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Omega Chemical Site

Skateland Sub-Slab Depressurization Testing
Draft Technical Memorandum

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Technical Memorandum

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Section 1
Introduction

1.1 Scope of Work

Camp Dresser & McKee Inc. (CDM) has prepared this technical memorandum (TM) on behalf of the Omega Chemical Site Potentially Responsible Party (PRP) Organized Group (OPOG) to document the results of investigation and testing related to sub-slab depressurization (SSD) at Skateland, which is adjacent to the former Omega Chemical property. The investigation/testing was performed to provide a basis for evaluating the feasibility of SSD at Skateland.

1.2 Site Introduction and Background

This section provides a brief summary of site conditions. A more complete description can be found in the *On-Site Soils Remedial Investigation/Feasibility Study Work Plan* (CDM, September 29, 2003) and *On-Site Soils Work Plan Addendum* (CDM, October 20, 2004).

The former Omega property is located at 12504 East Whittier Boulevard in Whittier, California. It was developed in 1951 and occupies Los Angeles County Assessor Tract No. 13486, Lots 3 and 4. The property is approximately 41,000 square feet (200 feet wide by 205 feet long) and contains two structures – an approximate 140-foot by 50-foot warehouse and an approximate 80-foot by 30-foot administrative building. A loading dock is attached to the rear of the warehouse. The exterior areas are concrete-paved and the property is secured with a perimeter fence and locking gate.

The primary volatile organic compound (VOC) contaminants are tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), Freon 113, and Freon 11.

Adjacent and Nearby Properties

One commercial property (Skateland) and two industrial properties (Medlin & Son and Terra Pave) are located immediately adjacent to the former Omega property (southeastern, northwestern, and southwestern boundaries, respectively).

Skateland is located on Whittier Boulevard, adjacent to the southeastern boundary of the former Omega property. The property consists of an indoor roller-skating rink that is currently in operation and is open to the general public.

The Terra Pave, Inc. facility is located at 12511 East Putnam Street, adjacent to the southwestern boundary of the former Omega property. New England Lead Burning Company (NELCO) reportedly operated the property beginning in the mid-1950s. NELCO purchased lead in sheet, pipe, and solid rods and fabricated the desired product by burning (welding) the lead to the required shape. The welding was performed in the building located along the northeastern portion of the property.

Undeveloped portions of the property consisted of exposed soil and miscellaneous rubble.

The Medlin & Son (formerly Cal-Air) facility is located at 12484 Whittier Boulevard, adjacent to the northwestern boundary of the former Omega property. A machine shop and office were reportedly constructed at the property in 1954. In September 1976, Cal-Air Conditioning Company added three new offices and occupied the property until 1996. Medlin & Son currently operate a machine shop at the property, producing specialty small metal parts.

Local Hydrogeology

The former Omega property is underlain by low permeability silty and clayey soils of the upper Pleistocene Lakewood Formation, probably representing the Bellflower aquiclude, to a depth of at least 120 feet below ground surface (bgs). The term "aquiclude" is used in the published literature, but "aquitard" is a more accurate description of this stratigraphic unit. Soils underlying the former Omega property consist primarily of fine-grained materials (e.g., clayey silts and silty clays).

Depth-to-water in onsite well OW-1 was measured at 76.15 feet bgs during August 2005. A coarser-grained sandy layer, probably representing the Gage aquifer, was encountered southwest of the facility along and downgradient of Putnam Street, but was not detected beneath the former Omega property.

Well OW-1b (screened from 110 to 120 feet bgs), located at the adjacent Terra Pave property, was designed as a deeper companion well to onsite well OW-1. The subsurface materials at location OW-1b were very uniform and consisted of fine-grained materials (silty clays) throughout the entire drilled depth of the boring (131.5 feet bgs). Some gravel imbedded in the silty clay matrix was observed in the interval from 125 to 130 feet bgs. During the August 2005 semi-annual sampling event, depth-to-water was measured at 75.76 feet bgs in well OW-1b. Observations made during sampling events performed from 1999 to the present indicate a consistent direction of groundwater flow to the southwest.

The Report Addendum for Additional Data Collection in the Phase 1a Area (CDM, June 27, 2003) was revised (March 31, 2005) to include the results of additional investigation performed by OPOG (e.g., aquifer testing, well installation, groundwater and soil sampling, etc.). The revised report includes detailed cross-sections illustrating subsurface lithology beneath and downgradient of the former Omega property.

1.3 Sub-Slab Depressurization Description

Sub-slab depressurization reduces the pressure in the sub-slab materials and extracts sub-slab gases before they can enter the building. A SSD system typically consists of a blower or fan connected to one or more pipes that are installed within the sub-slab materials. Extracted gases are either vented directly to the atmosphere or treated prior to atmospheric discharge. The type of vapor treatment is based on the nature and

concentrations of the chemical. When required petroleum hydrocarbons and chlorinated solvents are typically treated with granular activated carbon (GAC).

The effectiveness and design of a SSD for a particular building are directly related to the permeability of the material beneath the slab. If this permeability is high (e.g., crushed rock or gravel), then fewer pipes and a lower applied level of vacuum are needed to reduce the sub-slab pressure over the entire building footprint compared to a low permeability scenario such as when a slab is constructed directly on compacted native soil.

1.4 Objectives

The overall objective of the SSD investigation/testing was to collect data to aid in evaluating the feasibility of SSD at Skateland. Specific objectives included:

- Estimate the permeability of the sub-slab materials
- Estimate the VOC concentrations in the sub-slab vapors to determine the need for vapor treatment and to provide a basis to select a treatment type, if needed
- Determine the vapor extraction rate that can be achieved from the sub-slab at various levels of applied vacuum
- Estimate the vacuum distribution that is established around a suction point to help in determining spacing between extraction points

The general criteria that are used in this TM to evaluate the feasibility of applying SSD at Skateland are effectiveness, implementability, and cost. Regarding effectiveness, the ultimate objective of the operation of a sub-slab system is to reduce indoor air contaminant concentrations. This objective is met to the degree that the system can remove contaminants from the majority of the sub-slab materials. SSD will be considered feasible with regard to effectiveness and implementability if a measurable vacuum is produced at all pressure measuring holes that are 15 feet from the suction holes and completed in the sub-slab materials. If this condition cannot be met, the sub-slab materials will be considered to be too low in permeability for practical implementation of SSD. If a high permeability layer is not present beneath the slab, SSD may be implementable in the sub-slab native soils if the same condition described above is met. This was observed at SH4, which was completed in the sub-slab native soils, and was able to induce a vacuum in monitoring holes within 15 feet.

Section 2
Pilot Test Design and Procedures

This section describes the procedures used to perform the SSD investigation/testing as they were presented in the *Sub-Slab Depressurization Work Plan* (CDM 2005). The procedures are based on those described in the U.S. Environmental Protection Agency (EPA) Handbook titled *Sub Slab Depressurization for Low-Permeability Fill Material* (EPA, 1991). Additional applicable guidance is provided in *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* [Department of Toxic Substances Control (DTSC) and California Environmental Protection Agency 2004]. Specifically, the guidance regarding soil gas sampling procedures described in Appendix G of that document are relevant to this testing.

2.1 Investigating Sub-Slab Conditions

This investigation entailed the following steps:

1. Selected investigation locations within Skateland considering access issues, subsurface utility locations, and location relative to exterior walls (Figure 2-1).

2. Drilled a small diameter suction hole (1- to 2-inch) through the building slab at each of the locations.

3. Drilled pressure measurement holes (3/8- to 1/2-inch) at distances of 1, 3, 9, and 15 feet from each suction hole.

4. Temporarily sealed with rope caulk and took baseline pressure readings at all holes.

5. Took a field photoionization detector (PID) reading, and collect a summa canister grab sample of sub-slab vapors from each suction hole; immediately following sampling took a second PID reading.

