D      |           |
| SF <sub>o</sub>                   | (1/[mg/kg/day])           | -      | -         |
| SF <sub>d</sub>                   | (1/[mg/kg/day])           | -      | -         |
| URF <sub>1</sub>                  | (1/[µg/m <sup>3</sup> ])  | -      | -         |
| RfD <sub>o</sub>                  | (mg/kg/day)               | 1.0E-1 | T         |
| RfD <sub>d</sub>                  | (mg/kg/day)               | -      | -         |
| RfC <sub>1</sub>                  | (mg/m <sup>3</sup> )      | 1.0E+0 | T         |
| <b>Dermal Exposure Parameters</b> |                           |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                   | 5.0E-1 | -         |
| K <sub>p</sub>                    | (cm/hr)                   | -      | -         |
| tau <sub>d</sub>                  | (hr/event)                | -      | -         |
| t <sub>crit</sub>                 | (hr)                      | -      | -         |
| B                                 | (-)                       | -      | -         |
| <b>Regulatory Standards</b>       |                           |        |           |
| MCL                               | (mg/L)                    | -      | *         |
| TWA                               | (mg/m <sup>3</sup> )      | -      | -         |
| AQL                               | (mg/L)                    | -      | -         |
| <b>Miscellaneous Parameters</b>   |                           |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                    | -      | -         |
| ADL <sub>s</sub>                  | (mg/kg)                   | -      | -         |
| t <sub>1/2, soil</sub>            | (d)                       | -      | -         |
| t <sub>1/2, unsat</sub>           | (d)                       | -      | -         |

\* MCL ref = -

|                                     | Units                                     | Residential | Commercial | Construction |
|-------------------------------------|---|-------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b> |   |             |            |              |
| VF <sub>ss</sub>                    | (kg-soil/m <sup>3</sup> -air)             | 3.9E-5      | NA         | NA           |
| VF <sub>semb</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 6.5E-6      | NA         | NA           |
| VF <sub>womb</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 2.3E-4      | NA         | NA           |
| VF <sub>soep</sub>                  | (kg-soil/m <sup>3</sup> -air)             | 3.0E-4      | NA         | NA           |
| VF <sub>wosp</sub>                  | (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 7.9E-1      | NA         | NA           |
| LF                                  | (kg-soil/L-wat)                           | NC          |            | NA           |

|                                  | Units | On-Site | Off-Site1 | Off-Site2 |
|----------------------------------|-------|---------|-----------|-----------|
| <b>Lateral Transport Factors</b> |       |         |           |           |
| DAF <sub>gw</sub>                | (-)   | NA      | 1.0E+100  | 1.0E+100  |
| DAF <sub>s/gw</sub>              | (-)   | NA      | 1.0E+100  | 1.0E+100  |

|                           | Units                    | Value  |
|---------------------------|--------------------------|--------|
| <b>Derived Parameters</b> |                          |        |
| H                         | (L-wat/L-air)            | 1.2E+2 |
| K <sub>sw</sub>           | (L-wat/kg-soil)          | 1.2E-4 |
| C <sub>sat</sub>          | (mg/kg-soil)             | 2.8E+2 |
| C <sub>sat, vap</sub>     | (µg/m <sup>3</sup> -air) | 4.2E+6 |
| D <sub>eff, a</sub>       | (cm <sup>2</sup> /sec)   | 9.9E-5 |
| D <sub>eff, crk</sub>     | (cm <sup>2</sup> /sec)   | 7.8E-3 |
| D <sub>eff, cap</sub>     | (cm <sup>2</sup> /sec)   | 1.3E-5 |
| D <sub>eff, vs</sub>      | (cm <sup>2</sup> /sec)   | 6.9E-5 |
| R <sub>sat</sub>          | (-)                      | 4.3E+4 |
| R <sub>unsat</sub>        | (-)                      | 4.5E+4 |
| Z                         | (cm/event)               | -      |

- Notes: 1) NA = Not applicable; NC = Not calculated.  
 2) Definitions and references presented on page 7 of 7.