6. Applied a vacuum to each suction hole such that the vacuum at the 1 foot pressure measurement hole was approximately 1.5 to 2 inches of water. Then measured the steady state induced vacuum (< 0.1 inch of water change between successive readings taken 30 minutes apart) at each of the pressure measurement holes and measure the vapor extraction rate.

The suction hole and associated pressure measurement holes at test location SH-4 were completed approximately 1 to 2 feet into the native soil beneath the sub-slab materials to collect information on the relative permeability of this soil.

2.2 Testing SSD

Tests were performed at each suction hole to establish a relationship between applied vacuum and the resulting extraction rate. This testing entailed the following procedure:

1. Apply a vacuum to each suction hole such that a vacuum of 0.8 inch of water results at the 1 foot pressure measurement hole.

2. Record the resulting vapor extraction rate and steady state pressures (< 0.1 inch of water change between successive readings taken 30 minutes apart) at each pressure measurement hole.

3. Repeat steps 1 and 2 with a target vacuum at the 1 foot hole of 2.0 and 5.0 inches of water vacuum.

4. At the end of testing, take a field photoionization detector (PID) reading, and collect a summa canister grab sample of sub-slab vapors from each suction hole; immediately following sampling take a second PID reading.

5. Permanently seal all holes and return floor to pre-test conditions.

When conducting the step testing, it was necessary to modify the targeted vacuum levels from those specified in the SSD work plan (steps 1 and 3) due to the lower than anticipated permeability of the sub-slab materials.

Section 3
Results

Testing was performed between September 21 and 23, 2005. This section describes the SSD investigation/testing results. Interpretation of the results is presented in Section 4.

3.1 Pre-Test Measurements

Baseline pressure and PID readings were taken at all measuring points prior to testing. Table 3-1 presents the results of the pre-testing measurements. Baseline pressures varied from 0.03 to -0.01 inch of water. PID readings varied from 0.2 to 17.5 parts per million by volume (ppmv).

3.2 Vacuum Distribution

Tables 3-2 to 3-5 present the results of permeability and step testing at each of the four test locations (SH-1 to SH-4). At location SH-3, no measurable flow was observed when 70 inches of water vacuum was applied to the suction hole. An increase in applied vacuum to 72 inches of water (the maximum vacuum for the blower used) only produced 0.8 standard cubic feet per minute (scfm); therefore additional testing was not performed at that location.

The vacuum measurements at the monitoring points 9 and 15 feet from the suction hole are shown for all test locations on Figure 3-1.

Table 3-6 presents descriptions of the sub-slab conditions that were encountered during installation of the holes. Six to 10 inches of sand were observed at three of the test locations; however, at SH-3 the sand was not observed. The data shown in Table 3-4 indicate that the sub-slab materials at this location of the slab are less permeable than the other three locations.

The monitoring point vacuum levels were plotted versus the log of the distance from the suction hole to estimate the radius of influence of the vacuum applied to the suction hole. Figure 3-2 shows four examples of such plots for an applied vacuum of approximately 72 inches of water.

3.3 Vacuum – Flow Relationships

Figure 3-3 presents the vacuum-flow relationship for three of the test locations (due to low permeability of the sub-slab materials at SH-3, only two steps were performed, so a plot could not be generated for that location). The slopes of all three plots and the flow rates are very similar, indicating similar permeability of sub-slab materials at these three locations – even though the suction hole and monitoring points at SH-4 were located in native soils beneath the sand layer. This, along with the relatively high vacuum needed to extract vapors, suggests that the sand layer may not be contiguous, and vapor extraction occurred within native soils beneath the slab.

3.4 Vapor Sampling

Samples of sub-slab vapors were collected from each suction hole in summa canisters for laboratory VOC analysis. Sub-slab vapors were also measured for total VOCs in the field using a field PID (Table 3-1). Table 3-7 summarizes the laboratory results and the laboratory reports are presented in Appendix A. In general, the VOCs detected in the sub-slab samples were similar to those that are typically found in site soil vapor samples. Due to the overall lower total VOC concentrations in the sub-slab samples compared to the on-site soil vapor samples, the lower detection limits for the sub-slab samples indicate the presence of VOCs such as benzene, ethyl benzene, toluene, and xylenes (BTEX) at low concentrations.

Section 4
Analysis and Interpretation of Test Results

This section describes the data analysis and interpretation of the SSD result with regard to SSD feasibility.

4.1 SSD Feasibility

The applied vacuum levels and the resulting vapor extraction rates, along with the vacuum distribution data in the sub-slab material indicate that SSD would be effective in reducing indoor air VOC concentrations within the Skateland building. The data indicate that when a relatively high vacuum of 72 inches of water is applied to a suction hole, vapors can be extracted at reasonable rates and a vacuum field is established in the sub-slab materials that extends greater than 15 feet. However, it appears that little and sometimes no high permeability layer (sand) exists immediately below the slab (see Table 3-6). Data from suction hole SH-4 which was completed below the sub-slab layer into native soils, indicate that vapors can be removed from the native soils at a level of applied vacuum similar to that applied to the sub-slab materials. At suction hole SH-3, lower permeability materials were encountered and a measurable vacuum was documented at 9 feet, but not at 15 feet. Therefore, there may be portions of the sub-slab that would not be affected by SSD, but these would be areas where VOC migration would minimal to the slab.

The test data have been used to estimate the permeability of the sub-slab material. The following equation was used for this purpose (USEPA 1993):

$$Q/H = \pi (k/\mu) P_w [[1-(p_{atm}/P_w)^2]/\ln(R_w/R_I)]]$$

Where
- Q = actual airflow rate at suction point
- H = vapor extraction interval thickness
- k = soil permeability
- μ = viscosity of air
- P_w = absolute pressure at suction point
- P_{atm} = absolute ambient pressure
- R_w = radius of suction point
- R_I = radius of influence of suction point

Appendix B presents the results of the permeability calculations. The estimates range from 4×10^{-8} to 4×10^{-7} cm^2 which is indicative of a silty sand material.

For a full-scale SSD system at Skateland, a higher vacuum would likely be applied over a sustained period of many days. It is anticipated, based on the test data, that vapors could be extracted from a distance of 20 to 30 feet from the suction point, depending on the level of applied vacuum.

Given the VOC concentrations present in the sub-slab vapors (Table 3-7), SSD extracted vapors may require treatment to meet air emission standards before discharge to the atmosphere. Vapor phase activated carbon can effectively remove all of the VOCs detected in the sub-slab vapor samples.

In summary, because the testing data indicate SSD would be effective, implementable and not cost-prohibitive, SSD is considered feasible at Skateland if mitigation of subsurface vapors is necessary and appropriate for this operation.

Section 5
References

CDM (Camp Dresser & McKee Inc.). 2005. *Sub-Slab Depressurization Work Plan.* August 17.

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DTSC (Department of Toxic Substances Control) and California Environmental Protection Agency. 2004. *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air.* Interim Final December 15, 2004 (Revised February 27, 2005).

USEPA (U.S. Environmental Protection Agency). 1993. *Decision-Support Software for Soil Vapor Extraction Technology Application: HyperVentilate.* EPA/600/R-93/028. February

_____. 1991. *Sub Slab Depressurization for Low-Permeability Fill Material – Design & Installation of a Home Radon Reduction System.* Office of Research and Development EPA/625/6-91/029. July.

Table 3-1. Pre-test monitoring results.

Baseline Pressure Readings (inches of water)

SH-1		SH-2		SH-3		SH-4	
VMP-1'	0.01	VMP-1'	0.00 to -0.01	VMP-1'	0.00 to 0.01	VMP-1'	0.02
VMP-3'	0.03	VMP-3'	0.001 to 0.003	VMP-3'	0.00 to 0.01	VMP-3'	0.01
VMP-9'	0.01	VMP-9'	0.01 to 0.00	VMP-9'	0.00	VMP-9'	0.01 to 0.00
VMP-15'	0.00	VMP-15'	0.01 to 0.00	VMP-15'	0.00	VMP-15'	0.008

PID Readings (ppmv)

	SH-1	SH-2	SH-3	SH-4
Before*	9.7 to 0.2	4.7	0**	11.6
After	17.5	5.6 to 4.7	0** (14 to 3.1)	11

* - Before collecting 400 cc canister sample w/ flow controller
** - PID failure-repeat reading next day with replacement PID ( )

Table 3-2. Test results for location SH-1.

Permability Test (9/22/2005)

Flow Rate: **1.6 scfm**
Vacuum at Suction Hole: **12 "of H20**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	11:30	1.8	11:50	1.8
VMP-3'		0.17		0.17
VMP-9'		0.025		0.025
VMP-15'		0.007		0.005

Step Test 99/22/2005)

Flow Rate: **2.25 scfm**
Vacuum at Suction Hole: **27 " of H2O**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	12:00	4	12:30	4
VMP-3'		0.37		0.37
VMP-9'		0.065		0.065
VMP-15'		0.01		0.01

Flow Rate: **3.3 scfm**
Vacuum at Suction Hole: **45 " of H2O**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	12:32	6.5	12:50	6.5
VMP-3'		0.69		0.69
VMP-9'		0.125		0.125
VMP-15'		0.02		0.02

Flow Rate: **4.6 scfm**
Vacuum at Suction Hole: **70 " of H2O**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	12:55	10.5	13:30	10.5
VMP-3'		1.12		1.13
VMP-9'		0.205		0.205
VMP-15'		0.04		0.04

PID: 10 ppmv

Table 3-3. Test results for location SH-2.

Permability Test (9/22/2005)

Flow Rate: **1.25 scfm**
Vacuum at Suction Hole: **12 "of H20**

Measurement Hole	Vacuum (" of H2O)
VMP-1'	0.6
VMP-3'	0.32
VMP-9'	0.07
VMP-15'	0.01

Step Test 9/22/2005)

Flow Rate: **2.75 scfm**
Vacuum at Suction Hole: **32 " of H2O**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	8:10	1.5	8:25	1.5	8:40	1.5
VMP-3'		0.75		0.72		0.72
VMP-9'		0.02		0.01		0.01
VMP-15'		0.02		0.02		0.02

Flow Rate: **3.3 scfm**
Vacuum at Suction Hole: **44 " of H2O**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	8:45	2	9:10	2
VMP-3'		0.96		0.96
VMP-9'		0.01		0.01
VMP-15'		0.02		0.025

Flow Rate: **5.6 scfm**
Vacuum at Suction Hole: **72 " of H2O (2.6 psi)**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	9:15	4	9:30	4	9:45	4
VMP-3'		1.68		1.69		1.69
VMP-9'		0.025		0.03		0.03
VMP-15'		0.045		0.045		0.045

Flow Rate: **7.2 scfm**
Vacuum at Suction Hole: **89 " of H2O (3.2 psi)**

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	9:55	5.01	10:15	5.11	10:30	5.24
VMP-3'		2.2		2.4		2.6
VMP-9'		0.037		0.04		0.04
VMP-15'		0.055		0.05		0.05

Table 3-4. Test results for location SH-3.

Flow Rate: 0 scfm
Vacuum at Suction Hole: 70 "of H20

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	17:00	0.04	17:15	0.04
VMP-3'		0		0
VMP-9'		0		0
VMP-15'		0		0

Flow Rate: 0.8 scfm
Vacuum at Suction Hole: 72 " of H2O (2.6 psi)

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	17:20	0.04	17:30	0.04	17:40	0.04
VMP-3'		0.00		0.001		0.001
VMP-9'		0.00		0.001		0.001
VMP-15'		0.00		0.00		0.00

* - @17:30 vacuum @SH-3 decreased (1.6 psi) .Flow rate did not change

PID: 8.5 ppmv

Due to low flow at this location, step testing was not performed.

Table 3-5. Test results for location SH-4.

Permability Test (9/22/2005)

Flow Rate: 1.4 scfm
Vacuum at Suction Hole: 32 "of H20

Measurement Hole	Time	Vacuum (" of H2O)
VMP-1'	14:25	1.1
VMP-3'		0.15
VMP-9'		0
VMP-15'		-0.002

Step Test 99/22/2005)

Flow Rate: 2.3 scfm (flow rate increased to 3 scfm @15:30)
Vacuum at Suction Hole: 58 " of H2O

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	15:15	2.3	15:30	2.6
VMP-3'		0.31		0.27
VMP-9'		0		0.00
VMP-15'		-0.002		0.00

Flow Rate: 6.3 scfm
Vacuum at Suction Hole: 94 " of H2O (3.4 psi)

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	15:37	5	16:00	5
VMP-3'		0.55		0.55
VMP-9'		0.01		0.01
VMP-15'		0.01		0.01

Flow Rate: 7.1 scfm
Vacuum at Suction Hole: 72 " of H2O (2.6 psi)

Measurement Hole	Time	Vacuum (" of H2O)	Time	Vacuum (" of H2O)
VMP-1'	16:02	6	16:15	6.5
VMP-3'		0.68		0.7
VMP-9'		0.4		0.04
VMP-15'		0.02		0.02

PID: 63.3 ppmv

Table 3-6. Summary of sub-slab conditions encountered during testing.

SH-1 0 -6" CONCRETE 6" - 8" SAND: 100% sand (FILL), no odor dry, PG 8"- 12" SANDY CLAY: 80% clay, med plasticity; 20%sand, PG, moist, faint odor
SH-2 0 -6" CONCRETE 6" - 8" SAND: 60% sand, 30% clay, dry to moist, low to medium plasticity, faint odor 8"- 12" SANDY CLAY: 80% clay, med plasticity; 20% sand, PG, moist, faint odor
SH-3 0 -6" CONCRETE SANDY CLAY: 80% clay, med plasticity; 20%sand, PG, moist, faint odor
SH-4 0 -6" CONCRETE 6" - 10" SAND: 100% sand (FILL), faint gasoline odor, dry, PG 11"- 14" SANDY CLAY: 80% clay, moist, strong odor