**RBCA SITE ASSESSMENT**

**Chemical-Specific Tier 2 Cleanup Summary**

Site Name: Kawahara Nursery  
 Site Location: 16550 Ashland Avenue, San Lorenzo, CA

Completed By: Mark Detterman  
 Date Completed: Sept. 2002

Job ID: 94015

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**Constituent: TPH - Arom >C10-C12 CAS No.: 0-00-0**

| Site-Specific Target Level (SSTL) Concentrations                  |                  |                       |                   |
|---|------------------|-----------------------|-------------------|
|   | On-site          | Off-site1             | Off-site2         |
| <b>Groundwater Ingestion</b>                                      |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | None             | MCL / 75              | Residential / 110 |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | NA               | noMCL                 | >2.5E+1           |
| (mg/L) TR = 1e-6  | NA               | noMCL                 | NC                |
| <b>Soil Leaching to Groundwater Ingestion</b>                     |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | None             | MCL / 75              | Residential / 110 |
| SSTL <sub>s</sub> THQ = 1e+0                                      | NA               | noMCL                 | >2.1E+3           |
| (mg/kg) TR = 1e-6   | NA               | noMCL                 | NC                |
| <b>Surface Soil Inhalation, Ingestion, Dermal Contact</b>         |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Res./Constr. / 0 | No Off-site Receptors |                   |
| SSTL <sub>ss</sub> THQ = 1e+0                                     | 9.2E+2           |                       |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |                   |
| <b>Outdoor Air Inhalation</b>                                     |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 2.1E+2           | 2.1E+2                | NA                |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               | NC                    | NA                |
| <b>Soil Volatilization/Particulates to Outdoor Air Inhalation</b> |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >2.1E+3          | >2.1E+3               | NA                |
| (mg/kg) TR = 1e-6   | NC               | NC                    | NA                |
| <b>Groundwater Volatilization to Outdoor Air Inhalation</b>       |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | Residential / 110     | None              |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >2.5E+1          | >2.5E+1               | NA                |
| (mg/L) TR = 1e-6  | NC               | NC                    | NA                |
| <b>Indoor Air Inhalation</b>                                      |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| RBEL <sub>air</sub> THQ = 1e+0                                    | 2.1E+2           |                       |                   |
| (µg/m <sup>3</sup> ) TR = 1e-6                                    | NC               |                       |                   |
| <b>Soil Volatilization to Indoor Air Inhalation</b>               |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| SSTL <sub>s</sub> THQ = 1e+0                                      | >2.1E+3          |                       |                   |
| (mg/kg) TR = 1e-6   | NC               |                       |                   |
| <b>Groundwater Volatilization to Indoor Air Inhalation</b>        |                  |                       |                   |
| Receptor Type / Distance (ft)                                     | Residential / 0  | No Off-site Receptors |                   |
| SSTL <sub>gw</sub> THQ = 1e+0                                     | >2.5E+1          |                       |                   |
| (mg/L) TR = 1e-6  | NC               |                       |                   |