PG = poorly graded

Table 3-7
Omega Chemical Superfund Site
Summary of Vapor Laboratory Analysis

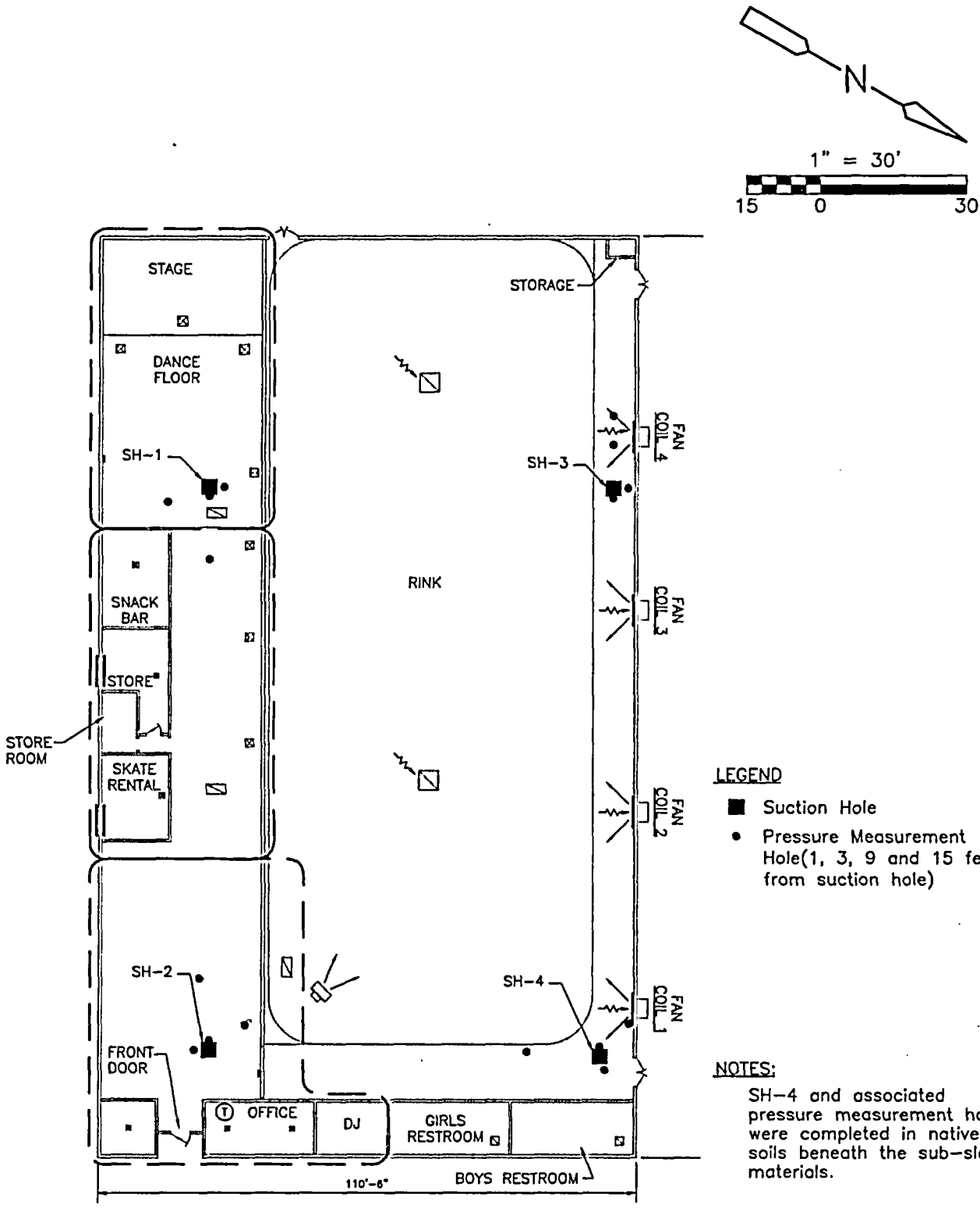
Sample Location	Sample Date	Sample Type	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	1,1-DCA	1,1,1-TCA	Chloroform	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	1,2,4-TMB	1,3,5-TMB	4-Ethyl-toluene	Acetone	2-Butanone	Cyclo-hexane	Freon 113	DFM (Freon 12)	TFM (Freon 11)	Heptane	Hexane	Vinyl Acetate	THF
SH-1F	23-Sep-05	ORIG	12900	8600	3200	3.97 U	103000	729	158	53.7	35.1	218	100	260	234	208	78.6	37.3	2.37 U	2.95 U	65.4	322000	593	84300	81.9	3.52 U	3.52 U	61.9
SH-1I	23-Sep-05	ORIG	18300	13400	32	10.3	194000	4.05 U	180	58.6	19.2	904	825	4250	2040	68.8	28	29	2.37 U	2.95 U	25.1	651000	939	180000	4.1 U	3.52 U	3.52 U	88.4
SH-2F	23-Sep-05	ORIG	414	1560	10.1	3.97 U	9100	4.05 U	5.45 U	4.88 U	14.7	94.1	23.9	69.5	69.5	98.3	36.4	18.2	64.1	2.95 U	3.44 U	34500	89	7860	4.1 U	3.52 U	3.52 U	15.6
SH-2I	23-Sep-05	ORIG	10800	24200	48.6	3.97 U	38000	4.05 U	5.45 U	4.88 U	47.9	753	326	695	695	334	123	63.9	738	162	16.2	115000	321	25800	4.1 U	3.52 U	298	56
SH-3F	23-Sep-05	ORIG	6130	1560	21	3.97 U	6340	4.05 U	35	4.88 U	13.4	377	191	521	564	462	177	118	45.1	2.95 U	3.44 U	8430	4.94 U	3650	9.83	3.52 U	3.52 U	47.2
SH-3I	23-Sep-05	ORIG	4610	1020	14.6	3.97 U	7920	4.05 U	5.45 U	4.88 U	8.94	6400	3910	16500	6950	88.4	43.2	63.9	61.7	13.3	3.44 U	16900	18.3	5620	4.1 U	3.52 U	3.52 U	16.5
SH-4F	23-Sep-05	DUP	122000	118000	13.4	3.97 U	135000	48.8	87.3	4.88 U	575	6400	695	955	955	737	280	260	2.37 U	2.95 U	516	107000	54.4	61800	1190	810	3.52 U	2.95 U
SH-4F	23-Sep-05	ORIG	129000	124000	4.05 U	3.97 U	147000	52.6	92.7	4.88 U	20.1	75.3	31.3	95.5	104	103	38.8	22.1	2.37 U	2.95 U	3.44 U	123000	49.4	61800	4.1 U	3.52 U	3.52 U	19.2
SH-4I	23-Sep-05	ORIG	27100	27400	4.05 U	3.97 U	37600	48.6	65.4	4.88 U	38.3	290	161	399	478	241	83.5	47.7	522	2.95 U	3.44 U	34500	49.4	17400	4.1 U	3.52 U	3.52 U	38.3
SH-TB	23-Sep-05	M	393	188	4.05 U	3.97 U	83.2	4.05 U	5.45 U	4.88 U	3.19 U	15.4	4.34 U	15.6	22.1	20.1	4.91 U	4.91 U	2.37 U	2.95 U	3.44 U	56.7	4.94 U	21.3	10.6	3.52 U	3.52 U	2.95 U

Notes:
Concentrations are reported in micrograms per cubic meter (ug/m3)
Only compounds detected in one or more vapor samples are shown.
VOCs analyzed by EPA Method TO-15.
"I" and "F" in sample ID indicate initial and final samples at each suction hole, respectively.

U = Not detected at a concentration greater than the reporting limit shown.

PCE = Tetrachloroethene; TCE = Trichloroethene.DCE = Dichloroethene; DCA = Dichloroethane; TCA = Trichloroethane; TMB = Trimethylbenzene; Freon 113 = 1,1,2-Trichloro-1,2,2-trifluoroethane, DFM = Dichlorodifluoromethane; TFM = Trichlorofluoromethane; THF = Tetrahydrofuran

Sample Type:
ORIG = Original sample
DUP = Duplicate sample
M = Trip Blank

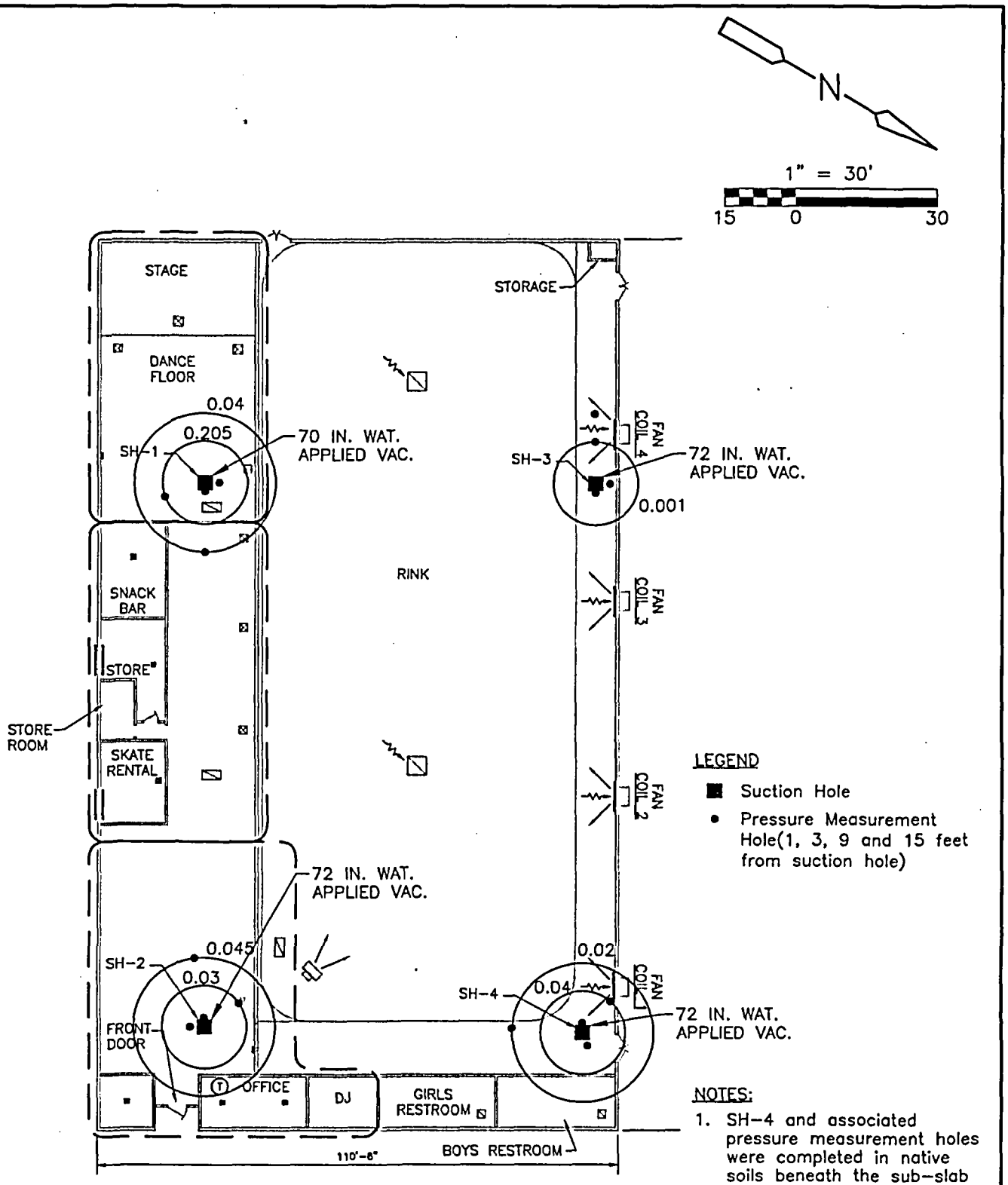


Skateland SSD Investigation - As-Built Testing Locations

CDM

Figure 2-1

S:\10500\37240\ FIG2-1 ASBUILT 10/12/05 10:33 simpsonke XREFS: SKATELAND



S:\10500\37240\ Fig3-1 10/12/05 10:34 simpsonkc XREFS: SKATELAND

Skateland SSD Investigation - Sub-Slab Vacuum Distribution

CDM

Figure 3-1

Figure 3-2. Comparison of Trendlines for Log Distance-Vacuum Relationships at Four Test Locations

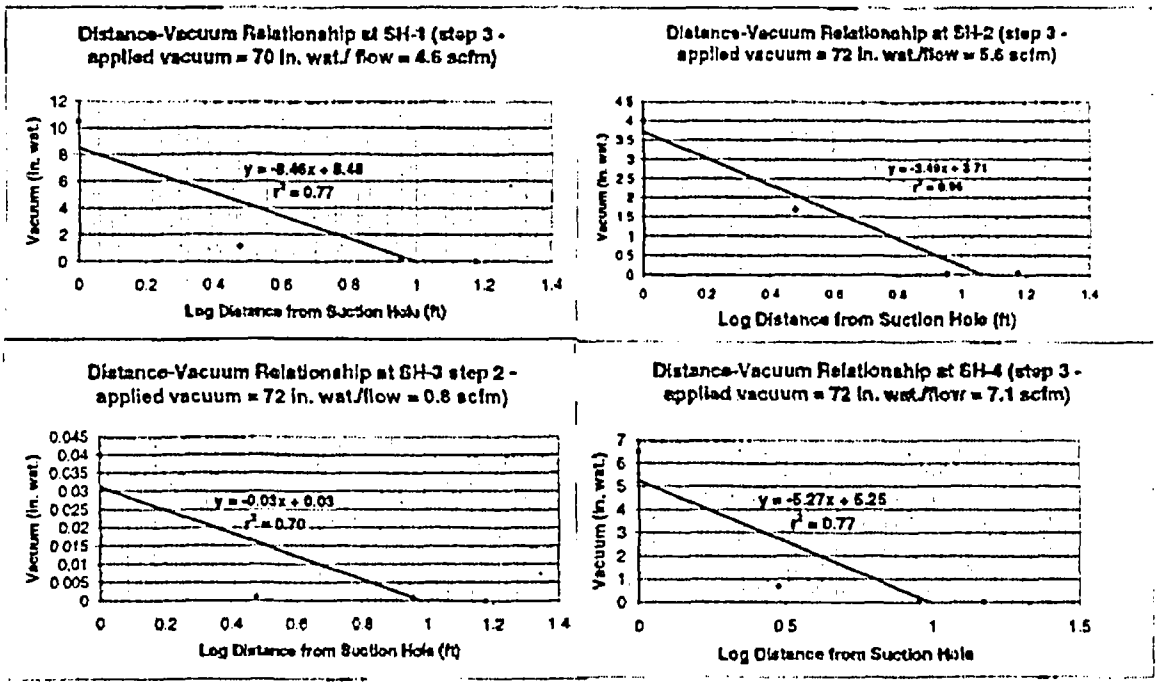
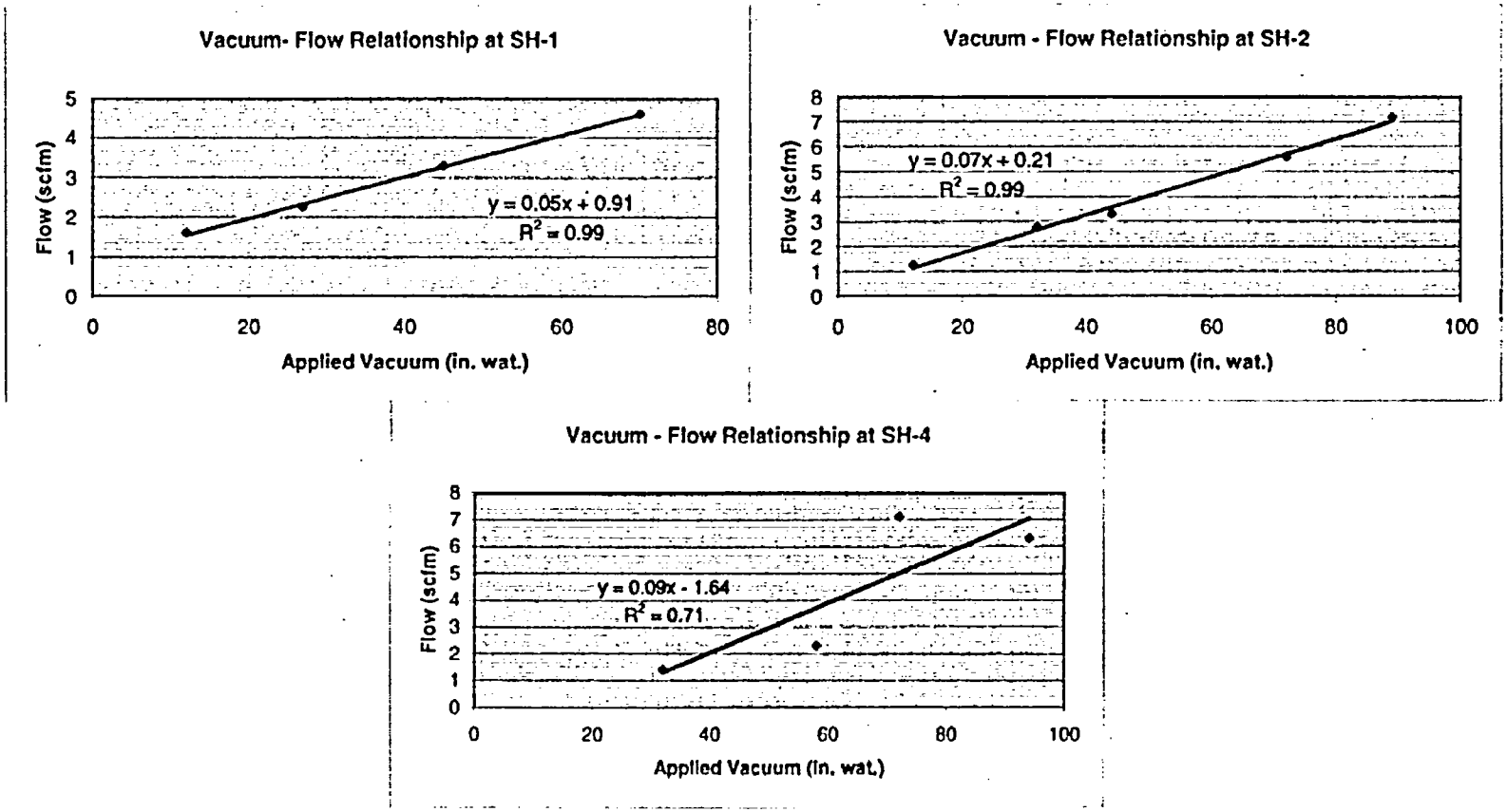