| Chemical Parameters               |                           |        |           |
|-----------------------------------|---------------------------|--------|-----------|
|                                   | Units                     | Value  | Reference |
| <b>Physical Properties</b>        |                           |        |           |
| MW                                | (g/mol)                   | 1.3E+2 | T         |
| Sol                               | (mg/L)                    | 2.5E+1 | T         |
| P <sub>vap</sub>                  | (mmHg)                    | 4.8E-1 | -         |
| H <sub>aim</sub>                  | (atm-m <sup>3</sup> /mol) | 3.3E-3 | T         |
| pK <sub>a</sub>                   | (log[mol/mol])            | -      | -         |
| pK <sub>b</sub>                   | (log[mol/mol])            | -      | -         |
| log(K <sub>ow</sub> )             | (log[L/kg])               | 3.4E+0 | T         |
| D <sub>air</sub>                  | (cm <sup>2</sup> /sec)    | 1.0E-1 | T         |
| D <sub>wat</sub>                  | (cm <sup>2</sup> /sec)    | 1.0E-5 | T         |
| <b>Toxicity Data</b>              |                           |        |           |
| Wt of Evd.                        |                           | D      | -         |
| SF <sub>o</sub>                   | (1/[mg/kg/day])           | -      | -         |
| SF <sub>d</sub>                   | (1/[mg/kg/day])           | -      | -         |
| URF <sub>i</sub>                  | (1/[µg/m <sup>3</sup> ])  | -      | -         |
| RfD <sub>o</sub>                  | (mg/kg/day)               | 4.0E-2 | T         |
| RfD <sub>d</sub>                  | (mg/kg/day)               | -      | -         |
| RfC <sub>i</sub>                  | (mg/m <sup>3</sup> )      | 2.0E-1 | T         |
| <b>Dermal Exposure Parameters</b> |                           |        |           |
| RAF <sub>d</sub>                  | (mg/mg)                   | 5.0E-1 | -         |
| k <sub>p</sub>                    | (cm/hr)                   | -      | -         |
| tau <sub>d</sub>                  | (hr/event)                | -      | -         |
| t <sub>cut</sub>                  | (hr)                      | -      | -         |
| B                                 | (-)                       | -      | -         |
| <b>Regulatory Standards</b>       |                           |        |           |
| MCL                               | (mg/L)                    | -      | *         |
| TWA                               | (mg/m <sup>3</sup> )      | -      | -         |
| AQL                               | (mg/L)                    | -      | -         |
| <b>Miscellaneous Parameters</b>   |                           |        |           |
| ADL <sub>gw</sub>                 | (mg/L)                    | -      | -         |
| ADL <sub>s</sub>                  | (mg/kg)                   | -      | -         |
| t <sub>1/2,sat</sub>              | (d)                       | -      | -         |
| t <sub>1/2,unest</sub>            | (d)                       | -      | -         |

\* MCL ref = -

| Units  | Residential            | Commercial | Construction |
|--|------------------------|------------|--------------|
| <b>Cross-Media Transfer Factors</b>                          |                        |            |              |
| VF <sub>ss</sub> (kg-soil/m <sup>3</sup> -air)               | 1.4E-5                 | NA         | NA           |
| VF <sub>samb</sub> (kg-soil/m <sup>3</sup> -air)             | 7.9E-7                 | NA         | NA           |
| VF <sub>wamb</sub> (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 3.4E-7                 | NA         | NA           |
| VF <sub>sosp</sub> (kg-soil/m <sup>3</sup> -air)             | 3.7E-5                 | NA         | NA           |
| VF <sub>wosp</sub> (m <sup>3</sup> -wat/m <sup>3</sup> -air) | 1.1E-3                 | NA         | NA           |
| LF (kg-soil/L-wat)   | All exposures: 1.3E-59 |            | NA           |

| Units                            | On-Site | Off-Site1 | Off-Site2 |
|----------------------------------|---------|-----------|-----------|
| <b>Lateral Transport Factors</b> |         |           |           |
| DAF <sub>gw</sub> (-)            | NA      | 5.0E+21   | 6.2E+26   |
| DAFs/gw (-)                      | NA      | 5.0E+21   | 6.2E+26   |

|                           | Units                    | Value  |
|---------------------------|--------------------------|--------|
| <b>Derived Parameters</b> |                          |        |
| H                         | (L-wat/L-air)            | 1.4E-1 |
| K <sub>sw</sub>           | (L-wat/kg-soil)          | 1.2E-2 |
| C <sub>sat</sub>          | (mg/kg-soil)             | 2.1E+3 |
| C <sub>sat,vap</sub>      | (µg/m <sup>3</sup> -air) | 3.4E+6 |
| D <sub>eff,a</sub>        | (cm <sup>2</sup> /sec)   | 1.1E-4 |
| D <sub>eff,crik</sub>     | (cm <sup>2</sup> /sec)   | 7.8E-3 |
| D <sub>eff,cap</sub>      | (cm <sup>2</sup> /sec)   | 2.7E-5 |
| D <sub>eff,ws</sub>       | (cm <sup>2</sup> /sec)   | 9.1E-5 |
| R <sub>sat</sub>          | (-)                      | 4.3E+2 |
| R <sub>unsat</sub>        | (-)                      | 4.6E+2 |
| Z                         | (cm/event)               | -      |

Notes: 1) NA = Not applicable; NC = Not calculated.  
 2) Definitions and references presented on page 7 of 7.