Figure 3-3. Vacuum - Flow Relationships at Three Test Locations



Appendix A
Vapor Analysis Laboratory Reports

12 October 2005

Sibel Tekce
CDM -- Irvine
18581 Teller Ave., Suite 200
Irvine, CA 92612
RE: Omega

Enclosed are the results of analyses for samples received by the laboratory on 09/24/05 10:01. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

John Shepler
Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
OC-SSD-SH-1I-092105	T501118-01	Air	09/23/05 14:40	09/24/05 10:01
OC-SSD-SH-1F-092105	T501118-02	Air	09/23/05 13:35	09/24/05 10:01
OC-SSD-SH-2I-092105	T501118-03	Air	09/23/05 12:25	09/24/05 10:01
OC-SSD-SH-2F-092105	T501118-04	Air	09/23/05 10:35	09/24/05 10:01
OC-SSD-SH-3I-092105	T501118-05	Air	09/23/05 15:50	09/24/05 10:01
OC-SSD-SH-3F-092205	T501118-06	Air	09/23/05 17:00	09/24/05 10:01
OC-SSD-SH-4I-092205	T501118-07	Air	09/23/05 14:20	09/24/05 10:01
OC-SSD-SH-4F-092205	T501118-08	Air	09/23/05 16:20	09/24/05 10:01
OC-SSD-SH-4FK-092205	T501118-09	Air	09/23/05 16:20	09/24/05 10:01
OC-SSD-TB-092205	T501118-10	Air	09/23/05 00:00	09/24/05 10:01

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-1I-092105
T501118-01 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
Acetone	ND	1.0	ppb(v)	2	5092603	09/26/05	10/09/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**85000**	1.0	"	51.17	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	2	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	**12**	1.0	"	"	"	"	10/08/05	"	
Chloromethane	ND	1.0	"	"	"	"	10/09/05	"	
Cyclohexane	**7.3**	1.0	"	"	"	"	10/08/05	"	
Hexane	ND	1.0	"	"	"	"	10/09/05	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**190**	1.0	"	4.25	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	2	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**49000**	1.0	"	51.17	"	"	"	"	
cis-1,2-Dichloroethene	**7.9**	1.0	"	2	"	"	"	"	
trans-1,2-Dichloroethene	**2.6**	1.0	"	"	"	"	10/08/05	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	10/09/05	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**5.9**	1.0	"	"	"	"	10/08/05	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	10/09/05	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**2700**	1.0	"	4.25	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	2	"	"	"	"	
Tetrahydrofuran	**30**	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-1I-092105
T501118-01 (Air)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
TO-15									
1,1,2-Trichloroethane	ND	1.0	ppb(v)	2	5092603	09/26/05	10/09/05	TO-15	
1,1,1-Trichloroethane	**33**	1.0	"	"	"	"	10/08/05	"	
Trichloroethene	**2500**	1.0	"	4.25	"	"	10/09/05	"	
Trichlorofluoromethane	**32000**	1.0	"	51.17	"	"	"	"	
1,3,5-Trimethylbenzene	**5.7**	1.0	"	2	"	"	10/08/05	"	
1,2,4-Trimethylbenzene	**14**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	10/09/05	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	10/08/05	"	
Benzene	**6.0**	1.0	"	"	"	"	"	"	
Toluene	**240**	1.0	"	"	"	"	10/09/05	"	
Ethylbenzene	**190**	1.0	"	"	"	"	10/08/05	"	
m,p-Xylene	**980**	2.0	"	4.25	"	"	10/09/05	"	
o-Xylene	**470**	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-1F-092105
T501118-02 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
Acetone	ND	1.0	ppb(v)	4.8	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	42000	1.0	"	5.04	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	4.8	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	11	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	19	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	20	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	120	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	180	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	26000	1.0	"	5.04	"	"	"	"	
cis-1,2-Dichloroethene	790	1.0	"	4.8	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	7.6	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	1900	1.0	"	5.07	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	4.8	"	"	"	"	
Tetrahydrofuran	21	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-1F-092105
T501118-02 (Air)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
TO-15									
1,1,1-Trichloroethane	**29**	1.0	ppb(v)	4.8	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**1600**	1.0	"	5.04	"	"	"	"	
Trichlorofluoromethane	**15000**	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**16**	1.0	"	4.8	"	"	"	"	
1,2,4-Trimethylbenzene	**42**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**11**	1.0	"	"	"	"	"	"	
Toluene	**58**	1.0	"	"	"	"	"	"	
Ethylbenzene	**23**	1.0	"	"	"	"	"	"	
m,p-Xylene	**60**	2.0	"	"	"	"	"	"	
o-Xylene	**54**	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-2I-092105
T501118-03 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	**310**	1.0	ppb(v)	4.32	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**15000**	1.0	"	5.4	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	4.32	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	**4.7**	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**65**	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**9600**	1.0	"	5.4	"	"	"	"	
cis-1,2-Dichloroethene	**12**	1.0	"	4.32	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**13**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**1600**	1.0	"	5.4	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	4.32	"	"	"	"	
Tetrahydrofuran	**19**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

CDM – Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-2I-092105
T501118-03 (Air)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
TO-15									
1,1,1-Trichloroethane	ND	1.0	ppb(v)	4.32	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	4500	1.0	"	5.4	"	"	"	"	
Trichlorofluoromethane	4600	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	25	1.0	"	4.32	"	"	"	"	
1,2,4-Trimethylbenzene	68	1.0	"	"	"	"	"	"	
Vinyl acetate	84	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	55	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	15	1.0	"	"	"	"	"	"	
Toluene	200	1.0	"	"	"	"	"	"	
Ethylbenzene	75	1.0	"	"	"	"	"	"	
m,p-Xylene	160	2.0	"	"	"	"	"	"	
o-Xylene	160	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-2F-092105
T501118-04 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	**27**	1.0	ppb(v)	2.5	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**4500**	1.0	"	5.3	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	2.5	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**18**	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**2300**	1.0	"	5.3	"	"	"	"	
cis-1,2-Dichloroethene	**2.5**	1.0	"	2.5	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**3.7**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**61**	1.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
Tetrahydrofuran	**5.3**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-2F-092105
T501118-04 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,1,1-Trichloroethane	ND	1.0	ppb(v)	2.5	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**290**	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	**1400**	1.0	"	5.3	"	"	"	"	
1,3,5-Trimethylbenzene	**7.4**	1.0	"	2.5	"	"	"	"	
1,2,4-Trimethylbenzene	**20**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**4.6**	1.0	"	"	"	"	"	"	
Toluene	**25**	1.0	"	"	"	"	"	"	
Ethylbenzene	**5.5**	1.0	"	"	"	"	"	"	
m,p-Xylene	**16**	2.0	"	"	"	"	"	"	
o-Xylene	**16**	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-3I-092105
T501118-05 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	**26**	1.0	ppb(v)	2.54	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**2200**	1.0	"	5.4	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	2.54	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**3.7**	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**2000**	1.0	"	5.4	"	"	"	"	
cis-1,2-Dichloroethene	**3.6**	1.0	"	2.54	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**13**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**680**	1.0	"	5.4	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	2.54	"	"	"	"	
Tetrahydrofuran	**5.6**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-3I-092105
T501118-05 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
1,1,1-Trichloroethane	ND	1.0	ppb(v)	2.54	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**190**	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	**1000**	1.0	"	5.4	"	"	"	"	
1,3,5-Trimethylbenzene	**8.8**	1.0	"	2.54	"	"	"	"	
1,2,4-Trimethylbenzene	**18**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	**4.5**	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**2.8**	1.0	"	"	"	"	"	"	
Toluene	**1700**	1.0	"	5.4	"	"	"	"	
Ethylbenzene	**900**	1.0	"	"	"	"	"	"	
m,p-Xylene	**3800**	2.0	"	"	"	"	"	"	
o-Xylene	**1600**	1.0	"	"	"	"	"	"	

SunStar Laboratories, Inc.

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-3F-092205
T501118-06 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	**19**	1.0	ppb(v)	2.42	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**1100**	1.0	"	4.7	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	2.42	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	**2.4**	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**1600**	1.0	"	4.7	"	"	"	"	
cis-1,2-Dichloroethene	**5.2**	1.0	"	2.42	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**24**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**1200**	1.0	"	4.7	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	2.42	"	"	"	"	
Tetrahydrofuran	**16**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-3F-092205
T501118-06 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
1,1,1-Trichloroethane	**6.4**	1.0	ppb(v)	2.42	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**290**	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	**650**	1.0	"	4.7	"	"	"	"	
1,3,5-Trimethylbenzene	**36**	1.0	"	2.42	"	"	"	"	
1,2,4-Trimethylbenzene	**94**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**4.2**	1.0	"	"	"	"	"	"	
Toluene	**100**	1.0	"	"	"	"	"	"	
Ethylbenzene	**44**	1.0	"	"	"	"	"	"	
m,p-Xylene	**120**	2.0	"	"	"	"	"	"	
o-Xylene	**130**	1.0	"	"	"	"	"	"	

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4I-092205
T501118-07 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	**220**	1.0	ppb(v)	4.48	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**4500**	1.0	"	6.5	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	4.48	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**10**	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	**12**	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**9500**	1.0	"	6.5	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	4.48	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**9.7**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**4000**	1.0	"	6.5	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	4.48	"	"	"	"	
Tetrahydrofuran	**13**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM – Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4I-092205
T501118-07 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
1,1,1-Trichloroethane	**12**	1.0	ppb(v)	4.48	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**5100**	1.0	"	6.5	"	"	"	"	
Trichlorofluoromethane	**3100**	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**17**	1.0	"	4.48	"	"	"	"	
1,2,4-Trimethylbenzene	**49**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**12**	1.0	"	"	"	"	"	"	
Toluene	**77**	1.0	"	"	"	"	"	"	
Ethylbenzene	**37**	1.0	"	"	"	"	"	"	
m,p-Xylene	**92**	2.0	"	"	"	"	"	"	
o-Xylene	**110**	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4F-092205
T501118-08 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	ND	1.0	ppb(v)	4.2	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**16000**	1.0	"	14.82	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	4.2	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	**10**	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	**13**	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**37000**	1.0	"	14.82	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	4.2	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	**4.5**	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**19000**	1.0	"	14.82	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	4.2	"	"	"	"	
Tetrahydrofuran	**6.5**	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4F-092205
T501118-08 (Air)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SunStar Laboratories, Inc.									
TO-15									
1,1,1-Trichloroethane	**17**	1.0	ppb(v)	4.2	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**23000**	1.0	"	14.82	"	"	"	"	
Trichlorofluoromethane	**11000**	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**7.9**	1.0	"	4.2	"	"	"	"	
1,2,4-Trimethylbenzene	**21**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**6.3**	1.0	"	"	"	"	"	"	
Toluene	**20**	1.0	"	"	"	"	"	"	
Ethylbenzene	**7.2**	1.0	"	"	"	"	"	"	
m,p-Xylene	**22**	2.0	"	"	"	"	"	"	
o-Xylene	**24**	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4FK-092205
T501118-09 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
Acetone	ND	1.0	ppb(v)	2	5092603	09/26/05	10/08/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	14000	1.0	"	26.66	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	2	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	150	1.0	"	"	"	"	"	"	
Hexane	230	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	290	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	11	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	12	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	34000	1.0	"	26.66	"	"	"	"	
cis-1,2-Dichloroethene	3.3	1.0	"	2	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	53	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	18000	1.0	"	26.66	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	2	"	"	"	"	
Tetrahydrofuran	ND	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-SH-4FK-092205
T501118-09 (Air)

SunStar Laboratories, Inc.

TO-15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,1,1-Trichloroethane	**16**	1.0	ppb(v)	2	5092603	09/26/05	10/08/05	TO-15	
Trichloroethene	**22000**	1.0	"	26.66	"	"	"	"	
Trichlorofluoromethane	**11000**	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	**57**	1.0	"	2	"	"	"	"	
1,2,4-Trimethylbenzene	**150**	1.0	"	"	"	"	"	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	**180**	1.0	"	"	"	"	"	"	
Toluene	**1700**	1.0	"	26.66	"	"	"	"	
Ethylbenzene	**160**	1.0	"	2	"	"	"	"	
m,p-Xylene	**220**	2.0	"	"	"	"	"	"	
o-Xylene	**220**	1.0	"	"	"	"	"	"	

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-TB-092205
T501118-10 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
Acetone	ND	1.0	ppb(v)	2	5092603	09/26/05	10/09/05	TO-15	
1,3-Butadiene	ND	2.0	"	"	"	"	"	"	
Benzyl chloride	ND	1.0	"	"	"	"	"	"	
Carbon disulfide	ND	1.0	"	"	"	"	"	"	
Freon 113	**7.4**	1.0	"	"	"	"	"	"	
Isopropyl alcohol	ND	1.0	"	"	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Cyclohexane	ND	1.0	"	"	"	"	"	"	
Hexane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Ethyl acetate	ND	1.0	"	"	"	"	"	"	
Heptane	**2.6**	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	**21**	1.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
4-Ethyltoluene	ND	1.0	"	"	"	"	10/09/05	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	10/09/05	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	**58**	1.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
Tetrahydrofuran	ND	1.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

OC-SSD-TB-092205
T501118-10 (Air)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TO-15									
1,1,1-Trichloroethane	ND	1.0	ppb(v)	2	5092603	09/26/05	10/09/05	TO-15	
Trichloroethene	**35**	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	**3.8**	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	10/09/05	"	
1,2,4-Trimethylbenzene	**4.1**	1.0	"	"	"	"	10/09/05	"	
Vinyl acetate	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
1,4-Dioxane	ND	1.0	"	"	"	"	"	"	
2-Butanone	ND	1.0	"	"	"	"	"	"	
Methyl isobutyl ketone	ND	1.0	"	"	"	"	"	"	
Benzene	ND	1.0	"	"	"	"	"	"	
Toluene	**4.1**	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	10/09/05	"	
m,p-Xylene	**3.6**	2.0	"	"	"	"	10/09/05	"	
o-Xylene	**5.1**	1.0	"	"	"	"	"	"	

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	**Reported:**
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

TO-15 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5092603 - General Prep VOC-MS										
Blank (5092603-BLK1)				Prepared: 09/26/05 Analyzed: 10/08/05						
Acetone	ND	1.0	ppb(v)							
1,3-Butadiene	ND	2.0	"							
Benzyl chloride	ND	1.0	"							
Carbon disulfide	ND	1.0	"							
Freon 113	ND	1.0	"							
Isopropyl alcohol	ND	1.0	"							
Bromodichloromethane	ND	1.0	"							
Bromoform	ND	1.0	"							
Bromomethane	ND	1.0	"							
Carbon tetrachloride	ND	1.0	"							
Chlorobenzene	ND	1.0	"							
Chloroethane	ND	1.0	"							
Chloroform	ND	1.0	"							
Chloromethane	ND	1.0	"							
Cyclohexane	ND	1.0	"							
Hexane	ND	1.0	"							
Dibromochloromethane	ND	1.0	"							
Ethyl acetate	ND	1.0	"							
Heptane	ND	1.0	"							
1,2-Dibromoethane (EDB)	ND	1.0	"							
1,2-Dichlorobenzene	ND	1.0	"							
1,3-Dichlorobenzene	ND	1.0	"							
1,4-Dichlorobenzene	ND	1.0	"							
Dichlorodifluoromethane	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
1,2-Dichloroethane	ND	1.0	"							
1,1-Dichloroethene	ND	1.0	"							
cis-1,2-Dichloroethene	ND	1.0	"							
trans-1,2-Dichloroethene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
trans-1,3-Dichloropropene	ND	1.0	"							
4-Ethyltoluene	ND	1.0	"							
Hexachlorobutadiene	ND	1.0	"							
Methylene chloride	ND	1.0	"							
Styrene	ND	1.0	"							
1,1,2,2-Tetrachloroethane	ND	1.0	"							
Tetrachloroethene	ND	1.0	"							
1,2,4-Trichlorobenzene	ND	1.0	"							
Tetrahydrofuran	ND	1.0	"							
1,1,2-Trichloroethane	ND	1.0	"							

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John Shepler, Laboratory Director

CDM -- Irvine	Project: Omega	
18581 Teller Ave., Suite 200	Project Number: 10500-37240	Reported:
Irvine CA, 92612	Project Manager: Sibel Tekce	10/12/05 10:58

TO-15 - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5092603 - General Prep VOC-MS										
Blank (5092603-BLK1)				Prepared: 09/26/05 Analyzed: 10/08/05						
1,1,1-Trichloroethane	ND	1.0	ppb(v)							
Trichloroethene	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
Vinyl acetate	ND	1.0	"							
Vinyl chloride	ND	1.0	"							
1,4-Dioxane	ND	1.0	"							
2-Butanone	ND	1.0	"							
Methyl isobutyl ketone	ND	1.0	"							
Benzene	ND	1.0	"							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
m,p-Xylene	ND	2.0	"							
o-Xylene	ND	1.0	"							

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

John Shepler, Laboratory Director

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Appendix B
Permeability Calculations

Analysis of Air Permeability

1.0 Purpose/Objective

Analyze sub-slab permeability tests at Skateland

2.0 Procedure

Use steady state gas flow equations, which is derived from the Theim solution.

$$\frac{Qwell}{H} = \pi \cdot \frac{k}{\mu} \cdot Pw \cdot \frac{1 - \left(\frac{Patm}{Pw}\right)^2}{\ln\left(\frac{Rw}{Ri}\right)}$$

$$-Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)}$$

Define a new pressure unit for use in calculations, inches of water head

$$in\_water := 0.03612729 \cdot psi$$

Define variables

Qwell - flow rate at well (negative for abstraction)
H thickness of extraction interval
k soil permeability
μ air viscosity
Pw absolute pressure at well
Patm ambient pressure
Rw well radius
Ri radius of influence

3.0 References/Data Sources

Field testing data from October 2005

4.0 Assumptions

This solution assumes that no turbulet well losses occur at the suction point. This may be overcome by using an observation point outside of the radius of the zone affected by turbulent flow. The thickness of the tested zone is assumed to be .5 ft, assuming a more permeable sub-base is present.

5.0 Calculations

Set parameters that are constant for each of the tests

Thickness of tested zone

$H := .5 \cdot ft$

$Patm := 0 \cdot in\_water$

$Rw := 0.5 \cdot in$

$\mu := 0.00018 \cdot \frac{gm}{cm \cdot sec}$

Rearrange equation to solve for k

$$k = -Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)}$$

Test at SH-1

$Qwell := -4.6 \cdot \frac{ft^3}{min}$ $Pw := 70 \cdot in\_water$ $Ri := 20 \cdot ft$

$$k := -Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)} \qquad k = 2.8899 \times 10^{-7}\, cm^2$$

Test at SH-2

$$Qwell := -5.6 \cdot \frac{ft^3}{min} \qquad Pw := 72 \cdot in\_water \qquad Ri := 20 \cdot ft$$

$$k := -Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)} \qquad k = 3.4205 \times 10^{-7}\, cm^2$$

Test at SH-3

$$Qwell := -0.8 \cdot \frac{ft^3}{min} \qquad Pw := 72 \cdot in\_water \qquad Ri := 9 \cdot ft$$

$$k := -Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)} \qquad k = 4.2544 \times 10^{-8}\, cm^2$$

Test at SH-4

$$Qwell := -7.1 \cdot \frac{ft^3}{min} \qquad Pw := 72 \cdot in\_water \qquad Ri := 18 \cdot ft$$

$$k := -Qwell \cdot \mu \cdot Pw \cdot \frac{\ln\left(\frac{Rw}{Ri}\right)}{\pi \cdot H \cdot \left(-Pw^2 + Patm^2\right)} \qquad k = 4.2626 \times 10^{-7}\, cm^2$$

6.0 Conclusions/Results

The permeability is estimated to range from $4 \cdot 10^{-8} \cdot cm^2$ to $4 \cdot 10^{-7} \cdot cm^2$

The results are somewhat sensitive to the assumption of the thickness of the tested zone, where increasing by a factor of 2 decreases the k by half. Conversly, if the tested zone thickness were .25 ft, then the permeabilty would double.